



# PRODUCT OVERVIEW

## Introduction

Snow Owl is integrated with a Drug Dictionary module that enables pharmacists to record medication data using simple forms and transform it into SNOMED CT's ontological representation. This allows executing semantic queries on the data and also creating sets of drug product concepts that match a particular use case (e.g. prescribing, dispensing, or administration).

## Source medication entry and editing

Snow Owl has a dedicated perspective for medication authoring. This perspective provides searching and browsing capabilities for existing drug product data, and also allows entering or importing new drug data into the system.

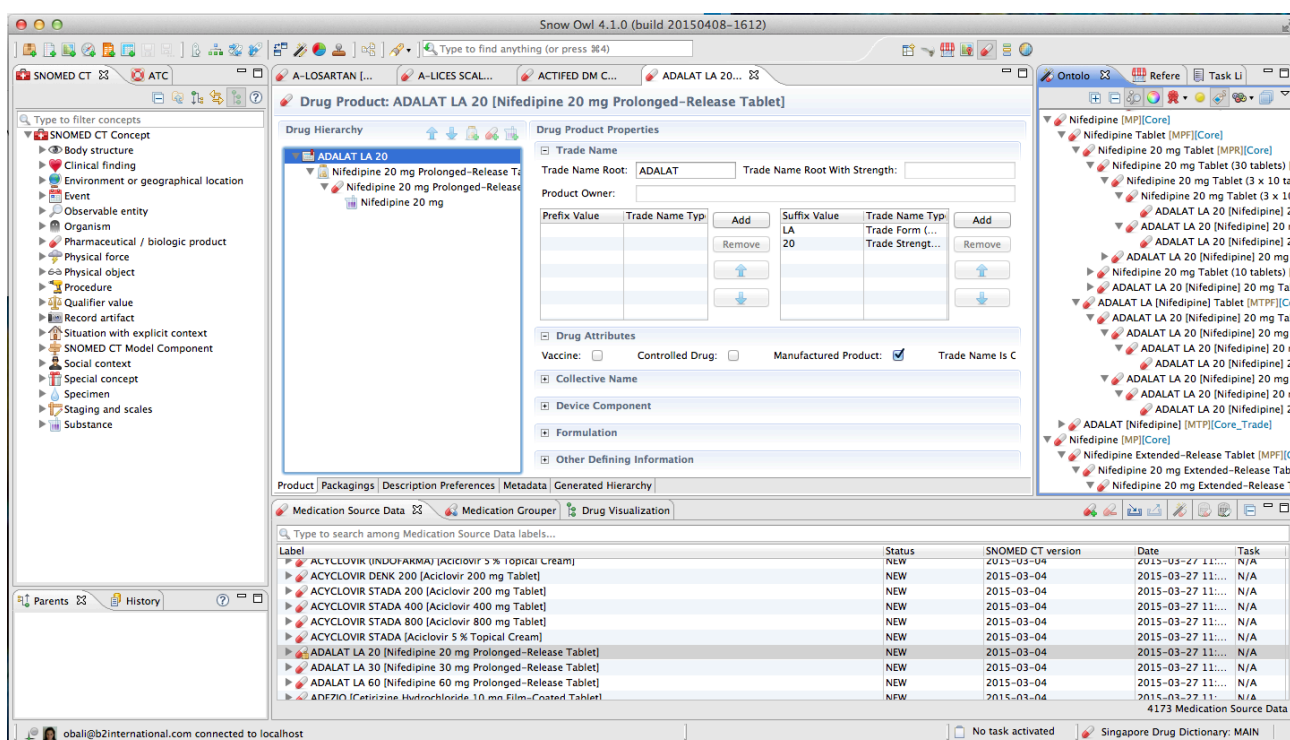


Figure 1 - The Drug Dictionary authoring workbench

A form-based editor assists the pharmacists to record the necessary information from the drug product. The editor uses reference sets that were previously created to support the definition of the product by populating pick lists for attributes like ingredients, dose forms, etc.

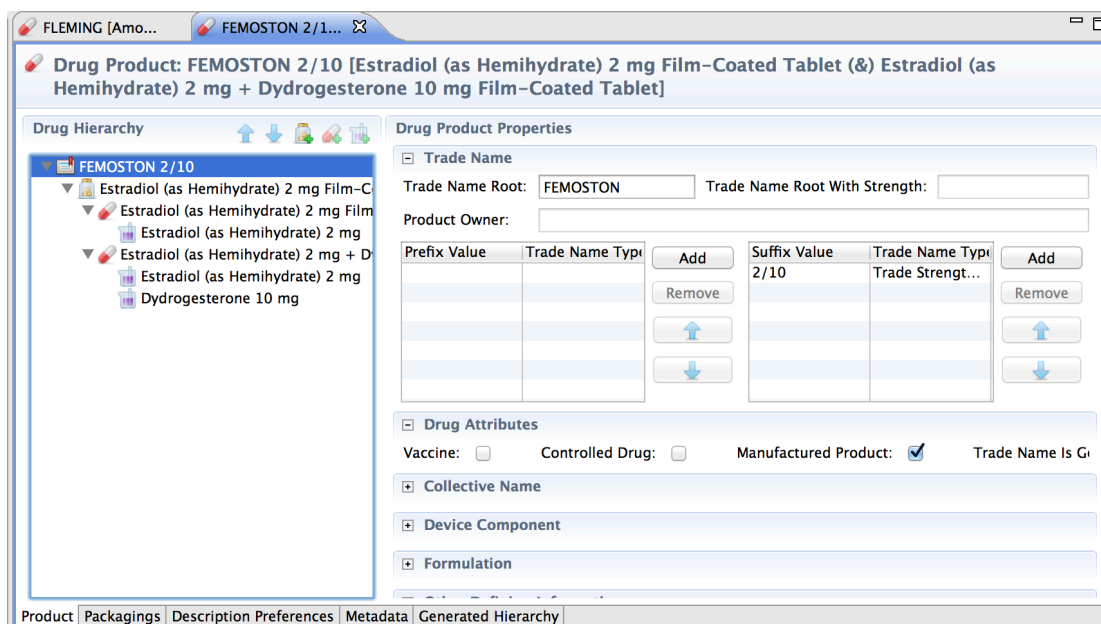


Figure 2 - Form-based editor for complex medications

The editor also allows the configuration of different descriptions that are automatically generated for the drug concepts. Each product can have multiple pack sizes; this can also be set on the editor. In case there are mappings to other classifications (e.g. ATC, the Anatomical, Therapeutic and Chemical Classification from WHO), or national coding schemes, these identifiers can also be entered on the editor.

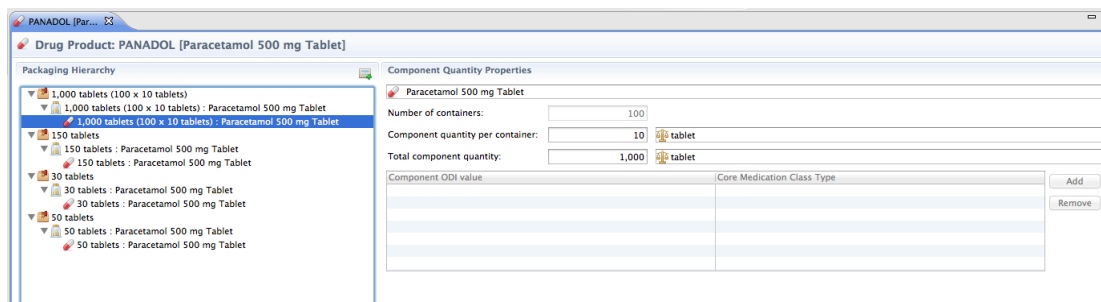


Figure 3 - Multiple packagings on a drug product

In a collaborative environment, each user is connected to a server with a desktop client. During authoring, users are working on isolated tasks where the source medications are reviewed before they are used to generate the SNOMED CT representation of the drug. After the SNOMED CT ontology has been created, another review verifies that the content is ready to be promoted to the main repository. With this process Snow Owl guarantees that the published content has been validated before publication.

## Ontology review and operations

The SNOMED CT representation of a medication has a hierarchical structure, where abstract and more detailed drug concepts are connected to each other. These concepts also have connections to other parts of the SNOMED CT terminology, for example connections to substance concepts representing the active ingredient of the drug product. The exact hierarchical representation depends on the actual drug model, and can vary for different extensions/national release centers.

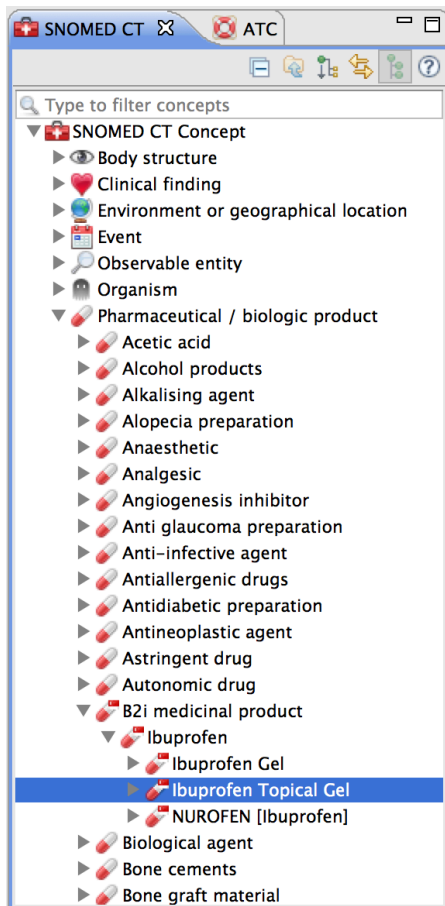


Figure 4 - Generated drug concepts are integrated into SNOMED CT

Individual drug concepts can be viewed in a concept editor, where previously defined modeling rules help to validate the concept attributes and definition.

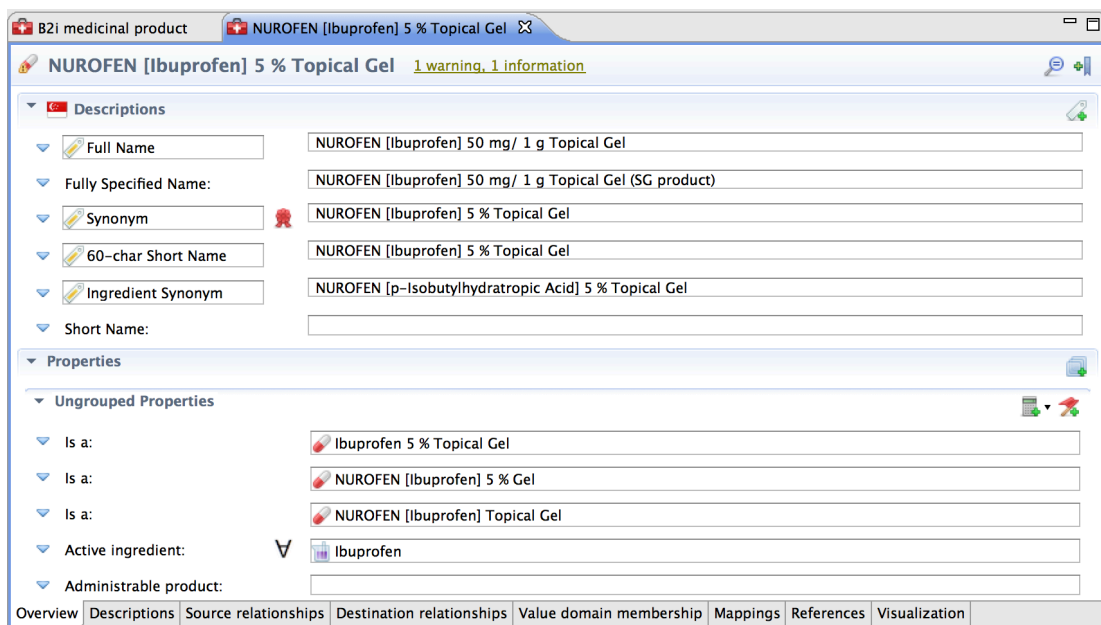


Figure 5 - A SNOMED CT concept editor displaying an auto-generated concept and its descriptions

The versioning of the drug dictionary is aligned with the SNOMED CT versioning standards. Once published, components can no longer be deleted but can be set to inactive, which allows thorough change tracking. This also helps tracking product withdrawals properly.

The generated medication hierarchies are completely integrated into SNOMED CT and can be published together with SNOMED CT to create a national extension, or can be used to create code sets for different purposes.

The Extended SNOMED CT Compositional Grammar (ESCG) is a query language, specifically suited for querying SNOMED CT content by attributes. This language allows querying the drug ontology, and retrieving drugs by attributes. For example, it is possible to create sets for branded products, injections, or analgesics.

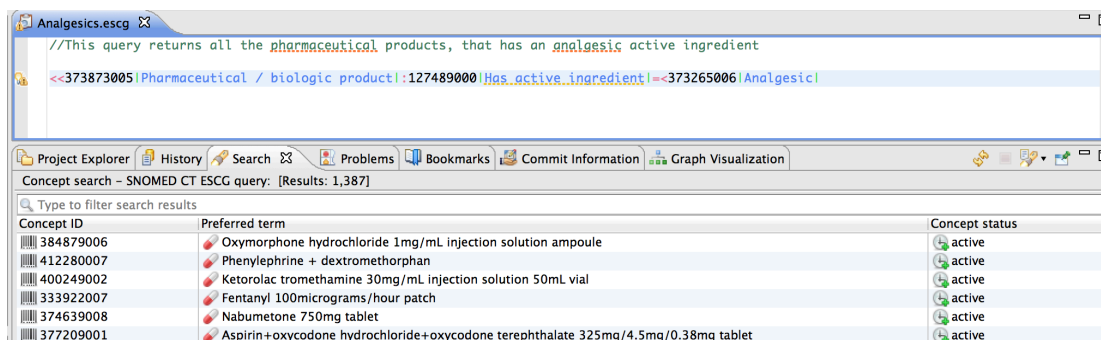


Figure 6 - Semantic queries can be run on SNOMED CT content

The advantage of these query-based sets is that they can be automatically updated when the ontology is updated with a new drug, and there is no need to manually select the new additions – leaving less room for human error. These sets can be published in a configurable spreadsheet format.

## Online access

Besides creating document-based publications, the Drug Dictionary data is also published online. A simple, easy-to-use web browser allows external users to browse through the drug dictionary, and – if they are provided with the necessary permissions – download content for local use.

The screenshot shows the MOH Holdings web application interface. At the top, there is a search bar with the text 'Type here to find concepts' and a user profile icon for 'oball@b2International.com'. Below the search bar, there are navigation tabs: 'SDD Drug Product List', 'Retired SDD Drug Products', 'SDD model', and 'Out of scope SDL items'. On the left side, there is a sidebar menu with options: 'Dashboard', 'Browse', 'Search', 'Filters', 'Drug Products', and 'Reports'. The main content area shows search filters: 'Ingredient' set to 'Paracetamol' and 'Brand' set to 'Panadol'. Below the filters, it indicates '22 results'. A table of results is displayed with the following columns: SDD Code, Preferred Term, SDD Class, MPF Parent SDD Code, MPF Parent Term, ATC Code, and ATC Description. The table lists various Panadol products such as 'CHILDREN'S PANADOL 1-6 YEARS', 'PANADOL ACTIFAST', and 'PANADOL COLD & FLU HOT REMEDY'.

| SDD Code      | Preferred Term   | SDD Class | MPF Parent SDD Code | MPF Parent Term                            | ATC Code | ATC Description |
|---------------|--|-----------|---------------------|--|----------|-----------------|
| 1229-31-49X-5 | CHILDREN'S PANADOL 1-6 YEARS [Paracetamol] 120 mg/ 5 mL Oral S | MTPP      | 1682-82-06X-5       | Paracetamol Oral Suspension                | N02BE01  | paracetam       |
| 3469-36-33X-9 | CHILDREN'S PANADOL 6 PLUS [Paracetamol] 250 mg/ 5 mL Oral Sus  | MTPP      | 1682-82-06X-5       | Paracetamol Oral Suspension                | N02BE01  | paracetam       |
| 3747-64-78X-0 | CHILDREN'S PANADOL COLD & FLU [Paracetamol 160 mg/ 5 mL + Cl   | MTPP      | 7045-28-07X-2       | Paracetamol + Chlorpheniramine Maleate + F | N02BE51  | paracetam       |
| 8921-97-65X-9 | PANADOL [Paracetamol] 1 g Tablet                               | MTPR      | 8737-11-15X-5       | Paracetamol Tablet                         | N02BE01  | paracetam       |
| 3449-88-92X-8 | PANADOL ACTIFAST [Paracetamol] 500 mg Tablet                   | MTPR      | 8737-11-15X-5       | Paracetamol Tablet                         | N02BE01  | paracetam       |
| 9506-79-98X-9 | PANADOL COLD & FLU CAPLET [Paracetamol 500 mg + Phenylephrin   | MTPR      | 2194-90-85X-9       | Paracetamol + Phenylephrine Hydrochloride  | N01BE51  | N01BE51         |
| 6286-07-96X-9 | PANADOL COLD & FLU HOT REMEDY [Paracetamol 750 mg + Phenyl     | MTPP      | 4517-69-95X-9       | Paracetamol + Phenylephrine Hydrochloride  | N02BE51  | paracetam       |
| 1262-82-80X-1 | PANADOL COLD & FLU HOT REMEDY [Paracetamol 750 mg + Phenyl     | MTPP      | 4517-69-95X-9       | Paracetamol + Phenylephrine Hydrochloride  | N02BE51  | paracetam       |
| 6571-20-21X-5 | PANADOL COLD & FLU HOT REMEDY [Paracetamol 750 mg + Phenyl     | MTPP      | 4517-69-95X-9       | Paracetamol + Phenylephrine Hydrochloride  | N02BE51  | paracetam       |
| 5888-51-83X-3 | PANADOL COLD RELIEF PE CAPLET [Paracetamol 500 mg + Phenylep   | MTPR      | 2194-90-85X-9       | Paracetamol + Phenylephrine Hydrochloride  | N01BE51  | N01BE51         |
| 2333-56-97X-7 | PANADOL COLOURFREE [Paracetamol] 120 mg/ 5 mL Oral Suspensio   | MTPP      | 1682-82-06X-5       | Paracetamol Oral Suspension                | N02BE01  | paracetam       |
| 2706-16-67X-6 | PANADOL COUGH PLUS CAPLET [Paracetamol 500 mg + Pseudoeph      | MTPR      | 4825-32-90X-9       | Paracetamol + Pseudoephedrine Hydrochlori  | N02BE51  | paracetam       |
| 2570-83-04X-4 | PANADOL EXTEND CAPLET [Paracetamol] 665 mg Sustained-Release   | MTPR      | 4104-81-69X-0       | Paracetamol Sustained-Release Tablet       | N02BE01  | paracetam       |
| 8801-86-71X-7 | PANADOL EXTRA CAPLET [Paracetamol 500 mg + Caffeine 65 mg] Ta  | MTPR      | 5267-98-73X-6       | Caffeine + Paracetamol Tablet              | N02BE51  | paracetam       |
| 0552-25-18X-2 | PANADOL FLU MAX CAPLET [Paracetamol 500 mg + Phenylephrine H   | MTPR      | 4774-69-47X-5       | Paracetamol + Phenylephrine Hydrochloride  | N02BE51  | paracetam       |

Figure 7 - Browsing published drug products by ingredient and brand name

## DETAILED DESCRIPTION

The following pages provide a more detailed explanation of the core features in Snow Owl's Drug Dictionary module.

### Drug Dictionary Perspective

Snow Owl provides various perspectives that organize the necessary editors and views to support different tasks. The drug dictionary perspective displays the SNOMED CT hierarchical navigator and the reference set navigator, while the main focus remains the medication source data navigator and editor. There are a number of supporting views to allow handling workflow, looking up parents or history of a SNOMED CT concept, and a progress view to provide information about long-running processes. To avoid overcrowding the UI, views that do not relate to source drug authoring are hidden. It is possible to open and close any view and customize the perspective for any specific activity.

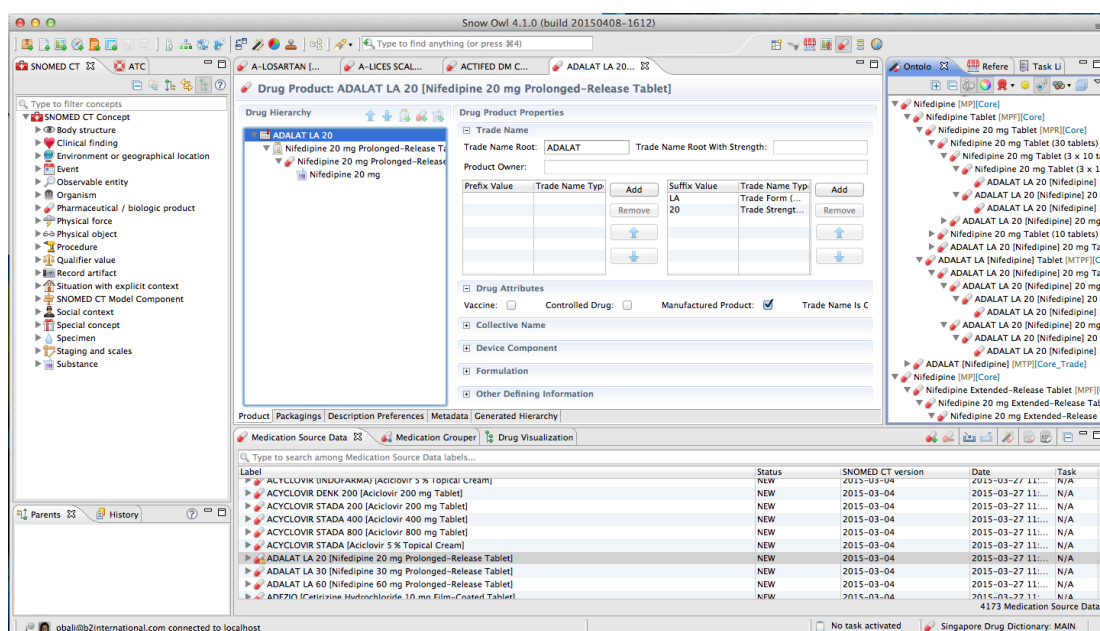


Figure 8 - Drug Dictionary authoring workbench

When working with the Drug Dictionary workflow, the workbench switches automatically to the Drug Dictionary perspective, so the user has all the necessary views on hand.

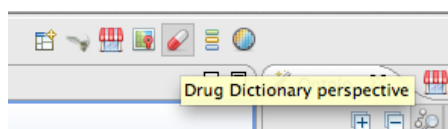


Figure 9 - Selecting the Drug Dictionary perspective

## SNOMED CT navigator and reference set navigator

The SNOMED CT navigator displays all the active SNOMED CT concepts organized into a hierarchy. Nodes can be expanded to reveal leaf concepts, and it is also possible to limit the concepts that are displayed to a sub hierarchy. Typing into the text box above the tree filters it; results can be viewed in a hierarchical or in a flat list view.

To support navigation a parents view allows inverse hierarchy browsing, from the low-level concepts to the top-level categories and the root concept.

Double-clicking a concept in the navigator opens a concept editor, displaying the properties (identifier, status, attributes, descriptions, etc.) of a SNOMED CT concept. Right-clicking a concept in the navigator allows additional actions, such as adding the concept to a reference set, validating the concept, bookmarking it for later use, or creating a new concept under the selected one.

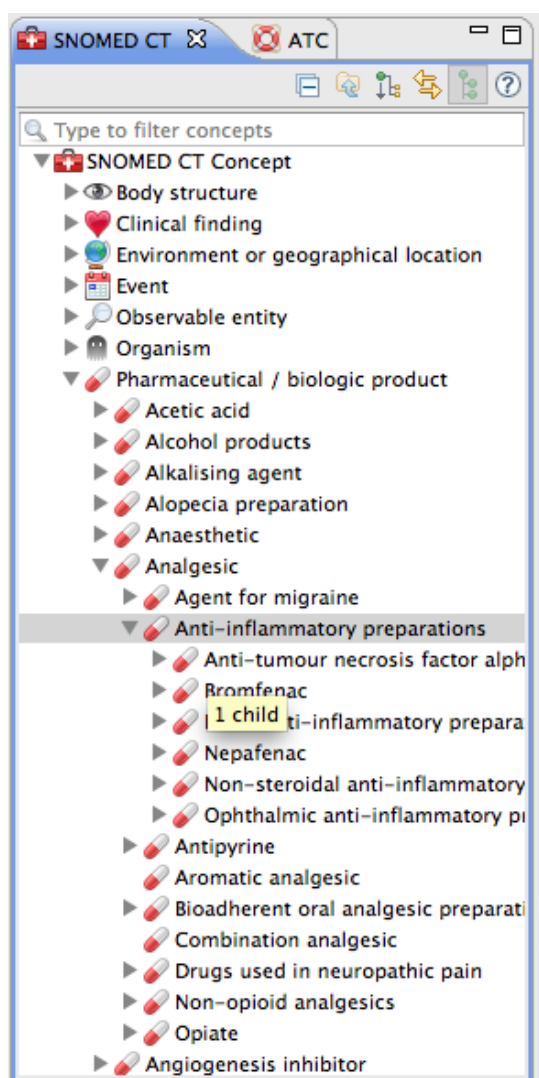


Figure 10 - A hierarchical navigator of the SNOMED CT terminology



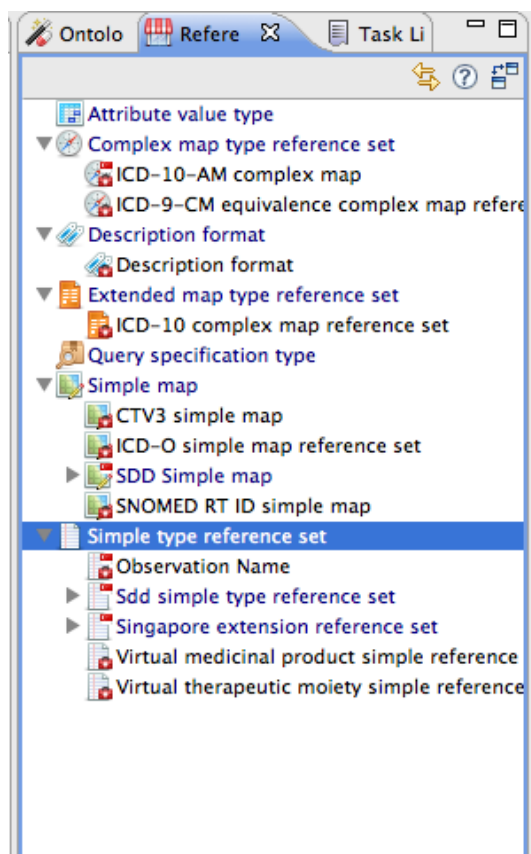


Figure 11 - The reference set navigator

SNOMED CT reference sets can be browsed in the reference set navigator. Reference sets are organized by type, but it is also possible to add sub-categories. Double-clicking a reference set opens it in an editor. For each reference set type, there is a dedicated wizard that assists in the reference set creation. Members can be dragged and dropped into the reference set from the hierarchy navigator, from search results, or intensional (query-based) reference sets can be specified using the ESCG query language.

## Supporting reference sets

For editing the drug dictionary, it is useful to build a few reference sets that contain the valid concepts a concept attribute can point to. For example, all drug concepts have an active ingredient relationship. The value of this relationship is selected from a reference set that contains concepts from under the substance hierarchy. Only these previously validated substances can be used to describe the drug products. Similarly, there is such a reference set for dosage forms, units, and more can be created for other attributes, depending on the drug model being used.

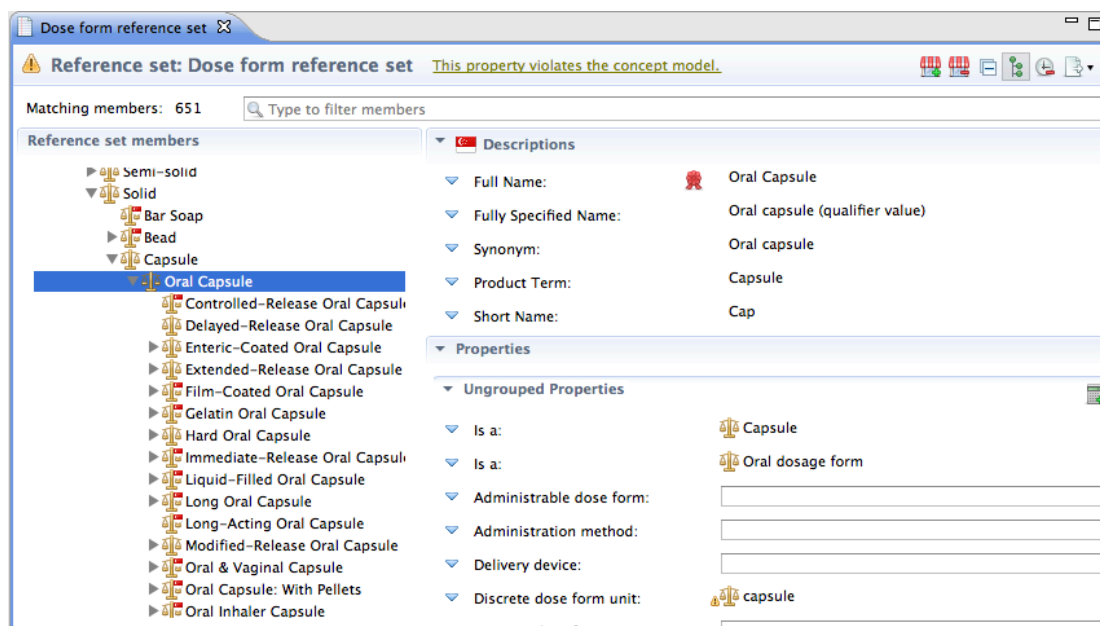


Figure 12 - Dose form reference set for valid drug dosage definitions

## Medication Source Data Navigator

The Medication Source Data navigator allows reviewing the drug products that have been entered into the system. Besides the description, the associated packagings are also displayed. Some relevant metadata, like status, version, and workflow-related information is presented.

A number of actions are available from the toolbar of this navigator, including medication source data creation and deletion, medication source data import and export, ontology generation, and drug and description retirement.

| Label   | Status | SNOMED CT version | Date              | Task |
|---|--------|-------------------|-------------------|------|
| ▼ A-LICES SCALP & BODY HYGIENE [Malathion 1 % Shampoo]            | NEW    | 2015-03-04        | 2015-03-27 11:... | N/A  |
| Bottle 30 mL (1 x 30 mL)  | NEW    |                   | 2015-03-27 11:... |      |
| ▶ A-LOSARTAN [Losartan Potassium 100 mg Film-Coated Tablet]       | NEW    | 2015-03-04        | 2015-03-27 11:... | N/A  |
| ▼ A-LOSARTAN [Losartan Potassium 50 mg Film-Coated Tablet]        | NEW    | 2015-03-04        | 2015-03-27 11:... | N/A  |
| Blister Strip 30 tablets (3 x 10 tablets)                         | NEW    |                   | 2015-03-27 11:... |      |
| Blister Strip 100 tablets (10 x 10 tablets)                       | NEW    |                   | 2015-03-27 11:... |      |
| Blister Strip 50 tablets (5 x 10 tablets)                         | NEW    |                   | 2015-03-27 11:... |      |
| ▶ A-SCABS [Permethrin 5 % Lotion]                                 | NEW    | 2015-03-04        | 2015-03-27 11:... | N/A  |
| ▶ A-SILDENAFIL [Sildenafil as Citrate] 100 mg Film-Coated Tablet] | NEW    | 2015-03-04        | 2015-03-27 11:... | N/A  |

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Figure 13 - Drugs with multiple packagings

Quick, description-based filtering mechanism allows looking up source data from the navigator.

| Label   | Status | SNOMED CT version | Date              | Task |
|---|--------|-------------------|-------------------|------|
| ▶ APO-IBUPROFEN-FC [Ibuprofen 200 mg Film-Coated Tablet]    | NEW    | 2015-03-04        | 2015-03-27 11:... | N/A  |
| ▶ APO-IBUPROFEN-FC [Ibuprofen 400 mg Film-Coated Tablet]    | NEW    | 2015-03-04        | 2015-03-27 11:... | N/A  |
| ▶ BIFEN [Ibuprofen 100 mg / 5 mL Oral Suspension]           | NEW    | 2015-03-04        | 2015-03-27 11:... | N/A  |
| ▶ BIFEN [Ibuprofen 100 mg / 5 mL Oral Suspension]           | NEW    | 2015-03-04        | 2015-03-27 11:... | N/A  |
| ▶ BRUFEN 600 [Ibuprofen 600 mg Film-Coated Tablet]          | NEW    | 2015-03-04        | 2015-03-27 11:... | N/A  |
| ▶ BRUFEN [Ibuprofen 100 mg / 5 mL Oral Suspension]          | NEW    | 2015-03-04        | 2015-03-27 11:... | N/A  |
| ▶ BRUFEN [Ibuprofen 200 mg Sugar-Coated Tablet]             | NEW    | 2015-03-04        | 2015-03-27 11:... | N/A  |
| ▶ BRUFEN [Ibuprofen 400 mg Sugar-Coated Tablet]             | NEW    | 2015-03-04        | 2015-03-27 11:... | N/A  |
| ▶ BRUFEN RETARD [Ibuprofen 800 mg Sustained-Release Tablet] | NEW    | 2015-03-04        | 2015-03-27 11:... | N/A  |

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Figure 14 - Filtering the navigator to find drugs with 'ibupro' in their description

## Source Drug Editor

In order to create a new source drug definition, or to modify an existing definition, the source drug has to be opened in an editor. Double-clicking a drug in the Medication Source Data navigator opens it in an editor. It is also possible to import a drug that was created by someone else, or create a new drug definition from scratch. The structure of the source drug depends on the actual drug model, but generally all drugs would have an ingredient section where the user can select the required ingredient from a pick-list which is populated from the Ingredient reference set. Similarly, dose form and strength values (including units) can be specified this way.

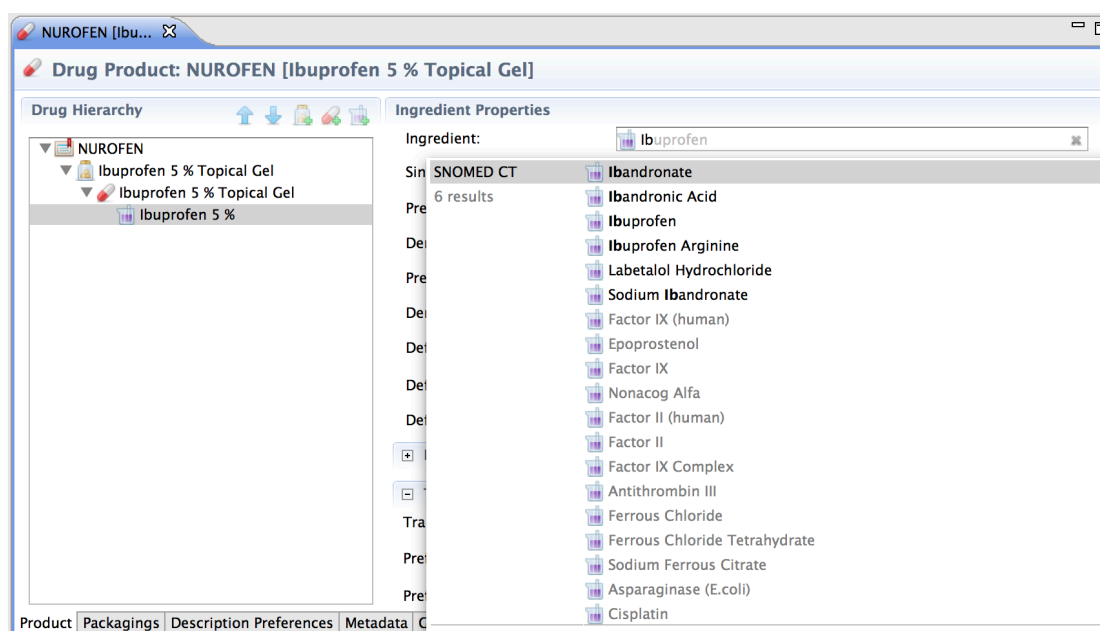


Figure 15 - Selecting an ingredient from the Ingredient reference set

Depending on the underlying drug model, it is possible to add complex, multi-ingredient, multi-subpack drug definitions. The medication source data editor allows adding branding-related information. Branding information is optional; if specified, both trade and generic drug concepts are generated. If no brand information is provided, only the generic drug concept hierarchies are created.

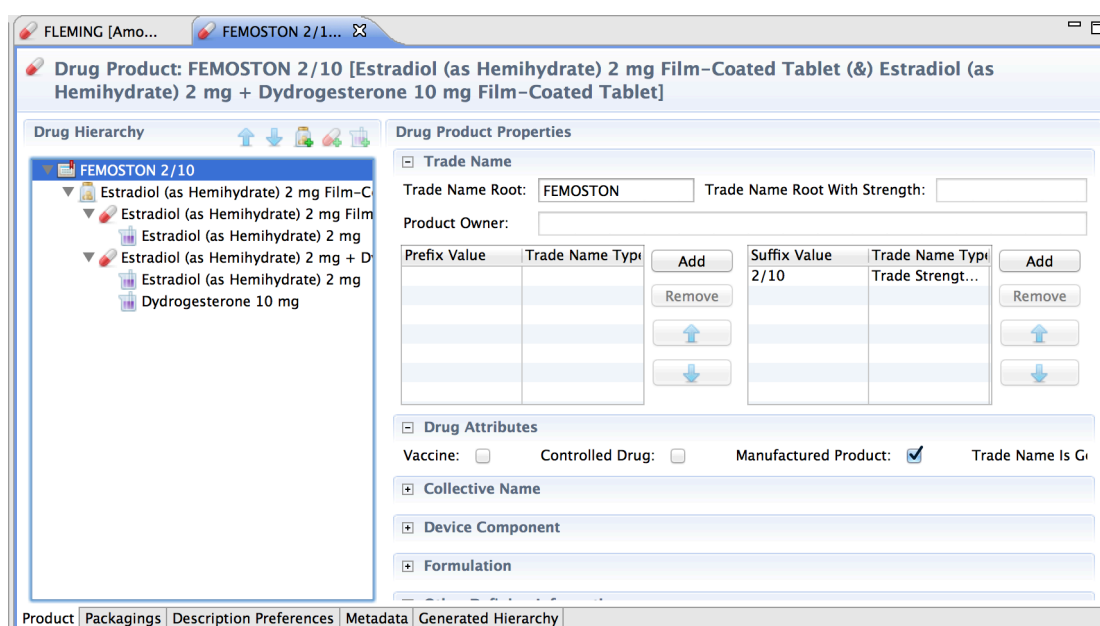


Figure 16 - The structure of a complex drug

A drug product can come in many different pack sizes. The medication source data editor supports adding multiple packagings to a drug product, these will each generate their own sub-hierarchy in the resulting SNOMED CT representation.

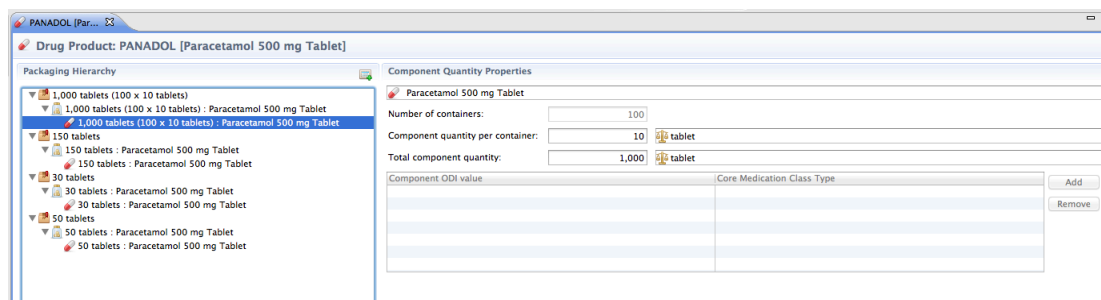


Figure 17 - Multiple pack sizes on a product

The editor also allows configuring the descriptions of the resulting drug concepts. New descriptions of various types and length can be added.

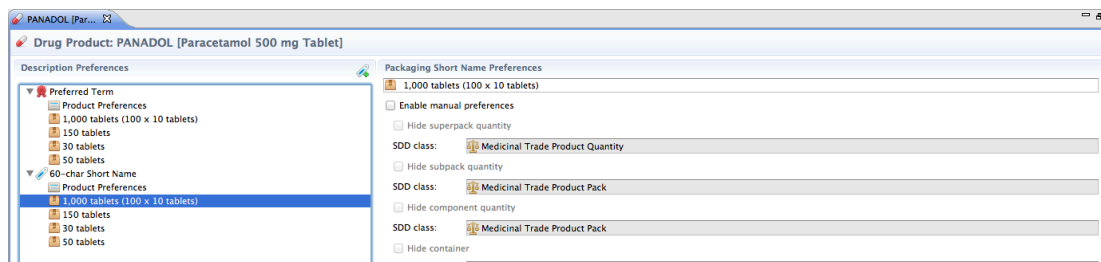


Figure 18 – Setting the description preferences for each pack size

## Ontology Preview

During the source drug editing process the user can get immediate feedback about the ontological output of the source drug definition. The ontology preview allows reviewing the expected drug hierarchies, as well as the descriptions that will be associated with the concepts. The author can align the source drug definition in order to get the expected hierarchical representation.

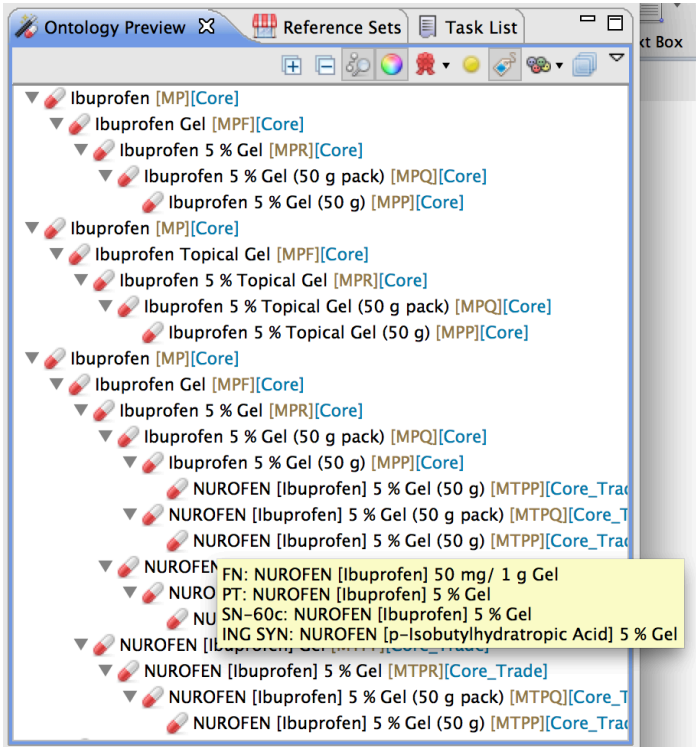


Figure 19 - Ontology preview displaying the hierarchies inferred from the source drug definition

## Advanced search on source drugs

Besides filtering the Medication Source Data navigator by the description of the drug, it is also possible to look up source drugs by their relevant attributes, such as trade name, ingredient, or associated external identifier.

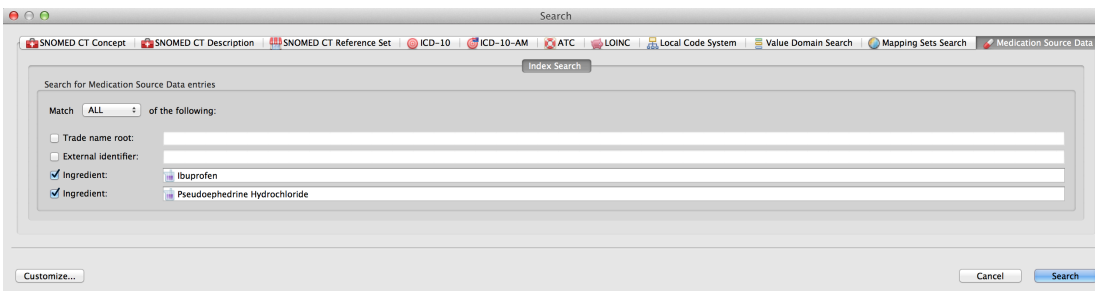


Figure 20 – Advanced search on source drugs

## Ontology generation

Once the source drug definition has been completed, the drug is ready for ontology generation. During the generation process, Snow Owl creates the generic, and—if applicable—the trade hierarchies, and fully defines the concepts using the attributes specified in the medication source data editor. The last part of the generation involves running a description logic classifier that checks for equivalencies and validates ontological consistency.

An association is maintained between the source drug definition and the generated ontology, which allows updates to the ontology. In case some attributes change on the medication, or a new description type is required, it is possible to re-generate the ontology, and the associated concepts are going to be updated seamlessly. Similarly, if a description is deprecated, or if the drug is recalled and needs to be inactivated, the necessary concepts are automatically selected and updated in SNOMED CT.

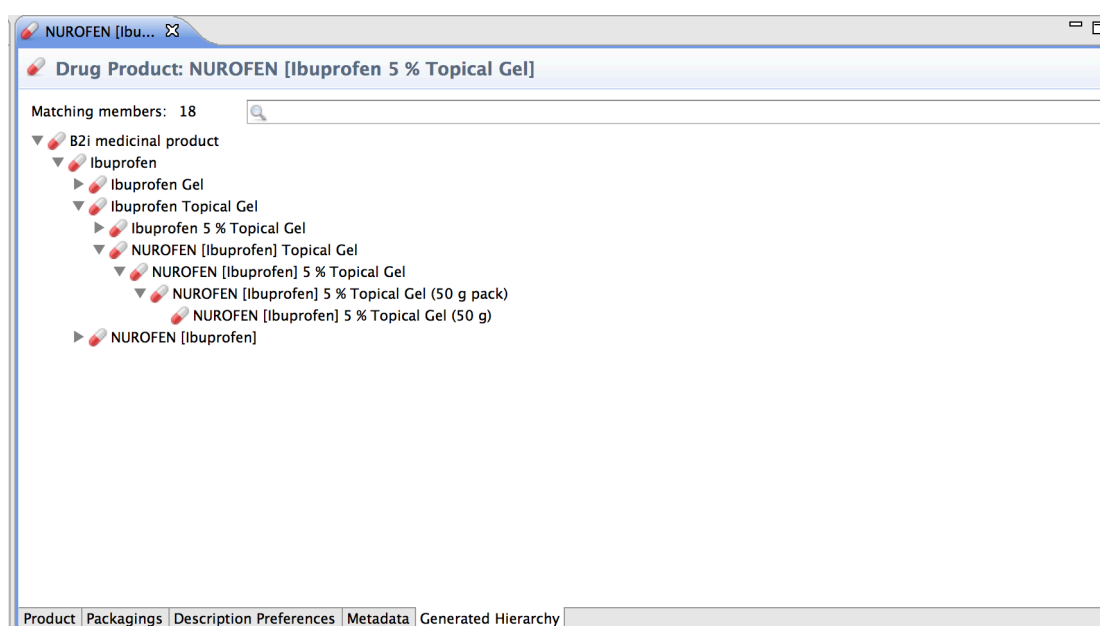


Figure 21 - A medication source data editor displaying the generated hierarchies

## The drug hierarchies in the ontology

The generated concepts are integrated into the SNOMED CT hierarchy. They are placed under a selected node in the Pharmaceutical/Biologic product hierarchy. Not only are they tied to the core SNOMED CT content with their is-a relationships, but also to other defining attributes like active ingredient and dose form relationships.

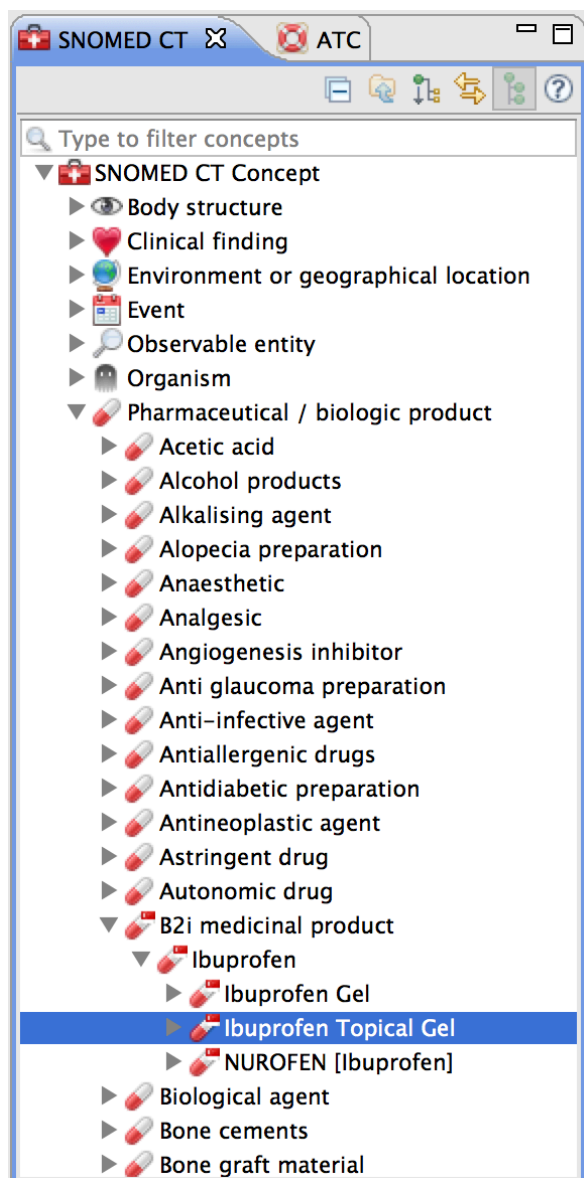
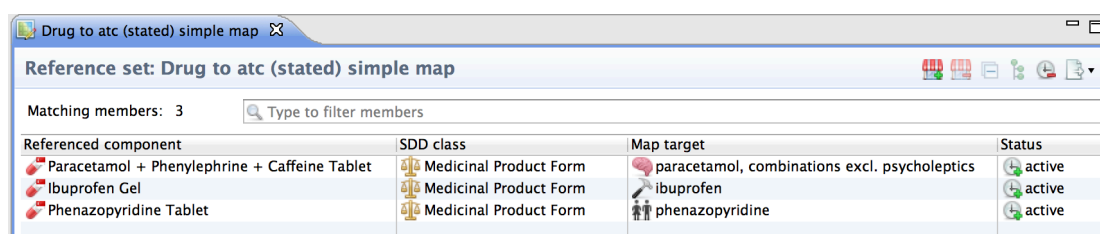


Figure 22 - The generated concepts are integrated into SNOMED CT

In addition to the concept hierarchies, mappings are also produced by the generation process. The external identifiers that were recorded on the source drug editor are added to a mapping reference set.

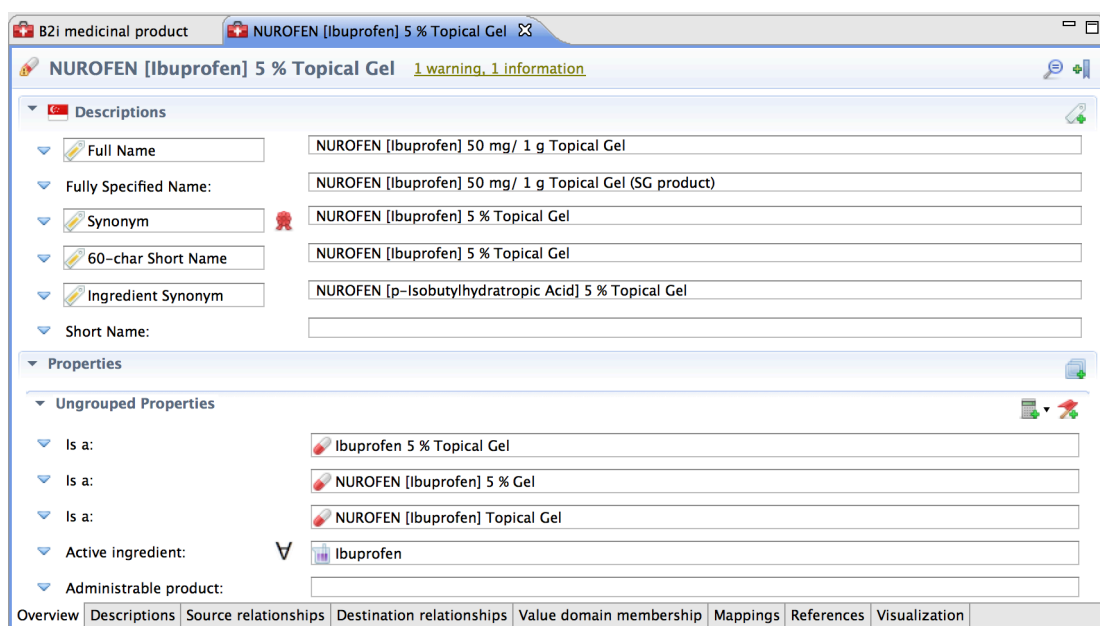


| Referenced component                          | SDD class              | Map target                                    | Status |
|---|------------------------|---|--------|
| Paracetamol + Phenylephrine + Caffeine Tablet | Medicinal Product Form | paracetamol, combinations excl. psycholeptics | active |
| Ibuprofen Gel                                 | Medicinal Product Form | ibuprofen                                     | active |
| Phenazopyridine Tablet                        | Medicinal Product Form | phenazopyridine                               | active |

Figure 23 - Mapping reference set populated during the ontology generation

## Machine Readable Concept Model

Snow Owl implements and extends the Machine Readable Concept Model (MRCM) from IHTSDO. This model defines the valid attributes and attribute ranges for particular groups of concepts, and additionally, it is also possible to define the necessary concrete domain attributes and descriptions that are required. With these extensions, the MRCM is suitable for supporting and validating pharmaceutical extensions.



**NUROFEN [Ibuprofen] 5 % Topical Gel** 1 warning, 1 information

**Descriptions**

- Full Name: NUROFEN [Ibuprofen] 50 mg/ 1 g Topical Gel
- Fully Specified Name: NUROFEN [Ibuprofen] 50 mg/ 1 g Topical Gel (SG product)
- Synonym: NUROFEN [Ibuprofen] 5 % Topical Gel
- 60-char Short Name: NUROFEN [Ibuprofen] 5 % Topical Gel
- Ingredient Synonym: NUROFEN [p-Isobutylhydratropic Acid] 5 % Topical Gel
- Short Name:

**Properties**

**Ungrouped Properties**

- Is a: Ibuprofen 5 % Topical Gel
- Is a: NUROFEN [Ibuprofen] 5 % Gel
- Is a: NUROFEN [Ibuprofen] Topical Gel
- Active ingredient:  Ibuprofen
- Administrable product:

Overview | Descriptions | Source relationships | Destination relationships | Value domain membership | Mappings | References | Visualization

Figure 24 - SNOMED CT concept editor, driven by the Machine Readable Concept Model

The SNOMED CT concept editor is automatically created based on the MRCM. Attributes that conform to the model are displayed and a pick-list assists selecting values from the allowed range. Unsanctioned attributes can also be added; a warning indicates that the concept definition deviates from the formal model.



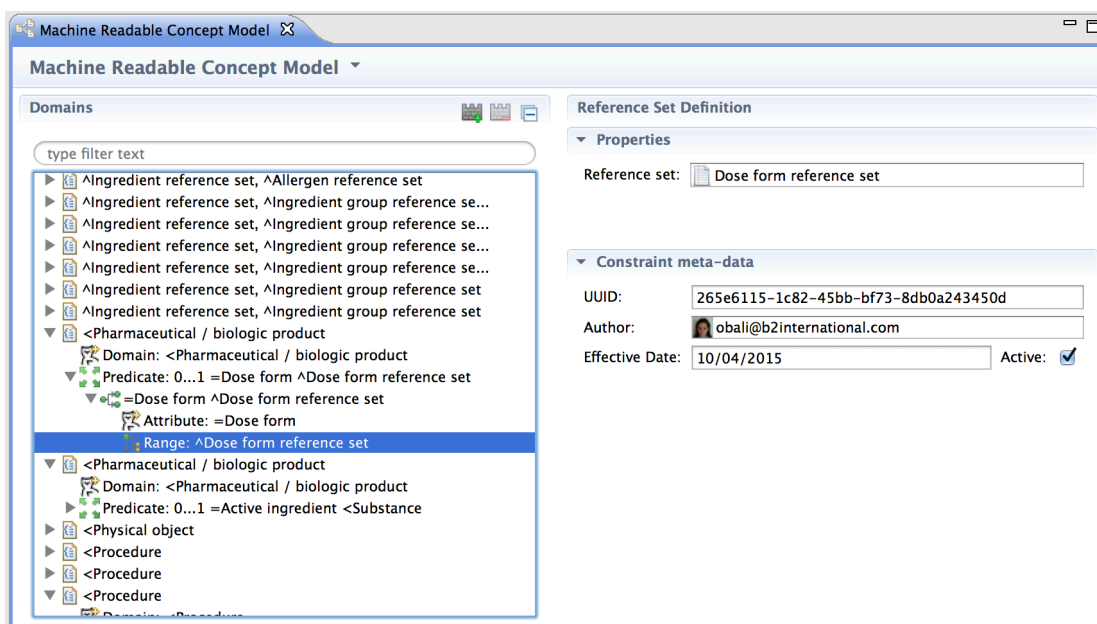


Figure 25 - The MRCM editor

The concept model can be edited in within Snow Owl. This feature is recommended for advanced users only. The above screenshot displays an example for MRCM rules that are applied in the drug dictionary. It adds an optional attribute (has dose form) to the subtypes of the Pharmaceutical/biologic product hierarchy and allows the dose forms to be selected from the Dose form reference set.

## Workflow support

Drug Dictionary authoring is integrated into Snow Owl's workflow support. When working in collaborative mode, the Snow Owl clients are connected to an authoring server and to an issue tracking repository (e.g. Bugzilla). Authoring exercises can be organized into tasks, and tasks are assigned to authors and reviewers. When starting to work on a task, the author has to activate it; the activation creates a branch on the main repository. All the changes that happen in the scope of that particular task remain on the branch. Once the authoring work is completed, the reviewer validates the content changes and merges it back to the main repository. This way Snow Owl can guarantee that the content of the main repository has been thoroughly validated before publication.

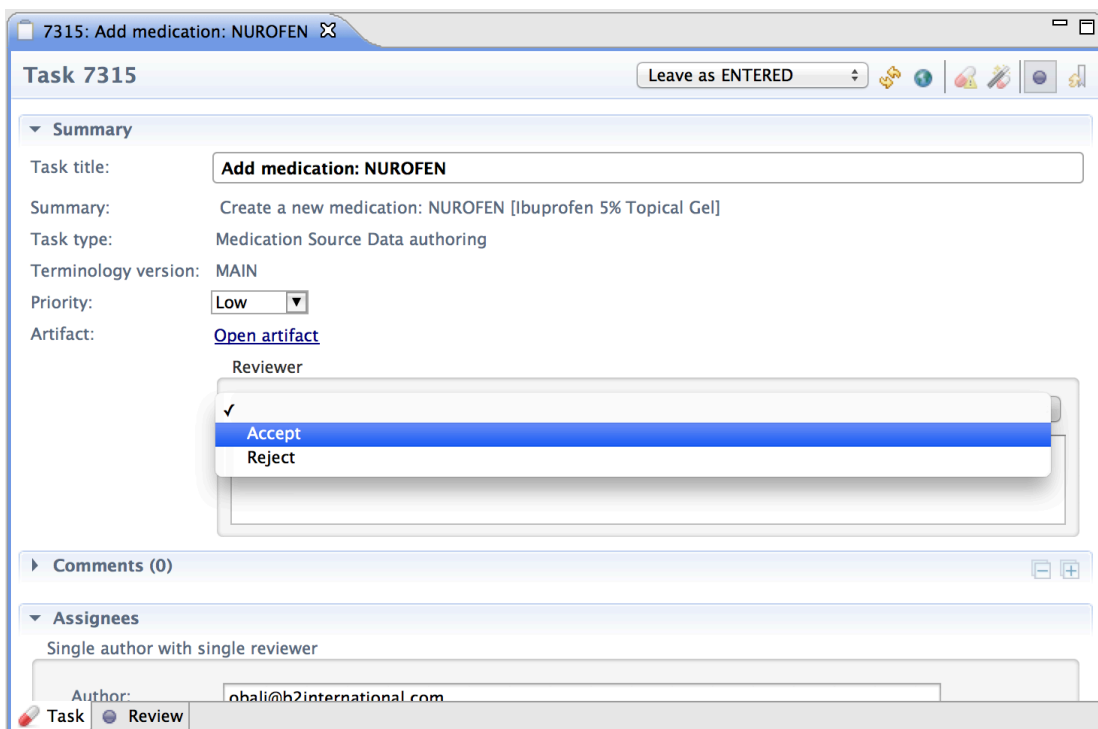


Figure 26 - Reviewer accepts changes on a task editor

In the drug dictionary workflow both the medication source data and the generated ontology is reviewed before the contents are merged to the main repository.

The task editor's Review tab provides a change log to display all the updates that happened on the SNOMED CT repository.

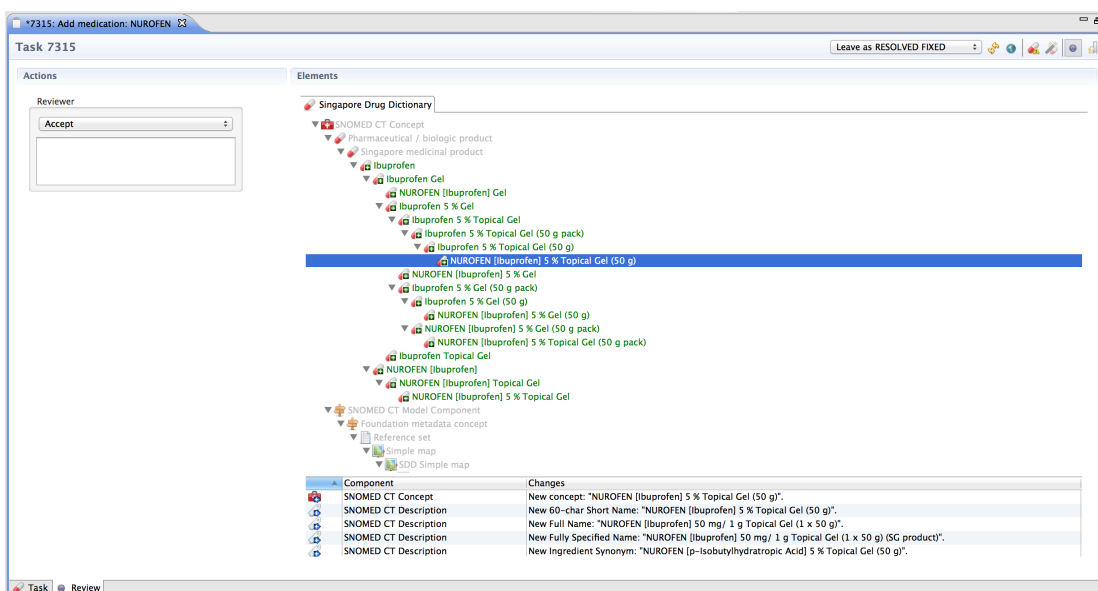


Figure 27 - Review tab displays changes to SNOMED CT

## Reference set creation

SNOMED CT supports the creation of reference sets: concept sets that are collected for a specific purpose or that are organized around a particular domain. These reference sets can be created by manually selecting the concepts that one would like to include (extensional selection method), or by specifying a semantic query that returns concepts based on their definition (intensional selection method). Snow Owl is using the Extended SNOMED CT Compositional Grammar as the query language. The screenshot below demonstrates a simple query, where all the subtypes of the Pharmaceutical/biologic product hierarchy are returned, whose active ingredient is a subtype of the Analgesic grouper concept in the Substance hierarchy.

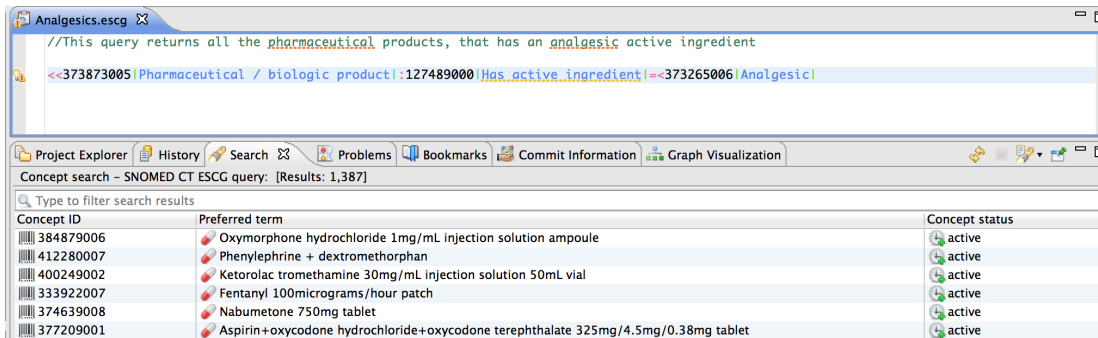


Figure 28 - An ESCG query returning drug concepts

The Query specification type reference set is a collection of these semantic queries (instead of the actual concepts that match the query). The benefit of this reference set type is that queries can be executed again after the ontology has been updated with new content. If new matching results are found, the result set gets automatically updated.

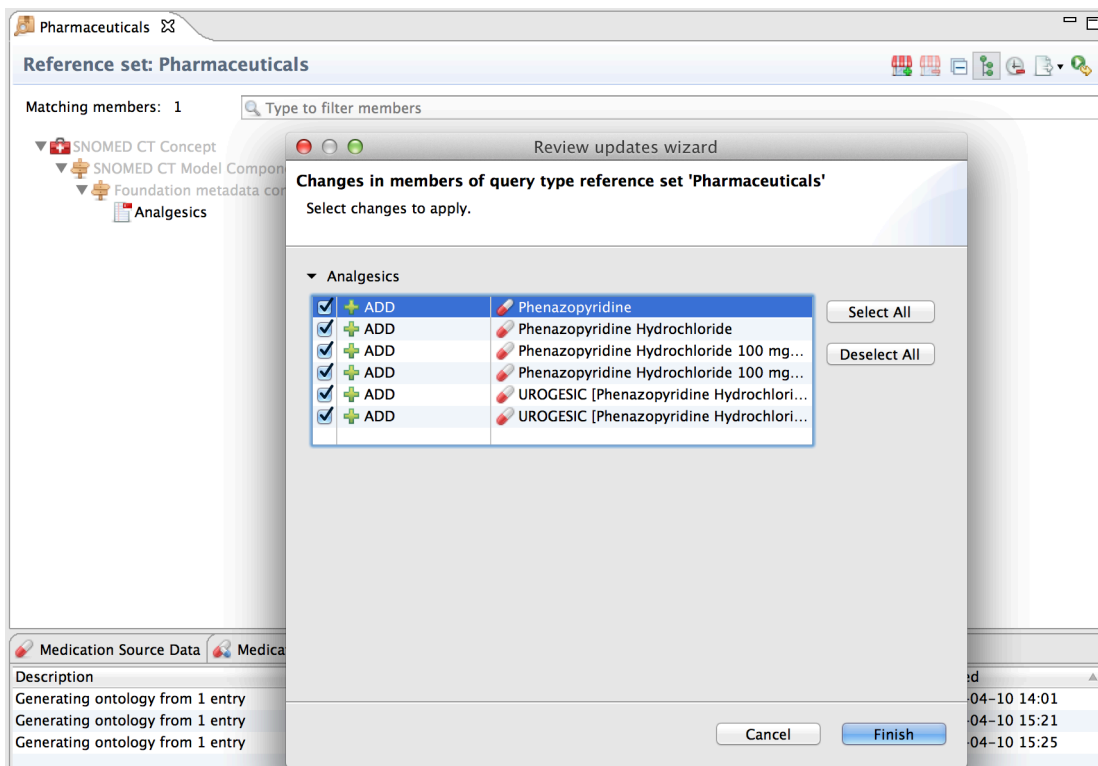


Figure 29 - Automatically updating a query specification type reference set

Reference sets can be published in SNOMED CT's official release formats (RF1, RF2), or in delimiter separated values format.

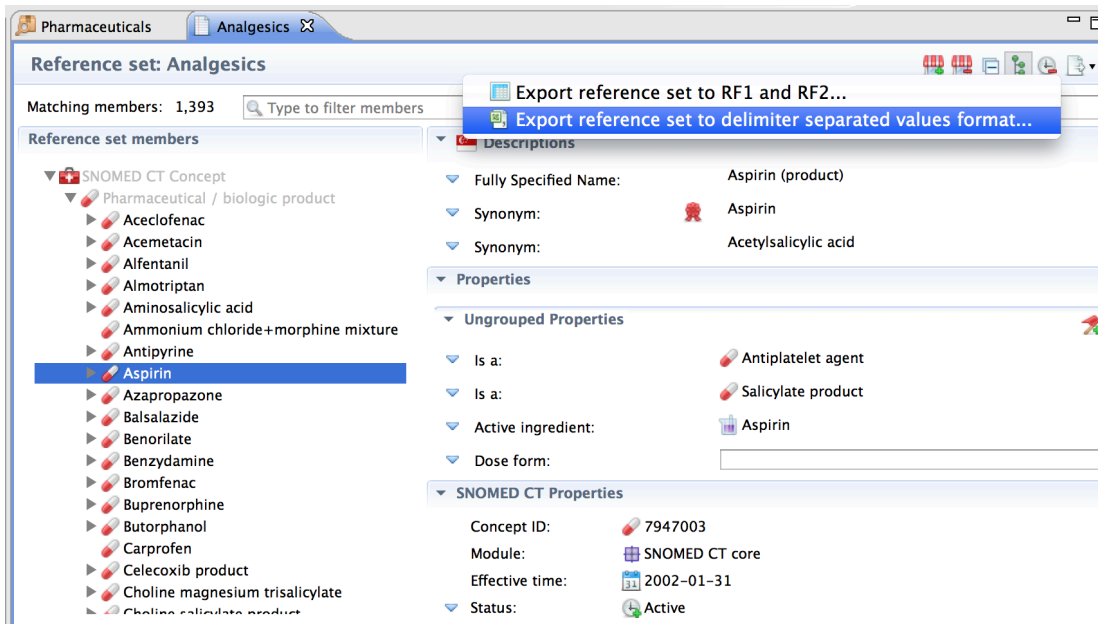


Figure 30 - Selecting export format for a simple type reference set

## Exporting and publishing medications

The delimiter separated value publication format enables the configuration of the export output. Users can select the properties of the concepts, which they would like to see in the resulting files. A simple wizard allows choosing and organizing the columns of the output file

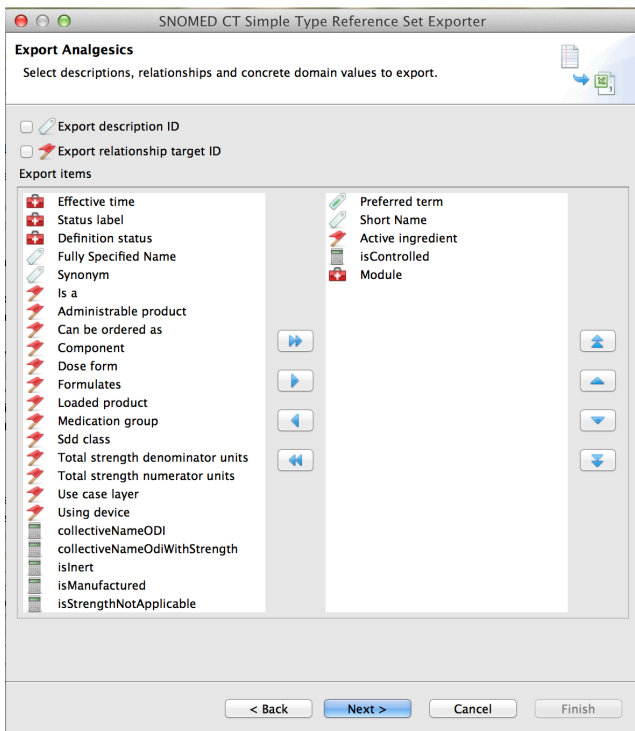


Figure 31 - Reference set export configuration wizard

The exported file can be imported into MS Excel or can be reused by other systems.

| Concept ID | Preferred term  | Active ingredient (1)       | Active ingredient (2) | IsControlled | Module         |
|------------|---|-----------------------------|-----------------------|--------------|----------------|
| 329711003  | Ibuprofen 200mg m/r capsule   | Ibuprofen                   |                       |              | SNOMED CT core |
| 329686007  | Ibuprofen 100mg/5mL s/r oral suspension   | Ibuprofen                   |                       |              | SNOMED CT core |
| 329716008  | Indometacin 100mg suppository   | Indometacin                 |                       |              | SNOMED CT core |
| 329726001  | Indometacin 50mg m/r tablet   | Indometacin                 |                       |              | SNOMED CT core |
| 329723009  | Indometacin 75mg m/r tablet   | Indometacin                 |                       |              | SNOMED CT core |
| 329713000  | Ibuprofen+codeine phosphate 300mg/20mg m/r tablet                                       | Codeine Phosphate           | Ibuprofen             |              | SNOMED CT core |
| 386188002  | Paracetamol + hydrocodone bitartrate  | Hydrocodone Tartrate        | Paracetamol           |              | SNOMED CT core |
| 329712005  | Ibuprofen 300mg m/r capsule   | Ibuprofen                   |                       |              | SNOMED CT core |
| 329715007  | Indometacin 50mg capsule  | Indometacin                 |                       |              | SNOMED CT core |
| 430388001  | Parenteral form butorphanol   | Butorphanol                 |                       |              | SNOMED CT core |
| 329714006  | Indometacin 25mg capsule  | Indometacin                 |                       |              | SNOMED CT core |
| 329754008  | Indometacin 1mg injection (pdr for recon)   | Indometacin                 |                       |              | SNOMED CT core |
| 20320002   | Hydrocodone   | Hydrocodone                 |                       |              | SNOMED CT core |
| 422180003  | Sumatriptan 6mg injection solution pre-filled cartridge                                 | Sumatriptan                 |                       |              | SNOMED CT core |
| 329756005  | Indometacin 75mg m/r capsule  | Indometacin                 |                       |              | SNOMED CT core |
| 329727005  | Indometacin 25mg m/r tablet   | Indometacin                 |                       |              | SNOMED CT core |
| 329785004  | Ketoprofen 150mg m/r capsule  | Ketoprofen                  |                       |              | SNOMED CT core |
| 430425002  | Paracetamol 325mg/hydrocodone 10mg 15mL oral solution                                   | Hydrocodone Tartrate        | Paracetamol           |              | SNOMED CT core |
| 329760008  | Ketoprofen 100mg suppository  | Ketoprofen                  |                       |              | SNOMED CT core |
| 329758006  | Ketoprofen 50mg capsule   | Ketoprofen                  |                       |              | SNOMED CT core |
| 329757001  | Indometacin 25mg m/r capsule  | Indometacin                 |                       |              | SNOMED CT core |
| 329788002  | Ketoprofen 200mg m/r capsule  | Ketoprofen                  |                       |              | SNOMED CT core |
| 329790001  | Mefenamic acid 250mg capsule  | Mefenamic Acid              |                       |              | SNOMED CT core |
| 430417004  | Nasal form butorphanol  | Butorphanol                 |                       |              | SNOMED CT core |
| 329786003  | Ketoprofen 50mg/mL injection solution 2mL ampoule                                       | Ketoprofen                  |                       |              | SNOMED CT core |
| 329787007  | Ketoprofen 100mg m/r capsule  | Ketoprofen                  |                       |              | SNOMED CT core |
| 414430003  | Hydromorphone hydrochloride 32mg m/r capsule  | Hydromorphone Hydrochloride |                       |              | SNOMED CT core |
| 329807003  | Naproxen 500mg tablet   | Naproxen                    |                       |              | SNOMED CT core |
| 414427005  | Hydrocodone polistirex 10mg/chlorpheniramine polistirex 8mg per 5mL oral m/r suspension | Chlorpheniramine            | Hydrocodone           |              | SNOMED CT core |
| 430311002  | Oropharyngeal form dihydroergotamine mesylate   | Dihydroergotamine Mesilate  |                       |              | SNOMED CT core |
| 432686004  | Oral form povidone  | Povidone                    |                       |              | SNOMED CT core |
| 329806007  | Naproxen 250mg tablet   | Naproxen                    |                       |              | SNOMED CT core |

Figure 32 - Exported simple reference set in Excel

## Drug Dictionary Lite – publishing onto the web

Besides document-based publication, the drug dictionary is also published on the web. External users with the right permissions can view, browse and download data from a web user interface.

| SDD Code      | Preferred Term  | SDD Class | MPF Parent SDD Code | MPF Parent Term                           | ATC Code | ATC Descri   |
|---------------|---|-----------|---------------------|---|----------|--------------|
| 3924-63-68X-6 | A-LICES SCALP & BODY HYGIENE [Malathion] 1 % Shampoo (30 mL)    | MTPP      | 6405-48-63X-5       | Malathion Shampoo                         | P03AX03  | malathion    |
| 2409-42-15X-6 | A-LOSARTAN [Losartan Potassium] 100 mg Tablet                   | MTPP      | 4721-11-28X-4       | Losartan Potassium Tablet                 | C09CA01  | losartan     |
| 3086-01-76X-8 | A-LOSARTAN [Losartan Potassium] 50 mg Tablet                    | MTPP      | 4721-11-28X-4       | Losartan Potassium Tablet                 | C09CA01  | losartan     |
| 0272-04-66X-0 | A-SCABS [Permethrin] 5 % Lotion (30 mL)                         | MTPP      | 2062-87-75X-5       | Permethrin Lotion                         | P03AC04  | permethrin   |
| 1719-04-45X-2 | A-SILDENAFIL [Sildenafil] 100 mg Tablet                         | MTPP      | 5341-02-90X-3       | Sildenafil Tablet                         | G04BE03  | sildenafil   |
| 5482-37-35X-8 | Abacavir 100 mg/ 5 mL Oral Solution (240 mL)                    | MPP       | 9094-56-41X-7       | Abacavir Oral Solution                    | J05AF06  | abacavir     |
| 6593-86-11X-8 | Abacavir 300 mg + Lamivudine 150 mg + Zidovudine 300 mg Tablet  | MPR       | 9689-89-47X-5       | Abacavir + Lamivudine + Zidovudine Tablet | J05AR04  | zidovudine   |
| 5881-61-82X-2 | Abacavir 300 mg Tablet  | MPR       | 0015-90-05X-6       | Abacavir Tablet                           | J05AF06  | abacavir     |
| 7609-07-29X-0 | Abacavir 600 mg + Lamivudine 300 mg Tablet                      | MPR       | 4030-83-85X-0       | Abacavir + Lamivudine Tablet              | J05AR02  | lamivudine   |
| 7172-08-27X-4 | Abciximab 10 mg/ 5 mL Intravenous Injection                     | MPP       | 8876-40-26X-2       | Abciximab Intravenous Injection           | B01AC13  | abciximab    |
| 7618-49-61X-9 | ABELCET [Amphotericin B (lipid complex)] 100 mg/ 20 mL Infusion | MTPP      | 5330-42-21X-7       | Amphotericin B (lipid complex) Infusion   | J02AA01  | amphotericin |
| 3970-71-28X-8 | Abiraterone Acetate 250 mg Tablet                               | MPR       | 6968-49-00X-1       | Abiraterone Acetate Tablet                | L02BX03  | L02BX03      |
| 5807-75-44X-9 | Acamprosate Calcium 333 mg Enteric-Coated Tablet                | MPR       | 3293-84-42X-4       | Acamprosate Calcium Enteric-Coated Tablet | N07BB03  | acamprosate  |
| 6044-83-01X-3 | Acarbose 100 mg Tablet  | MPR       | 5487-98-98X-1       | Acarbose Tablet                           | A10BF01  | acarbose     |

Figure 33 - Drug list view in the Drug Dictionary Lite

The web display is optimized for users that are not necessary familiar with ontologies or SNOMED CT, but would still like to execute meaningful queries on the list of drug concepts. A preset list of search criteria is available to search drugs by various attributes, like brand name, ingredient, dose form or strength.

| SDD Code      | Preferred Term   | SDD Class | MPF Parent SDD Code | MPF Parent Term                            | ATC Code | ATC Descri |
|---------------|--|-----------|---------------------|--|----------|------------|
| 1229-31-49X-5 | CHILDREN'S PANADOL 1-6 YEARS [Paracetamol] 120 mg/ 5 mL Oral S | MTTP      | 1682-82-06X-5       | Paracetamol Oral Suspension                | N02BE01  | paracetam  |
| 3469-36-33X-9 | CHILDREN'S PANADOL 6 PLUS [Paracetamol] 250 mg/ 5 mL Oral Sus  | MTTP      | 1682-82-06X-5       | Paracetamol Oral Suspension                | N02BE01  | paracetam  |
| 3747-64-78X-0 | CHILDREN'S PANADOL COLD & FLU [Paracetamol 160 mg/ 5 mL + C    | MTTP      | 7045-28-07X-2       | Paracetamol + Chlorpheniramine Maleate + F | N02BE51  | paracetam  |
| 8921-97-65X-9 | PANADOL [Paracetamol] 1 g Tablet                               | MTPR      | 8737-11-15X-5       | Paracetamol Tablet                         | N02BE01  | paracetam  |
| 3449-88-92X-8 | PANADOL ACTIVAST [Paracetamol] 500 mg Tablet                   | MTPR      | 8737-11-15X-5       | Paracetamol Tablet                         | N02BE01  | paracetam  |
| 9506-79-98X-9 | PANADOL COLD & FLU CAPLET [Paracetamol 500 mg + Phenylephrin   | MTPR      | 2194-90-85X-9       | Paracetamol + Phenylephrine Hydrochloride  | N01BE51  | N01BE51    |
| 6286-07-96X-9 | PANADOL COLD & FLU HOT REMEDY [Paracetamol 750 mg + Pheny      | MTTP      | 4517-69-95X-9       | Paracetamol + Phenylephrine Hydrochloride  | N02BE51  | paracetam  |
| 1262-82-80X-1 | PANADOL COLD & FLU HOT REMEDY [Paracetamol 750 mg + Pheny      | MTTP      | 4517-69-95X-9       | Paracetamol + Phenylephrine Hydrochloride  | N02BE51  | paracetam  |
| 6571-20-21X-5 | PANADOL COLD & FLU HOT REMEDY [Paracetamol 750 mg + Pheny      | MTTP      | 4517-69-95X-9       | Paracetamol + Phenylephrine Hydrochloride  | N02BE51  | paracetam  |
| 5888-51-83X-3 | PANADOL COLD RELIEF PE CAPLET [Paracetamol 500 mg + Pheny      | MTPR      | 2194-90-85X-9       | Paracetamol + Phenylephrine Hydrochloride  | N01BE51  | N01BE51    |
| 2333-56-97X-7 | PANADOL COLOURFREE [Paracetamol] 120 mg/ 5 mL Oral Suspensio   | MTTP      | 1682-82-06X-5       | Paracetamol Oral Suspension                | N02BE01  | paracetam  |
| 2706-16-67X-6 | PANADOL COUGH PLUS CAPLET [Paracetamol 500 mg + Pseudoeph      | MTPR      | 4825-32-90X-9       | Paracetamol + Pseudoephedrine Hydrochlor   | N02BE51  | paracetam  |
| 2570-83-04X-4 | PANADOL EXTEND CAPLET [Paracetamol] 665 mg Sustained-Release   | MTPR      | 4104-81-69X-0       | Paracetamol Sustained-Release Tablet       | N02BE01  | paracetam  |
| 8801-86-71X-7 | PANADOL EXTRA CAPLET [Paracetamol 500 mg + Caffeine 65 mg] Ta  | MTPR      | 5267-98-73X-6       | Caffeine + Paracetamol Tablet              | N02BE51  | paracetam  |
| 0552-25-18X-3 | PANADOL 6 PLUS [Paracetamol 250 mg + Phenylephrine Hydrochlori | MTPR      | 4724-60-47X-5       | Paracetamol + Phenylephrine Hydrochloride  | N02BE51  | paracetam  |

Figure 34 - Filtering the drug list by ingredient and brand name

The web UI also displays additional details of the drugs, and it is possible to review the drug concept's position in the hierarchy.

**SNOMED CT**

Type here to filter concepts  Add filter

Overview History Other Product Presentations

**DESCRIPTIONS**

**ACC SYRUP [Acetylcysteine] 100 mg/ 5 mL Oral Powder (150 mL)**

Full Name ACC SYRUP [Acetylcysteine] 20 mg/ 1 mL Oral Powder (1 x 150 mL)  
 Fully Specified Name ACC SYRUP [Acetylcysteine] 20 mg/ 1 mL Oral Powder (1 x 150 mL) (SG product)  
 Synonym ACC SYRUP [Acetylcysteine] 100 mg/ 5 mL Oral Powder (150 mL)  
 60-char Short Name ACC SYRUP [Acetylcysteine] 100 mg/ 5 mL Oral Powder (150 mL)  
 Ingredient Synonym ACC SYRUP [Acetyl Cysteine] 100 mg/ 5 mL Oral Powder (150 mL)  
 Ingredient Synonym ACC SYRUP [N-Acetyl-L-Cysteine] 100 mg/ 5 mL Oral Powder (150 mL)  
 Ingredient Synonym ACC SYRUP [N-Acetylcysteine] 100 mg/ 5 mL Oral Powder (150 mL)

**PROPERTIES**

Is a ACC SYRUP [Acetylcysteine] 100 mg/ 5 mL Oral Powder (150 mL pack)  
 Is a Acetylcysteine 100 mg/ 5 mL Oral Powder (150 mL)  
 Active ingredient Acetylcysteine  
 Dose form Oral Powder  
 Quantity per container units mL  
 Sdd class Medicinal Trade Product Pack  
 Total quantity units mL  
 Use case layer CR-T-NO-LQ  
 Use case layer CR-T-NO-Q  
 Use case layer CR-T-O-LQ

Figure 35 - Concept details of a drug concept

Users with the necessary permissions can download content from the online drug dictionary. It is possible to download the either the full list, or a subset matching semantic query criteria. The format of the downloaded value separated file is configurable. The file can be loaded into Excel for further processing.

Drug Product Export ×

Select the columns to include and click on the download link to start the export. [Download](#)

| Available columns   | Selected columns |
|---------------------|------------------|
| ATC Code            | SDD Code         |
| ATC Description     | Preferred Term   |
| GPO Code            |                  |
| GPO Description     |                  |
| MPF Parent SDD Code |                  |
| MPF Parent Term     |                  |
| SDD Class           |                  |
| SIN Number          |                  |

Delimiter

Figure 36 - Configure format of the downloaded value separated file

## About B2i Healthcare

B2i Healthcare is a boutique software engineering firm specialized in SNOMED CT and healthcare information standards and exchange. B2i provides products to simplify SNOMED CT adoption and offer software development services to support healthcare IT needs. B2i's Snow Owl technology family is deployed in over 2,500 locations in 83+ countries worldwide.

For more information on Snow Owl visit <http://b2i.sg>.