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SNOMED CT® UK Drug Extension Model

Document management

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Contents

1 About this Document

Purpose

This document specifies the Data Model for the SNOMED CT[1] UK Drug Extension and focuses on the association between the SNOMED CT UK Drug Extension data and the data held in the SNOMED CT International release.

For further information on SNOMED CT there are a number of resources produced by SNOMED International[2] which describe how the content of SNOMED CT should be developed and maintained, these are constantly updated and users should refer to the SNOMED International website (http://snomed.org/doc) for the latest version.

Audience

This document has been written for all those involved in the use and implementation of the SNOMED CT UK Drug Extension. This will include, but is not limited to, dictionary authors, system implementers, and end users. A basic understanding of NHS terminology products and history is assumed.

Acronyms and abbreviations

Acronym	Description
AMP	Actual Medicinal Product. A concept class used in dm+d.
AMPP	Actual Medicinal Product Pack. A concept class used in dm+d.
ARP	Actual Radiopharmaceutical Product. A concept class used in the SNOMED CT UK Drug Extn.
ARPP	Actual Radiopharmaceutical Product Pack. A concept class used in SNOMED CT UK Drug Extn.
Clinical drug	A concept class used in the SNOMED CT International drug data defined as; - An abstract representation of the intended *active ingredient, (basis of strength substance (BoSS), strength, and manufactured dose form* of a drug product.
Concept	A "concept" as referred to in this document is a clinical meaning identified by a unique numeric identifier (Concept ID) that never changes. Concepts are represented by a unique human-readable Fully Specified Name (FSN). The concepts are formally defined in terms of their relationships with other concepts. These "logical definitions" give explicit meaning which a computer can process and query on. Every concept also has a set of terms that name the concept in a human-readable way.

[1] SNOMED® and SNOMED CT® are registered trademarks of the International Health Terminology Standards Development Organisation (IHTSDO)® (www.snomed.org). SNOMED CT® was originally created by the College of American Pathologists.

[2] SNOMED International is the trading name of the International Health Terminology Standards Development Organisation (IHTSDO), but references thereafter should be to SNOMED International

Concept ID	The unique identifier (code) for each SNOMED CT concept. Refer to the SNOMED CT Release File Specification for a full explanation of how this identifier is structured.
CTv3	Clinical Terms Version 3. A clinical terminology developed in the UK for use in electronic health records. This terminology is no longer maintained or updated.
Description	The human-readable phrases or names associated with SNOMED CT concepts. All of the concept descriptions in SNOMED CT are listed in the Descriptions Table.
Description ID	An SCTID that uniquely identifies a Description. Refer to the SNOMED CT Release File Specification for a full explanation of how this identifier is structured.
dm+d	NHS Dictionary of Medicines and Devices
EDQM	European Directorate for Quality of Medicines. https://www.edqm.eu/
Extension	Extensions are complements to a released version of SNOMED CT. Extensions are components that are created in accordance with the data structures and authoring guidelines applicable to SNOMED CT.
Fully defined concept	SNOMED CT concepts are either primitive or fully defined. A concept is primitive when its modelling (attributes and parents) does not fully express its meaning. Fully defined concepts can be differentiated from their parent and sibling concepts by virtue of their relationships. Primitive concepts do not have the unique relationships needed to distinguish them from their parent or sibling concepts.
FSN	Fully Specified Name - A description that names a concept in a manner intended to be unambiguous.
IHTSDO	International Health Terminology Standards Development Organisation. Please note SNOMED International is the trading name of the International Health Terminology Standards Development Organisation (IHTSDO)
International Release	The SNOMED CT International Release is the data produced and published by SNOMED International
Medicinal product	A concept class used in the SNOMED CT International drug data defined as; - An abstract representation of the intended *active ingredient* for a drug product. It implies that the drug product non-exclusively contains the intended active ingredient specified in the FSN but may also contain other intended active ingredients.
Medicinal product form	A concept class used in the SNOMED CT International drug data defined as; - An abstract representation of the *active ingredient and dose form* for a drug product. It implies that the drug product non-exclusively contains the active ingredient specified in the FSN but may also contain other active ingredients.
NPfIT	National Programme for IT
Preferred Term	Preferred Term (PT) - A description that names a concept in a manner that is intended to capture the common word used by clinicians in the UK.
Reference Set	A reference set or refset is a subset of SNOMED CT components.
Relationship	An association between two Concepts. The nature of the association is indicated by a Relationship Type. Each Relationship is represented by a row in the Relationships Table.

Relationship Type	The nature of a Relationship between two concepts within SNOMED CT. The RelationshipType field indicates the ConceptID for the concept that forms the relationship between two other concepts (ConceptID1 and ConceptID2). SNOMED CT has four types of relationships: Defining characteristics are IS_A relationships and defining attributes. Example: "PROCEDURE-SITE = Liver" is a defining characteristic of Liver biopsy. Qualifying characteristics are non-defining, qualifying attributes. Historical relationships relate inactive concepts to active concepts. For example, a concept may be inactivated because it is a duplicate. In this example a relationship is created when one concept is inactivated and stated to be the "same-as" another concept. Additional relationships are other non-defining characteristics, like PART OF which is retained for backward compatibility with SNOMED RT.
Relationship ID	A SNOMED CT ID that uniquely identifies a Relationship between three concepts: a source concept (ConceptID1), a target concept (ConceptID2), and a relationship type. Each row in the Relationships Table represents a relationship "triplet" (ConceptID1 - RelationshipType - ConceptID2) identified by a RelationshipID. Refer to the SNOMED CT Release File Specification for a full explanation of how this identifier is structured.
RF1	Release Format 1. Prior to April 2018 the SNOMED CT UK Edition and UK Drug Extension was released by the UK National Release Centre (UK NRC) in two formats. This data format is no longer supported.
RF2	Release Format 2. The SNOMED CT UK Edition and UK Drug Extension is currently released by the UK National Release Centre (UK NRC) in RF2 format. The release is provided as a 'Supported Product' in line with the UK NTC Product Development Lifecycle criteria. Further details on the release formats can be found in the SNOMED International Technical Implementation Guide and the SNOMED International SNOMED CT Starter Guide.
RTF	Radiopharmaceutical Trade Family
RTFG	Radiopharmaceutical Trade Family Group
SNOMED CT	SNOMED CT is a terminology used by health and care professionals to record and share information via electronic patient record (EPR) systems to support the provision of care.
SNOMED International	SNOMED International is the trading name of the International Health Terminology Standards Development Organisation (IHTSDO)
SCT ID	SNOMED CT Identifier
TF	Trade Family. A concept class used in SNOMED CT UK Drug Extn.
TFG	Trade Family Group. A concept class used in SNOMED CT UK Drug Extn.
UK NRC	UK National Release Centre formerly known as the UK Terminology Centre (UKTC)
VMP	Virtual Medicinal Product. A concept class used in dm+d.

VMPP	Virtual Medicinal Product Pack. A concept class used in dm+d.
VRP	Virtual Radiopharmaceutical Product. A concept class used in SNOMED CT UK Drug Extn.
VRPP	Virtual Radiopharmaceutical Product Pack. A concept class used in SNOMED CT UK Drug Extn.
VRM	Virtual Radiopharmaceutical Moiety. A concept class used in SNOMED CT UK Drug Extn.
VTM	Virtual Therapeutic Moiety. A concept class used in dm+d.

Notation

Character	Name	Description
:=	Definition	The symbol on the left can be replaced by the expression on the right.
;	Terminating character	This identifies the end of a rule (called a "production rule")
|	Logical OR	A choice, with alternative items separated by this symbol.
[…]	Optional	Encloses optional items.
{ … }	Optional and repeatable	Encloses optional items that can be repeated zero or more times.
(…)	Arrangement in groups	Encloses items that need to be grouped together.
" … "	Double quotation	A terminal expression (i.e. characters that appear exactly as shown).
(* … *)	Comment	Encloses a comment (i.e. the characters inside are not part of the expression).
-	Exception	An exception to the rule.

Related Documents

1.	NHS Dictionary of Medicines and Devices – Editorial Policy Available at https://www.nhsbsa.nhs.uk/pharmacies-gp-practices-and-appliance-contractors/dictionary-medicines-and-devices-dmd
2.	SNOMED CT Starter Guide.
3.	SNOMED CT Technical Implementation Guide.
4.	SNOMED CT Release File Specification.

SNOMED CT documentation produced by SNOMED International describes how the content of SNOMED CT should be developed and maintained, these are constantly updated and users

should refer to the SNOMED International website (http://snomed.org/doc) for the latest version.

2 Introduction

Need for Standardisation

The NHS dictionary of medicines and devices (dm+d) has been developed for use throughout the NHS (in hospitals, primary care and the community) as a means of uniquely identifying the specific medicines or devices used in the diagnosis or treatment of patients. dm+d will be used as the underlying set of descriptors, codes and relationships wherever medicines and devices data is entered, processed or stored. Prior to dm+d there has been no common, standardised vocabulary for medicinal products for the UK. Lack of standardisation does not allow interoperability between diverse clinical systems or allow effective decision support through linkage of data. The case for change is driven at a strategic level by the need to underpin and support key national initiatives by providing a unique and unambiguous identifier.

Integration with SNOMED CT

The history of the development of dm+d required that a standalone entity be produced to allow implementation in systems independent of the strategic clinical terminology solution the NHS was committed to – SNOMED CT. However, even in taking this decision the importance of seamless integration with SNOMED CT was recognised and as a result all unique identifiers used in dm+d are SNOMED CT identifiers.

Feedback from stakeholders at the time of the inception of dm+d consistently pointed to the requirement to integrate dm+d into SNOMED CT. One of the key reasons for this feedback was a requirement to implement a single terminology structure from root node to Actual Medicinal Product Pack (AMPP). Furthermore, representation within the SNOMED CT file structures would provide benefit of a full concept history, something not provided by the dm+d XML format.

From a strategic perspective it was important both to the implementation of National Health Service clinical systems and for the internationalisation of its terminological structures that dm+d be seen as the SNOMED CT UK Drug Extension.

SNOMED CT Extensions

The Extension mechanism is a structure that enables authorised organisations to add Concepts, Descriptions, Relationships and Refsets to complement the International content of the SNOMED CT International Release. One example of the Extension mechanism is for extensibility of SNOMED CT for the specialised terminology needs such as medicine and device terminology.

3 Overview of The SNOMED CT UK Drug Extension

The SNOMED CT UK Drug Extension now comprises NHS Dictionary of Medicines and Devices (dm+d) derived content as well as unique content that is out of scope of dm+d and also content derived from Clinical Terms Version 3 (CTv3) .

The NHS dm+d, as the NHS preferred drug terminology is the basis for all medicine and device codes forming the SNOMED CT UK Drug Extension. Data contained in the UK Drug Extension

files is a subset of the data in the original dm+d XML format data. The five main concept classes (VTM, VMP, AMP, VMPP and AMPP) are fully included. However not all of the attributes and associations from the XML format are replicated in the UK Drug Extension data.

At its simplest SNOMED CT is a three table terminology (Concepts, Descriptions and Relationships) designed to comply with all the principles of good terminology practice; at its simplest dm+d (XML format) is a nine table (five main concept classes plus associated data) dictionary designed to support the business processes of the NHS and comply with good vocabulary practice wherever possible. Translation of dm+d into the UK Drug Extension involves representing these nine tables in the three table SNOMED CT format.

Translation of dm+d XML data into the SNOMED CT UK Drug Extension provides dm+d concepts with: -

- Fully Specified Name and UK preferred term for each concept;
- A valid SNOMED CT Description ID for each description (e.g. Fully Specified Name or Synonym) associated with a dm+d concept;
- Relationships to International Release SNOMED CT. Each dm+d concept will have a SNOMED CT defined relationship either to an appropriate supertype concept in the SNOMED CT International Release or to another dm+d concept that is itself linked (directly or indirectly) to a SNOMED CT International Release concept;
- Inherited defining relationships (where appropriate);
- Specific defining relationships. Relationships to other International Release defined concepts;
- Historical relationships that are represented by refsets

In addition to the data from the original XML format dm+d two extra concept classes are included in the SNOMED CT UK Drug Extension data. These are the Trade Family (TF) and Trade Family Group (TFG) and are provided to facilitate system vendors in their implementation of dm+d.

The SNOMED CT UK Drug Extension Model

The SNOMED CT UK Drug Extension represents each of the dm+d concept classes. Each concept class has a set of attributes. The concept classes also have a number of relationships with other concept classes as depicted in the diagram below. Details of the relationships and attributes can be found in section 3.5 The SNOMED CT UK Drug Extension Components.

The dm+d concept classes are:

- Virtual Therapeutic Moiety (VTM)
- Virtual Medicinal Product (VMP)
- Virtual Medicinal Product Pack (VMPP)
- Actual Medicinal Product (AMP)
- Actual Medicinal Product Pack (AMPP)

Concept classes are also created in the SNOMED CT UK Drug Extension. They are:

- Trade Family (TF) a concept class within the products hierarchy
- Trade Family Group (TFG) is a Qualifier Value concept and therefore forms part of a different hierarchy within SNOMED CT.

Additional concept classes are also created to represent the radiopharmaceuticals content that is not in dm+d but only in the SNOMED CT UK Drug Extension. See section 10 of this document for further details.

Further concept classes may be added as new use cases are identified.

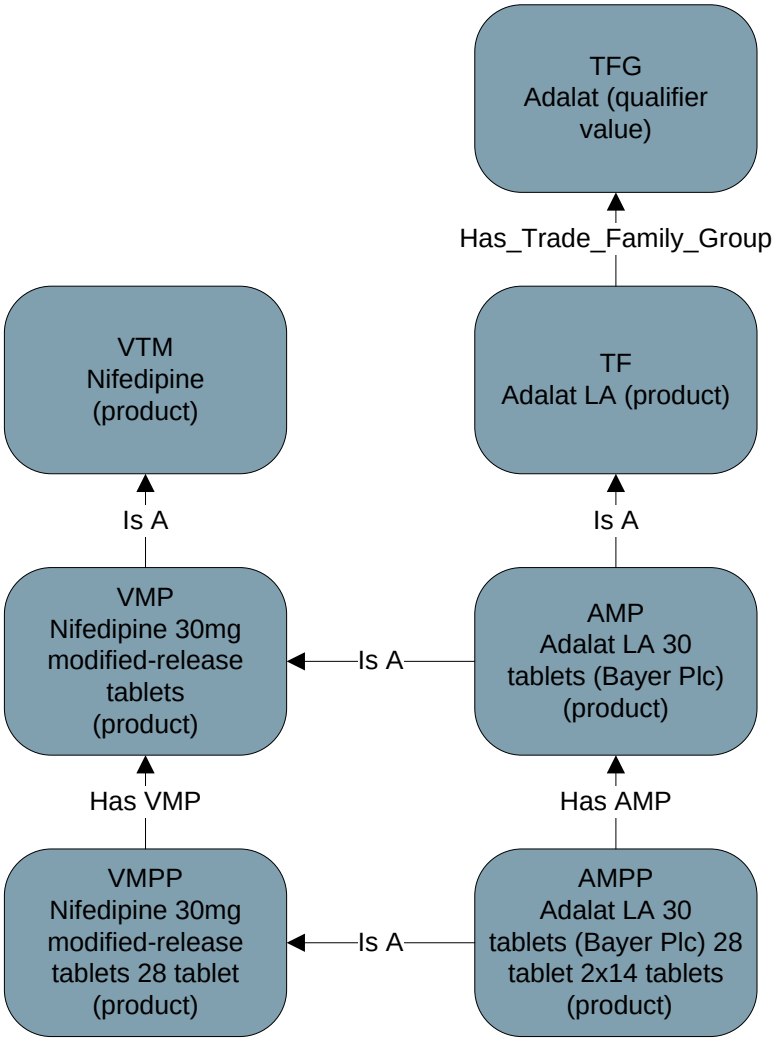


Figure 1

A model for the representation of all medical devices in the SNOMED CT UK drug extension is not currently defined. However, some medical devices (in addition to the appliances in dm+d) have now been populated in the SNOMED CT UK Drug extension. The model used for these is developed on a case by case basis to support the identified use cases. (For further information see modelling of breast implants and also mesh and matrices concepts.)

SNOMED International is continuing to work with the UK Terminology Release Centre and other stakeholders to develop a model for devices. It is anticipated that when this is completed the UK will look to harmonise any existing content with the International model.

4 Creation of the SNOMED CT UK Drug Extension

General Principles

- Existing SNOMED CT relationships are utilised where possible and where they will not result in inheritance issues.
- 'Medicines' from dm+d will be placed in the pharmaceutical/biological product (product) hierarchy and 'devices' (appliances) from dm+d in the physical object (physical object) hierarchy. Please note that this document currently only details editorial rules for medicines. The representation of appliance information is currently under development and will therefore not be represented in SNOMED CT format at this time.
- The distinction between 'medicine' and 'device' in dm+d is based on licensing. Products one may clinically assert to be medicines (e.g. synovial fluid injections), due to their licensing, would appear to be devices on first, simple extraction from dm+d. Author intervention will be required to place these concepts in the clinically intuitively correct hierarchy (i.e. (product)). This may result in some of the attributes remaining unpopulated
  e.g. HAS_SPECIFIC_ACTIVE_INGREDIENT being unpopulated for such concepts.
- A dm+d realm description refset identifies the dm+d term as the preferred term for the five concept classes derived from the XML data. This is due to an implementation requirement that the dm+d term for a concept be presented as the preferred term for that concept in SNOMED CT when used in the UK. N.B. There a small number of concepts in the qualifier value hierarchy that are also utilised in dm+d and where the dm+d derived term is not considered suitable for use in prescribing systems. For these, work with NPfIT work streams has provided a Preferred Term that is more appropriate for use in interface systems.
- Five concept classes five are derived from dm+d (VTM, VMP, AMP, VMPP and AMPP) and two created specifically for the SNOMED CT UK Drug Extension (TF and TFG). Each concept class is represented individually as a refset.

Main translation points

The following section highlights the changes required to dm+d data to create a structurally compliant extension of SNOMED CT known as the SNOMED CT UK Drug Extension.

- Addition of high level concepts for each concept class (see Figure 2).

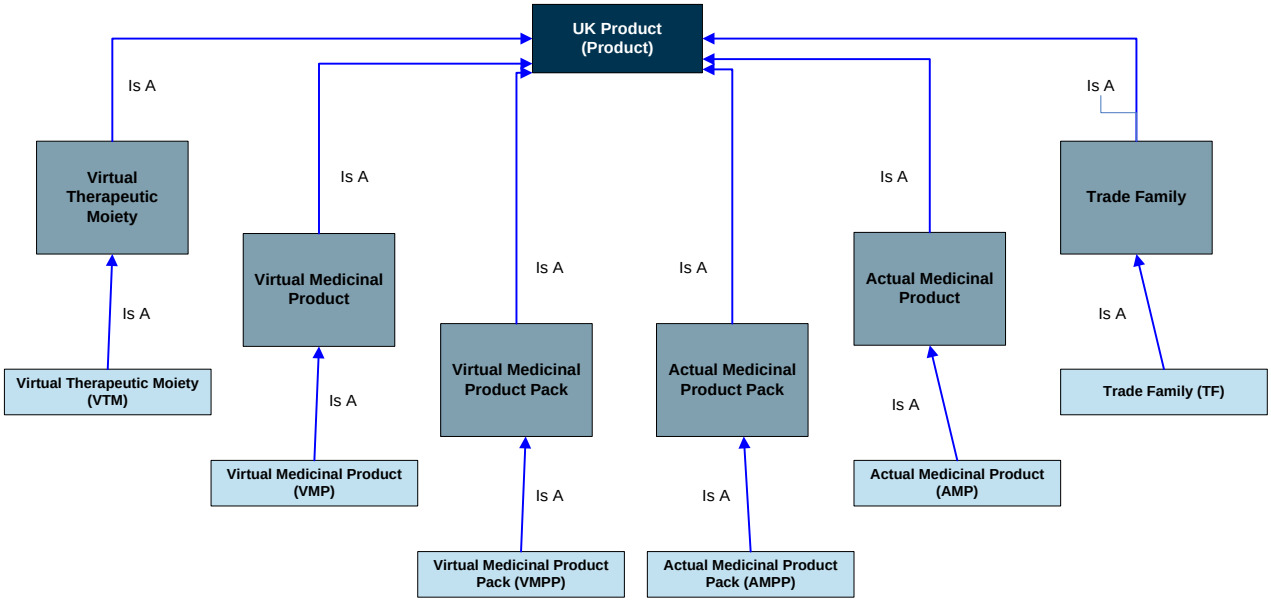


Figure 2

- Product containing only atenolol (product) IS_A Product containing atenolol (medicinal product) IS_A Product containing beta-1 adrenergic receptor antagonist (product) IS_A Product containing beta adrenergic receptor antagonist (product) IS_A Medicinal product categorized by disposition (product)
- Reference to cardinalities removed. There is currently no mechanism to represent cardinality constraints in SNOMED CT.
- Refsets created to represent each of the five dm+d derived concept classes VTM, VMP, AMP, VMPP and AMPP.
- Removal of the PRODUCT_ASSERTED_FREE_FROM relationships. Inclusion of a PRODUCT_ASSERTED_FREE_FROM relationship would create a SNOMED CT International Release relationship that included embedded negation. In terms of ontology engineering and description logic reasoning over negation can be problematic and should therefore be avoided. These concepts are represented using refsets.
- HAS_SPECIFIC_ACTIVE_INGREDIENT. A UK extension specific relationship of HAS_SPECIFIC_ACTIVE_INGREDIENT is used to identify the active ingredient (s) exported from the dm+d XML data. This differs from the active ingredient attribute values already defined in the International Release of SNOMED CT. Provenance will be denoted by the UK relationship Id.
- Dates held in SNOMED CT format (e.g. '*VTM identifier date*', '*non-availability status date*', '*Discontinued flag change date*' etc). The dates are exported from the XML data and are therefore consistent with the date with which the change was made.
- Information held within a terminology must be always and necessarily true. Therefore, in the creation of the SNOMED CT UK Drug Extension, some information associated with dm+d derived concepts is removed. For example, route of administration is not always the same for equivalent products with different manufacturers (depending on a particular product's licence). Similarly, information pertaining to cost fluctuates and cannot be said to be true for all related VMPs and AMPs.

- Creation of two additional concept classes - Trade Family (TF) and Trade Family Group (TFG) and represented as refsets.
- 10363001000001101 | Has NHS dm+d (dictionary of medicines and devices) basis of strength substance (attribute) is the attribute used to identify the ingredient (s) exported from the dm+d XML data. This may differ from the has basis of strength substance attribute values already defined in the International Release of SNOMED CT which uses the attribute 732943007 | Has basis of strength substance (attribute). Provenance will be further denoted by the UK relationship Id.

5 The SNOMED CT UK Drug Extension Components

These descriptions are SNOMED CT descriptions and are subject to the same rules and constraints.

Concepts

A ‘concept’ is a clinical meaning identified by a unique numeric identifier (Concept ID) that never changes. Each concept is represented by a unique human readable Fully Specified Name (FSN). The concepts are formally defined in terms of their relationships with other concepts. These ‘logical definitions’ give explicit meaning which a computer can process and query on. Every concept also has a set of terms (descriptions) that name the concept in a human readable way.

Each concept has a unique Concept ID. Concept IDs do not contain hierarchical or implicit meaning although it does indicate if the concept is from the International Release or a National Extension.

Descriptions

Concept descriptions are the terms or names assigned to a SNOMED CT concept. “Term” in this context means a phrase used to name a concept. A unique Description ID identifies a description. Multiple descriptions might be associated with a concept identified by one ConceptID. Each description has a unique Description ID.

Relationships

The SNOMED CT UK Drug Extension will use SNOMED CT relationships and specific SNOMED CT UK Drug Extension relationships which link concepts within SNOMED CT (both International Release and National Extensions). Every active concept (except the SNOMED CT ‘Root’ concept) has at least one IS_A relationship to a supertype concept.

IS_A relationships are also known as ‘Supertype-Subtype’ relationships or ‘parent-child’ relationships. IS_A relationships are the basis of SNOMED CT hierarchies.

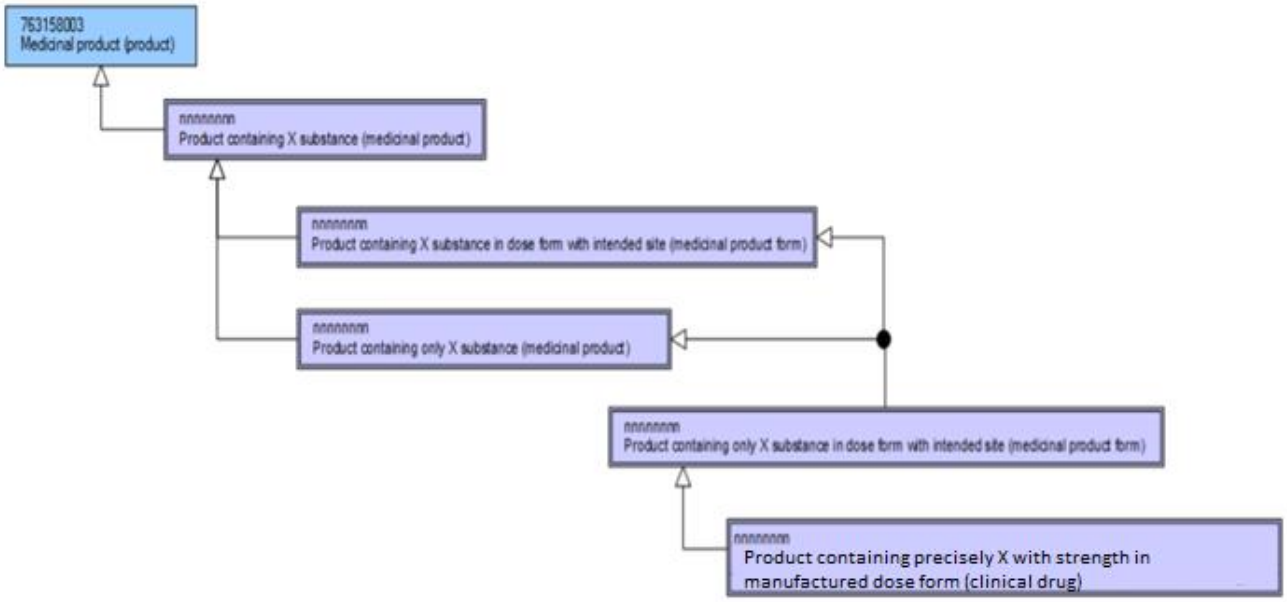
Attribute relationships relate two concepts and establish the type of relationship between them. Together with IS_A relationships they are considered defining characteristics since they allow the logical representation of the meaning of a concept by establishing relationships with other concepts. A logical concept definition includes one or more supertypes (modelled with IS_A relationships), and a set of defining attributes that capture the semantics of a concept to help differentiate it from other concept definitions, including its supertypes.

Relationship Types	**Relationship source**
is a	SNOMED CT
pending move	SNOMED CT
has VMP	SNOMED CT UK Drug Extension
has AMP	SNOMED CT UK Drug Extension
has trade family group	SNOMED CT UK Drug Extension
has specific active ingredient	SNOMED CT UK Drug Extension

has dispensed dose form	SNOMED CT UK Drug Extension
has excipient	SNOMED CT UK Drug Extension
Is component of	SNOMED CT UK Drug Extension
Prescribing status	SNOMED CT UK Drug Extension
Non-availability indicator	SNOMED CT UK Drug Extension
Legal category	SNOMED CT UK Drug Extension
Discontinued indicator	SNOMED CT UK Drug Extension
Has basis of strength substance	SNOMED CT UK Drug Extension
Has unit of administration	SNOMED CT UK Drug Extension
Has NHS dm+d basis of strength substance	SNOMED CT UK Drug Extension

6 SNOMED CT International Drug Model

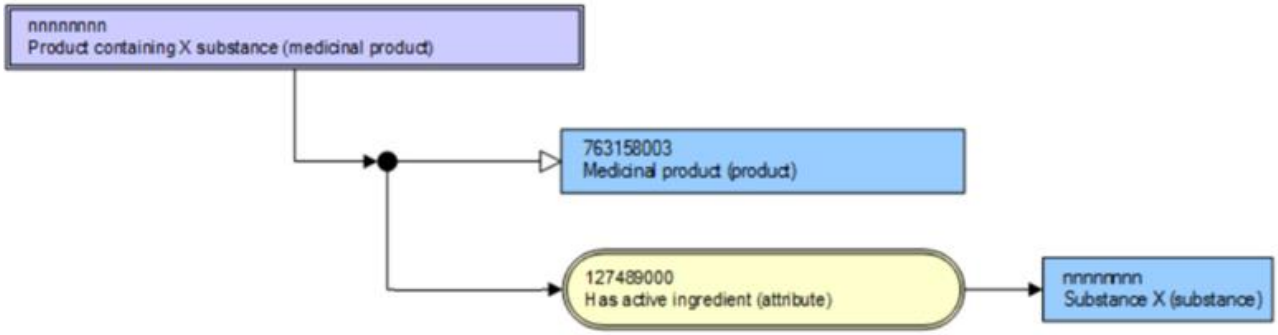
The SNOMED CT International Drug model can be represented as below. There are five concept classes, not all of which are populated at the time of publishing this document (August 2018).



Medicinal Product

The least granular concept class is that of Medicinal Product.

An abstract representation of the intended *active ingredient* for a drug product. It implies that the drug product non-exclusively contains the intended active ingredient specified in the FSN but may also contain other intended active ingredients.



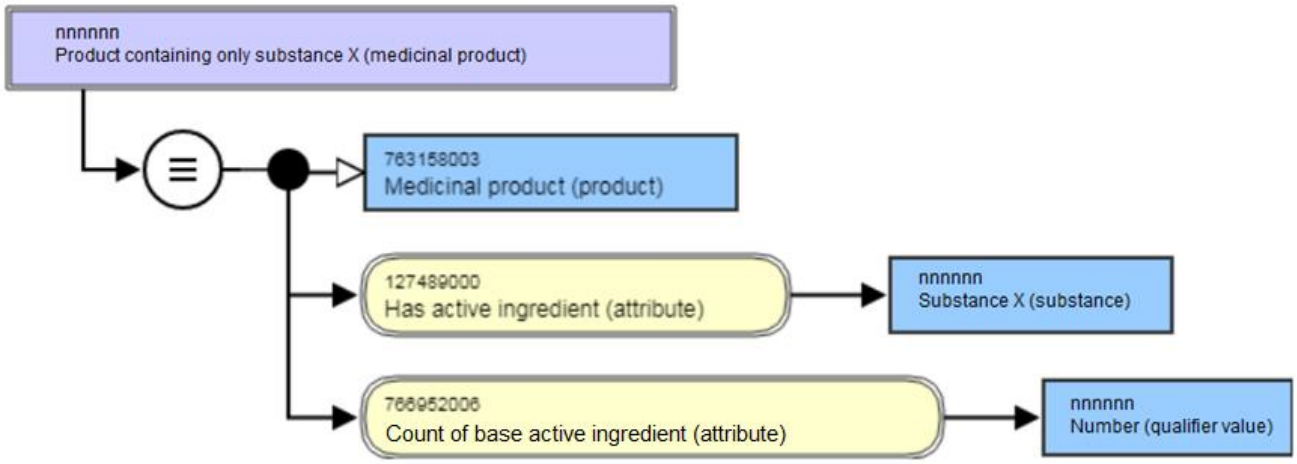
For full information about the modelling of this concept class see the SNOMED International release documentation which can be found at https://confluence.ihtsdotools.org/pages/viewpage.action?pageId=33492839.(It may be necessary to request access from SNOMED International to the confluence pages.)

And is modelled using existential modelling. In other words, this concept of X (medicinal product) represents medicines containing at least X.

dm+d does not have an equivalent concept class.

Medicinal Product (containing only)

As at August 2018 concept class not yet populated.

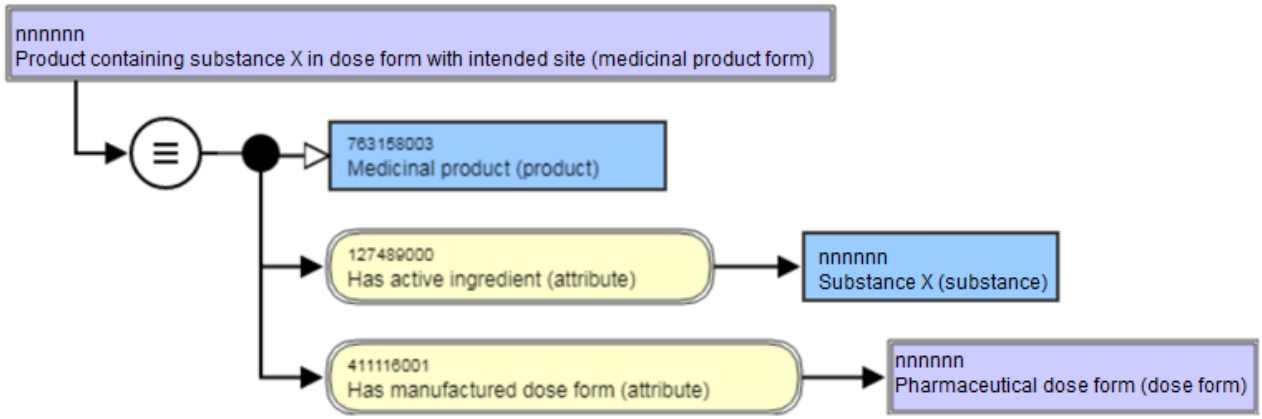


This concept class represents products containing at least “X”. Meaning that descendants may contain only “X” or may contain “X” along with other active ingredients.

This is different from the modelling used in dm+d where the concept of X (product) represents medicines containing only “X”.

Medicinal Product Form

An abstract representation of the *active ingredient and dose form* for a drug product. It implies that the drug product non-exclusively contains the active ingredient specified in the FSN but may also contain other active ingredients.

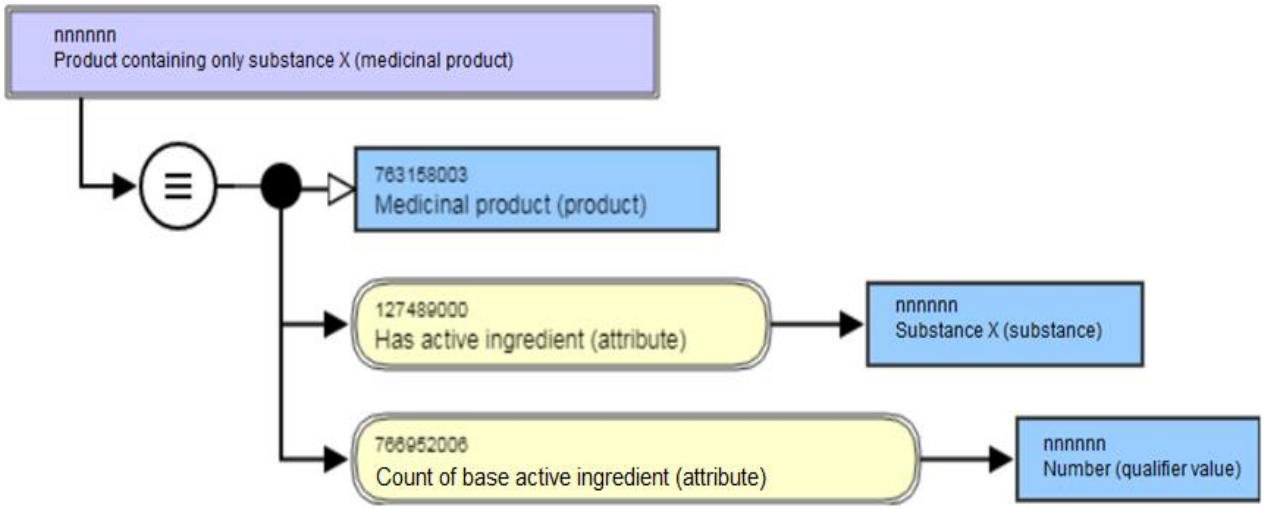


And is modelled using existential modelling. In other words, this concept of X (medicinal product form) represents medicines containing at least X.

dm+d does not have an equivalent concept class.

Medicinal Product Form (containing only)

As at August 2018 concept class not yet populated.



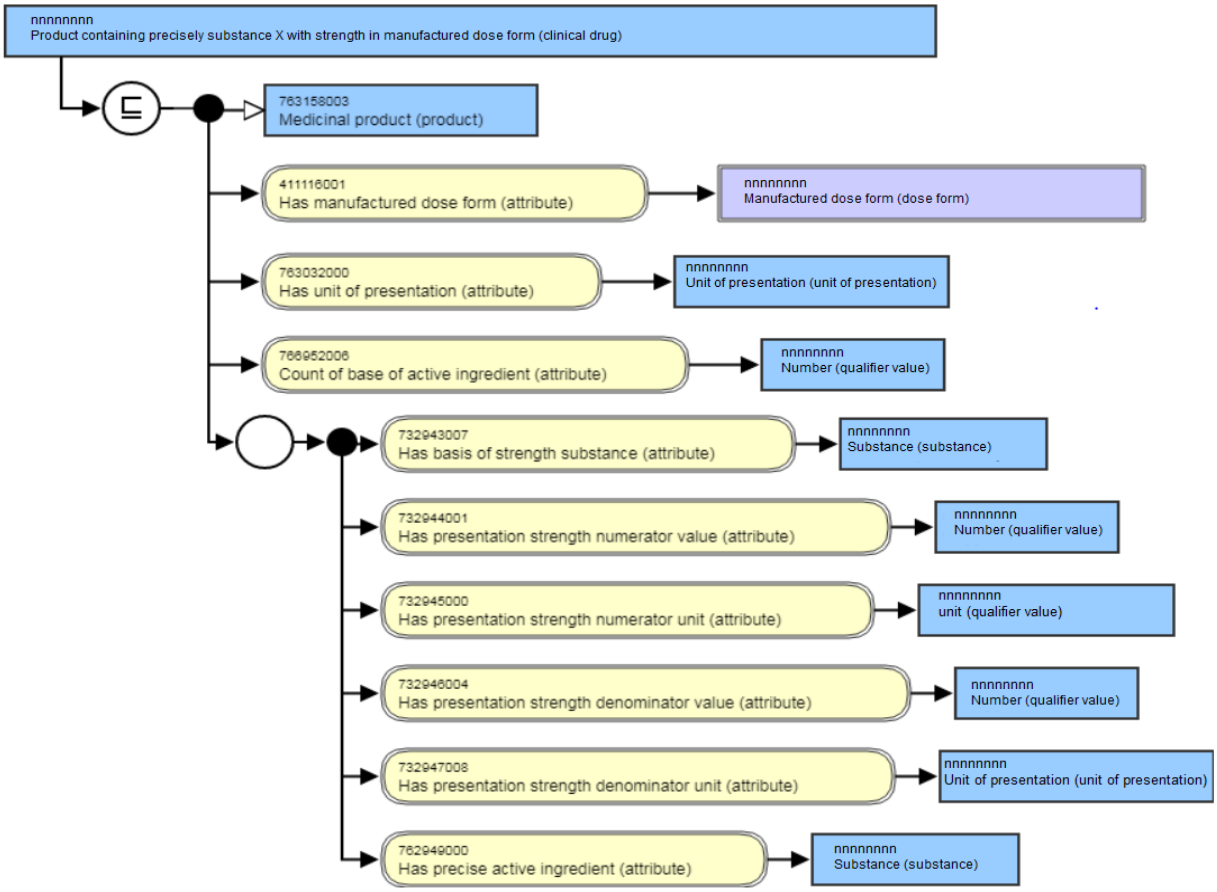
This concept class where the concept of X (medicinal product form) represents medicines containing only X.

dm+d does not have an equivalent concept class since there is no HAS_INGREDIENT or ingredient count modelled for VTM concepts in dm+d.

Clinical Drug

The most granular concept class is that of Clinical Drug.

An abstract representation of the intended active ingredient, (basis of strength substance (BoSS), strength, and manufactured dose form of a drug product.



This concept class represents medicines containing only X.

In dm+d the Virtual Medicinal Product concept class is equivalent to Clinical Drug in the SNOMED CT International data.

7 dm+d concept associations in SNOMED CT format

Virtual Therapeutic Moiety (VTM)

VTM concepts in dm+d have a semantic meaning of “contains only”. This means that the dm+d VTM concepts (even when they may appear as texturally identical) are not semantically equivalent to the SNOMED CT Medicinal Product concepts.

VTM Concepts		
All dm+d derived VTM concepts will be members of a VTM refset. Provenance is denoted by UK refset ID		
Descriptions / ID	**Type**	**Occurrence**
VTM_ID	SNOMED CT ID	1
The SNOMED CT concept identifier for the Virtual Therapeutic Moiety (VTM). This identifier will be from the SNOMED CT UK Drug Extension namespace.		
VTM_FSN	string	1
The Fully Specified Name for the Virtual Therapeutic Moiety. This will be in the format “Virtual Therapeutic Moiety (product)”. The semantic tag indicates the semantic category to which the concept belongs.		
VTM_UK_Preferred_Term	string	1
The UK Preferred Term for the Virtual Therapeutic Moiety. For conceptually equivalent concepts, the dm+d term (XML format) may not be the same as the en-GB Preferred Term in SNOMED CT The dm+d realm description refset should be used to identify the current dm+d name as the Preferred Terms where this is required for implementations.		
Relationships		
In the case of hierarchical relationships (i.e. IS_A) only the closest relationship is represented explicitly. The reciprocal relationship is implied together with relationships to its children. All concepts are primitive.		
IS_A		
VTM *(product)* IS_A VTM *(concept class)* i.e. atenolol IS_A VTM IS_A UK_Product IS_A Pharmaceutical/Biological Product This relationship is a SNOMED CT relationship.		

Note: There is no HAS_INGREDIENT or ingredient count modelled for VTM concepts in dm+d so these concepts should not be considered as equivalent to the SNOMED CT International Medicinal Product (containing only) concepts and would be sibling concepts where they exist.

Virtual Medicinal Product (VMP)

VMP Concepts		
All dm+d derived VMP concepts (or where there is an equivalent concept in the International Release then this is used) will be members of a VMP refset. Provenance denoted by UK refset Id		
Descriptions	**Type**	**Occurrence**
VMP_ID	SNOMED CT ID	1
The SNOMED CT concept identifier for the Virtual Medicinal Product (VMP). This identifier will either be from SNOMED CT International release or where applicable from the SNOMED CT UK Drug Extension namespace.		
VMP_FSN	string	1
The Fully Specified Name for the Virtual Medicinal Product. This will be in the format “Virtual Medicinal Product (product)”.		
VMP_UK_Preferred_Term	string	1
The UK Preferred Term for the Virtual Medicinal Product. For conceptually equivalent concepts, the dm+d term (XML format) may not be the same as the en-GB Preferred Term in SNOMED CT The dm+d realm description refset should be used to identify the current dm+d VMP name as the Preferred Terms where this is required for implementations.		
Relationships		
In the case of hierarchical relationships (i.e. IS_A) only the closest relationship is represented explicitly. The reciprocal relationship is implied together with relationships to its children. Other relationships further define the concept. All concepts are primitive.		
IS_A		

VMP *(product)* IS_A VMP *(concept class)* E.g. atenolol 100mg tablets IS_A VMP VMP IS_A VTM E.g. [Atenolol 100mg tablets] IS_A Atenolol (product) The IS_A relationship is a SNOMED CT relationship. Where a relationship to a VTM in dm+d does not exist an additional parent concept should be modelled in SNOMED CT with the parent concept being a SNOMED CT International concept.
HAS_DISPENSED_DOSE_FORM
VMP HAS_DISPENSED_DOSE_FORM Form This relationship HAS_DISPENSED_DOSE_FORM is a UK extension specific relationship and is used to identify the dose form as specified in dm+d. HAS_DOSE_FORM is already defined in SNOMED CT .These relationships are inherited from the SNOMED International release and due to differences in editorial policy may identify a different dose form concept.
HAS_SPECIFIC_ACTIVE_INGREDIENT
VMP HAS_SPECIFIC_ACTIVE_INGREDIENT VPI E.g. Atenolol 100mg tablets [VMP] HAS_SPECIFIC_ACTIVE_INGREDIENT Atenolol (substance) [VPI] where VPI = Virtual Product Ingredient This relationship HAS_SPECIFIC_ACTIVE_INGREDIENT is a UK extension specific relationship and is used to identify the active ingredient as specified in dm+d. HAS_ACTIVE_INGREDIENT relationship is already defined in SNOMED CT. These relationships are inherited from the SNOMED International Release and due to differences in editorial policy may identify a different substance concept.
NON_AVAILABILITY_INDICATOR
This relationship is a UK Extension specific relationship with a set of dm+d permissible values (qualifier values).
PRESCRIBING_STATUS
This relationship is a UK Extension specific relationship with a set of dm+d permissible values (qualifier values).
HAS_NHS_dm+d_BASIS_OF_STRENGTH_SUBSTANCE
This relationship is a UK Extension specific relationship and only exists if the basis of strength substance differs from the substance as stated in the HAS_SPECIFIC_ACTIVE_INGREDIENT relationship.
HAS_UNIT_OF_ADMINISTRATION

This relationship is a UK Extension specific relationship and is only applied to an identified subset of VMP concepts. See the SNOMED CT UK Drug Extension Editorial Policy for details.

Note: Virtual Medicinal Product concepts from dm+d can be considered to be semantically equivalent to the SNOMED CT International concept having the same precise ingredient/ strength/ form/unit of presentation.

Virtual Medicinal Product Pack (VMPP)

VMP Concepts		
All dm+d derived VMPP concepts will be members of a VMPP refset Provenance denoted by UK refset Id.		
Descriptions / Id	**Type**	**Occurrence**
VMPP_ID	SNOMED CT ID	1
Unique identifier for the Virtual Medicinal Product Pack. This identifier will be taken from the SNOMED CT UK Drug Extension namespace.		
VMPP_FSN	string	1
The Fully Specified Name for the Virtual Medicinal Product Pack. This will be in the format “Virtual Medicinal Product Pack (product)”.		
VMPP_UK_Preferred_Term	string	1
The UK Preferred Term for the Virtual Medicinal Product Pack. The dm+d realm description refset should be used to identify the current dm+d VMPP name as the Preferred Term where this is required for implementations.		
Relationships		
In the case of hierarchical relationships (i.e. IS_A) only the closest relationship is represented explicitly. The reciprocal relationship is implied together with relationships to its children. All concepts are primitive. HAS_DISPENSED_DOSE_FORM; HAS_SPECIFIC _ACTIVE_INGREDIENT; PRESCRIBING_STATUS, NON_ AVAILABILITY_INDICATOR HAS_Basis_Of_Strength_Substance are all stated relationships.		
IS_A		
VMPP *(product)* IS_A VMPP *(concept class)* E.g. Atenolol 100mg tablets 28 IS_A VMPP		
HAS_VMP		
VMPP HAS_VMP VMP Atenolol 100mg tablets 28 HAS_VMP Atenolol 100mg tablets		

There is no equivalent concept class in the SNOMED CT International data.

Actual Medicinal Product (AMP)

AMP Concepts		
All dm+d derived AMP concepts will be members of an AMP refset. Provenance denoted by UK refset Id		
Descriptions / Id	Type	Occurrence
AMP_ID	SNOMED CT ID	1
Unique identifier for the Actual Medicinal Product. This identifier will be taken from the SNOMED CT UK Drug Extension namespace.		
AMP_FSN	string	1
The Fully Specified Name for the Actual Medicinal Product. This will be in the format “Actual Medicinal Product (product)”.		
AMP_UK_Preferred_Term	string	1
The UK Preferred Term for the Actual Medicinal Product. The dm+d realm description refset should be used to identify the current dm+d AMP description as the Preferred Term where this is required for implementations.		
Relationships		
In the case of hierarchical relationships (i.e. IS_A) only the closest relationship is represented explicitly. The reciprocal relationship is implied together with relationships to its children. All concepts are primitive. HAS_DISPENSED_DOSE_FORM; HAS_SPECIFIC _ACTIVE_INGREDIENT; PRESCRIBING_STATUS; HAS_BASIS_OF STRENGTH_SUBSTANCE and NON_ AVAILABILITY_INDICATOR are all stated relationships.		
IS_A		

AMP *(product)* IS_A AMP *(concept class)* E.g. Tenormin 100mg tablets (AstraZeneca) IS_A AMP AMP IS_A VMP E.g. Tenormin 100mg tablets (AstraZeneca) *[AMP]* IS_A Atenolol 100mg tablets *[VMP]* Through this relationship, the AMP will inherit defining characteristics such as HAS_SPECIFIC_ACTIVE_INGREDIENT and HAS_DISPENSED_DOSE_FORM. AMP IS_A TF One AMP may have zero to one TF associated with it. E.g. Tenormin 100mg tablets (AstraZeneca) [AMP] IS_A Tenormin [TF]
HAS_EXCIPIENT
AMP HAS_EXCIPIENT Ingredient (substance) Every concept will have an HAS_EXCIPIENT relationship either to an excipient or to a 'not declared' concept. This is a SNOMED CT UK Drug Extension relationship. For information on which excipients (substance) are identified using this relationship see the dm+d Editorial policy.

There is no equivalent concept class in the SNOMED CT International data.

Actual Medicinal Product Pack (AMPP)

AMPP Concepts		
All dm+d derived AMPP concepts will be members of an AMPP refset. Provenance denoted by UK refset Id		
Descriptions / Id	Type	Occurrence
AMPP_ID	SNOMED CT ID	1
Unique identifier for the Actual Medicinal Product Pack. This identifier will be taken from the SNOMED CT UK Drug Extension namespace.		
AMPP_FSN	string	1
The Fully Specified Name for the Actual Medicinal Product Pack. This will be in the format "Actual Medicinal Product Pack (product)".		
AMPP_UK_Preferred_Term	string	1

The UK Preferred Term for the Actual Medicinal Product. The dm+d realm description refset should be used to identify the current dm+d AMPP description as the Preferred Term where this is required for implementations.
Relationships
In the case of hierarchical relationships (i.e. IS_A) only the closest relationship is represented explicitly. The reciprocal relationship is implied together with relationships to its children. All concepts are primitive. HAS_DISPENSED_DOSE_FORM; HAS_SPECIFIC _ACTIVE_INGREDIENT; PRESCRIBING_STATUS, NON_ AVAILABILITY_INDICATOR and HAS_EXCIPIENT are all stated relationships.
IS_A
AMPP *(product)* IS_A AMPP *(concept class)* E.g. Tenormin 100mg tablets (AstraZeneca) 28 IS_A AMPP AMPP IS_A VMPP E.g. Tenormin 100mg tablets (AstraZeneca) 28 [AMPP] IS_A Atenolol 100mg tablets 28 [VMPP] This relationship is a SNOMED CT relationship.
HAS_AMP
AMPP HAS_AMP AMP E.g. Tenormin 100mg tablets (AstraZeneca) 28 [AMPP] HAS_AMP Tenormin 100mg tablets (AstraZeneca) [AMP]
DISCONTINUED_INDICATOR
This relationship is a UK Extension specific relationship with a set of dm+d permissible values (qualifier values).
LEGAL_CATEGORY
This relationship is a UK Extension specific relationship with a set of dm+d permissible values (qualifier values).

There is no equivalent concept class in the SNOMED CT International data.

Trade Family (TF)

TF Concepts
All TF concepts will be members of a TF refset. Provenance denoted by UK refset Id

Descriptions / Id	Type	Occurrence
TF_ID	SNOMED CT ID	1
Unique identifier for the Trade Family. This identifier will be taken from the SNOMED CT UK Drug Extension namespace.		
TF_FSN	string	1
The Fully Specified Name for Trade Family. This will be in the format “Trade Family (product)”.		
TF_UK_Preferred_Term	string	1
The UK Preferred Term for the Trade Family name. In most instances this will be the same as the FSN without the semantic tag. The NHS Realm description refset should be used to identify the current Trade Family description as the Preferred Term where this is required for implementations.		
Relationships		
In the case of hierarchical relationships (i.e. IS_A) only the closest relationship is represented explicitly. The reciprocal relationship is implied together with relationships to its children. All concepts are primitive.		
IS_A		
TF *(product)* IS_A TF *(concept class)* Tenormin IS_A TF TF IS_A UK Product IS_A pharmaceutical/biologic product. TF has reciprocal IS_A relationship with AMP		
HAS_TRADE_FAMILY_GROUP		
TF HAS_TRADE_FAMILY_GROUP TFG This relationship is a UK extension specific relationship with a set of permissible values (qualifier values). One TF may have zero to one Trade Family Group associated with it whereas one TFG may have one to many TF associated with it.		

There is no equivalent concept class in the SNOMED CT International data.

8 Ingredients

Ingredients Concepts		
All Ingredients concepts in dm+d will be will be concepts in the SNOMED CT substances hierarchy.		
Descriptions / Id	Type	Occurrence
Ingredient_ID	SNOMED CT ID	1
This identifier will either be from SNOMED CT International release or where applicable from the SNOMED CT UK Drug Extension namespace.		
Ingredient_FSN	string	1
The Fully Specified Name for Ingredient concept. This will be in the format “Ingredient (substance)”.		
Ingredient_UK_Preferred_Term	string	1
The UK Preferred Term for the Ingredient concept. The dm+d realm description refset should be used to identify the current dm+d Ingredient description as the Preferred Term where this is required for implementations.		
Relationships		
In the case of hierarchical relationships (i.e. IS_A) only the closest relationship is represented explicitly. The reciprocal relationship is implied together with relationships to its children. All concepts are primitive.		
IS_A		
Ingredient IS_A substance (substance)		
IS_Modification		
Where appropriate (as defined by the SNOMED International Editorial guidance for substance concepts) an IS_Modification relationship should be populated for substances creating a relationship between the substance and its base.		

The equivalent concept class is in the SNOMED CT substance hierarchy.

9 Qualifier Value Concepts

Trade Family Group (TFG)

TFG Concepts		
All TFG concepts will be members of a TFG refset. Provenance denoted by UK refset Id		
Descriptions / Id	Type	Occurrence
TFG_ID	SNOMED CT ID	1
Unique identifier for the Trade Family group. This identifier will be taken from the SNOMED CT UK Drug Extension namespace.		
TFG_FSN	string	1
The Fully Specified Name for Trade Family Group. This will be in the format “Trade Family Group (qualifier value)”.		
TFG_UK_Preferred_Term	string	1
The UK Preferred Term for the Trade Family Group. The NHS realm description refset should be used to identify the current Trade Family Group description as the Preferred Term where this is required for implementations.		
Relationships		
In the case of hierarchical relationships (i.e. IS_A) only the closest relationship is represented explicitly. The reciprocal relationship is implied together with relationships to its children. All concepts are primitive.		
IS_A		
TFG IS_A qualifier value		

There is no equivalent concept class in the SNOMED CT International data.

Route of Administration (ROA)

Route of Administration Concepts		
All Route of Administration concepts in dm+d will be will be concepts in the SNOMED CT qualifier value hierarchy.		
Descriptions / Id	Type	Occurrence
ROA_ID	SNOMED CT ID	1
This identifier will either be from SNOMED CT International release or where applicable from the SNOMED CT UK Drug Extension namespace.		

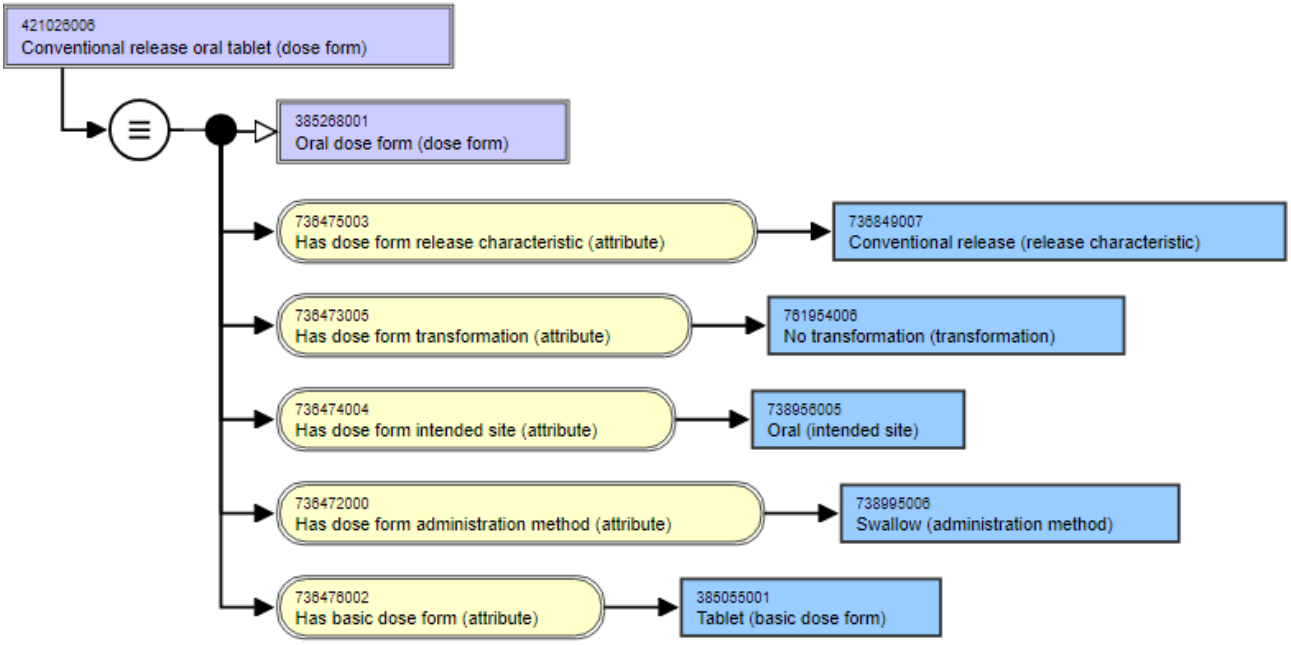
ROA_FSN	string	1
The Fully Specified Name for Route of Administration concept. This will be in the format “Route of Administration (qualifier value)”.		
ROA_UK_Preferred_Term	string	1
The UK Preferred Term for the Route of Administration concept. The dm+d realm description refset should be used to identify the current dm+d Route of Administration description as the Preferred Term where this is required for implementations.		
Relationships		
In the case of hierarchical relationships (i.e. IS_A) only the closest relationship is represented explicitly. The reciprocal relationship is implied together with relationships to its children. All concepts are primitive.		
IS_A		
ROA IS_A Route of administration value (qualifier value)		

All Route of Administration concepts will be from the SNOMED CT qualifier value hierarchy.

Dose Forms

The SNOMED CT International dose forms have been remodelled in line with EDQM dose forms.

For pharmaceutical dose form the SNOMED CT International model is; -



Dose Form Concepts		
All Dose Form concepts in dm+d will be will be concepts in the SNOMED CT qualifier value hierarchy.		
Descriptions / Id	Type	Occurrence
Dose Form_ID	SNOMED CT ID	1
This identifier will either be from SNOMED CT International release or where applicable from the SNOMED CT UK Drug Extension namespace.		
Dose Form_FSN	string	1
The Fully Specified Name for Dose Form concept. This will be in the format “Dose Form (qualifier value)”. Where the concept ID is from The SNOMED CT International Release the semantic tag may be (qualifier value), (basic dose form) or (dose form) dependent upon the level of granularity of the dm+d dose form definition.		
Dose Form_UK_Preferred_Term	string	1
The UK Preferred Term for the Dose Form concept. The dm+d realm description refset should be used to identify the current dm+d Ingredient description as the Preferred Term where this is required for implementations.		
Relationships		
In the case of hierarchical relationships (i.e. IS_A) only the closest relationship is represented explicitly. The reciprocal relationship is implied together with relationships to its children. Dose Form concept in the SNOMED CT International data may be primitive or fully defined.		
IS_A		
Dose Form IS_A 736542009| Pharmaceutical dose form (dose form) or Dose Form IS_A 736478001| Basic dose form (basic dose form) The parent concept allocated depend upon the level of granularity of the dm+d concept.		

Dose form concepts form the SNOMED CT International data will have additional attributes as per the International model above.

Units of Measure (UOM)

Unit of Measure Concepts

All Unit of Measure concepts in dm+d will be will be concepts in the SNOMED CT qualifier value hierarchy.		
Descriptions / Id	**Type**	**Occurrence**
UOM_ID	SNOMED CT ID	1
This identifier will either be from SNOMED CT International release or where applicable from the SNOMED CT UK Drug Extension namespace.		
UOM_FSN	string	1
The Fully Specified Name for Route of Administration concept. This will be in the format “Route of Administration (qualifier value)”.		
UOM_UK_Preferred_Term	string	1
The UK Preferred Term for the Route of Administration concept. The realm description refset should be used to identify the current dm+d Unit of Measure description as the Preferred Term where this is required for implementations.		
Relationships		
In the case of hierarchical relationships (i.e. IS_A) only the closest relationship is represented explicitly. The reciprocal relationship is implied together with relationships to its children. All concepts are primitive.		
IS_A		
UOM IS_A 767524001 | Unit of measure (qualifier value)		

All Unit of Measure concepts are from the SNOMED CT qualifier value hierarchy.

Suppliers

Supplier Concepts		
All Supplier concepts in dm+d will be will be concepts in the SNOMED CT qualifier value hierarchy.		
Descriptions / Id	**Type**	**Occurrence**
SUPPLIER_ID	SNOMED CT ID	1
Unique identifier for the Supplier concept. This identifier will be taken from the SNOMED CT UK Drug Extension namespace.		
SUPPLIER_FSN	string	1
The Fully Specified Name for Supplier concept. This will be in the format “Supplier (qualifier value)”.		
SUPPLIER_UK_Preferred_Term	string	1

The UK Preferred Term for the Supplier. The realm description refset should be used to identify the current dm+d Supplier description as the Preferred Term where this is required for implementations.
Relationships
In the case of hierarchical relationships (i.e. IS_A) only the closest relationship is represented explicitly. The reciprocal relationship is implied together with relationships to its children. All concepts are primitive.
IS_A
Supplier IS_A 2061601000001103 |Suppliers (qualifier value)

All Supplier concepts are from the SNOMED CT qualifier value hierarchy.

10 Radiopharmaceuticals content

The Model

The model for the representation of radiopharmaceuticals in the SNOMED CT UK Drug Extension is a 5 box model using many of the attributes from dm+d. There are the three hierarchical concept classes as shown below in Figure 3. Each Virtual Radiopharmaceutical Product (VRP) and Actual Radiopharmaceutical Product (ARP) concept in the model is also associated with one or more pack concepts (Virtual Radiopharmaceutical Product Pack and Actual Radiopharmaceutical Product Pack).

A limited amount of radiopharmaceuticals content is now added to dm+d. Where there is a sematic duplicate the dm+d concept will persist with the concept originating in the SNOMED CT UK Drug Extension data being inactivated.

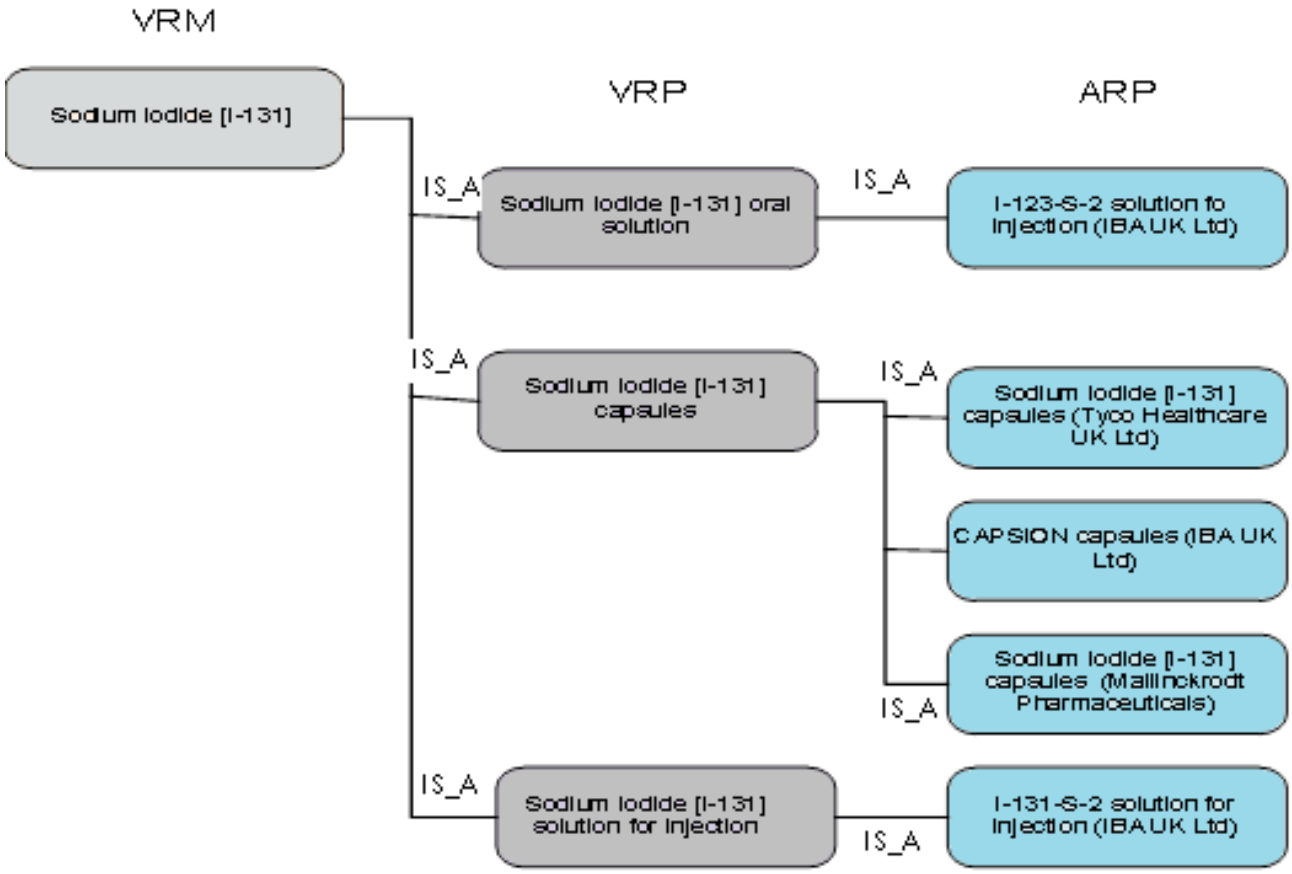


Figure 3: Diagram of the three hierarchical concept classes in the radiopharmaceuticals model

It should be noted that where pre-existing SNOMED CT International concepts are appropriate they will be utilised and not retired in favour of new UK Extension content.

Concept Class Definitions

The following are definitions for the concept classes to be used to represent radiopharmaceuticals in the SNOMED CT UK Drug Extension.

Virtual Radiopharmaceutical Moiety

Description
Virtual Radiopharmaceutical Moieties are created whenever a new concept is authored at that level. Where applicable VRM concepts will be members of a dm+d VTM refset. Provenance is denoted by UK refset ID
Relationships
Child Concept: An instance of Virtual Radiopharmaceutical Moiety will be associated with one or more child concepts. These are implied relationships to its children as these are not stated in SNOMED CT.

Attributes	Type	Occurrence
VRM_ID	**SNOMED CT ID**	**1**
The SNOMED CT identifier for the Virtual Radiopharmaceutical Moiety will be either from the UK Drug Extension or where applicable the SNOMED CT International Release.		
VRM_FSN	**String**	**1**
The Fully Specified Name for the Virtual Radiopharmaceutical Moiety. This will be in the format “Virtual Radiopharmaceutical Moiety (product)”		
VRM_UK_Preferred_Term	**String**	**1**
The UK Preferred Name for the Virtual Radiopharmaceutical Moiety. Where concepts are also present in dm+d this will be the name used in dm+d Where the concept already exists in the International Release there may be a requirement for an International Preferred Term that is in addition to the UK Preferred Term.		
Parent	**SNOMED CT ID**	**1 or more**
The Virtual Radiopharmaceutical Moiety will have one or more “IS_A” relationships to other SNOMED CT concepts. It will also have implied relationships to its children concepts as these are not stated in SNOMED CT. Where applicable the Virtual Radiopharmaceutical Moiety		

Virtual Radiopharmaceutical Product

Description
Virtual Radiopharmaceutical Products are created whenever a new concept is authored at that level. Where applicable VRP concepts will be members of a dm+d VMP refset. Provenance is denoted by UK refset ID
Relationships
Child Concepts. An instance of Virtual Radiopharmaceutical Product will be associated with one or more child concepts. These are implied relationships to its children as these are not stated in SNOMED CT. *Virtual Radiopharmaceutical Product Pack:* An instance of Virtual Radiopharmaceutical Product will be associated with one or more instances of Virtual Radiopharmaceutical Product Pack

Attributes	Type	Occurrence
VRP_ID	**SNOMED CT ID**	**1**
The SNOMED CT identifier for the Virtual Radiopharmaceutical Product. The SNOMED CT ID will be from the UK Drug Extension.		
VRP_FSN	**String**	**1**

The Fully Specified Name for the Virtual Radiopharmaceutical Product will be of the format Radioactive salt [isotope] form unit dose details		
VRP_UK_Preferred_Term	**String**	**1**
The UK Preferred Term for the Virtual Radiopharmaceutical Product. Where concepts are also present in dm+d this will be the name used in dm+d Where the concept already exists in the International Release there may be a requirement for an international preferred name that is in addition to the UK Preferred Term.		
VRP_ HAS_SPECIFIC_ACTIVE_INGREDIENT	**SNOMED CT ID**	**1 or more**
Each Virtual Radiopharmaceutical Product has a “has_specific_active_ingredient” relationship to one or more concepts in the substance hierarchy of SNOMED CT.		
VRP_HAS_DISPENSED_DOSE_FORM	**SNOMED CT ID**	**1**
Each Virtual Radiopharmaceutical Product will have one “has_dispensed_dose_form” relationship to a concept in the qualifier value hierarchy of SNOMED CT.		
Parent	**SNOMED CT ID**	**1 or more**
The Virtual Radiopharmaceutical Product will have one or more “IS_A” relationships to other SNOMED CT concepts. In addition, there will be a link to the concept named “Virtual Radiopharmaceutical Product” via “IS_A” relationship. It will also have implied relationships to its children concepts as these are not stated in SNOMED CT.		
VRP_Non-availability indicator	**SNOMED CT ID**	**1**
Each Virtual Radiopharmaceutical Product will have one “Non-availability indicator” relationship to a concept in the qualifier value hierarchy of SNOMED CT.		
VRP_Prescribing status	**SNOMED CT ID**	**1**
Each Virtual Radiopharmaceutical Product will have one “Prescribing status” relationship to a concept in the qualifier value hierarchy of SNOMED CT.		

Where a VMP concept originating from dm+d is identical to an existing SNOMED CT UK Drug Extension radiopharmaceutical the dm+d concept should remain active and the SNOMED CT UK Drug Extension concept inactivated as a duplicate.

Where the concept originating in the SNOMED CT UK Drug Extension data is less granular than the equivalent concept originating from dm+d due to the requirements to specify unit dose and unit dose size in dm+d. In these instances, the dm+d concept should be made a child of the SNOMED CT UK Drug Extension concept.

Actual Radiopharmaceutical Product

Description
Actual Radiopharmaceutical Products are created whenever a new concept is authored at that level. Where applicable ARP concepts will be members of a dm+d AMP refset. Provenance is denoted by UK refset ID

Relationships
Parent Concept: An instance of Actual Radiopharmaceutical Product will have an IS_A relationship with one parent Virtual Radiopharmaceutical Product. In addition, there will be a link to the concept named “Actual Medicinal Product” via IS_A relationship. *Actual Radiopharmaceutical Product Pack*: An instance of Actual Radiopharmaceutical Product will be associated with one or more instances of Actual Radiopharmaceutical Product Pack

Attributes	Type	Occurrence
ARP_ID	**SNOMED CT ID**	**1**
The SNOMED CT identifier for the Actual Radiopharmaceutical Product. The SNOMED CT ID will be from the UK Drug Extension.		
ARP_FSN	**string**	**1**
The Fully Specified Name for the Actual Radiopharmaceutical Product. This will be in the format “Actual Virtual Radiopharmaceutical Product Name (Supplier) (Product)”		
ARP_UK_Preferred_Term	**string**	**1**
The UK Preferred Term for the Actual Radiopharmaceutical Product. Where concepts are also present in dm+d this will be the name used in dm+d		
Parent	**SNOMED CT ID**	**1 or more**
The Actual Radiopharmaceutical Product will have one “IS_A” relationship to a Virtual Radiopharmaceutical Product. In addition, there will be a link to the concept named “Actual Radiopharmaceutical Product” via “IS_A” relationship.		

Where an AMP concept originating from dm+d is identical to an existing SNOMED CT UK Drug Extension radiopharmaceutical the dm+d concept should remain active and the SNOMED CT UK Drug Extension concept inactivated as a duplicate.

Where the concept originating in the SNOMED CT UK Drug Extension data is less granular than the equivalent concept originating from dm+d due to the requirements to specify unit dose and unit dose size in dm+d. In these instances, the dm+d concept should be made a child of the SNOMED CT UK Drug Extension concept.

Virtual Radiopharmaceutical Product Pack

. Description
A Virtual Radiopharmaceutical Product Pack is created whenever a new concept is authored at that level. Where applicable VRPP concepts will be members of a dm+d VMPP refset. Provenance is denoted by UK refset ID
Relationships

Child Concept: An instance of Virtual Radiopharmaceutical Product Pack will be associated with one or more Actual Radiopharmaceutical Product Packs as child concepts

Attributes	Type	Occurrence
VRPP_ID	**SNOMED CT ID**	**1**
The SNOMED CT identifier for the Virtual Radiopharmaceutical Product Pack. The SNOMED CT ID will be from the UK Drug Extension.		
VRPP_FSN	**string**	**1**
The Fully Specified Name for the Virtual Radiopharmaceutical Product Pack. This will be in the format “VRPP Preferred Name (product)”		
VRPP_Preferred_Term	**string**	**1**
The UK Preferred Term for the Virtual Radiopharmaceutical Product Pack. This will normally be in the format “Virtual Radiopharmaceutical Product concept name” + “Defining Dimension Numeric Value” + “Defining Dimension Unit of Measure” + Unit dose form Where concepts are also present in dm+d this will be the name used in dm+d		
VRPP_HAS_VRP	**SNOMED CT ID**	**1**
The Virtual Radiopharmaceutical Product Pack will have one relationship to a Virtual Radiopharmaceutical Product.		
Parent	**SNOMED CT ID**	**1**
An instance of Virtual Radiopharmaceutical Product Pack will have an IS_A relationship with concept named “Virtual Radiopharmaceutical Product Pack”		

There is no equivalent concept class in SNOMED CT International data

Actual Radiopharmaceutical Product Pack

Description
Actual Radiopharmaceutical Product Packs are created whenever a new concept is authored at that level. Where applicable ARPP concepts will be members of a dm+d AMP refset. Provenance is denoted by UK refset ID

Attributes	Type	Occurrence
ARPP_ID	**SNOMED CT ID**	**1**
The SNOMED CT identifier for the Actual Radiopharmaceutical Product Pack. The SNOMED CT ID will be from the UK-Drug Extension.		
ARPP_FSN	**string**	**1**
The Fully Specified Name for the Actual Radiopharmaceutical Product Pack. This will be in the format “Actual Radiopharmaceutical Product Pack Name (product)”		

ARPP_Preferred_Term	**string**	**1**
The UK Preferred Term for the Actual Radiopharmaceutical Product Pack. This will normally be in the format “Actual Radiopharmaceutical Product concept name” + “Defining Dimension Numeric Value” + “Defining Dimension Unit of Measure” + Unit Dose Form Where concepts are also present in dm+d this will be the name used in dm+d		
ARPP_HAS_ARP	**SNOMED CT ID**	**1**
An ARPP concept will have one relationship to an Actual Radiopharmaceutical Product concept.		
Parent	**SNOMED CT ID**	**1**
The Actual Radiopharmaceutical Product Pack will have one “IS_A” relationship to a Virtual Radiopharmaceutical Product Pack. In addition, there will be a link to the concept named “Actual Radiopharmaceutical Product Pack” via IS_A relationship.		

There is no equivalent concept class in SNOMED CT International data

Radiopharmaceuticals Trade Family

Description
Radiopharmaceutical Trade Family concepts will be created whenever a new concept is authored at that level. Where a Trade Family concept is applicable to radiopharmaceutical content derived from dm+d and concepts in the SNOMED CT UK Drug Extension that Trade Family concept will have a parent of 9191801000001103 | Trade family (product) and also parent of 12224201000001103 | Radiopharmaceutical trade family (product)

Attributes	Type	Occurrence
RTF_ID	**SNOMED CT ID**	**1**
Unique identifier for the Trade Family. This identifier will be taken from the SNOMED CT UK Drug Extension namespace.		
RTF_FSN	**string**	**1**
The Fully Specified Name for Radiopharmaceutical Trade Family. This will be in the format “Radiopharmaceutical Trade Family (product)”.		
RTF_Preferred_Term	**string**	**1**
The UK Preferred Term for the Radiopharmaceutical Trade Family. In most instances this will be the same as the FSN without the semantic tag.		
HAS_TRADE_FAMILY_GROUP		
This relationship is a UK extension specific relationship with a set of permissible values (qualifier values). One RTF may have zero to one Trade Family Group associated with it whereas one TFG may have one to many TF associated with it.		
Parent	**SNOMED CT ID**	**1**
In the case of hierarchical relationships (i.e. IS_A) only the closest relationship is represented explicitly. The reciprocal relationship is implied together with relationships to its children. All concepts are primitive.		

There is no equivalent concept class in the SNOMED CT International data.

APPENDIX I. The SNOMED CT UK Drug Extension model