

## Using Snoflake to access SNOMED CT

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### An Introduction to SNOMED CT

SNOMED CT – the Systematized Nomenclature of Medicine Clinical Terms - is a comprehensive and precise clinical reference terminology designed to make healthcare information useable and accessible. Global in scope SNOMED CT provides a **common language** of great depth that enables a consistent way of capturing, sharing and aggregating health data across clinical specialties and sites of care.

The product is a result of collaboration between SNOMED International, a division of the College of American Pathologists, and the National Health Service. SNOMED CT brings together the content and structure of SNOMED RT V1.0 with the NHS Clinical Terms Version 3 (Read Codes or CTV3). SNOMED CT delivers unmatched content and expressivity for clinical documentation and reporting, and provides a means of medical communication that spans languages, clinical specialties and geographic borders.

SNOMED CT contains concepts linked to clinical knowledge to enable unambiguous recording of data. The terminology's content also includes terms or synonyms relating to clinical concepts, each with their own unique identifier. Links, or semantic relationships, between clinical concepts provide formal definitions. The SNOMED CT structure makes possible interoperability across software applications that relate to diseases, treatments, etiologies, clinical findings, therapies, procedures and outcomes. The breadth and depth of the terminology, as well as its computer-readable hierarchies, enable faster, reliable and consistent retrieval of robust clinical information. Concepts included in SNOMED CT with multiple levels of granularity including those illustrated below...

Body structure  
Context-dependent category  
Event  
Environments/location  
Finding  
Linkage concept  
Observable entity  
Organism  
Physical force  
Physical object  
Procedure  
Product  
Qualifier value  
Record artefact  
Social context  
Special concept  
Specimen  
Staging and scales  
Substance

This depth allows health care organisations to use their clinical information to their advantage. Users can record data just once, at the level of specificity they choose, then mine it repeatedly for decision support, statistical reporting, outcomes measurement, treatment guidelines and cost analysis. Cases can be retrieved based on numerous different criteria, including clinical and laboratory findings, causative agents, anatomical structure and therapeutic procedures.

SNOMED CT offers several structural advantages over Read Codes. A critical improvement for clinical decision support is the capacity to allow any coded disorder to 'belong to' more than one class of disorder. For example, in Read Version 2, "bacterial meningitis" is classed as an "inflammatory disease of the central nervous system", but due to technical constraints within the Read Version 2 coding scheme, it cannot also be classed as a "bacterial disease". For clinical decisions, the fact that "bacterial meningitis" is, in reality, both a nervous system disease and a bacterial disease cannot be ignored.

The 300,000+ concepts available when coding using SNOMED CT not only offer the facility to provide greater detail about a patient than was present in previous coding schemes, but also allow for additional context information to be coded and associated with the patient. For example, if a patient reports a family history of asthma, current clinical systems use varying methods to record this

information. Some systems have the context of “family history” embedded into their structure and the *asthma* code is selected and added to this field; some use a specific code of *family history of asthma*; while others apply the context of *family history* to asthma using free text. Multiple methods of representing identical patient information, in particular free text, present immense challenges for clinical decision support.

A very important aspect of SNOMED CT is that its applicability is almost limitless. Clinicians and researchers can mine health information in ways that until the advent of SNOMED CT were not possible. SNOMED CT works through implementation in software applications, representing clinically relevant information in a reliable, reproducible manner is a natural and valid solution for a wide range of applications, some of which are listed below...

SNOMED CT can be seamlessly integrated with existing systems and although comprehensive on its own, it also cross-maps to other widely used legacy medical classifications, such as ICD-9-CM, ICD-O3, ICD-10, Laboratory LOINC and OPCS-4, making it easier to avoid duplicate data capture. In addition, SNOMED CT is aligned with numerous key health care standards such as HL7, DICOM, ANSI and ISO.

SNOMED CT also provides a framework to manage language dialects, clinically relevant subsets, qualifiers and extensions, such as the US and UK drug extensions of proprietary drug concepts and terms unique to these particular localities. This allows users to take advantage of its broad coverage while integrating their own specific codes, leading to easier adaptation to local needs.

The nature of SNOMED CT has, however, some practical problems regarding its use.

1. Size. The English language version used by the NHS contains 400,000 concepts, around 1 million terms and 1.6 million relationships.
2. Complexity. If SNOMED CT concept relationships followed the simple hierarchical parent-child model - where all concepts have a single parent, and each parent can have multiple children - there would not be a problem, because its concepts could be logically envisaged using an Explorer. Although many SNOMED CT concept relationships are of the parent-child type, many are polyhierarchical in that concepts have multiple parents and multiple children. Because of this a different visualisation model is required.

Electronic medical records  
 Problem lists and disease templates  
 Physician order entry for laboratory  
 Imaging and other investigations  
 Public health reporting  
 Electronic prescribing  
 3-D image labelling and auto indexing  
 Telemedicine  
 Literature encoding  
 Laboratory information systems  
 Data warehousing  
 Genetic databases  
 Therapeutic decision support  
 Cancer registry reporting  
 Case report forms for clinical research  
 Emergency room charting

**The Snoflake browser has been specifically developed to address both of these problems.**

Snoflake is an online SNOMED CT Browser, with support for SNOMED RT and CTV3 codes. The Snoflake Browser uses a variety of techniques to find, sort and retrieve codes, including a multi parent/child relationship viewer, to make it easier to traverse SNOMED CT relationships.

## Registration

You can examine, test and evaluate the Snoflake browser that is publicly available at <http://www.snoflake.co.uk>

When you go to the site, the Home page will be displayed:

**DATALINE SOFTWARE**

**Snoflake browser, the free online SNOMED database**

Home | What is Snomed? | The Snoflake browser | Snomobile for iPhone | SnAPI | Downloads & links | Contact

Lookup Clinical terms for FREE...  
...with Dataline's online SNOMED CT browser.

**Welcome to Snoflake V3.5**  
Snoflake v3.5 is a FREE online SNOMED CT Browser, with support for SNOMED RT codes.  
Snoflake now includes UK extensions, subset filtering, user favourites, prefix search and downloadable favourites  
Snoflake is updated regularly, so you can be sure that your code searches will always be accurate and relevant.  
[read more...](#)  
SnAPI, the application programming interface for Snomed CT is now available to registered users  
[read more...](#)

**Login or Register**  
If you are a registered SNOMED Snoflake user, please login below:  
Username:   
Password:   
  
If you are yet to register, use the link below. All personal details are only used by Dataline, and NOT passed onto third parties.  
**[Register for Snoflake™](#)**

**Talk to us**  
Phone us on: **01273 324 939**  
Name\*:   
Company:   
Phone:   
Email Address\*:   
Message:   
  
fields marked \* are mandatory

As a first-time user of Snoflake, you will be required to register. This is done by completing and submitting the registration form (below) which is minimal and takes a very short time.

**Snoflake Browser™**  
By Dataline Software

**SOFTWARE THAT IMPROVES WAITING TIME PERFORMANCE**

**SNOFLAKE - Snomed Browser by Dataline Software**

**OPTION 1: EXISTING USER**  
If you have already registered, please enter your user name and password - then press the Login button.

Username:   
Password:

**OPTION 2: NEW USER**  
If you are a new user - click the register button and we will send login details to your email address.

[Download walkthrough PDF](#)

**REGISTRATION FOR SNOMED BROWSER**

Please complete the form below to register for a Snomed Browser account. Note that items marked with a \* are required fields. Click the Submit button when you are finished and we will send a confirmation of your registration to you by email.

Please enter a user name (up to 10 characters) \*  What is your full name? \*

What is your current e-mail address? \*  What is your current country of Residence? \*

What is the name of your organisation?  What is your phone number?

How did you find this website?  
[Please choose]

I have read and agree to the [terms and conditions](#)  
 Un-tick this box if you do not wish to receive details of SNOMED related products, special offers and services that may interest you from Dataline Software Ltd.

When you submit your registration details, an email containing your login credentials will be sent to you. Upon receipt you will now be able to access the Snoflake browser whenever you wish!

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## Using the Snoflake Browser

### The Home (opening) screen

An image of the Snoflake browser opening screen is displayed below:

The screenshot displays the Snoflake Browser interface. On the left, there is a search panel with a search bar, a 'return' dropdown set to 50, and several filter options: 'No Suffix', 'Show UK Extensions', 'Prefix Search', 'No Subset', and 'No Favourites'. A 'Search' button is at the bottom of this panel. The main area on the right is titled 'SNOMED CT Concept (SNOMED RT+CTV3)' and shows a 'Current' tab. It displays the Concept ID: 138875005, SNOMED RT: R-00000, and CTV3 ID: XU05D. Below this, there is a descriptive paragraph and a hierarchical diagram. The diagram shows the 'SNOMED CT Concept (SNOMED RT+CTV3) [138875005]' at the center, with lines connecting it to various child concepts such as 'Social context (social concept) [48176007]', 'Procedure (procedure) [71388002]', 'Physical force (physical force) [78621006]', 'Substance (substance) [105590001]', 'Linkage concept (linkage concept) [106237007]', 'Body structure (body structure) [123037004]', 'Specimen (specimen) [123038009]', 'Situation with explicit context (situation) [243796009]', 'Staging and scales (staging scale) [254291000]', 'Physical object (physical object) [260787004]', 'Event (event) [272379006]', 'Environment or geographical location (environment / location) [308916002]', 'Qualifier value (qualifier value) [362961000]', 'Observable entity (observable entity) [363787002]', 'Special concept (special concept) [370115009]', 'Pharmaceutical / biologic product (product) [373873005]', 'Clinical finding (finding) [404684003]', 'Organism (organism) [410607006]', and 'Record artifact (record artifact) [419891008]'. The root concept is highlighted with a dark blue background.

The screen displays two frames:

**Left** This contains the Snoflake **Search** mechanism which enables a user to locate a required concept. This aspect of the browser will be dealt with later in this document, as will the explanations for the 3 tabs.

**Right** Displays the **Root** concept (in the centre, formatted in **Bold white** text with a background of dark blue) and its first level child concepts, the relationships between the parent and its children being represented by the light grey lines. When you open Snoflake you will see, as illustrated above, that the default root is the **SNOMED CT Concept** and its child concepts are the various concept types – for example, Procedure, Clinical finding, Organism, etc.

*Note: In some cases the SNOMED **Parent** can have a large number of child relationships and for clarity the number of these displayed is controlled by the application. If there are more children a clickable **Next** button is displayed in the bottom RH corner of the frame. If this is clicked the user is taken to the next page of relationships where another **Next** button is displayed if more child options are available, and a **Previous** button provided to return the user to the previous view.*

## Navigation

The RH frame provides a useful navigation tool. If any of the child concept labels are clicked, the screen redraws to display that concept's mapping. The **Parent** concept becoming the root and being displayed centred in **Bold** text. In addition to its own child concepts, the Root concept's parent/s is/are displayed in **Red** text.

For example, if the **Procedures (procedure)** concept found in the top right hand side of the previous screen is clicked the following screen is displayed.

It can be seen that the selected (or Root) concept is again displayed in **Bold** text centred in the screen and its **Parent** concept (only one in this case) displayed in red text. Around the Root concept **some** its own child concepts – in this case procedure classifications – are displayed.

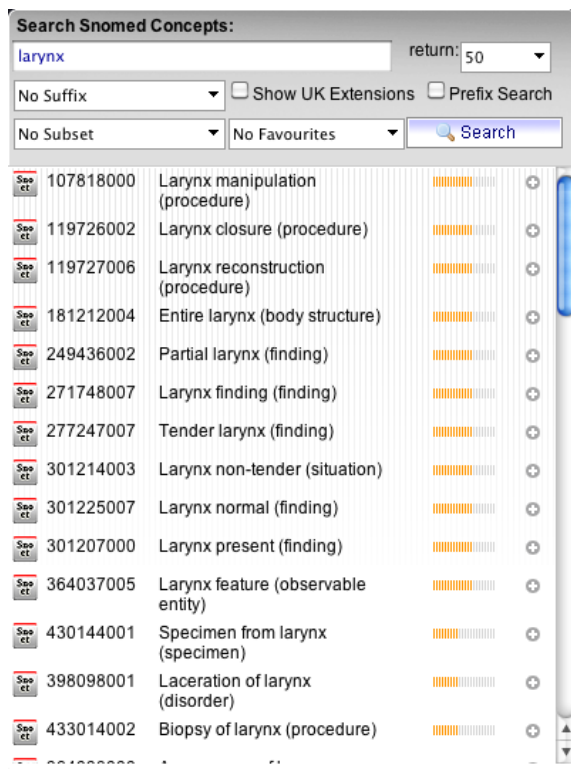
*Note: It is obvious that the full list of known procedures would not be readable if displayed on a single page, and Snoflake caters for this by displaying just 20 at a time. Click the button at the bottom right hand corner of the page and the next 20 procedures will be displayed. Page numbering is displayed to aid navigation.*

**By clicking on any of these concepts – parent or child – you can navigate through the SNOMED CT system.**

## Finding a SNOMED CT concept

Returning to the left hand frame of the screen, you will find the **Keyword Search** mechanism.

If the term **larynx**, for example, is typed into the **Keywords** field and the **Search** button is clicked, a list of concepts containing the term **larynx** is displayed as illustrated below:



From this result set a **Concept ID** – the blue numbers and concept description on the left hand side – can be selected.

The weighting bar at the RHS of each concept indicates the fit of the submitted description with that of the particular concept.

You can see that just searching by keyword can return large result sets. To create a better user experience Dataline has input several filters giving you more control over the searches you perform.

Selecting a **Suffix** from the dropdown list – for example, **procedure** or **finding** – will filter the number of records displayed in the result set by that particular suffix.

**Show UK Extensions** - ticking this box includes the UK extension of Snomed CT Concepts in your search.

**Prefix Search** - ticking this box enables prefix searching within the keyword search

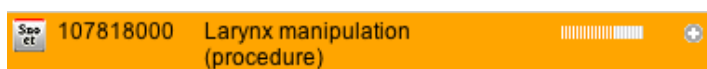
field. This allows the user to search single or multiple words in a shorter and more efficient time frame than before. For example if I was looking for the Concept ID to 'Larynx Manipulation', instead of typing out the full description I would simply type 'lar' and 'man' (minimum of the first 3 characters). The prefix searching algorithm returns me all concepts containing 'lar' and/or 'man' with a weighting so the top search results are those that match my search criteria the closest.

**Subset** – Selecting a **Subset** filters your result string to those concepts only found within that subset.

**Favourites** - allows the user to filter the results by their own library of pre selected concepts. This will be covered further on in the documentation.

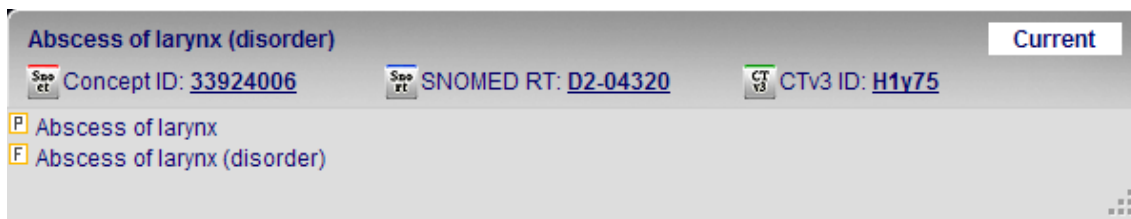
*Note: Multiple keywords can be entered to reduce the result set and the number of items listed will depend upon the **return** number selected.*

From this result set a **Concept ID** ( the numbers and concept description on the left hand side) can be selected.



The weighting bar at the RHS of each item indicates the fit of the submitted description with that particular concept.

For this example the concept selected is **33924006 - Abscess of larynx (disorder)**.



As a result the upper part of the right hand frame displays as above, showing (in order working down the page):

1. The full concept description, and its status (current in this case)
2. The concept ID (number)
3. The equivalent legacy codes for both SNOMED RT & CTV3
4. The descriptive terms used to describe the concept - in this example there are just two.

The term types are signified by:

P = Preferred term, S = Synonym, H = Homonym, F = Fully specified and U = Unspecified

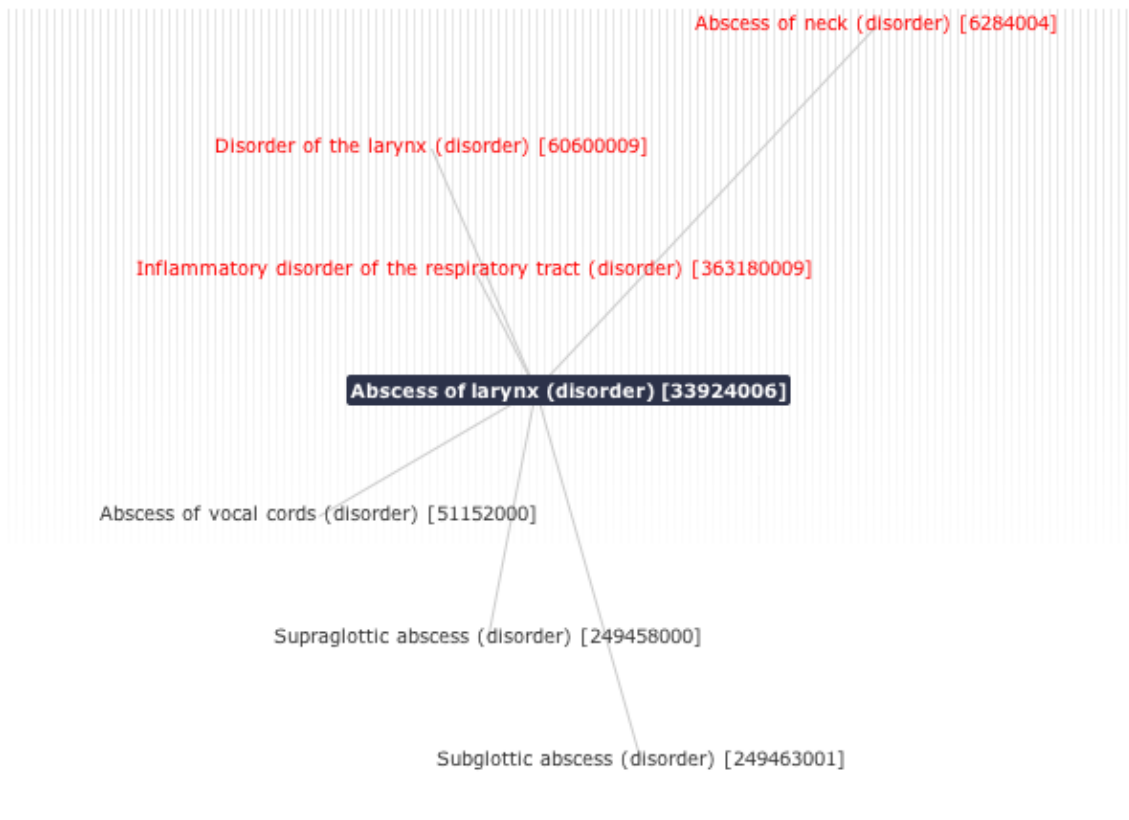
In this particular case the Preferred & Full types are indicated to be in use.

*Note. Each **Term** used as a **Concept description** has its own SNOMED CT code as shown in the screenshot above and in fact every entity within the SNOMED CT thesaurus has a code.*

See et	1282001	Perichondritis of larynx (disorder)		⊕
See et	28709001	Cellulitis of larynx (disorder)		⊕
See et	33924006	Abscess of larynx (disorder)		⊕
See et	32497008	Fracture of larynx (disorder)		⊕
See et	32090000	Injection of larynx (procedure)		⊕

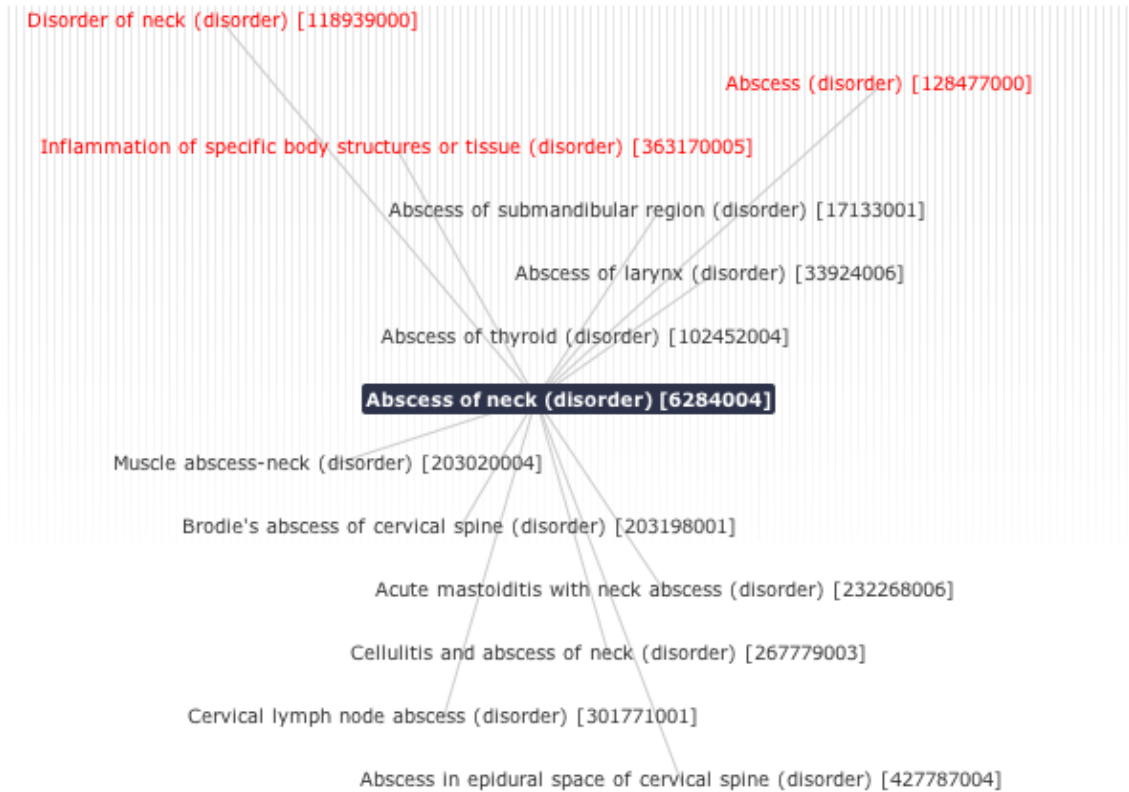
To view **Concept ID** in the **Snoflake** – Move the cursor over any of your search results and the **Concept ID** and description will highlight orange.

If the highlighted area is clicked, the selected concept is displayed in the right hand frame as shown below.



Note: The **Concept** is in bold font and it can be seen that it has **3 Child** and **3 Parent** concepts.

Clicking on the **Abscess of neck (disorder)** parent node takes the user one step up the polyhierarchy so that this particular concept is displayed with its own relationships – **3 parents** and **9 Children** - as shown below:



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











## Favourite Concepts – Creation & Management


Users can create a library system where their most used concepts can be stored and maintained for quick and easy access.

If we return to the search and selection stage as described earlier and illustrated again here. The right-hand  button adjacent to the **Concept ID** can be clicked to save the displayed concept in a **Favourites** folder.

	32090000	Injection of larynx (procedure)		
	32497008	Fracture of larynx (disorder)		
	33924006	Abscess of larynx (disorder)		
	51599000	Edema of larynx (disorder)		
	61169001	Obstruction of larynx (disorder)		











Clicking on the button changes the highlighted frame as below:

	1282001	Perichondritis of larynx (disorder)		
	28709001	Cellulitis of larynx (disorder)		
	33924006	Abscess of larynx (disorder)		
Add folder:		<input type="text" value="Folder #1"/>		<a href="#">Add</a>
	51599000	Edema of larynx (disorder)		

Clicking the  **Add** hyperlink will save this concept in the selected folder.

If you have more than 1 folder in your favourites you can select the relevant folder using the drop down select box as seen on the left here.

A confirmation message is displayed as shown below:

	1282001	Perichondritis of larynx (disorder)		
	28709001	Cellulitis of larynx (disorder)		
		You have added concept <b>33924006</b> to your favourites		
	51599000	Edema of larynx (disorder)		

*Note. A new user will be automatically provided with a **Folder #1**.*

To edit your **favourites** select the **Account & Favourites** tab in the top left of the screen. Once loaded select your required favourites folder from the top bar. Your favourites will display as below.

**Manage your favourites**

Horsham Folder #1

Folder Name:\* Folder #1 New Save

- 106331006 Administrative/managerial worker (occupation)
- 119726002 Larynx closure (procedure)
- 84914008 School administrator (occupation)
- 48176007 Social context (social concept)
- 106541005 Worker (occupation)

Delete selected Download Folder (csv format)

**Favourites** are displayed in the right hand frame.

This screen can be used to create and manage a folder system for your favourites.

To add a new folder click the **New** button to the right of the **Folder Name** field, type your new folder name and click the **Save** Button.

To remove an entry first tick the tick-box adjacent to the **Concept ID** and then click the **delete selected** button.

A new feature of Snoflake 3.5 is the ability to download your favourite folder. Simply select the favourite folder you would like to download and click the **download folder** button, this will now download in csv format.

**Your Account Details Management** (displayed in the left frame)

You can edit your details by clicking on the **Account & Favourites** tab on the main menu.

Details available to edit include the following

- **Name**
- **Organisation**
- **Email**
- **Phone**
- **Country**

You may edit and save (just click the **Save** button) any of these, however you will NOT be able to edit your password for security reasons. If you need to amend your password, please contact us on [snomed@dataline.co.uk](mailto:snomed@dataline.co.uk) quoting your username.

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