WHO-FIC Content Model Reference Guide

v 0.9 (Draft)

for the

International Classification of Diseases and Health Related Problems (ICD)
International Classification of Functioning, Disability and Health (ICF)
International Classification of Health Interventions (ICHI)

Citation. Any mention of this content model reference guide in published reports should include the following citation of the source: WHO-FIC Content Model Reference Guide, World Health Organization (WHO) 2021 https://icd.who.int/browse11. Licensed under the Creative Commons Attribution-NoDerivatives 3.0 IGO licence (CC BY-ND 3.0 IGO).

Table of Contents

1 Goal

This Guide is intended to define and explain the Content Model used for WHO Family of Classifications (WHO-FIC) in practical terms. It aims to guide users to understand its purposes and the parameters by which data is correctly entered into the model.

The Guide also provides information about the technical specifications of each parameter of the Content Model that can be filled in the International Collaborative Authoring Tool[1] (iCAT) — the computer platform that is used to fill in the content model.

The purpose of this Guide is to ensure that the Content Model and its different parameters are properly understood.

This document will be periodically updated in response to user needs and evolution of the content model.

[1] "iCAT." https://icat.stanford.edu/. Accessed 15 Jul. 2020.

2 WHO-FIC Overview

The WHO Family of International Classifications (WHO-FIC)[2] comprises classifications that have been endorsed by the WHO to describe various aspects of health and the health system in a consistent manner. The purpose of the Family is to assist the development of reliable statistical systems at local, national and international levels, with the aim of improving health status and health care.

The WHO-FIC provides standardised building blocks for health information systems and consists of three broad groups: Reference classifications, Derived classifications, and Related classifications.

Reference classifications cover the main parameters of the health system, such as death and disease (ICD), disability, functioning, and health (ICF) and health interventions (ICHI). WHO-FIC reference classifications are a product of international agreements. They have achieved broad acceptance and official agreement for use and are approved and recommended as guidelines for international reporting on health.

The three Reference classifications are:

1. International Classification of Diseases and Health Related Problems (ICD)[3]
2. International Classification of Functioning, Disability & Health (ICF)[4]
3. International Classification of Health Intervention (ICHI)[5]

Derived classifications are often tailored for use at the national or international level or for use in a particular specialty. They are based on reference classifications (i.e. ICD, ICF, ICHI).

Related classifications are included in WHO-FIC to describe important aspects of health or the health system not covered by reference or derived classifications.

---

[2] "WHO-FIC Network " https://www.who.int/standards/classifications/family-of-international-classifications-(fic)

[3] ICD: https://www.who.int/classifications/classification-of-diseases

[4] ICF: https://www.who.int/standards/classifications/international-classification-of-functioning-disability-and-health

[5] ICHI: https://www.who.int/standards/classifications/international-classification-of-health-interventions

For further details about the WHO Family Classifications and their relationship, please refer to the "ICD-11 Reference Guide"[6] sections 1.1.4.3 and 1.1.4.4.

3 General Concepts

3.1 What is the Content Model?

The Content Model is a structured framework that contains the definition and other attributes of a ***classification unit*** in WHO-FIC, covering ICD, ICF, and ICHI. A classification unit, also referred to as an ***entity***, represents a thing that can be classified, i.e., it can appear in a classification. An entity can have multiple **parameters**, also known as **properties** or **attributes**. The Content Model is standardised in terms of its components and allows for the electronic storage of data.

A ***model*** is a technical term that refers to a systematic representation of knowledge that underpins any system or structure. Hence, the content model is an organised description of a WHO-FIC unit with its different parameters.

In the past, WHO-FIC did not explicitly define its classification units. For example, in ICD-10 (and prior releases), diseases were classified without defining first "What is a disease?".[7] In defining the new structures for the WHO Classifications, deliberate action is being taken to define the WHO-FIC entities in a systematic way, and to represent the classification knowledge so as to allow processing within computer systems.

The WHO-FIC content model contains different types of entities (e.g., diseases, functioning descriptions, interventions), their attributes (e.g., *title*, *definition*, *index terms*), relationships (e.g., a disease may *appear in an anatomical structure*), and constraints, as explained in the following sections.

The definition that will be used in this Guide is as following:

---

[6] ICD-11 Reference Guide: https://icd.who.int/icd11refguide/en/index.html

[7] There have been efforts to provide some definitions, inclusions, exclusions, notes, coding hints and some coding rules in the instructions and in the index. Some ICD chapters, such as mental health, oncology, or other groups of diseases have been elaborated with diagnostic criteria. All these efforts may be seen as implicit definitions or implicit modeling.

The **Content Model (CM)** provides the formal structure for describing entities in the WHO-FIC Foundation Component. Hence, the Content Model defines the different types of entities, the different types of properties and relationships that can be applied to an entity, descriptions on how an entity can be linearized or postcoordinated, as well as constraints and rules for different parts of the Content Model.

3.2 WHO-FIC Model Architecture: Content Model, Foundation, and Linearizations

The function and purpose of the WHO-FIC Content Model is shown in the following diagram:

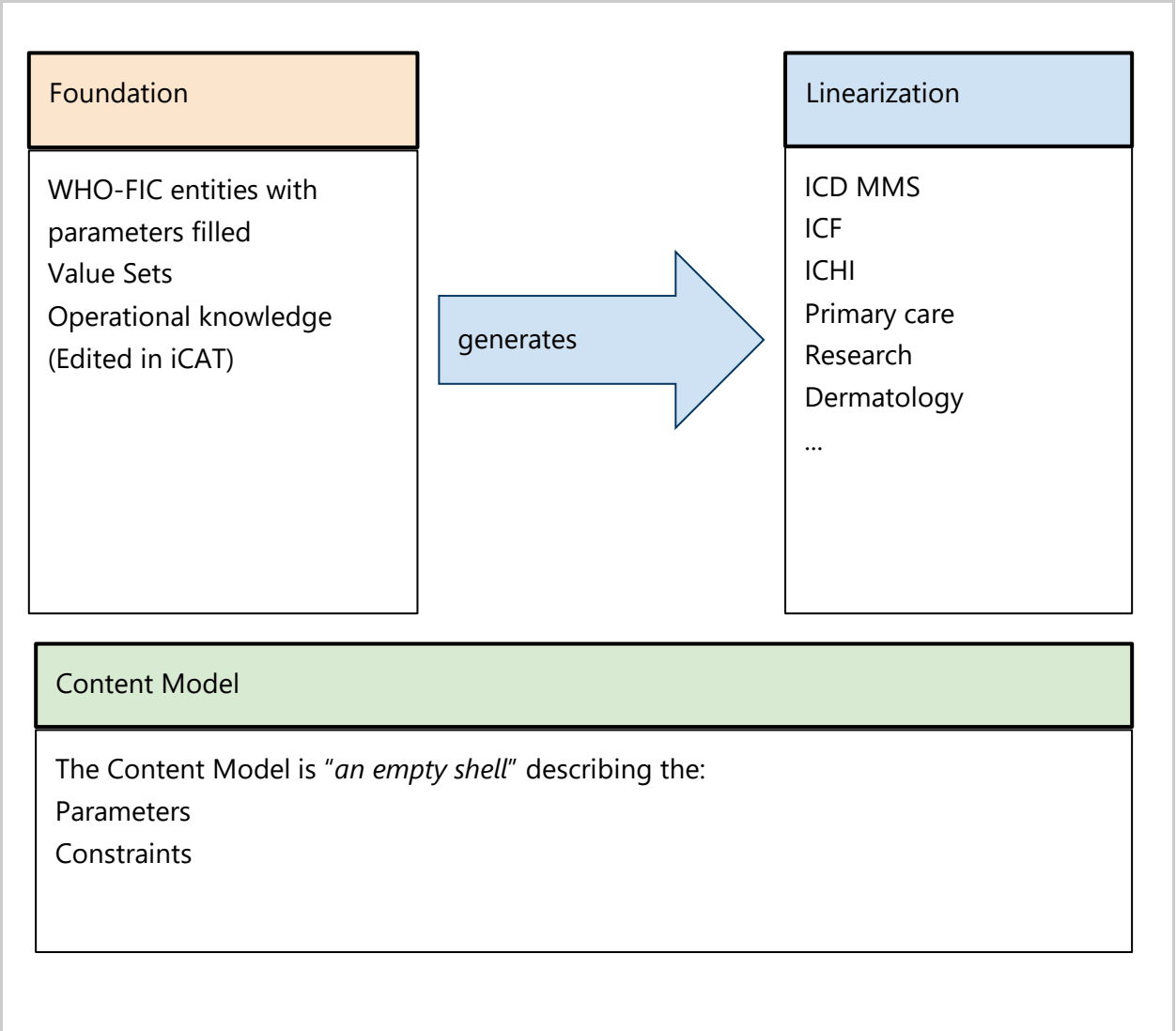


Fig. 1. **The Three-Component Model of WHO-FIC Model Architecture**. The Content Model provides the structure for the Foundation Component, out of which the different linearizations are generated. The Foundation Component, which contains all the entities in the WHO-FIC universe, is edited in iCAT.

The **Content Model** represents "*an empty shell*" that defines the different types of entities that appear in WHO Classifications. For each entity type (e.g., diseases, health interventions, functions), the Content Model defines the parameters that it can take (e.g., *title*, *short description*, *inclusions*), the linearizations it can be part of (e.g., ICD-11 for Mortality and Morbidity Statistics - MMS, Primary Care), and the potential postcoordination axes (e.g., *specific anatomy*, *severity)*.

The **Foundation Component** stores the filled-in entities of WHO Classifications. For example, it contains a disease entity *Acute myocardial infarction* that has the *title*, *short description*, and *exclusions* filled in. This disease entity can be postcoordinated using the *specific anatomy* axis with a constrained value set with the top node *Heart Wall* from the *Anatomy and topography* value set. The Foundation Component also stores operational knowledge, such as, which entity is part of which linearization. This operational knowledge is used in the process that generates linearizations (i.e., classifications) from the Foundation Component.

The **Linearization Component** contains the actual classifications or tabular lists that are generated from the Foundation Component. For example, the ICD Mortality and Morbidity Statistics (MMS) is one of the linearizations, but many other linearizations can be generated (e.g., Primary Care, Research, Dermatology, etc.). ICF and ICHI also have their own linearizations. The inclusion of an entity in a linearization (e.g., *Acute myocardial infarction* is part of ICD MMS) is defined in the Foundation Component as operational knowledge.

3.3 WHO-FIC Foundation

The Foundation Component (FC) is a multidimensional collection of all WHO-FIC entities, such as diseases, disorders, injuries, external causes, signs and symptoms, functional descriptions, interventions, and extension codes.

Entities are described using several properties (see the Content Model section), and are organised in a poly-hierarchy, meaning that one entity may have multiple direct parents. The entities may also have different types of relationships to other entities in the FC. The entities in the WHO-FIC Foundation Component are not necessarily mutually-exclusive.

The primary use of the Foundation Component is to serve as a common content layer for generating multiple linearizations, i.e., constrained subsets of the Foundation Component that are suitable for a particular type of use (see Linearizations section), as depicted in Figure 2. For ICD, the primary linearization extracted from the FC is the ICD Mortality and Morbidity Statistics (MMS). Other linearizations can also be extracted, for example for Primary Care, Research, or for different specialities, such as Dermatology. In the same way also the linearization(s) of ICF and ICHI are produced.

The WHO-FIC Foundation Component contains all necessary information to generate electronic and print versions of the linearizations, tabular lists, as well as additional information that is needed to generate specialty linearizations of ICD-11, and country-specific modifications.

An entity in the Foundation Component:

- Has a unique identifier in the form of an URI (for example, the identifier for *Pneumonia* is *http://id.who.int/icd/entity/142052508*);
- It is described by several properties (for example, title, definition, synonyms, inclusions, exclusions, etc.)
- It contains the details on how it is included in different linearizations (see Linearizations section)
- It contains specifications on how it can be postcoordinated (see Postcoordination section)
- It contains logical definitions on how this entity can be formed by logically combining other entities (see Precoordination section)
- It contains editorial information (for example, completion status)
- It contains backwards compatibility information with previous revisions, if applicable.

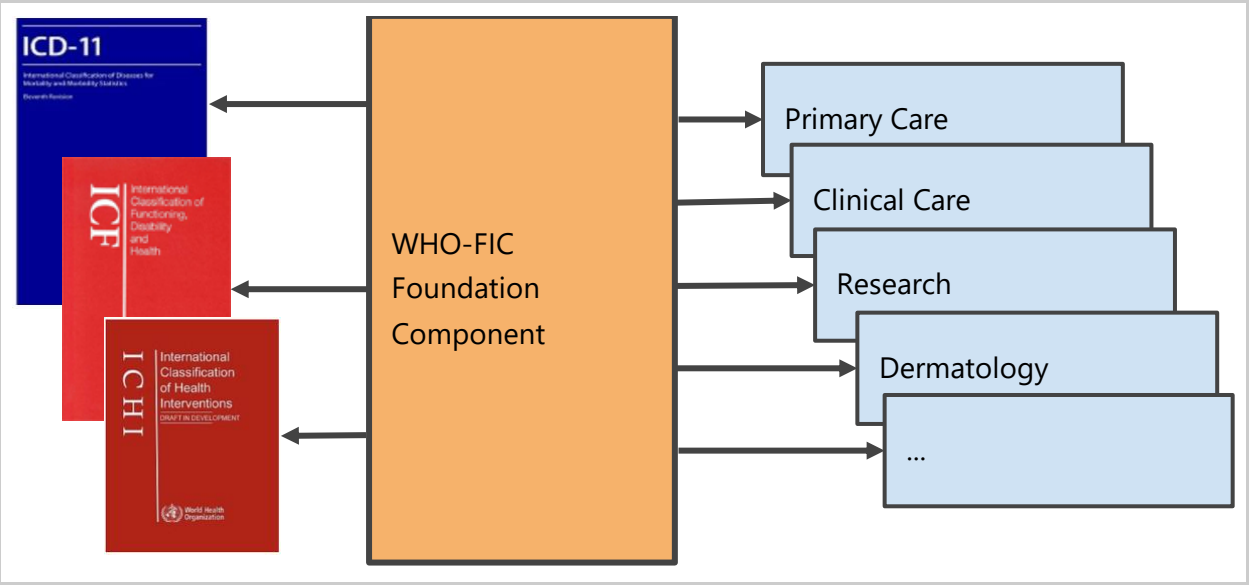


Fig. 2. Different linearizations are generated from the WHO-FIC Foundation Component, including ICD-11 MMS, ICF, and ICHI, as well as Primary Care, and others.

The Foundation Component is sometimes referred to as "the Foundation".

More details on the WHO-FIC Foundation Component can be found in the ICD-11 Reference Guide and in the ICD-11 Browser User Guide.[8]

3.4 Content Model Building Blocks

The Content Model (CM) provides the formal structure for describing entities in the WHO-FIC Foundation. Hence, the Content Model defines the different types of entities, the different types of properties and relationships that can be applied to an entity, descriptions on how an entity can be linearized or postcoordinated, as well as constraints and rules for different parts of the Content Model.

3.4.1 Entities

The basic building block of the Content Model is the **entity**. An entity represents a concept in the domain of WHO-FIC, and it can be of different **types** (e.g., disease, disorder, sign and symptoms, functioning descriptor, intervention, extension code).

An entity is identified by a unique Uniform Resource Identifier (URI).

Entities are described by multiple **parameters**, also referred to as **properties** or **attributes**.

WHO-FIC entities are *language-independent*, and are solely identified by their URI. The maintenance of the WHO-FIC Foundation on an international level is handled in English, but the content model of a WHO-FIC entity is language-independent facilitated through the use of language terms (see Terms section). This model allows binding of any language to the terms of an entity in the Foundation, and facilitates translations and multilingual browsing.

3.4.2 Hierarchy

Entities are organised in a **hierarchical structure**, also called a parent-child hierarchy. A child entity is a more specialised concept than the parent entity. A child entity can have multiple parents in the Foundation Component. A child can have a set of **direct parents**, i.e., the first-level ancestors in the hierarchy. **Indirect parents** are the ancestors found by traversing up the hierarchy starting with the direct parents. A parent is also referred to as a superclass in the Foundation. In a linearization, an entity has precisely one parent.

---

[8] "General Information - User Guide." https://icd.who.int/dev11/Help/Get/architecture/en. Accessed 16 Jul. 2020.

3.4.3 Terms

A term represents a textual value for a parameter of an entity. Terms encode a textual value for an entity parameter (e.g., *title*). The term contains a textual value, called a *label* (e.g., *Pneumonia*), and a language identifier (e.g., *en*).

Some terms may contain additional information. For example, *exclusion* terms may contain, besides the label and language, also references to entities in the Foundation (i.e., the excluded entities).

A few examples of terms specified in the Content Model are: title, fully specified title, short description, additional information, synonym, or narrower term.

3.4.4 External References

The Content Model also allows the specification of linkages to external classifications or terminologies at the entity level. For example, to represent the predisposing or causing genes for an ICD entity, a *genomic linkages* parameter may provide links to Gene Ontology[9] entities.

External references usually contain the label, the language identifier, the external entity identifier, the name of the external resource, and a URI link to the linked external resource.

3.5 Linearizations

A linearization is a constrained subset of the Foundation Component, which serves a particular purpose. For example, the ICD-11 Mortality and Morbidity Statistics can be used for statistical reporting purposes, while other linearizations, such as the Primary Care or Clinical Care linearizations can be used in those specific settings. Linearizations can be built at different granularity levels, for different use cases, or for other purposes.

As all linearizations are generated from the same WHO-FIC Foundation, they are guaranteed to be **consistent among each other** in terms of content. The consistency is ensured by the fact that every codable entity in a linearization is linked to its corresponding Foundation entity. Hence, even if a Foundation entity is linearized in different linearizations, they will still point to the same Foundation entity, which provides the content and the structure. The linearization

[9] "Gene Ontology." http://geneontology.org/. Accessed 17 Jul. 2020.

mechanism allows the granularity of the linearizations to be different (e.g., more detailed categories are included in a *Research* linearization versus a *Primary care* linearization).

Linearizations are sometimes referred to as **tabular lists**. Linearizations are similar to the previous versions of ICD Tabular Lists (e.g., volume I of ICD-10 or other previous editions).

A linearization must follow the rules of a statistical classification, that is:

- The hierarchy is single-parented, i.e., each entity can have at most one parent.
- All entities in the linearization are mutually exclusive.
- The linearization entities exhaustively describe the domain of the linearization.
- A linearization contains **residual categories**:
    - *"Other specified …"* residuals are provided to ensure exhaustivity;
    - ICD coding should always be completed to include the most specific level of detail possible. *".. unspecified"* residuals are provided for cases in which necessary information to select a specific category may not be available in the source documentation.
- A linearization contains **codes**. (e.g. 1A00) Even though the URIs are inherited from the Foundation Component as entity identifiers, shorter, hierarchical codes are provided in the linearization.

When an entity is linearized it becomes a **grouping** or a **category** in that linearization. **Groupings** are higher level entities which are too broad to be used for coding and therefore they don't have codes. **Categories** on the other hand always have codes.

Linearization entities i.e. groupings and categories are linked to the URI of the Foundation entity. This linkage ensures the **consistent use of an entity across all linearization** and use cases for the WHO Family of International Classifications (WHOFIC)

The Foundation contains for each entity operational knowledge (stored as linearization specifications) that describe how an entity needs to be linearized (see details in the Linearization Specification section).

Using these linearization specifications, an automated algorithm can extract the linearizations described in the Foundation Component.

Linearizations may also serve as *Specialty Adaptations* that refer to special components of the Foundation sections that are subsets, which have been inserted to respond to particular

specialty needs. Current specialty adaptations for ICD-11 that can be generated from the WHO-FIC Foundation are:

- Mental Health
- Dermatology
- Musculoskeletal
- Neurology
- Paediatrics
- Occupational Health
- Environmental Health
- Rare Diseases
- Ophthalmology
- International Classification of Diseases for Oncology (ICD-O)

The ICD-11 Reference Guide section 2.1.6 gives more information on the structure and taxonomy of the ICD Classification System.[10]

ICF and ICHI also have linearizations corresponding to the released versions of their corresponding classifications.

Given the possibility of generating multiple linearizations from the WHO-FIC Foundation, in future applications there may be more linearizations.

3.6 Postcoordination

Postcoordination is a new feature in ICD-11 and is built into ICHI from inception. The **postcoordination** system allows adding more detail to an entity in a linearization. For example, a disease entity can be further specialised in ICD MMS by postcoordinating it with the *severity* of the disease or with *specific anatomy* details.

The properties that can be used for postcoordination are called **postcoordination axes**. Examples of postcoordination axes are: *severity*, *specific anatomy*, and *histopathology*.

10 https://icd.who.int/icd11refguide/en/index.html#2.01.06StructureandTaxonomyofICD(referstoPart1)|structure-and-taxonomy-of-the-icd-classification-system|c2-1-6

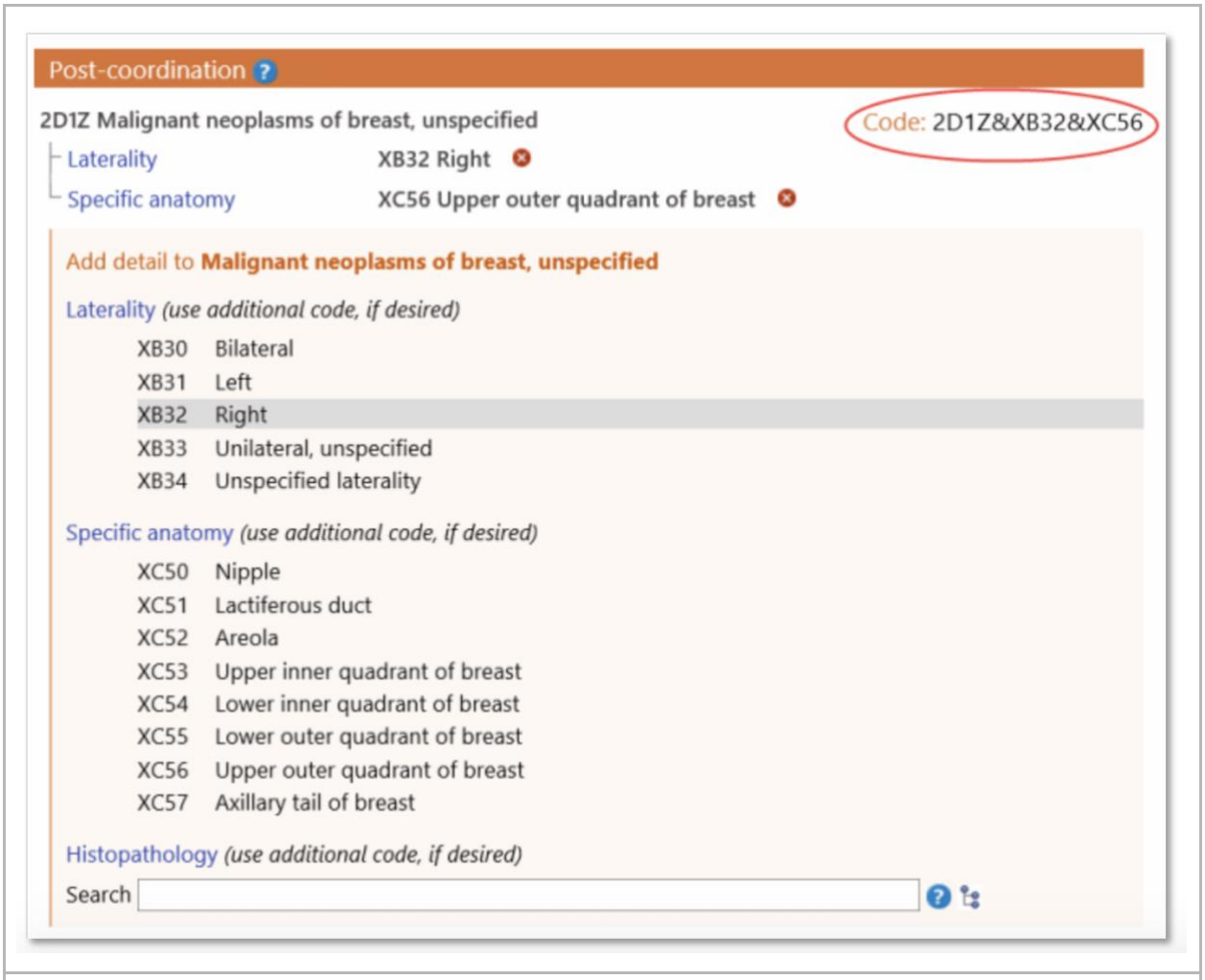


Fig 3. Example of postcoordination in the ICD-11 Browser. The *Malignant neoplasm of breast, unspecified* is postcoordinated with laterality *Right* and specific anatomy *Upper outer quadrant of breast*. A new code for the new category (*2D1Z&XB32&XC56*) is generated in the ICD-11 Browser and can be used in coding systems.

The allowed values for the postcoordination axes are called **postcoordination value sets**. The postcoordination value sets are usually one or more hierarchy of entities from the Extension Codes branch in the Foundation (see Extension Codes section), or they are one or more hierarchies from elsewhere in the Foundation.

For example, the most generic value set for the *specific anatomy* postcoordination axis is the *Anatomy and Topography* hierarchy in the Extension Codes. Other postcoordination axes, such as *has causing condition*, *has manifestation*, or *is associated with* have as value set all ICD entities from the WHO-FIC Foundation.

The postcoordination system allows the specification of valid postcoordination axes with their specialised value set *per linearization*. For example, the *histopathology* axis can be added only to entities in the *Neoplasm* hierarchy, but it cannot be added to entities elsewhere in the classification. Also, some postcoordination axes can only be used in certain linearizations.

The value sets for a particular entity and a particular postcoordination axis can be specialised. For example, *Bacterial pneumonia* can be postcoordinated using the *infectious agent* axis in the MMS linearization. The value set for the *infectious agent* axis is set to *Bacteria* (which is a child of the generic value set of the axis, i.e., the *Infectious agents* hierarchy in the Extension Codes).

When a linearization is generated (e.g., ICD-11 MMS), the postcoordination information from the Foundation Component can be used to generate more detailed categories that follow the postcoordination constraints defined in the Foundation. The ICD-11 Browser allows the creation of codes for more detailed diseases that are not part of the MMS. An example is shown in Figure 2, in which the *Malignant neoplasm of breast, unspecified* is postcoordinated with laterality *Right* and specific anatomy *Upper outer quadrant of breast*. This newly generated category gets a code that can be used in coding systems.

3.7 Precoordination

Even though postcoordination offers a flexible system through which new categories and codes can be generated by combining values from multiple axes in a linearization, there are also cases in which having a precoordinated category with a predefined code is important.

Therefore, it is possible in the Foundation Component to define a **precoordinated entity** that is formed by specifying an ancestor of the entity and the values of one or more of the postcoordination axes.

For example, the precoordinated entity *CA40.00 Pneumonia due to Chlamydophila pneumoniae* is formed by combining the parent *Bacterial pneumonia* with the postcoordination axis *infectious agent* set to *Chlamydia pneumoniae*.

3.8 Logical Definitions

As the Content Model and the Foundation are represented using a formal language[11] that can be computer-interpreted, it is now possible to formally define the formula by which a

[11] The formal language is called the Web Ontology Language (OWL).

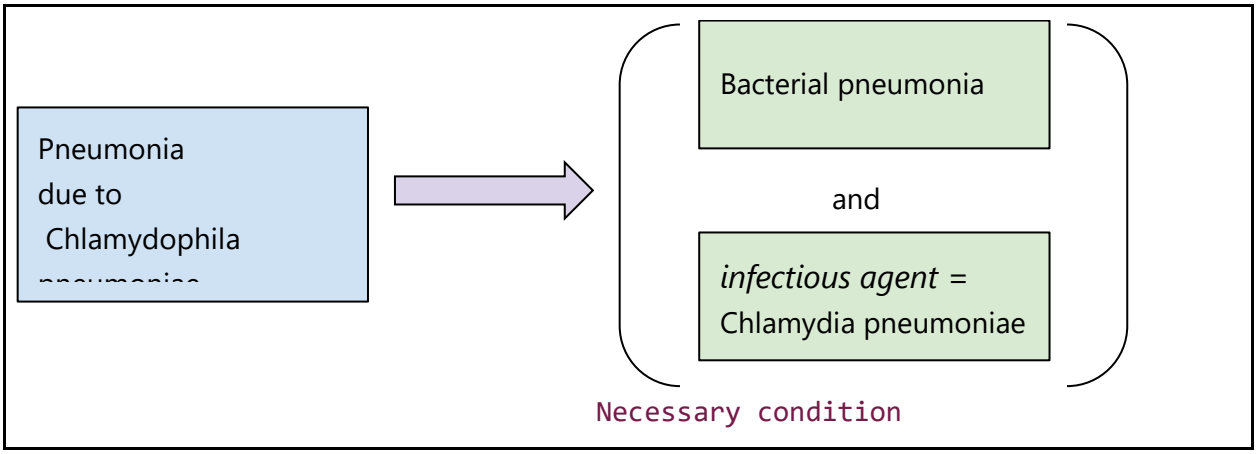
precoordinated entity is composed from a parent entity and combinations of postcoordination axes and values. The logical mechanism by which we define such a formula is known as *Class Equivalence*.

In the example from above, we can logically define the precoordinated entity *CA40.00 Pneumonia due to Chlamydophila pneumoniae* as:

> *Pneumonia due to Chlamydophila pneumoniae*
> equivalent to
> *Bacterial pneumonia* and *infectious agent* = *Chlamydia pneumoniae*

The precoordination formula is also referred to as the **Logical Definition** of the precoordinated entity.

A **logical definition** means that the precoordinated entity is fully defined from a logical point of view by the logical formula. That is, a logical equivalence holds between the precoordinated entity and the logical definition and it can be used for logical inference. A logical definition provides the **necessary** and **sufficient** conditions that **both need to hold in a logical equivalence**, as shown in Figure 4.



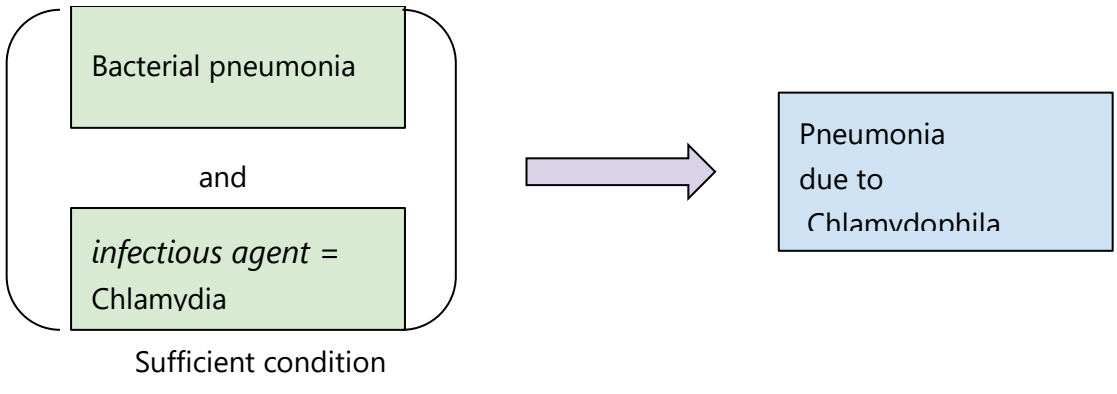


Fig. 4. The logical definition for *Pneumonia due to Chlamydophila pneumoniae* provides the necessary (top image) and the sufficient (bottom image) conditions.

Figure 4 depicts the meaning of the `necessary` and `sufficient` conditions that hold in a logical equivalence.

- **`Necessary condition`** (top image): If a user selects a disease *Pneumonia due to Chlamydia pneumoniae*, then the user will know that it is a *Bacterial pneumonia* and that it has an *infectious agent* of *Chlamydia pneumoniae*.
- **`Sufficient condition`** (bottom image): If a user tries to find a disease for which it is sufficient that it is a *Bacterial pneumonia* and that it has an *infectious agent Chlamydia pneumoniae,* then an automated algorithm will find the *Pneumonia due to Chlamydophila pneumoniae*.

The logical definitions are used when trying to find a code for an entity in a linearization. It is possible that the user specifies combinations of postcoordination axes and values for which a precoordinated entity already exists. In that case, the ICD coding tool and the ICD-11 browser will propose the precoordinated code.

Logical definitions can also be composed of multiple combinations of postcoordination axes and their values, not just one, as shown in Figure 4. For example, a logical definition might specify the *specific anatomy* and the *infectious agent* for a disease.

3.9 Necessary Conditions

Sometimes it is not possible to fully define an entity from a logical point of view, that is, to find both the necessary and the sufficient conditions that hold for that entity, as explained in the Logical Definitions section.

It is more common, that we only know the necessary conditions for an entity (Figure 4 top image). For example, we often know that a disease appears in a certain part of the body, such as, *Gastritis* appears in the stomach (the necessary condition), but we cannot say that all diseases that appear in the stomach are *Gastritis* (the sufficient condition).

In the Content Model, it is possible to model such necessary conditions that we know are true about an entity. The necessary conditions use the postcoordination axes and the value sets defined for them. For example, for Gastritis, a necessary condition is that *specific anatomy* is *Stomach*.

The necessary conditions are the "things that hold true" for an entity. They can be thought of as relationships that are always true for a particular entity.

When creating the logical definitions for an entity (see Logical Definitions section) , some of the necessary conditions can become part of the logical definition, if they are also sufficient conditions.

3.10 The difference between Logical Definitions and Necessary Conditions

Both logical definitions and necessary conditions provide a way to add formal descriptions to entities so that they can be automatically checked for inconsistencies, can be easily integrated with other biomedical terminologies, and can become part of a wide-range of electronic health applications.

However, from a formal point of view, there is an important distinction between logical definitions and necessary conditions that is depicted in Figure 4.

A logical definition provides a formal description of an entity that is both **necessary** and **sufficient**, meaning that we (and an automated algorithm) can make both deductions depicted in Figure 4 top and bottom. However, a necessary condition is only **necessary**, meaning that we can only deduce the top part of Figure 4.

For example, if a necessary condition for *Gastritis* is that "*specific anatomy=Stomach"*, then we can only deduce that gastritis appears in the stomach. However, if we know of a disease that "*specific anatomy=Stomach"*, we cannot deduce that it is gastritis (for that, "*specific anatomy=Stomach*" would have had to be a logical definition, not a necessary condition).

3.11 Extension Codes

Extension codes are a part of the Foundation Component that contain entity hierarchies, which can be used as value sets for postcoordination axes.

Fig. 5 Left: The top-level entities of ICD-11 Extension Codes in the Foundation Component.

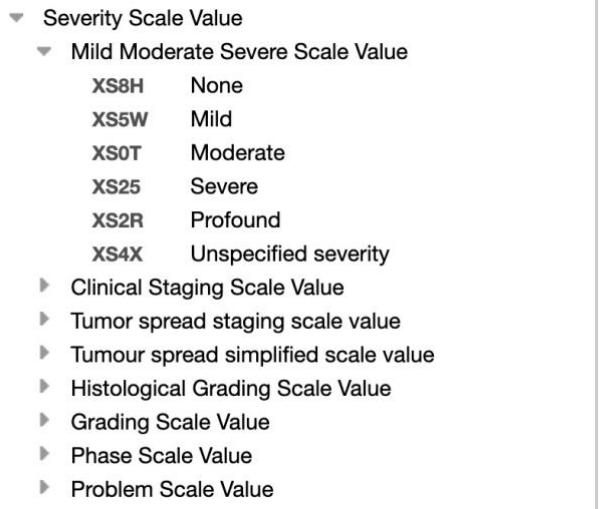


Fig. 5 Right: The Severity Scale values expanded.

For example, the current ICD-11 extension codes top level entities are shown in Figure 5 on the left. The right-hand side of Figure 5 shows the expanded *Severity Scales*. For example, one disease description can be postcoordinated on the severity scale using the "*Mild Moderate Severe Scale*". That means that the linearized category can be postcoordinated on the severity axis and one may choose one of the entities defined in this value set as a valid value (e.g., "*None*", "*Mild*", "*Moderate*", etc.)

In the current WHO-FIC Foundation Component, there are extension codes for ICD and for ICHI. ICF uses the concept of "*Qualifier*" to qualify different aspects of functioning descriptors.

4 The Content Model

This section describes in detail the parameters of the WHO-FIC Content Model.

Each parameter will be described as following:

- Definition,
- Rationale,
- Which classifications it applies to (ICD, ICHI, ICF),
- Access information through the ICD REST API.[12]

There are parts of the Content Model that only apply to the Foundation, and they are marked in the title of the following sections as "`Foundation-only`". Examples of such Foundation-only information of the Content Model are the ones pertaining to operational knowledge, such as how to linearize entities in different linearizations, for example, the section Linearization Specifications (Foundation-only).

Some parts of the Content Model only apply to the linearizations, and they are marked in the title of the sections as "`Linearization-only`". For example, the index terms are only part of linearizations, as they are generated from different information in the Foundation.

This Guide documents all parameters of the Content Model, including the ones that only apply to the Foundation or the linearizations.

Accessing the WHO-FIC Foundation and Linearization through the ICD REST API
ICD REST API allows programmatic access to the ICD (and later the WHO-FIC content). In this document we provide information and examples on how different content model parameters could be accessed using this API. More information on accessing the API, including authentication and code samples, is available at: https://icd.who.int/icdapi.

The schema that provides formal names for the content model parameters are available at: http://id.who.int/icd/schema/.

The JSON response from the ICD API is in JSON-LD format and the mappings between the property names returned in the JSON response and the corresponding property identifier from the ICD Schema are found in the `@context` link at the top of each JSON response. The most

[12] Currently the ICD API only works for ICD, but it will be wider available for the entire WHO-FIC in the near future.

widely-used property mappings are documented in the Appendix: JSON Context Property Mappings.

4.1 Entity Title

Definition:

The ***Entity Title*** is a name that represents the entity, and which labels the entity in a meaningful and unambiguous way.

Rationale:

1. To enable a user to understand the entity quickly in accordance with current scientific knowledge
2. To be used as the "Fully Specified Name" wherever applicable (see Fully Specified Name section).

The *Title* is a language term for any WHO-FIC entity. Existing titles should only be edited with utmost care, making sure that the meaning of the entity is not changed by the renaming (fixing typos is fine). If the meaning of an entity changes, then a new entity should be created, and if needed, the original entity should be retired.

There will be cases in which several synonyms could stand in as a title. In that case only one will become the title. The other synonyms will become Synonym Terms in the Foundation.

Applies to:

ICD, ICF, ICHI

ICD REST API:

ICD Schema property	JSON property mapping
http://www.w3.org/2004/02/skos/core#prefLabel	title

To retrieve the title of an entity, use the REST calls:

Component (where)	REST call
Foundation	/icd/entity/{id}
Linearization	/icd/release/11/{releaseId}/{linearizationname}/{id}

An excerpt from a JSON response for retrieving the Entity Title:

```
"title": {
   "@language": "en",
   "@value": "Scarlet fever"
 },
```

For a full example of using the ICD API to retrieve different parameters, please check the Appendix: ICD API Foundation Example and the Appendix: ICD API Linearization Example.

4.2 Fully Specified Name

Definition:

A ***Fully Specified Name*** is an unambiguous title that does not assume context. Its purpose is to uniquely designate an entity and to clarify meaning rather than present a commonly used or natural phrase.

Rationale:

- To enable users to understand the content of the entity with an short meaningful and complete label without ambiguity, and without consulting the hierarchical context of the entity
- To foster harmonisation between standard terminologies and ICD-11.

Example:
Example 1: "*Systemic illness with predominant gastrointestinal diarrheal symptoms attributable to vibrio cholera*" is a fully specified name, as opposed to *"cholera"* or *"other"* (where the meaning of *other* would have been clear from the hierarchical context).

Example 2: "*Transmural infarction*" - The information may be medically unique, but the same title might be used somewhere else in the classification. Specifying "*Acute transmural myocardial infarction*" would bear the full information and it would be unique.

Ideally, the title of a category is a fully specified name.

Applies to:
ICD, ICHI, ICF

ICD REST API:

ICD Schema property	JSON property mapping
http://id.who.int/icd/schema/fullySpecifiedName	fullySpecifiedName

To retrieve the fully specified name of an entity, use the REST calls:

Component (where)	REST call

Foundation	/icd/entity/{id}
Linearization	/icd/release/11/{releaseId}/{linearizationname}/{id}

An excerpt from a JSON response for retrieving the fully specified name for *Tuberculosis* (`http://id.who.int/icd/entity/2072728114`):

```
"fullySpecifiedName": {
    "@language": "en",
    "@value": "Tuberculosis attributable to Mycobacterium
}
```

For a full example of using the ICD API to retrieve different parameters, please check the Appendix: ICD API Foundation Example and the Appendix: ICD API Linearization Example.

4.3 Short Description

Definition:

The *short description* is a short characterisation (maximum of 100 words) of the entity that states things that are always true about a disease or condition and necessary to understand the scope of the rubric.

Short descriptions do not contain elements intended for level 3 (common epidemiology) or things that may be true for level 4 (clinical criteria). Short descriptions are language terms. Descriptions were formerly called 'short definitions'.

Rationale:

1. To allow for concise description for printing
2. To give a detailed description for online viewing
3. To assist with translation (so that the equivalent concept is chosen rather than a word-by-word translation)

Each WHO-FIC entity will be accompanied by a short concise textual description.

Short descriptions are at the core of WHO-FIC and inform coders, analysts and translators about the meaning of an entity and of its descriptive characteristics.

Applies to:

ICD, ICF, ICHI

ICD REST API:

ICD Schema property	JSON property mapping
http://www.w3.org/2004/02/skos/core#definition	definition

To retrieve the short description of an entity, use the REST calls:

Component (where)	REST call
Foundation	/icd/entity/{id}
Linearization	/icd/release/11/{releaseId}/{linearizationname}/{id}

An excerpt from a JSON response for retrieving the short description:


```
"definition": {
    "@language": "en",
    "@value": "A disease caused by an infection with the gram-positive bacteria Streptococcus pyogenes. This disease is characterised by a sore throat, fever, and a red rash. Transmission is commonly by inhalation of infected respiratory secretions, direct skin contact, or indirect contact."
  },
```


For a full example of using the ICD API to retrieve different parameters, please check the Appendix: ICD API Foundation Example and the Appendix: ICD API Linearization Example.

4.4 Additional Information

Definition:

The ***Additional Information*** is an optional text field that may contain any additional information and more context for the entity. For ICD, this might contain characteristics of the diseases or conditions included in the entity.

For example, the additional information may contain the most common epidemiologic circumstances, putative or highly suspected aetiologic agents, or other information that may not always be true but may be common, typical, or expected.

The Additional Information does not have any length restrictions and it will appear only in the online version of the WHO Classification (not the print version).

This field used to be called the "Detailed Definition".

Rationale

- To inform the formulation of the short description
- To provide more context for the entity.

Applies to:

ICD, ICHI, ICF

ICD REST API:

ICD Schema property	JSON property mapping
http://id.who.int/icd/schema/longDefinition	longDefinition

To retrieve the additional information of an entity, use the REST calls:

Component (where)	REST call
Foundation	/icd/entity/{id}
Linearization	/icd/release/11/{releaseId}/{linearizationname}/{id}

An excerpt from the JSON response for retrieving the additional information:


```
"longDefinition": {
    "@language": "en",
    "@value": "Scarlet fever is a disease caused by exotoxins released by Group A beta-haemolytic streptococci. It is most commonly associated with streptococcal tonsillitis or pharyngitis. The majority of cases occur in childhood. It is characterized by sudden onset of sore throat, headache, high fever, anorexia, nausea and malaise. (not all content shown)"
  },
```


For a full example of using the ICD API to retrieve different parameters, please check the Appendix: ICD API Foundation Example and the Appendix: ICD API Linearization Example.

4.5 Synonyms (Foundation-only)

Definition:

A ***Synonym*** is a language term that has a similar meaning to the entity and it is also used to denote the entity.

For example, Coronary arterial infarction is a synonym for Myocardial Infarction.

Synonyms appear only in the WHO-FIC Foundation, where they are (together with Narrower Terms) part of *Base Index Terms*. Synonyms become index terms for the entity when a linearization is generated.

Rationale:

- To indicate similar terms that are commonly used for the same entity
- To enable coders and translators to specify the term

Synonyms may include common terms and medical jargon. Synonyms are not intended to be used interchangeably with the entity title. The entity title will have precedence over synonyms for international reporting.

Applies to:

ICD, ICF, ICHI

ICD REST API:

ICD Schema property	JSON property mapping
http://www.w3.org/2004/02/skos/core#altLabel	synonym

To retrieve the synonyms and other information about an entity in the WHO-FIC Foundation, use the REST call:

/icd/entity/{id}

An excerpt from the JSON response for retrieving the synonym:

```
"synonym": [{
    "label": {
```

```
    "@language": "en",
    "@value": "Scarlatina NOS"
  }
}]
```

For a full example of using the ICD API to retrieve different parameters, please check the Appendix: ICD API Foundation Example and the Appendix: ICD API Linearization Example.

4.6 Narrower Terms (Foundation-only)

Definition:

A ***Narrower Term*** is a language term that has a narrower meaning than the entity, but it can still be used to refer to the entity for coding purposes.

Narrower Terms appear only in the WHO-FIC Foundation. Narrower terms become index terms for the entity when a linearization is generated. *Synonyms* and *Narrower Terms* are mutually exclusive, i.e., an index term is either a *synonym* (referring to the same underlying entity with an alternative name) or a *narrower term* (a more specific condition that is not already a child of WHO-FIC entity in question).

Rationale:

- To indicate which terms are different from synonyms.

Most narrower terms in the WHO-FIC Foundation have been converted into child entities. It is recommended to create a child entity rather than create a narrower term.

Applies to:

ICD, ICF, ICHI

ICD REST API:

ICD Schema property	JSON property mapping
http://id.who.int/icd/schema/narrowerTerm	narrowerTerm

To retrieve the narrower terms in the WHO-FIC Foundation, use the REST call:

/icd/entity/{id}

An excerpt from the JSON response for retrieving the narrower terms for *Sensation of nausea* (`http://id.who.int/icd/entity/2115007909`):

```
"narrowerTerm": [{
    "label": {
      "@language": "en",
      "@value": "heartburn"
    }
  }]
```

For a full example of using the ICD API to retrieve different parameters, please check the Appendix: ICD API Foundation Example and the Appendix: ICD API Linearization Example.

4.7 Index Terms (Linearization-only)

Definition:

Index Terms are language terms that correspond with an entity and that will become part of the index for that entity at the time when a linearization is generated.

Rationale:

- To indicate the index entries which enable coders to search for the correct code.

Index terms for linearization entities are computed from the terms within the Foundation Component. They include titles, synonyms, narrower terms for the foundation entity. In addition they may include terms from other Foundation entities that are not included in the linearization, but are aggregated to this linearization entity.

Index terms are used to find the relevant codes in WHO-FIC linearizations (e.g., in the ICD-11 MMS). For example, the ICD-11 coding tool[13] uses them to suggest codes based on a search phrase.

Applies to:

ICD, ICF, ICHI

ICD REST API:

To retrieve the index terms that are generated for a linearizations, use the REST call:

/icd/release/11/{releaseId}/{linearizationname}/{id}

ICD Schema property	JSON property mapping
http://id.who.int/icd/schema/indexTerm	indexTerm

An excerpt from the JSON response for retrieving the index terms for *Scarlet fever*:

```
"indexTerm": [
  {
```

[13] The ICD-11 coding tool is available at: https://icd.who.int/ct11/icd11_mms/en/release

```
    "label": {
      "@language": "en",
      "@value": "Scarlet fever"
    }
  },
  {
    "label": {
      "@language": "en",
      "@value": "Scarlatina NOS"
    }
  },
  {
    "label": {
      "@language": "en",
      "@value": "Otitis media in scarlet fever"
    },
    "foundationReference": "http://id.who.int/icd/entity/1512229243"
  }
]
```


For a full example of using the ICD API to retrieve different parameters, please check the Appendix: ICD API Foundation Example and the Appendix: ICD API Linearization Example.

4.8 Inclusions

Definition:

Inclusions are exemplary terms or phrases that are synonymous with the title of the entity or terms representing more specific conditions.

Rationale:

- To understand the conceptual space of the entity through a subset of terms which provide convenient examples.

There are two types of inclusions in the WHO-FIC Foundation:

- *Index terms* - an index term (synonym or narrower term) can also serve as an inclusion;
- *Subclass inclusion terms* - a child of the entity can also serve as an inclusion.

In a linearization, inclusion terms are listed primarily as a guide to the content of the category, in addition to the descriptions. Many of the items listed relate to important or common terms belonging to the category. Inclusion terms may refer to different conditions or they can be synonyms. They are not a sub-classification of the category. Others are borderline conditions or sites listed to distinguish the boundary between one subcategory and another. The lists of inclusion terms are by no means exhaustive.

Subclass inclusion terms from the Foundation are rendered in a linearization only if the subclass itself is not included in the linearization. Inclusion terms appear in the tabular list of the traditional print version.

There is a precise algorithm that generates the index terms and inclusions for each linearization based on the Foundation content.

Applies to:

ICD, ICF, ICHI

ICD REST API:

ICD Schema property	JSON property mapping
http://id.who.int/icd/schema/inclusion	inclusion

To retrieve the inclusions of an entity, use the REST calls:

Component (where)	REST call
Foundation	/icd/entity/{id}
Linearization	/icd/release/11/{releaseId}/{linearizationname}/{id}

An excerpt from the JSON response for retrieving the inclusions:

```
 "inclusion": [
  {
   "label": {
    "@language": "en",
    "@value": "Scarlatina NOS"
   }
  }
 ],
```

For a full example of using the ICD API to retrieve different parameters, please check the Appendix: ICD API Foundation Example and the Appendix: ICD API Linearization Example.

4.9 Exclusions

Definition:

Exclusions are entities that might be thought to be children of a given entity but, because they occur elsewhere in the classification, must be excluded from appearing under it.

Exclusions serve as a cross-reference in WHO-FIC, and help to delineate the boundaries of an entity.

An example of this is *Hyperfunction of pituitary gland* which excludes *Cushing syndrome*.

Rationale:

- To understand the boundaries of the conceptual space of the entity through convenient examples of other entities.

Exclusions have to be consistent across different linearizations and always refer to other WHO-FIC entities. Therefore, exclusions are references to other entities in the Foundation. Optionally, the exclusions in the Foundation may also contain an alternative label (usually, the title is used as the label of the exclusion).

Applies to:

ICD, ICF, ICHI

ICD REST API:

ICD Schema property	JSON property mapping
http://id.who.int/icd/schema/exclusion	exclusion

To retrieve the exclusions of an entity, use the REST calls:

Component (where)	REST call
Foundation	/icd/entity/{id}
Linearization	/icd/release/11/{releaseId}/{linearizationname}/{id}

An excerpt from the JSON response for retrieving the exclusions:

```
"exclusion": [
   {
     "label": {
       "@language": "en",
       "@value": "streptococcal sore throat"
     },
     "foundationReference": "http://id.who.int/icd/entity/1642172022",
     "linearizationReference": "http://id.who.int/icd/release/11/2020-
09/mms/1642172022"
   },

   {
     "label": {
       "@language": "en",
       "@value": "Staphylococcal scarlatina"
     },
     "foundationReference": "http://id.who.int/icd/entity/449652676",
     "linearizationReference": "http://id.who.int/icd/release/11/2020-
09/mms/449652676"
   }
 ],
```


For a full example of using the ICD API to retrieve different parameters, please check the Appendix: ICD API Foundation Example and the Appendix: ICD API Linearization Example.

4.10 Foundation Child Elsewhere (Linearization-only)

Definition:

Foundation Child Elsewhere are entities in the linearization that are children of the entity in the foundation but not children in the linearization

ICD-11 Foundation allows multiple parenting which means a category could be located in more than one place in the foundation component. However, this is not possible for ICD-11 linearizations such as in ICD-11 MMS in which a category must be located at a single location only. When looking at a linearization entity, this property would list the foundation children that are not children in the linearization.

The ICD-11 Browser shows them in gray colour therefore they are sometimes referred to as gray children.

Rationale:

- Even though these entities are not children in the linearization they are semantically very much related to the entity in question

Applies to:

ICD, ICF, ICHI

ICD REST API:

ICD Schema property	JSON property mapping
http://id.who.int/icd/schema/foundationChildElsewhere	foundationChildElsewhere

To retrieve the exclusions of an entity, use the REST calls:

Component (where)	REST call
Linearization	/icd/release/11/{releaseId}/{linearizationname}/{id}

An excerpt from the JSON response for retrieving the exclusions:

```
"foundationChildElsewhere": [
```

```
  {
    "label": {
      "@language": "en",
      "@value": "Hairy leukoplakia"
    },
    "foundationReference": "http://id.who.int/icd/entity/2106872801",
    "linearizationReference": "http://id.who.int/icd/release/11/2020-09/mms/2106872801"
  },
```

4.11 Obsoletion status (Foundation-only)

Definition:

The **Obsoletion status** is a flag that encodes whether an entity that was previously released, is now obsolete and should not be used for coding.

The Obsoletion status is only available in the Foundation. The value for the obsoletion status is a boolean (true/false/not set). Linearizations do not contain obsolete entities.

Rationale:

- Some entities have been previously released, but they have either been replaced by other entities with a more appropriate name, or they don't apply anymore, so they should not be used for coding in future releases.

Applies to:
ICD

ICD REST API:
Obsoleted entities and the Obsolete Status are not exposed in the ICD REST API.

4.12 Linearization Specifications (Foundation-only)

Definition:

A **Linearization Specification** documents in the WHO-FIC Foundation how an entity should be linearized by specifying different information (e.g., the parent of the entity in a linearization, whether the entity should become a grouping, or coding notes specific for a linearization).

A *linearization* refers to the listing of the WHO-FIC entities in a mutually exclusive and jointly exhaustive way to be used for particular purposes (e.g., ICD - Mortality and Morbidity Statistics). Read more details about linearizations in the Linearizations section.

A linearization is generated from the WHO-FIC Foundation using the configurations found in the linearization specifications. Hence, linearization specifications are operational knowledge available only in the Foundation that provides the "*instructions*" on how a linearization should be automatically generated.

Applies to:
ICD, ICHI, ICF

Technical Specifications

The WHO-FIC Foundation contains the details about how an entity should be linearized in each defined linearization.

For a particular entity to be included in a particular linearization, the following information may be specified in the Foundation (more details below):

- *Linearization parent*: The direct parent in the linearization;
- *Grouping*: Whether the entity is a grouping entity in the linearization;
- *Coding notes*: Coding notes specific to the linearization;
- *Auxiliary axis child:* The entity is to appear as an index entity for the unspecified residual.

A precise algorithm reads the WHO-FIC Foundation and the linearization information and generates the corresponding linearizations.

A more detailed description of each parameter describing how an entity is linearized is shown below.

Linearization Parent
The linearization parent identifies under which parent category the entity will be placed in a given linearization.

Example:
Asthma has two parents in the Foundation:

- *Certain lower respiratory tract diseases* (from *Diseases of the Respiratory System* chapter)
- *Allergic or hypersensitivity disorders involving the respiratory tract* (from *Diseases of the Immune System* chapter)

In the MMS, the linearization parent is set as the first one (*Certain lower respiratory tract diseases*), and therefore *Asthma* is included as a category in that chapter.

Grouping
The grouping is a flag that determines if the entity should become a grouping (i.e., chapter, block, or sub-block) in that particular linearization. A grouping will not have a code in a linearization, and it will hence not be codable.

Coding notes
The coding notes specific for this entity in this particular linearization.

Auxiliary axis child
The auxiliary axis child is a special flag that can be checked only if the entity is **not included** in that particular linearization.

If the auxiliary axis child flag is checked for an entity, its terms will become index terms of the '*unspecified*' residual, instead of the '*other specified*' residual, of the nearest ancestor included in the linearization.

When there are multiple children in the Foundation, some of which are checked in the linearization and some are not, we generally place the terms under the unchecked children as index entries of the '*other specified*' residual. In certain situations, however, the terms under the unchecked children need to be placed under the '*unspecified*' residuals.

ICD REST API:
The *Linearization Specifications* information is not exposed in the ICD REST API as it only provides operational knowledge that is used to generate the linearizations. The actual

linearizations generated from this information are available from the linearization part of the ICD API. An example for retrieving the parameters of an entity in a linearization is available in the Appendix: ICD API Linearization Example.

4.13 Postcoordination specifications

An entity can be postcoordinated in a linearization on different postcoordination axes with specific value sets (see Postcoordination section for a reminder of the definitions).

The building blocks of the WHO-FIC postcoordination system are:

- Postcoordination axes, for example:
  - For ICD diseases: severity, specific anatomy, has manifestation, etc.;
  - For ICD external causes: mechanism of injury, place of occurrence, etc.;
  - For ICHI: target, action, means, etc.;
- *Extension codes*: Hierarchy of entities that provide value sets for the postcoordination axes.

A postcoordination axis has a defined value set that represent valid values for that axis. For example, the *specific anatomy* postcoordination axis can take values only from the *Anatomy and Topography* branch of the *Extension Codes*. The specific anatomy of a particular class can be further specialised to allow only values from a subtree of the general value set of the postcoordination axis. For example, the *specific anatomy* of the *Aneurysmal bone cyst* can be specialised to take values only from the *Bones* subtree (a subclass of the *Anatomy and Topography*).

The WHO-FIC Foundation contains all the information necessary to generate valid postcoordination options for an entity in the linearizations. This information is comprised of:

- *Postcoordination specifications*: For each linearization, the postcoordination specification stores which of the applicable postcoordination axes are allowed, required, or not allowed;
- *Specialised value sets*: For each of the allowed or required postcoordination axes, a specialized value set can be selected that is a subset (i.e., one or more branches) of the general value set of the respective postcoordination axis.

By definition, a required postcoordination axis is also allowed.

Entities of different types (e.g, ICD diseases, ICD External Causes, ICHI Interventions) have different types of applicable postcoordination axis.

The cardinality of a postcoordination axis is single or multiple. A single-cardinality postcoordination axis can take only one value in a linearization, while a multi-cardinality postcoordination axis can take more. The values that a postcoordination axis can take in a

linearization is constrained by the specialised value set of the axis that is specified in the Foundation.

The *Postcoordination Specifications* are part of the Foundation and they are used in linearizations when postcoordinating an entity.

The postcoordination axes and their value sets are described in detail in the following sections.

Applies to:
ICD, ICHI

ICD REST API:
To retrieve the information on how an entity can be postcoordinated in a linearization, call the Linearization REST API:

```
/icd/release/11/{releaseId}/{linearizationname}/{id}
```

An excerpt from the JSON response is shown below

```
 "postcoordinationScale": [
   {
    "@id": "http://id.who.int/icd/release/11/2020-
09/mms/107294155/postcoordinationScale/specificAnatomy",
    "axisName": "http://id.who.int/icd/schema/specificAnatomy",
    "requiredPostcoordination": "false",
    "allowMultipleValues": "AllowAlways",
    "scaleEntity": [
     "http://id.who.int/icd/release/11/2020-09/mms/1644747126",
     "http://id.who.int/icd/release/11/2020-09/mms/687250607",
     "http://id.who.int/icd/release/11/2020-09/mms/1509166126"
    ]
   }
 ]
```

For each postcoordination scale on which an entity can be postcoordinated, find below the JSON property field mappings for the *postcoordination scale* fields:

ICD Schema property	JSON property mapping
http://id.who.int/icd/schema/axisName	axisName
http://id.who.int/icd/schema/requiredPostcoordination	requiredPostcoordination
http://id.who.int/icd/schema/allowMultipleValues	allowMultipleValues
http://id.who.int/icd/schema/scaleEntity	scaleEntity

The detailed definition of the *postcoordination scale* is found on the ICD Schema webpage. A brief overview is given below:

JSON property mapping	Short description
axisName	Identifies the unique name of the axis for the postcoordination (a URI that uniquely identifies the axis). A table with all available axis names is found in the Appendix: Postcoordination axis names in the ICD API.
requiredPostcoordination	Identifies whether the postcoordination axis is a required one or not. Value could be true or false.
allowMultipleValues	Identifies whether the postcoordination axis allows multiple values or not, with the following possible values: - `AllowAlways:` the user can postcoordinate multiple times using this axis; - `NotAllowed`: the user can only postcoordinate once using this axis; - `AllowedExceptFromSameBlock`: the user can postcoordinate multiple values, only if they are coming from different blocks within the value set.
scaleEntity	List of allowed values during postcoordination. They are hierarchical starting points of the allowed value set., i.e. any descendant of the entities provided under the `scaleEntity` property can be used for postcoordination.

4.13.1 ICD Postcoordination for Diseases

The following sections describe the postcoordination axes that apply to ICD together with the value sets that are defined in the ICD Extension Codes chapter.

4.13.1.1 Specific Anatomy

Definition:

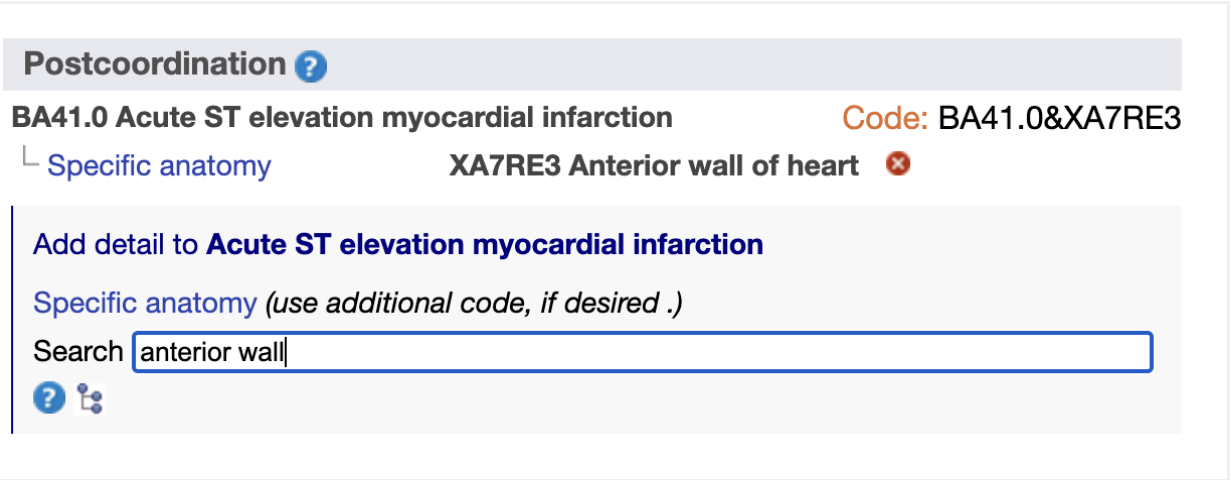
The *specific anatomy* axis identifies the most specific level of the topographic location or the anatomical structure where the health-related problem can be found relevant to the condition.

Rationale:

- To identify the anatomic grouping of the entities

The anatomical structure has been the starting point for assigning an ICD code.

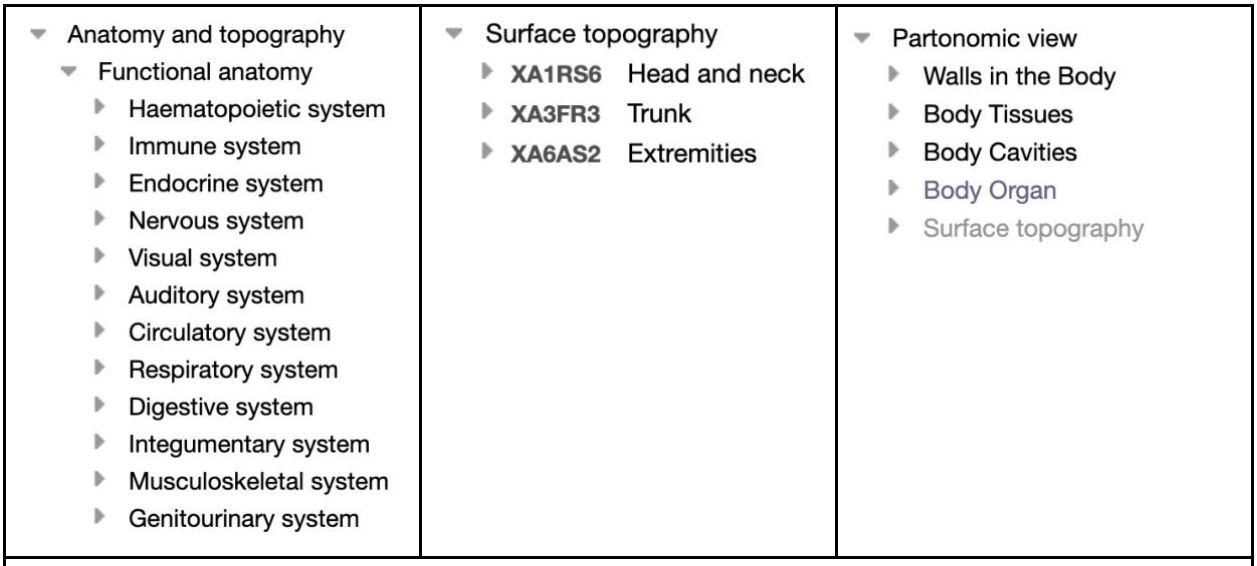
An example of postcoordination on the *specific anatomy* axis resulting in a new code is shown below:



Example of postcoordinating *BA41.0 Acute ST elevation myocardial infarction* with *specific anatomy* = *XA7RE3 Anterior wall of heart*

Value set:

The value set for the specific anatomy is the *Anatomy and topography* hierarchy from the Extension Codes, and it is shown below:



The Anatomy and topography value set for the *specific anatomy* postcoordination axis. The value set is split into three hierarchies that offer different views: *Functional anatomy* (left column), *Surface topography* (center column), and *Partonomic view* (right column).

The axis name in the ICD API is: http://id.who.int/icd/schema/specificAnatomy.

4.13.1.2 Histopathology

Definition:

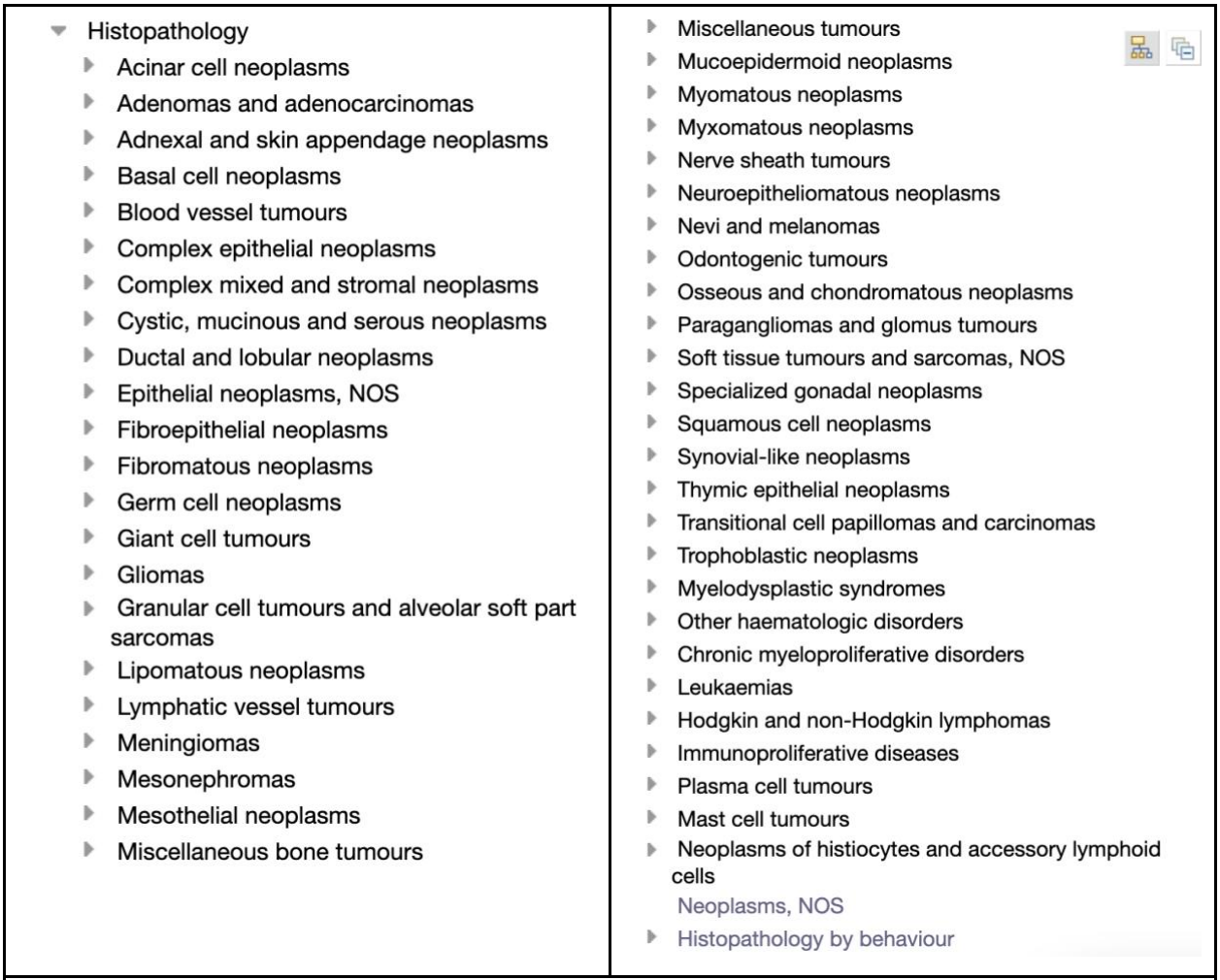
Histopathology refers to the tissue changes characteristic of diseases, particularly histopathologic features for Neoplasms.

Rationale:

- To identify the cellular type or morphological appearance of the entity (usually used for tumours, skin lesions, etc).

Value set:

The value set for the specific anatomy comes from the *Histopathology* hierarchy of the Extension Codes. The top level nodes of this hierarchy are shown below:



The *Histopathology* hierarchy from the Extension Codes.

The axis name in the ICD API is: http://id.who.int/icd/schema/histopathology.

4.13.1.3 Temporal Properties

The *Temporal Properties* axes describe the typical course and age that is related to a disease, which includes onset characteristics and the duration or course of a disease/health condition.

Rationale:

- To assist in formally representing the knowledge about the temporal relations of an entity

Diseases may behave differently depending on the age of diagnosis. Other diseases will be diagnosed typically at a certain age. Geriatric or pediatric linearizations, set building, and data edits would use this information.

There are three sub-axes that can be used to describe the temporal properties of a disease:

- Course
- Temporal Pattern / Onset
- Time in Life

The value sets for each of the temporal sub-axes are coming from one of the subtrees in the *Temporality* hierarchy.

4.13.1.3.1 Course

Definition:

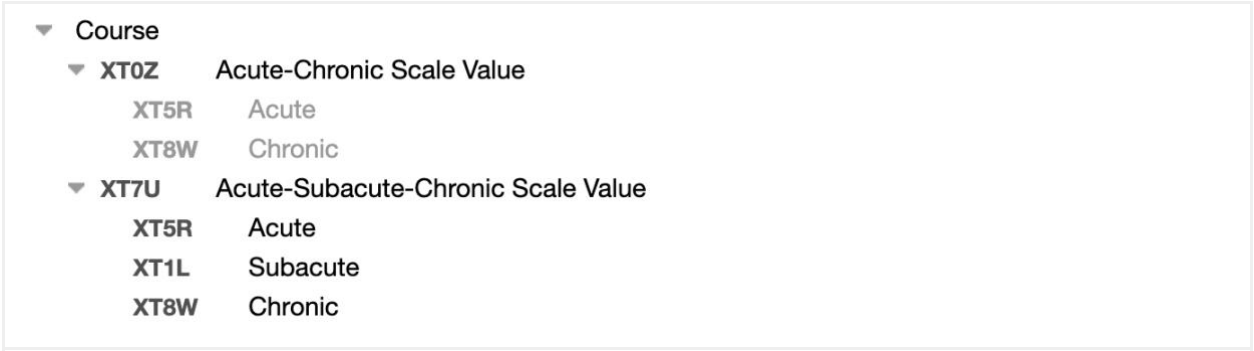
The *course* axis defines a point in time, a period, or step in the course of the disease.

Rationale:

- To bring operational definitions to temporal qualifiers (e.g. acute, sub-acute, chronic; immediate-onset, late-onset etc) – which is particularly required when an entity title or a fully specified name uses a temporal qualifier.

The terms acute, sub-acute and chronic are frequently used in the context of diseases. They may refer to the onset only, or to the overall course of the diseases, or to both.

The *Course* axis value set is coming from the *Course* tree in the Temporality hierarchy, and is shown below:



The *course* axis value set.

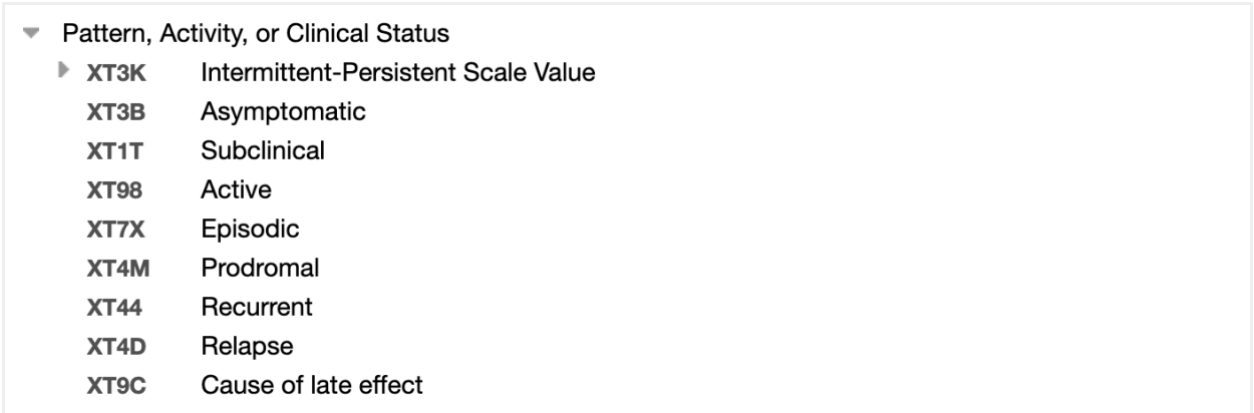
The axis name in the ICD API is: http://id.who.int/icd/schema/course.

4.13.1.3.2 Temporal Pattern / Onset

Definition:

The *temporal pattern / onset* axis defines how the first signs or symptoms of a condition started.

The value set for the temporal pattern / onset axis is coming from the *Pattern, Activity, or Clinical Status* tree in the Temporality hierarchy, and is shown below:



The temporal pattern / onset value set.

The axis name in the ICD API is: http://id.who.int/icd/schema/temporalPatternAndOnset.

4.13.1.3.3 Time in Life

Definition:

The *time in life* axis defines the period of life at which a disease or the initial symptoms or manifestations of a disease appear in an individual.

Rationale:

- To identify the Paediatric, Adult or Geriatric Specialty Adaptation

The value set for the *time in life* axis come from the Time in Life tree of the Temporality hierarchy, and is shown below:

Time in Life XT0S Pregnancy XT4Z Postpartum XT1G Puerperium XT77 Antenatal - WHO Standard XT16 Neonatal XT3N Perinatal XT2C Infancy XT4X Child under 5 XT50 Child over 5 XT7M Adolescent XT15 Young Adult XT6S Adult XT19 Early Geriatric XT13 Late Geriatric
The *time in life* axis value set.

The axis name in the ICD API is: http://id.who.int/icd/schema/timeInLife.

4.13.1.4 Severity

Definition:

The *severity* axis is used to describe the extent or magnitude of a disease. It particularly indicates the staging or grouping across a gradient from light forms to more severe forms. Severity properties are to be distinct from other clinical significance measures of risk, distress or disability.

Rationale:

- To specify the severity levels, if they are used for classifying the children categories.
- To differentiate the severity criteria from other clinical significance measures such as the functional impact, distress, burden or risk.

This parameter refers to commonly seen levels of severity in a disease or disorder, for example mild hypertension, moderate hypertension, etc.

It does not refer to the gravity (e.g. fatality) of the category itself e.g. as in the case of fulminant hepatitis.

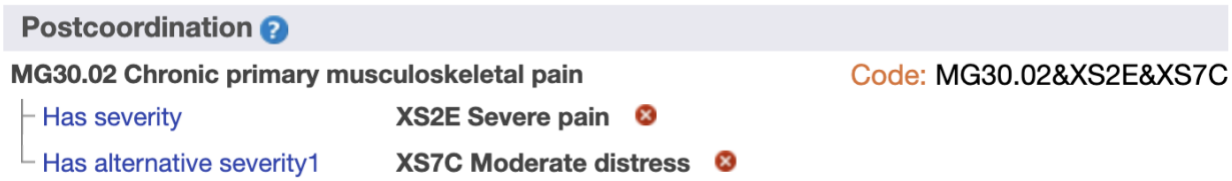
These severity patterns may be useful for differential diagnostics, case-mix, reimbursement, and quality assessment. It is required to express severity and/or extent in accepted clinical terms. Description of these terms should identify the underlying logic that defines the severity property clearly, represent defining features as groups and list them.

There are three severity axes defined:

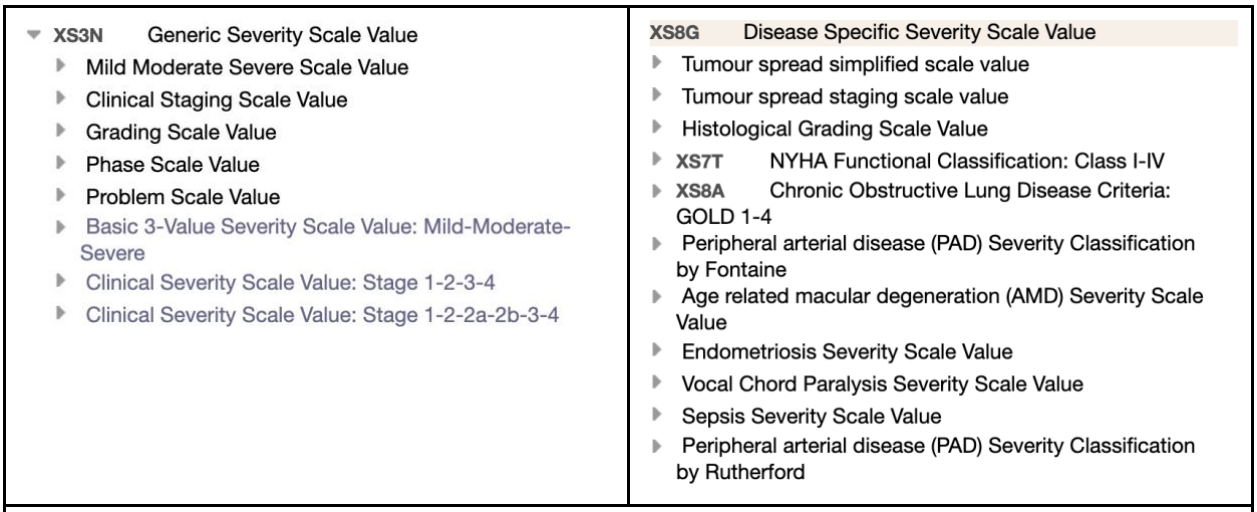
- *Severity* (i.e., the main severity axis)
- Alternative Severity 1
- Alternative Severity 2

The *Alternative Severity 1 and Alternative Severity 2* axes can be used for postcoordination, if there are additional severity scales that apply to a particular disease.

The *Pain severity scale value* axis is an example of when additional postcoordination may be used. For example, a patient with *Chronic primary musculoskeletal severe pain* causing him *moderate distress* will have the following codes assigned: MG30.02&XS2E&XS7C, as shown in the screenshot below:



The value set for the three severity axes come from the *Severity Scale Value* hierarchy from Extension Codes, and is shown below. As seen, there are two types of scales: the *Generic Severity Scale Value* (left column) and the *Disease Specific Severity Scale Value*.



The *severity* axis value set: **Left** - the Generic Severity Value set; **Right** - the Disease Specific Severity value set.

The axis name in the ICD API is: http://id.who.int/icd/schema/severity.

4.13.1.5 Causal Properties

Definition:

The *causal axes* describe the factors which specify the causation of an ICD entity (in line with the established scientific principles of causality).

Rationale:

- To indicate the basic grouping of causal factors: such as vectors and mechanisms underpinning the entity or group

There are several *causal* axes defined for ICD:

- *Causality* (i.e., aetiology type)
- Infection Agent
- Chemical Agent
- Causing Condition
- Medication

4.13.1.5.1 Causality

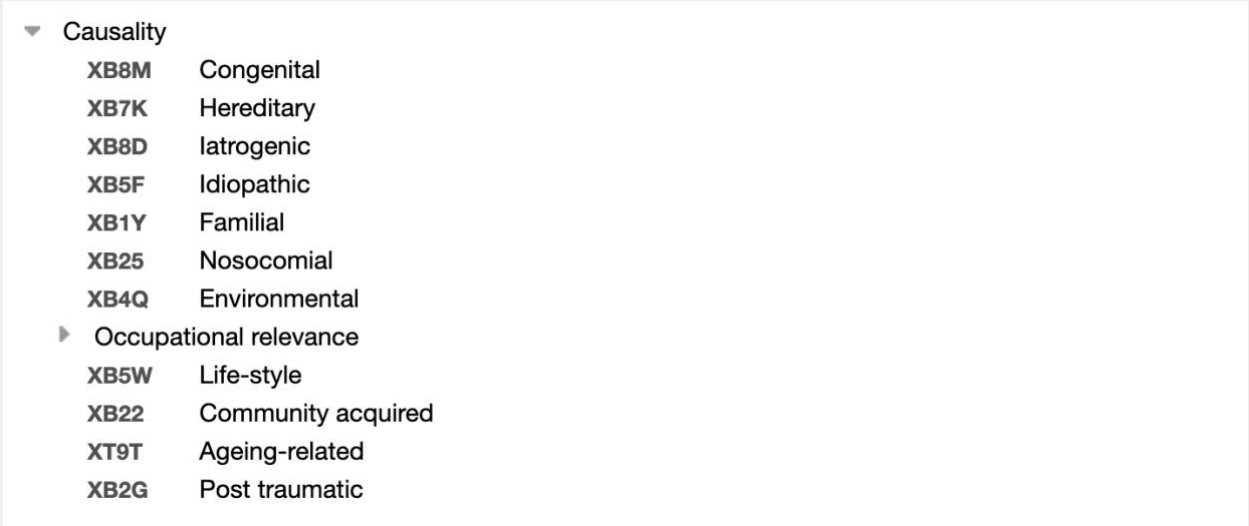
Definition:

The *causality axis* describes the basic type of cause of the health conditions pertaining to an ICD entity.

Rationale:

- To indicate the basic grouping of causal factors underpinning the entity, as metabolic or external.

The *causality* axis value set comes from the *Causality* tree of the Aetiology hierarchy of the Extension Codes, and is shown below.



The *causality* axis value set.

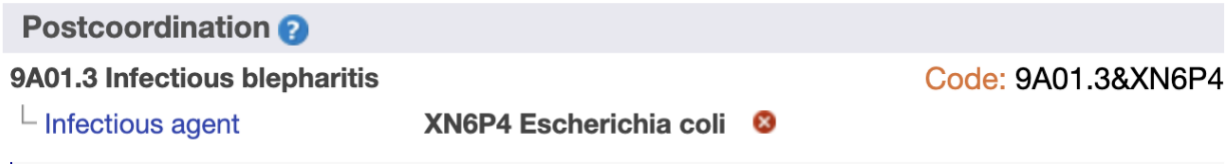
The axis name in the ICD API is: http://id.who.int/icd/schema/causality.

4.13.1.5.2 Infectious Agent

Definition:

> The *infectious agent axis* describes pathogens that cause the health conditions pertaining to an ICD entity.

An example of postcoordinating *Infectious blepharitis* with the *infectious agent* *Escherichia coli* is shown below:



The *infectious agent* value set comes from the *Infectious Agent* tree in the Aetiology hierarchy of the Extension Codes, and is shown below:

The *infectious agent* axis value set.

The axis name in the ICD API is: http://id.who.int/icd/schema/infectiousAgent.

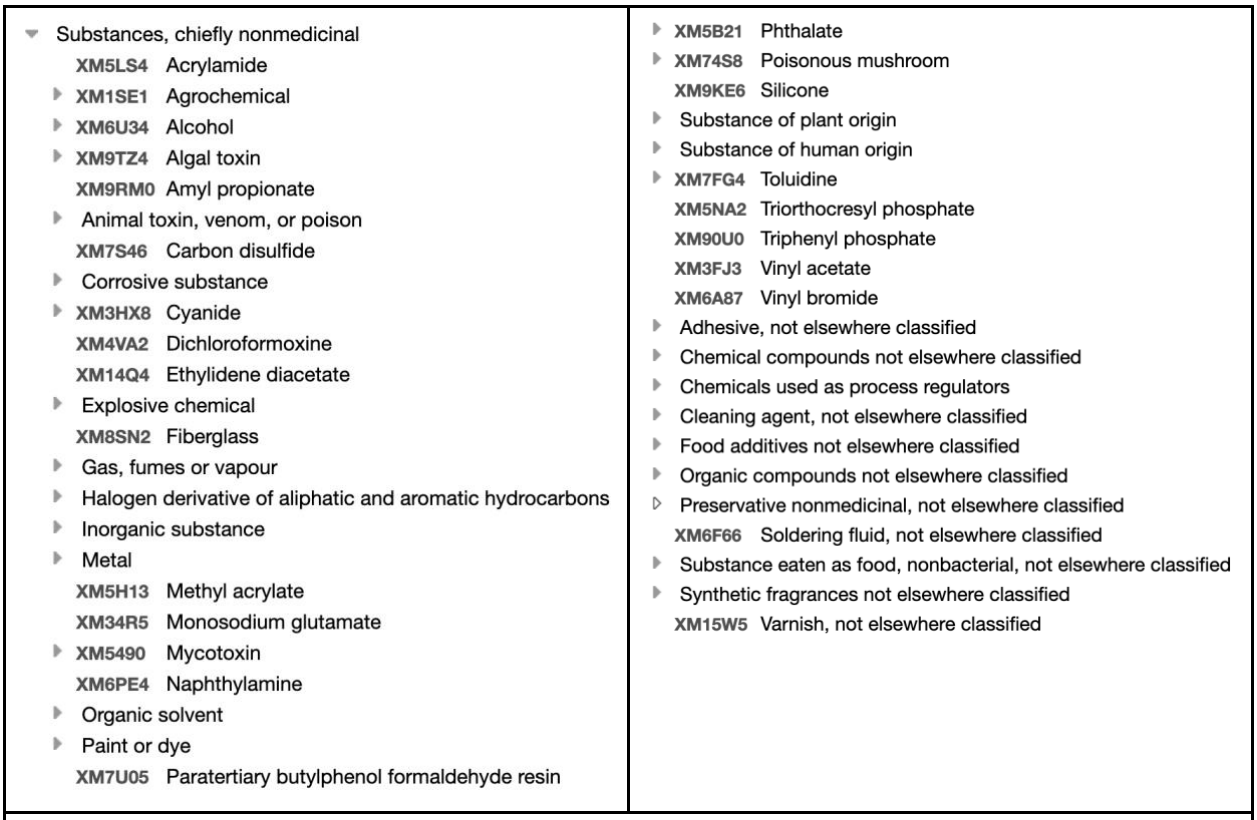
4.13.1.5.3 Chemical Agent

Definition:

The *chemical agent axis* describes chiefly nonmedicinal substances that cause the health conditions pertaining to an ICD entity.

An example of postcoordinating *Alcoholic duodenitis* with the *chemical agent* *Isopropyl alcohol* is shown below:

The *chemical agent* value set comes from the *Substances, chiefly nonmedicinal* tree in the Substances hierarchy of the Extension Codes, and is shown below:



The *chemical agent* value set.

The axis name in the ICD API is: http://id.who.int/icd/schema/chemicalAgent.

4.13.1.5.4 Causing Condition

Definition

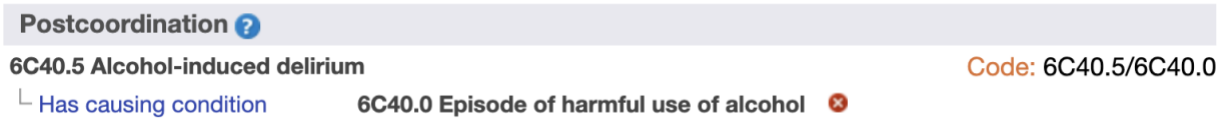
The *causing condition* axis describes another condition that caused the occurrence of the health condition pertaining to an ICD entity.

The *causing condition* axis is always marked as required in the Foundation. The *causing condition* axis value is translated as a "code-also" instruction in a linearization.

'Code also' instructions inform the user about required additional aetiological information which is mandatory to be coded in a cluster with certain categories because that additional information is relevant for primary tabulation. The 'code also' statement marks the categories that must be used in conjunction with the indicated second code(s). However, in some instances

aetiology may be unknown although the condition requires treatment in its own right. In this circumstance, the code may be reported alone.

An example of postcoordinating the *Alcohol-induced delirium* with *causing condition* *Episode of harmful use of alcohol* is shown below:



The *causing condition* value set is represented by the entire ICD hierarchy.

The axis name in the ICD API is: http://id.who.int/icd/schema/hasCausingCondition.

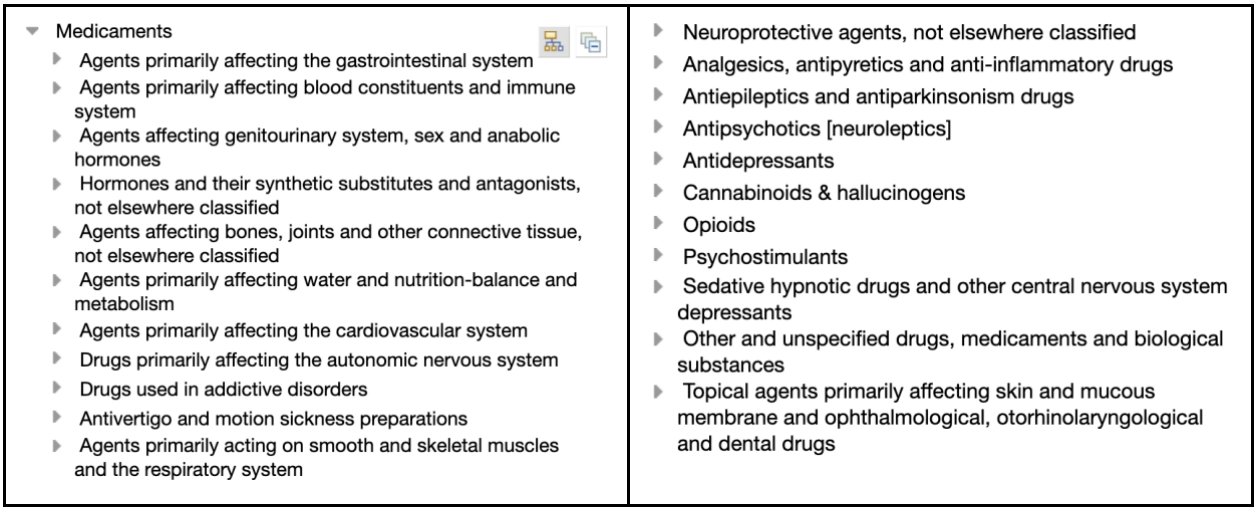
4.13.1.5.5 Medication

Definition

The *medication* axis describes the medication that caused the health condition pertaining to an ICD entity.

For example, the *medication* axis can be used for postcoordination when coding cases of overdose, underdose, incorrect medication, or harm arising despite correct administration and dosing.

The *medication* axis value set is coming from the *Medicaments* tree in the *Substances* hierarchy of the Extension Codes, and is shown below:



The *medication* axis value set.

The axis name in the ICD API is: http://id.who.int/icd/schema/medication.

4.13.1.6 Topology

Definition

The *topology* axis describes the relative position in or on the body.

There are four topology axes that are used for describing the topology information for an ICD entity:

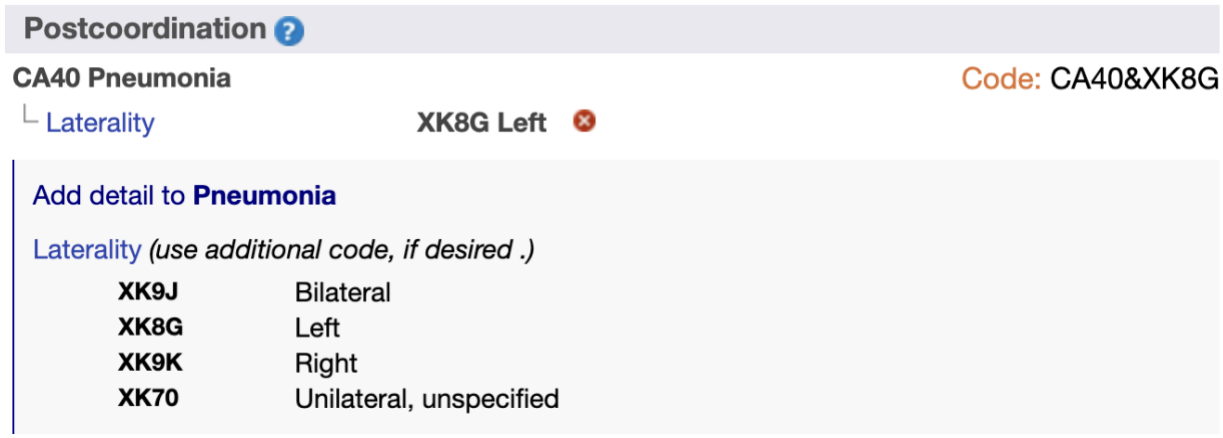
- Laterality
- Relational
- Regional
- Distribution

4.13.1.6.1 Laterality

Definition

The *laterality* axis describes the side (e.g., right, left) on which a health condition pertaining to an ICD entity occurs.

An example of postcoordinating *Pneumonia* with laterality *Left* is shown below:



The value set for the *laterality* axis is coming from the Laterality tree from the Topology hierarchy of ***Extension Codes*** and it is shown below:

Laterality axis value set

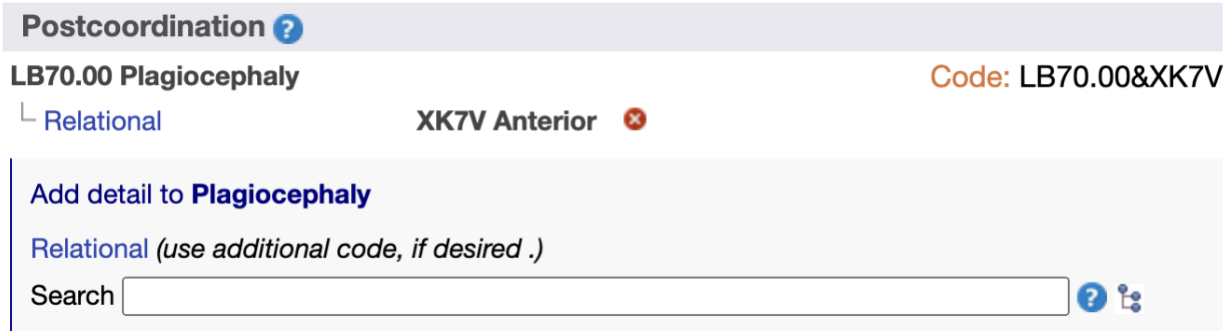
The axis name in the ICD API is: http://id.who.int/icd/schema/laterality.

4.13.1.6.2 Relational

Definition

The *relational* axis describes the topological relation of the part of the body with respect to a whole, or other subdivisions of an affected body part pertaining to an ICD entity.

An example of postcoordinating *Plagiocephaly* with the *relational* topography *Anterior* is shown below:



The value set for the *relational* axis comes from the *Relational* tree in the *Topology* hierarchy of *Extension Codes*, and it is shown below:

Relational			
XK7V	Anterior	XK6J	Proximal
XK8L	Posterior	XK6C	Distal
XK9H	Medial	XK3Z	Ipsilateral
XK09	Lateral	XK3Y	Contralateral
XK5N	Superior	XK2H	External
XK4H	Inferior	XK49	Internal
XK4M	Ventral	XK7F	Superficial
XK87	Dorsal	XK16	Deep
The *relational* axis value set			

The axis name in the ICD API is: http://id.who.int/icd/schema/relational.

4.13.1.6.3 Regional

Definition

The *regional* axis describes the region of the affected part of the body pertaining to an ICD entity from a short classification of regions.

The value set of the *regional* axis comes from the *Regional* tree of the *Topology* hierarchy of *Extension Codes*, and it is shown below:

The *regional* axis value set.

The axis name in the ICD API is: http://id.who.int/icd/schema/regional.

4.13.1.6.4 Distribution

Definition

The *distribution* axis describes the type or degree of distribution of the health condition within affected body parts or regions.

For example, the *distribution* axis can be used to describe the aspect or coverage of a disease in a body part.

The value set of the *distribution* axis comes from the *Distribution* tree of the *Topology* hierarchy of *Extension Codes*, and it is shown below:

▼ Distribution XK2J Complete distribution XK6P Consolidated distribution XK31 Diffuse distribution XK5A Disseminated distribution XK37 Focal distribution XK63 Generalised distribution	XK06 Incomplete distribution XK0V Intertriginous distribution XK5F Linear distribution XK9A Localised distribution XK36 Segmental distribution XK7Z Systematised distribution
The *distribution* axis value set	

The axis name in the ICD API is: http://id.who.int/icd/schema/distribution.

4.13.1.7 Serotype

Definition

The *serotype* axis allows the recording of the serotype information (i.e., a common set of antigens) for a microorganism that causes a health condition pertaining to an ICD entity.

Note: The *serotype* axis is currently not used for ICD, but it might be in the future.

There are currently no value sets defined for the *serotype* axis.

4.13.1.8 Genomic and chromosomal anomaly

Definition

The *genomic and chromosomal anomaly* axis identifies necessary candidate genes and SNIPs related to the occurrence of the condition specified by the ICD entity .

Rationale:

- To list the genes (and genetic mechanisms) in order to see whether a specific entity should be assigned to a specified term
- To seek similarities in grouping similar diseases/disorders

Predisposing or causing genes can be mentioned here.

Note: The *genomic and chromosomal anomaly* axis is currently not used for ICD, but it might be in the future.

There are currently no value sets defined for the *genomic and chromosomal anomaly* axis.

4.13.1.9 Injury Properties

A number of axes can be used to postcoordinate injuries:

- Type of injury
- Fracture axes:
  - Fracture Subtype
  - Fracture Open/Close
  - Joint Involvement in Fracture
- Burn axes:
  - Extent of Burn by Body Surface
  - Extent of Full Thickness Burn by Body Surface
  - Outcome of Full Thickness Burn

4.13.1.9.1 Type of injury

Definition

The *injury type* axis describes the type of the superficial injury from a short, predefined list.

The value set for the *type of injury* axis comes from the *Types of superficial injuries* tree of the *Dimensions of Injury* hierarchy of *Extension Codes*, and it is shown below:

The *type of injury* value set

The axis name in the ICD API is: http://id.who.int/icd/schema/typeOfInjury.

4.13.1.9.2 Fracture Properties

Three axes describe the fracture properties for postcoordination:

- Fracture Subtype
- Fracture Open or Closed
- Joint Involvement in Fracture

An example for postcoordinating *Fracture of scapula* on the three fracture axes and laterality is shown below:

4.13.1.9.2.1 Fracture subtype

Definition

The *fracture subtype* axis describes the type of fracture from a predefined list.

The value set for the *fracture subtype* axis is coming from the *Fracture types* tree of the *Dimensions of Injury* hierarchy of *Extension Codes*, and it is shown below:

Fracture types	
XJ36W Avulsion fracture	XJ4PE Infected fracture
XJ2EL Bucket handle or corner fracture	XJ392 Linear fracture
XJ76E Buckle fracture	XJ6RL Longitudinal fracture
XJ7ZH Burst fracture	XJ4CX Missile fracture
XJ1Z6 Comminuted fracture	XJ4FU Osteochondral fracture
XJ1PP Compound fracture	XJ3HH Physeal fracture
XJ778 Compression fracture	XJ64N Puncture fracture
XJ9UB Depressed fracture	XJ909 Simple fracture
XJ69V Dislocated fracture	XJ9XQ Slipped epiphysis fracture
XJ8PQ Displaced fracture	XJ967 Spiral fracture
XJ0QE Elevated fracture	XJ5V7 Transverse fracture
XJ5N9 Fissured fracture	XJ6NA Wedge fracture
XJ45W Greenstick fracture	XJ8QL Fracture with foreign body
XJ7AT Impacted fracture	
The *fracture subtype* axis value set	

The axis name in the ICD API is: http://id.who.int/icd/schema/fractureSubtype.

4.13.1.9.2.2 Fracture open or closed

Definition

The *fracture open or closed* axis specifies if the coded fracture is open (i.e., there is an open wound or break in the skin) or closed (i.e., no break in the skin).

The value set for the *fracture open or closed* axis is coming from the *Whether fracture is open or closed* tree of the *Dimensions of Injury* hierarchy of *Extension Codes*, and it is shown below:

▼ Whether fracture is open or closed XJ44E Closed fracture XJ7YM Open fracture
The fracture open or closed axis value set

The axis name in the ICD API is: http://id.who.int/icd/schema/fractureOpenOrClosed.

4.13.1.9.2.3 Joint involvement in fracture

Definition

The *joint involvement in fracture* axis describes whether the joint has been affected by the fracture or not.

The value set for the *joint involvement in fracture* axis is coming from the *Joint involvement in fracture* tree of the *Dimensions of Injury* hierarchy of *Extension Codes*, and it is shown below:

▼ Joint involvement in fracture ▼ XJ5GS Fracture extends into joint XJ5L7 Fracture extends into joint and a portion of the articular part remains attached to the main part of the bone XJ92H Fracture extends into joint and the entire articular part is detached from the main part of the bone XJ5VJ Fracture does not extend into joint
The joint involvement in fracture axis value set

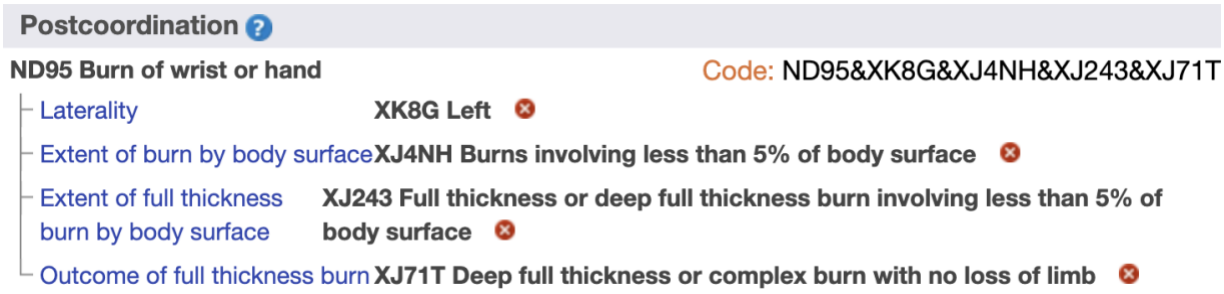
The axis name in the ICD API is: http://id.who.int/icd/schema/jointInvolvementInFracture.

4.13.1.9.4 Burn properties

There are three axes that can be used to describe burns for postcoordination:

- Extent of Burn by Body Surface
- Extent of Full Thickness Burn by Body Surface
- Outcome of Full Thickness Burn

An example for postcoordinating *Burn of wrist or hand* on the three *burn* axes and *laterality* is shown below:

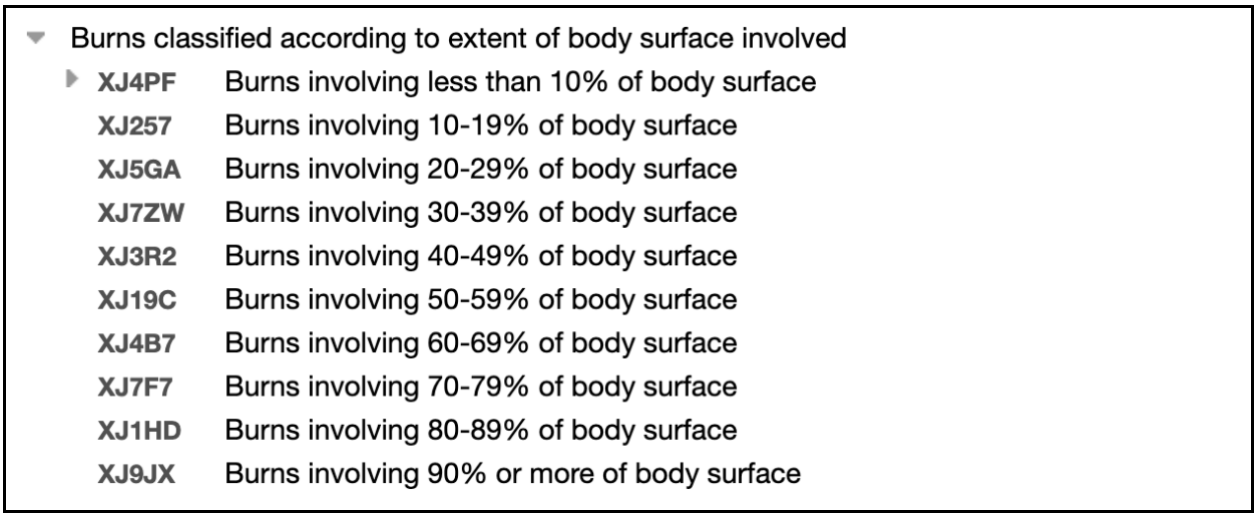


4.13.1.9.4.1 Extent of Burn by Body Surface

Definition

The *extent of burn by body surface* axis describes the percentage of the body surface that was affected by the burn.

The value set for the *extent of burn by body surface* axis is coming from the *Burns classified according to extent of body surface involved* tree of the *Dimensions of Burns* hierarchy of *Extension Codes*, and it is shown below:



The extent of burn by body surface axis value set

The axis name in the ICD API is: http://id.who.int/icd/schema/extentOfBurnByBodySurface.

4.13.1.9.4.2 Extent of Full Thickness Burn by Body Surface

Definition

The *extent of full thickness burn by body surface* axis describes the percentage of the body surface that has a full thickness or deep full thickness burn.

The value set for the *extent of extent of full thickness burn by body surface* axis is coming from the *Extent of body surface with full thickness or deep full thickness burn* tree of the *Dimensions of Burns* hierarchy of *Extension Codes*, and it is shown below:

Extent of body surface with full thickness or deep full thickness burn XJ31W Full thickness or deep full thickness burn involving less than 10% of body surface XJ243 Full thickness or deep full thickness burn involving less than 5% of body surface XJ4FJ Full thickness or deep full thickness burn involving 5-9% of body surface XJ82Z Full thickness or deep full thickness burn involving 10-19% of body surface XJ3XZ Full thickness or deep full thickness burn involving 20-29% of body surface XJ1NG Full thickness or deep full thickness burn involving 30-39% of body surface XJ4CR Full thickness or deep full thickness burn involving 40-49% of body surface XJ9MY Full thickness or deep full thickness burn involving 50-59% of body surface XJ8E0 Full thickness or deep full thickness burn involving 60-69% of body surface XJ68M Full thickness or deep full thickness burn involving 70-79% of body surface XJ9UE Full thickness or deep full thickness burn involving 80-89% of body surface XJ3MB Full thickness or deep full thickness burn involving 90% or more of body surface
The extent of extent of full thickness burn by body surface axis value set

The axis name in the ICD API is:
http://id.who.int/icd/schema/extentOfFullThicknessBurnByBodySurface.

4.13.1.9.4.3 Outcome of Full Thickness Burn

Definition

The *outcome of full thickness burn* axis describes whether the burn caused the loss of a limb or digit.

The value set for the *outcome of full thickness burn* axis is coming from the *Outcome of deep full thickness or complex burn* tree of the *Dimensions of Burns* hierarchy of *Extension Codes*, and it is shown below:

Outcome of deep full thickness or complex burn **XJ71T** Deep full thickness or complex burn with no loss of limb **XJ6NX** Deep full thickness or complex burn with loss of digit **XJ36Y** Deep full thickness or complex burn with loss of limb
The outcome of full thickness burn axis value set

The axis name in the ICD API is: http://id.who.int/icd/schema/outcomeOfFullThicknessBurn.

4.13.1.11 Duration of Coma

Definition

The *duration of coma* axis describes the length of a coma.

Note: The *duration of coma* axis is currently not used for ICD, but it might be in the future.

There are currently no value sets defined for the *duration of coma* axis.

4.13.1.12 Level of Consciousness

Definition

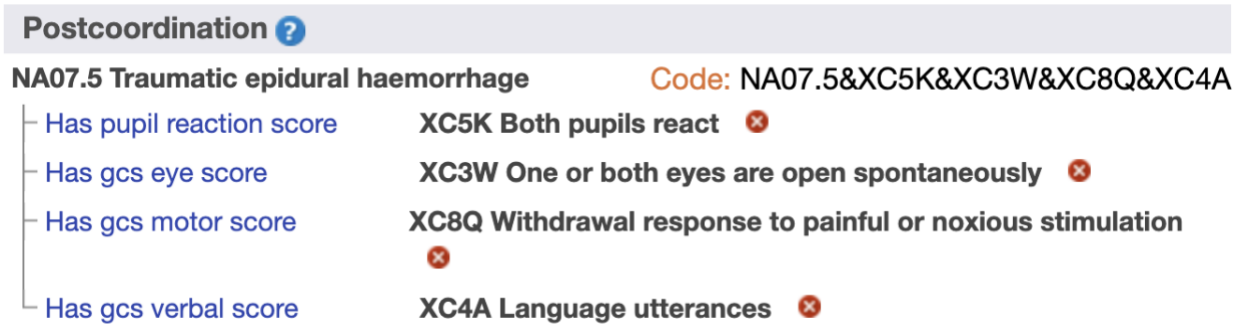
The level of consciousness axis describes four different aspects of consciousness that can be measured: pupil reaction score, GCS eye score, GCS motor core, and GCS verbal score.

There are four axes describing the level of consciousness for postcoordination (GCS stands for "Glasgow Coma Scale"):

- Pupil Reaction Score
- GCS Eye Score
- GCS Motor Score
- GCS Verbal Score

The three components of the Glasgow Coma Scale are reflected in the GCS postcoordination axes.

An example of postcoordinating *Traumatic epidural haemorrhage* on the four *level of consciousness* axes is shown below:



4.13.1.12.1 Pupil Reaction Score

Definition

The *pupil reaction score* axis is used to document the loss of pupil reactivity to light.

The value set for the *pupil reaction score* axis is coming from the *Pupil Reaction Score* tree of the *Consciousness* hierarchy of *Extension Codes*, and it is shown below:

▼ Pupil reaction score	
XC5Y	Neither pupil reacts
XC16	One pupil reacts
XC5K	Both pupils react
XC85	Data not available
The pupil reaction score axis value set	

The axis name in the ICD API is: http://id.who.int/icd/schema/hasPupilReactionScore.

4.13.1.12.2 GCS Eye Score

Definition

The *GCS eye score* axis describes the ability of the patient to perform eye movements using the Eye Response (E) of the Glasgow Coma Scale.

The value set for the *GCS eye score* axis is coming from the *Glasgow Coma Scale Eye opening score* tree of the *Consciousness* hierarchy of *Extension Codes*, and it is shown below:

▼ Glasgow Coma Scale Eye opening score	
XC3W	One or both eyes are open spontaneously
XC5L	One or both eyes open to verbal stimulation
XC3H	One or both eyes open to painful or noxious stimulation
XC87	No eye opening even with painful or noxious stimulation
The *GCS eye score* axis value set	

The axis name in the ICD API is: http://id.who.int/icd/schema/hasGCSEyeScore.

4.13.1.12.3 GCS Motor Score

Definition

The *GCS motor score* axis describes the ability of the patient to move their body using the Motor Response (M) of the Glasgow Coma Scale.

The value set for the *GCS motor score* axis is coming from the *Glasgow Coma Scale Motor score* tree of the *Consciousness* hierarchy of *Extension Codes*, and it is shown below:

Glasgow Coma Scale Motor score	
XC4L	Obeys commands
XC6J	Localizes response to painful or noxious stimulation
XC8Q	Withdrawal response to painful or noxious stimulation
XC8W	Abnormal flexion response to painful or noxious stimulation
XC8H	Extension response to painful or noxious stimulation
XC34	No motion even with painful or noxious stimulation

The *GCS motor score* axis value set

The axis name in the ICD API is: http://id.who.int/icd/schema/hasGCSMotorScore.

4.13.1.12.4 GCS Verbal Score

Definition

The *GCS verbal score* axis describes the ability of the patient to speak using the Verbal Response (V) of the Glasgow Coma Scale.

The value set for the *GCS verbal score* axis is coming from the *Glasgow Coma Scale Verbal score* tree of the *Consciousness* hierarchy of *Extension Codes*, and it is shown below:

Glasgow Coma Scale Verbal score	
XC2X	Oriented, normal speech
XC4Y	Confused, disoriented speech
XC4A	Language utterances
XC7U	Non-language utterances (incomprehensible sounds) to painful or noxious stimulation
XC8U	No verbal output even with painful or noxious stimulation

The *GCS verbal score* axis value set

The axis name in the ICD API is: http://id.who.int/icd/schema/hasGCSVerbalScore.

4.13.1.13 Diagnosis Confirmed by

Definition

The *diagnosis confirmed by* axis describes the means by which the diagnosis was confirmed.

The value set for the *diagnosis confirmed by* axis is coming from the Diagnosis method of confirmation tree of the *Diagnosis code descriptors* hierarchy in ***Extension Codes***, and it is shown below:

Diagnosis method of confirmation XY3B Diagnosis confirmed by laboratory examination XY0E Diagnosis confirmed by serology XY9Q Diagnosis confirmed by histology XY8K Diagnosis confirmed by genetics XY9R Diagnosis confirmed by imaging
The value set for the diagnosis method confirmation axis.

The axis name in the ICD API is: http://id.who.int/icd/schema/diagnosisConfirmedBy.

4.13.1.14 Has Manifestation

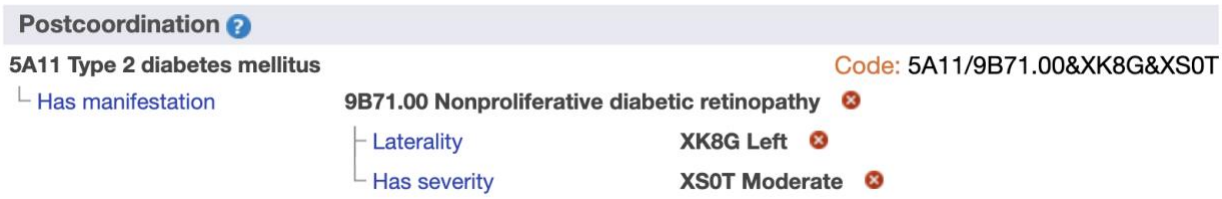
Definition

The *has manifestation* axis describes manifestations of the health condition pertaining to an ICD entity.

The value set for the *has manifestation* axis is the entire ICD disease hierarchy.

It is often the case (but not always!) that the cause of a disease (represented via the *has causing condition* axis) and the manifestation of the disease (*has manifestation* axis) are inverse relationships. That is, if *ICD Entity 1* has causing condition *ICD Entity 2*, then *ICD Entity 2* has manifestation *ICD Entity 1*.

An example of postcoordinating Type 2 diabetes mellitus with *has manifestation* *Nonproliferative diabetic retinopathy*, which can be further postcoordinated using laterality and severity, is shown below:



The axis name in the ICD API is: http://id.who.int/icd/schema/hasManifestation.

4.13.1.15 Associated With

Definition

The *associated with* axis establishes a relationship between an ICD entity and one or more other ICD entities without specifying the exact meaning of the relationship.

The value set for the *associated with* axis is the entire ICD disease hierarchy.

The *associated with* axis provides a placeholder into which different types of relationship between diseases can be documented, with the expectation that in future ICD developments, new explicit relationships will emerge from them, and that they will be explicitly represented as postcoordination axes.

The axis name in the ICD API is: http://id.who.int/icd/schema/associatedWith.

4.13.2 Postcoordination for External Causes of Morbidity or Mortality

External Causes of Morbidity and Mortality are causes that produce injuries, poisonings or other effects coming from a source outside the affected subject.

In the ICD, injury means physical or physiological bodily harm resulting from interaction of the body with energy (mechanical, thermal, electrical, chemical or radiant, or due to extreme pressure) in an amount, or at a rate of transfer, that exceeds physical or physiological tolerance.

Injury usually has rapid onset in response to a well-defined event (e.g., a car crash, striking the ground after falling, drinking a strongly alkaline liquid, an overdose of a medication, a burn sustained during a surgical procedure). These events are often referred to as external causes of injury.

Several postcoordination axes can be used to describe the entities in the *External Causes of Morbidity and Mortality* chapter. Three main axes (*intent*, *mechanism of injury*, and *object/substance producing injury*) are already precoordinated in three sections of the chapter (*Unintentional causes*, *Intentional self-harm*, *Undetermined intent*) as following:

- 1st level - *Intent* of external cause
- 2nd level - Broad category of the *mechanism* of the external cause
- 3rd level - More specific mechanism and objects/substances producing injury
- 4th level - Further characterisation of the external cause

Other generic postcoordination axes for describing external causes are:

- Activity when injured
- Occupational descriptor
- Place of occurrence
- Alcohol use
- Psychoactive drug use

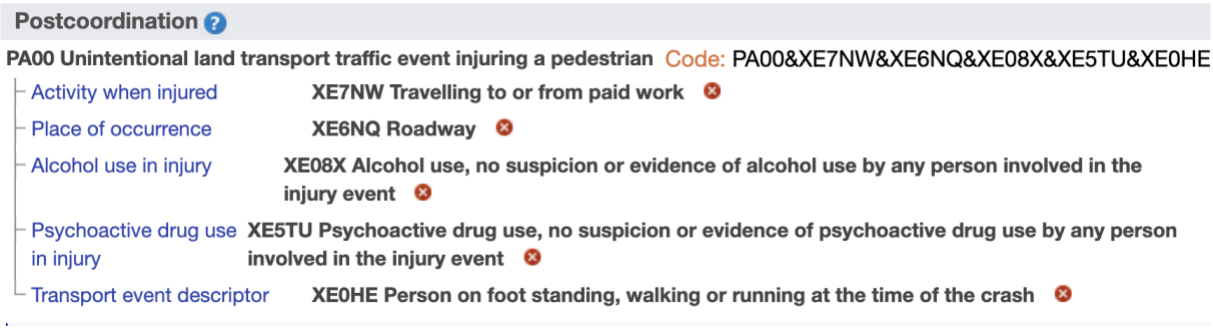
In addition, specific postcoordination axes are also available:

- Transport event descriptor
- Assault and maltreatment
- Intentional self-harm
- Armed conflict
- Legal intervention
- Sport activity descriptor

The value sets for all external cause postcoordination axes come from the *Dimensions of external causes* of ***Extension Codes***. The top level entities are shown below:

Top-level classes for the value set of dimensions of external causes axes.

An example of postcoordinating *Unintentional land transport traffic event injuring a pedestrian* on several applicable axes (*intent* axis value = "*unintentional*", as evident from the title), is shown below:



4.13.2.1 Intent

Definition

The *intent* axis denotes whether the source agent caused the occurrence of the injury in an intentional or unintentional way.

The primary axis for all external causes, except for exposure to extreme forces of nature, maltreatment, legal intervention, armed conflict, and health care related harm or injury, is now based on 'intent'.

The value set for the *intent* axis is implicit, and is one of the following values:

- Intentional
- Unintentional
- Assault
- Undetermined intent

Other top level entities and corresponding hierarchies that are considered to have *intentional* intent are:

- *Maltreatment*
- *Legal intervention*
- *Armed conflict*

The top level entities and corresponding hierarchies that are considered to have *unintentional* intent are:

- *Exposure to extreme forces of nature*
- *Causes of healthcare related harm or injury*

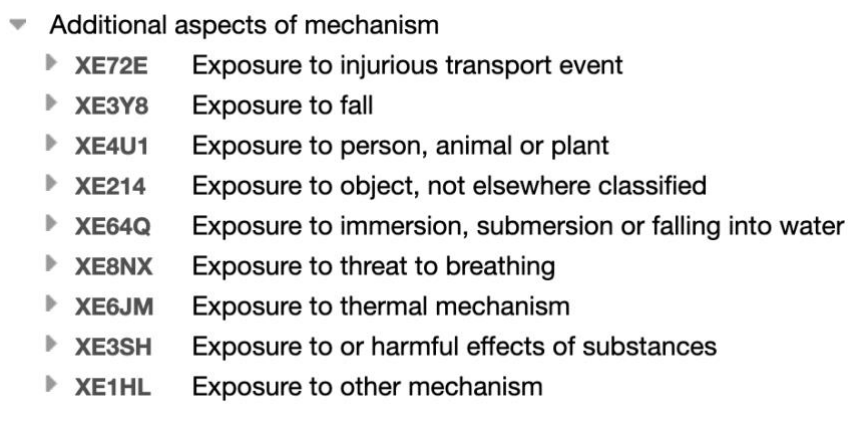
4.13.2.2 Mechanism of Injury

Definition

The *mechanism of injury* axis denotes the mechanism by which the injury was produced (e.g., fall, threat to breathing, exposure to forces of nature).

The broader *mechanism of injury* is usually precoordinated and it is part of the title of the second level of the External Causes hierarchies (e.g., *Unintentional fall*). The more detailed mechanism information appears in the entity titles of the third level of the hierarchy (e.g., *Unintentional fall on the same level or from less than 1 metre*).

The value set for the *mechanism of injury* axis comes from the *Additional aspects of mechanism* tree of the *Dimensions of external causes hierarchy*, and it is shown below:



The top level classes of the *mechanism of injury* axis value set

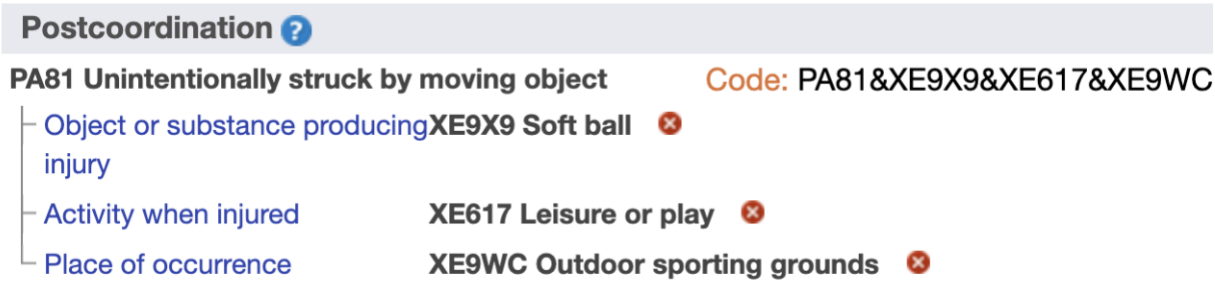
In ICD-11 Mortality and Morbidity Statistics (MMS), the *mechanism of injury* is precoordinated, and it is **not** offered as a postcoordination axis that a user can set.

4.13.2.4 Object or Substance Producing Injury

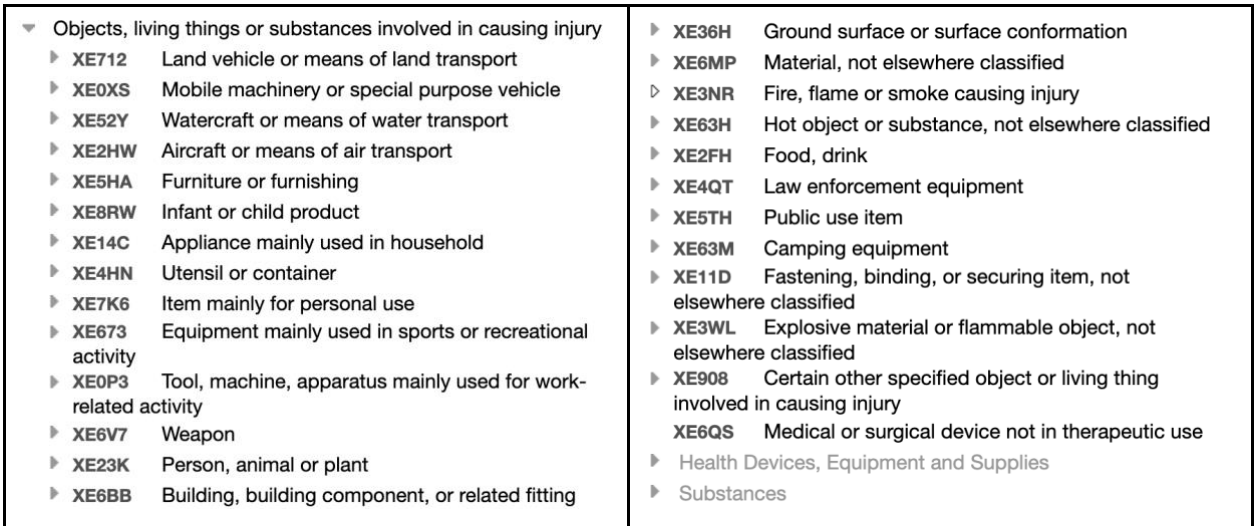
Definition

The *object or substance producing injury* axis documents the thing that caused the injury, which is one of: inanimate objects, living things (person, animal or plant), or substances.

An example of postcoordinating *Unintentionally struck by moving object* with *Soft ball* as the *object or substance producing injury* is shown below:



The value set for the *object or substance producing injury* axis comes from the *Objects, living things or substances involved in causing injury* tree of the *Dimensions of external causes hierarchy*, and it is shown below:



The object or substance producing injury axis value set

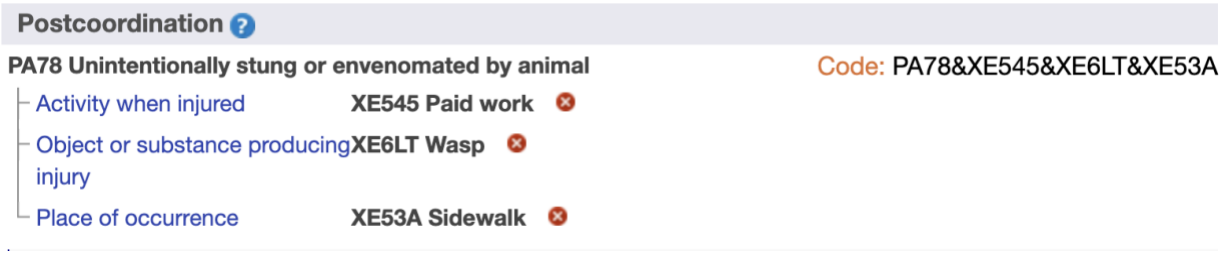
The axis name in the ICD API is: http://id.who.int/icd/schema/objectOrSubstanceProducingInjury

4.13.2.5 Activity when injured

Definition

The *activity when injured* documents the type of activity (e.g., paid work, unpaid work, educational) that the subject of the injury was performing when the injury occured.

An example of postcoordinating *Unintentionally stung or envenomated by animal* with *Paid work* as the *activity when injured* is shown below:



The value set for the *activity when injured* axis comes from the *Activity when injured* tree of the *Dimensions of external causes hierarchy*, and it is shown below:

Activity when injured XE545 Paid work XE8VF Unpaid work XE729 Educational activity XE38D Sports, recreation or leisure activity XE0E5 Being taken care of XE9GU Unspecified type of activity when injured
The activity when injured axis value set

The axis name in the ICD API is: http://id.who.int/icd/schema/activityWhenInjured

4.13.2.6 Occupational description

Definition

The *occupational description* axis documents the type of economic activity (e.g., agriculture, manufacturing) or the type of occupation (e.g., professionals, armed forces) of the subject of an occupational injury.

The value set for the *occupational description* axis comes from the *Aspects of occupational injury events* of the *Dimensions of external causes hierarchy*, and it is split into two sections: Economic activity and Occupation. The value set is shown below:

- Aspects of occupational injury events
  - Economic activity
    - XE7J2 Economic activity, agriculture, hunting, or forestry
    - XE227 Economic activity, fishing
    - XE45Q Economic activity, mining, quarrying, or extraction
    - XE13G Economic activity, manufacturing
    - XE6WE Economic activity, electricity, gas, or water supply
    - XE0SE Economic activity, construction
    - XE139 Economic activity, wholesale or retail trade
    - XE6J4 Economic activity, repair of motor vehicles, motorcycles, or personal and household goods
    - XE4JS Economic activity, hotels or restaurants
    - XE5JN Economic activity, transport, storage, or communications
    - XE8A7 Economic activity, financial intermediation
    - XE3YF Economic activity, real estate, renting, or business activities
    - XE3K1 Economic activity, public administration, defence, or compulsory social security
    - XE54F Economic activity, providing education
    - XE0G4 Economic activity, health or social work
    - XE7X1 Economic activity, other community, social, or personal service activities
    - XE2PM Economic activity, private households with employed persons
    - XE6N7 Economic activity, extra-territorial organisations or bodies
  - Occupation
    - XE3TU Occupation - legislators, senior officials, managers
    - XE59Y Occupation - professionals
    - XE558 Occupation - technicians or associate professionals
    - XE17U Occupation - clerks, secretaries
    - XE1CA Occupation - service workers, shop and market sales workers
    - XE6TG Occupation - skilled agriculture or fishery workers
    - XE0VC Occupation - craft or related trades workers
    - XE37Y Occupation - plant/machine operators or assemblers
    - XE4EE Occupation - elementary occupations
    - XE5G8 Occupation - armed forces

The value set of the *occupational description* axis.

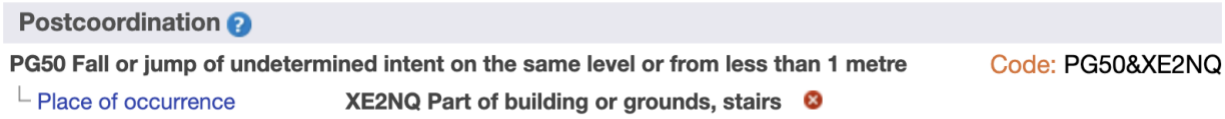
The axis name in the ICD API is: http://id.who.int/icd/schema/occupationalDescriptor.

4.13.2.7 Place of occurrence

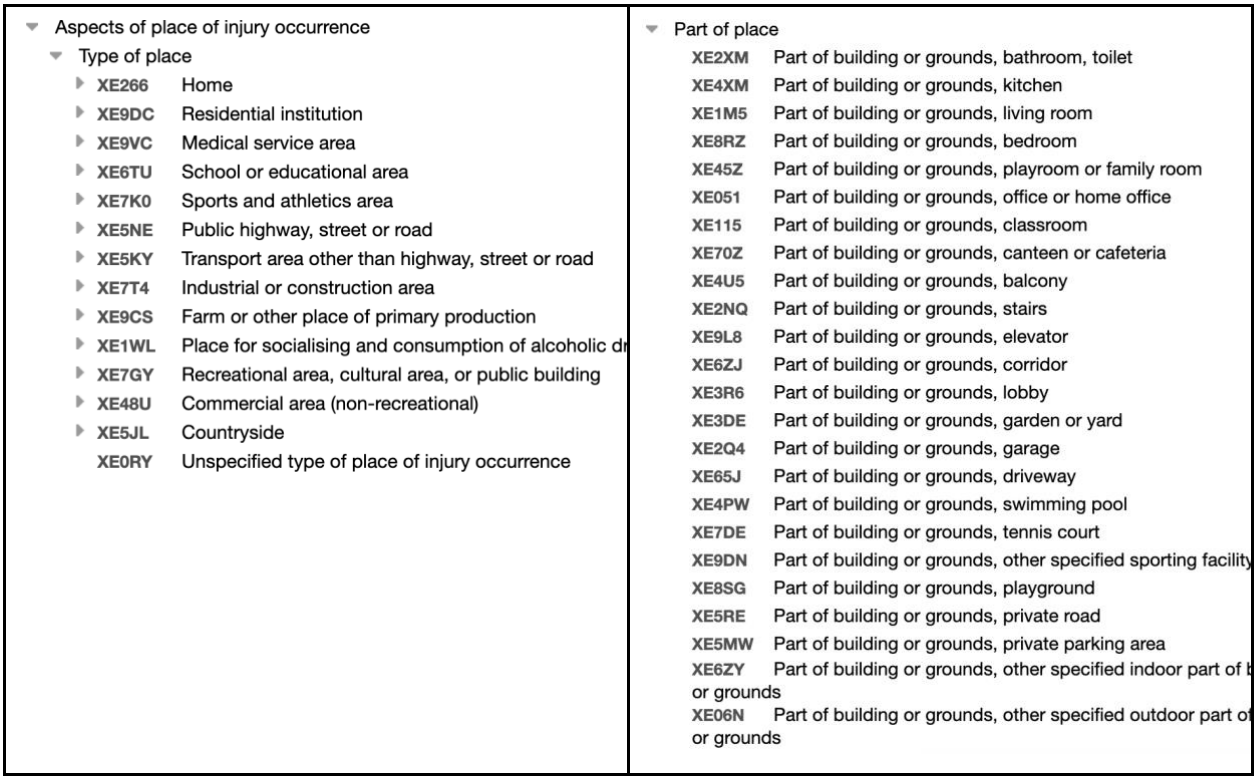
Definition

The *place of occurrence* axis documents the place where the injury occurred (e.g., home, commercial area, residential institution).

An example for postcoordinating *Fall or jump of undetermined intent on the same level or from less than 1 metre* on the *place of occurrence* axis is shown below:



The value set for the *place of occurence* axis comes from the *Aspects of place of injury occurrence* of the *Dimensions of external causes hierarchy*, and it is split into "Type of Place" and "Part of Place". The value set is shown below:



The value set for the *place of occurence* axis.

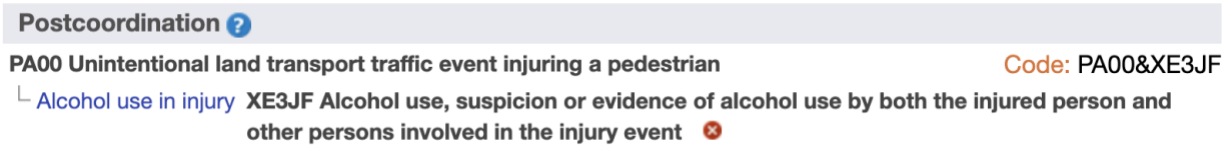
The axis name in the ICD API is: http://id.who.int/icd/schema/placeOfOccurrence.

4.13.2.8 Alcohol use in injury

Definition

The *alcohol use in injury* axis documents whether there is suspicion or evidence of alcohol use by any of the participants involved in the injury.

An example for postcoordinating *Unintentional land transport traffic event injuring a pedestrian* on the *alcohol use in injury* axis is shown below:



The value set for the *alcohol use in injury* axis comes from the *Alcohol use in injury event* of the *Dimensions of external causes hierarchy*, and it is shown below:

Alcohol use in injury event XE47R Alcohol use, no information available XE08X Alcohol use, no suspicion or evidence of alcohol use by any person involved in the injury event XE1G3 Alcohol use, suspicion or evidence of alcohol use by the injured person XE15H Alcohol use, suspicion or evidence of alcohol use by other persons involved in the injury event XE3JF Alcohol use, suspicion or evidence of alcohol use by both the injured person and other persons involved in the injury event
The value set for the *alcohol use in injury* axis.

The axis name in the ICD API is: http://id.who.int/icd/schema/alcoholUseInInjury.

4.13.2.9 Psychoactive drug use in injury

Definition

The *psychoactive drug use in injury* axis documents whether there is suspicion or evidence of psychoactive drug use by any of the participants involved in the injury.

An example for postcoordinating *Intentional self-harm by railway transport injury event* on the *psychoactive drug use in injury* axis is shown below:

The value set for the *psychoactive drug use in injury* axis comes from the *Psychoactive drug use in injury event* of the *Dimensions of external causes hierarchy*, and it is shown below:

Psychoactive drug use in injury event XE43G Psychoactive drug use, no information available XE5TU Psychoactive drug use, no suspicion or evidence of psychoactive drug use by any person involved in the injury event XE5VY Psychoactive drug use, suspicion or evidence of psychoactive drug use by the injured person XE8GW Psychoactive drug use, suspicion or evidence of psychoactive drug use by other persons involved in the injury event XE28E Psychoactive drug use, suspicion or evidence of psychoactive drug use by both the injured person and other persons involved in the injury event
Value set for the psychoactive drug use in injury axis

The axis name in the ICD API is: http://id.who.int/icd/schema/psychoactiveDrugUseInInjury.

4.13.2.10 Transport event descriptor

Definition

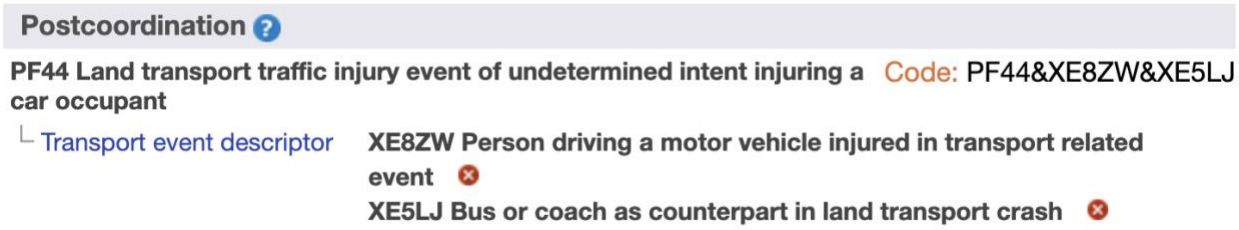
The *transport event descriptor* axis documents the mode of transport and the vehicle user role of the person injured, as well as the counterpart in the injury for land transport crashes, and other information for injuries with no counterpart.

Transport injuries can be described for postcoordination purposes on four aspects as part of the *transport event description* axis:

- Mode of transport of person injured in transport event,
- Vehicle user role of person injured in transport event,
- Counterpart in land transport crash, and
- Other specified mechanism with no counterpart.

Some of the aspects of the *transport event description* axis may already be precoordinated in the title of an entity (for example, the *mode of transport*). Not all four aspects are applicable for all transport injuries entities, and therefore cannot be used in postcoordination. For example, land transport crashes cannot be postcoordinated on the *Other specified mechanism with no counterpart* aspect. The postcoordination mechanism will only allow the selection of valid aspects for postcoordination.

An example for postcoordinating *Land transport traffic injury event of undetermined intent injuring a car occupant* on *transport event descriptor axis,* and more specifically on the *vehicle user role*, and *counterpart in land transport crash* aspects, is shown below:



In the example above, the *mode of transport*, i.e., *Car* is already precoordinated in the title of the entity.

Note: In the Foundation, the fours aspects of the t*ransport event descriptor axis* can be configured and edited individually in iCAT.

The value set for the *transport event descriptor axis* comes from the *Aspects of transport injury events* of the *Dimensions of external causes hierarchy*, and it is split into four hierarchies: *Mode of transport of person injured in transport event*, *Vehicle user role of person injured in transport event*, *Counterpart in land transport crash*, and *Other specified mechanism with no counterpart*. The value set is shown below:

- Aspects of transport injury events
  - Mode of transport of person injured in transport event
    - **XE88K** Pedestrian as mode of transport of person injured in transport event
    - **XE7ZY** Pedestrian conveyance as mode of transport of person injured in transport event
    - **XE71D** Pedal cycle as mode of transport of person injured in transport related event
    - **XE7NK** Motorcycle as mode of transport of person injured in transport related event
    - **XE2W4** Car as mode of transport of person injured in transport related event
    - **XE2RA** Bus or coach as mode of transport of person injured in transport related event
    - **XE9JB** Light goods vehicle as mode of transport of person injured in transport related event
    - **XE1PH** Heavy goods vehicle as mode of transport of person injured in transport related event
    - **XE41E** Streetcar or tram as mode of transport of person injured in transport related event
    - **XE5WB** Low-powered passenger vehicle as mode of transport of person injured in transport event
    - **XE35C** Special vehicle mainly used in agriculture as mode of transport of person injured in transport
    - **XE885** Special vehicle mainly used on industrial premises as mode of transport of person injured in
    - **XE312** Special construction vehicle as mode of transport of person injured in transport related event
    - **XE5RK** Special all-terrain vehicle as mode of transport of person injured in transport related event
    - **XE940** Animal being ridden as mode of transport of person injured in transport related event
    - **XE4ZZ** Animal drawn vehicle as mode of transport of person injured in transport related event
    - **XE8YD** Railway vehicle as mode of transport of person injured in transport related event
    - **XE27K** Watercraft as mode of transport of person injured in transport related event
    - **XE1JR** Aircraft as mode of transport of person injured in transport related event
    - **XE0VS** Spacecraft as mode of transport of person injured in transport related event
- Vehicle user role of person injured in transport event
  - **XE42A** Vehicle driver injured in transport related event
  - **XE1LZ** Vehicle passenger injured in transport related event
  - **XE9Y1** Person boarding or alighting a vehicle injured in transport related event
  - **XE166** Person on outside of vehicle or in load space injured in transport related event
  - **XE6R5** Rider of an animal injured in transport event

Counterpart in land transport crash XE6K0 Pedestrian as counterpart in land transport crash XE3NU Pedestrian conveyance as counterpart in land transport crash XE7ZZ Pedal cycle as counterpart in land transport crash XE8XQ Motorcycle as counterpart in land transport crash XE0JH Car as counterpart in land transport crash XE5LJ Bus or coach as counterpart in land transport crash XE6UN Light goods vehicle as counterpart in land transport crash XE854 Heavy goods vehicle as counterpart in land transport crash XE8UX Streetcar or tram as counterpart in land transport crash XE90S Low powered passenger vehicle as counterpart in land transport crash XE9HB Special vehicle mainly used in agriculture as counterpart in land transport crash XE9DQ Special vehicle mainly used on industrial premises as counterpart in land transport crash XE1YW Special construction vehicle as counterpart in land transport crash XE23Q Special all-terrain vehicle as counterpart in land transport crash XE6QK Animal as counterpart in land transport crash XE6X8 Animal drawn vehicle as counterpart in land transport crash XE6DQ Railway vehicle as counterpart in land transport crash XE98X Fixed or stationary object as counterpart in land transport crash
Other mechanisms of transport injury without counterpart XE0JJ Fall in mode of transport without counterpart XE3M5 Fall from mode of transport without counterpart XE5XB Other specified mechanism with no counterpart
The value set for the transport event description. Each of the four aspects is shown in a different row (Mode of transport of person injured in transport event, Vehicle user role of person injured in transport event, Counterpart in land transport crash, and Other specified mechanism with no counterpart).

The axis name in the ICD API is: http://id.who.int/icd/schema/transportEventDescriptor.

4.13.2.11 Aspects of Assault and Maltreatment

Definition

The *aspects of assault and maltreatment* axis documents the perpetrator-victim relationship, the gender of the perpetrator, and the context of the assault or maltreatment (e.g., altercation, gang-related incident).

Assault and maltreatment external causes can be postcoordinated on three *aspects of assault and maltreatment* axis:

- Perpetrator-victim relationship,
- Gender of perpetrator, and
- Context of assault and maltreatment.

The mechanism of maltreatment is already precoordinated in the title of the entities.

An example of postcoordinating *Assault by threat to breathing by strangulation* on the three *aspects of assault and maltreatment* axis is shown below:

In the example above, the precoordinated mechanism of the external cause is *Exposure to threat to breathing by strangulation*.

The value set for the *aspects of assault and maltreatment* axis comes from the *Aspects of assault and maltreatment* of the *Dimensions of external causes hierarchy*, and it is split into three hierarchies: *Perpetrator-victim relationship*, *Gender of perpetrator*, and *Context of assault and maltreatment*. The value set is shown below:

▼ Aspects of assault and maltreatment ▼ Perpetrator -victim relationship ▶ XE454 Spouse or partner ▶ XE8AA Parent ▶ XE5WN Other relative ▶ XE4BG Unrelated care giver ▶ XE270 Acquaintance or friend ▶ XE2HC Official or legal authority ▶ XE4WS Stranger XE0H2 Perpetrator-victim relationship, prisoner or detainee XE3FJ Perpetrator-victim relationship, person executing a felony or crime XE388 Perpetrator-victim relationship, person interceding in a crime
▼ Gender of perpetrator XE5YG Gender of perpetrator, male XE56C Gender of perpetrator, female XE9SL Gender of perpetrator, unknown XE6W8 Gender of perpetrator, other
▼ Context of assault and maltreatment ▶ XE0UM Altercation ▶ XE91G Illegal acquisition or attempted illegal acquisition of money or property ▶ XE933 Drug-related incident ▶ XE213 Context of assault, sexual assault ▶ XE8DB Gang-related incident ▶ XE3V7 Other criminal activity ▶ XE5QX Other specified context of assault
The value set for the *aspects of assault and maltreatment.* Each row shows a different aspect of the axis.

The axis name in the ICD API is: http://id.who.int/icd/schema/aspectsOfAssaultAndMaltreatment.

4.13.2.13 Aspects of intentional self-harm

Definition

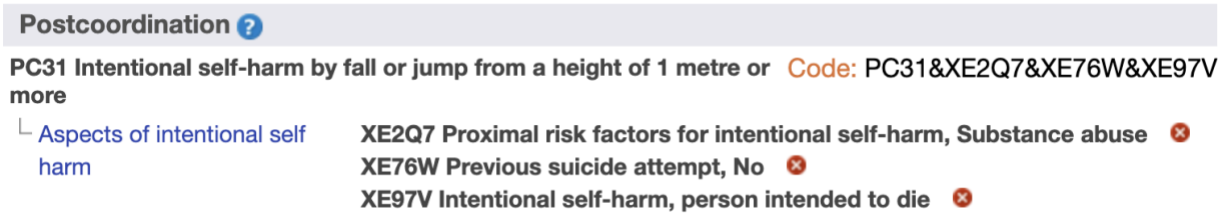
The *aspects of intentional self-harm* axis documents the proximal risk factors, the previous non-fatal intentional self harm, and the intention to die.

Intentional self-harm external causes can be postcoordinated on three *aspects*:

- Proximal risk-factors for intentional self-harm,
- Previous non-fatal intentional self harm, and
- Intention to die aspect of self-harm.

The mechanism of the intentional self-harm is already precoordinated in the title of the entities.

An example of postcoordinating *Intentional self-harm by fall or jump from a height of 1 metre or more* on the three *aspects of intentional self-harm* axis is shown below:



In the example above, the precoordinated mechanism of the external cause is *Exposure to fall from a height of 1 metre or more*.

The value set for the *aspects of intentional self-harm* axis comes from the *Aspects of intentional self-harm events* of the *Dimensions of external causes hierarchy*, and it is split into three hierarchies corresponding to the three aspects. The value set is shown below:

▼ Aspects of intentional self-harm events ▼ Proximal risk-factors for intentional self-harm ▶ **XE17Z** Conflict in relationship with family member, partner, or friend ▶ **XE3GP** Death of a relative, partner, or friend ▶ **XE97R** Physical problem ▶ **XE6XD** Psychological or psychiatric condition ▶ **XE3U9** Income-related or financial problem ▶ **XE5J3** Abuse **XE31V** Proximal risk factors for intentional self-harm, Legal system encounters **XE8MK** Proximal risk factors for intentional self-harm, School-related problem **XE98Q** Proximal risk factors for intentional self-harm, Religious belief or affiliation **XE6TW** Proximal risk factors for intentional self-harm, Cultural issue
▼ Previous non-fatal intentional self harm **XE76W** Previous suicide attempt, No **XE3YR** Previous suicide attempt, Yes
▼ Intention to die aspect of self-harm **XE97V** Intentional self-harm, person intended to die **XE5D6** Intentional self-harm, person did not intend to die **XE2SF** Intentional self-harm, not known or not determined if person intended to die
The value set for the *aspects of intentional self-harm* axis showing the three aspects in different rows.

The axis name in the ICD API is: http://id.who.int/icd/schema/aspectsOfIntentionalSelfHarm.

4.13.2.14 Aspects of armed conflict

Definition

The *aspects of armed conflict* axis documents the type of the armed conflict and the role of the injured person in the armed conflict.

Armed conflict external causes can be postcoordinated on two *aspects*:

- Type of armed conflict, and
- Role of injured person in armed conflict.

An example of postcoordinating *Use of chemical weapons during armed conflict* on the two *aspects of armed conflict* axis is shown below:

Postcoordination

PK30 Use of chemical weapons during armed conflict Code: PK30&XE324&XE42H

└ Aspects of armed conflict **XE324 Type of conflict, war**

XE42H Military personnel

The value set for the *aspects of armed conflict* axis comes from the *Aspects of armed conflict* of the *Dimensions of external causes hierarchy*, and it is split into two hierarchies corresponding to the two aspects. The value set is shown below:

- Aspects of armed conflict
  - Type of armed conflict
    - **XE2RB** Type of conflict, civil war or guerrilla operation
    - **XE324** Type of conflict, war
    - **XE4RJ** Type of conflict, declared terrorism
    - **XE0EG** Type of conflict, civil insurrection
    - **XE7HW** Type of conflict, postconflict incident
  - Role of injured person in armed conflict
    - **XE42H** Military personnel
    - **XE2WZ** Civilian
    - **XE3P0** Role of injured person in armed conflict unknown

The value set for the *aspects of armed conflict* axis showing the two aspects (type of armed conflict and role of injured person in armed conflict).

The axis name in the ICD API is: `http://id.who.int/icd/schema/aspectsOfArmedConflict`.

4.13.2.15 Type of legal intervention

Definition

The *type of legal intervention* axis documents the type of legal interventions from a discrete list of legal intervention types (e.g., civil disorder, potential arrest situation).

The *type of legal intervention* axis is currently not used for postcoordination in any linearization, but it may be in the future.

The value set for the *type of legal intervention* axis comes from the *Type of legal intervention* of the *Dimensions of external causes hierarchy*, and it is shown below:

- Type of legal intervention
  - **XE52B** Potential arrest situation
    - **XE9JF** Type of legal intervention, potential arrest related traffic pursuit
    - **XE25D** Type of legal intervention, potential arrest related investigation of a suspicious person or incident
    - **XE3XD** Type of legal intervention, potential arrest related execution of an arrest
  - **XE8Z9** Response to a disturbance call
    - **XE84H** Type of legal intervention, response to a disturbance call because of a family dispute
    - **XE8WD** Type of legal intervention, response to a disturbance call because of a person behaving aberrantly
    - **XE3FV** Type of legal intervention, response to other specified disturbance call
    - **XE439** Type of legal intervention, response to unspecified disturbance call
  - **XE8M2** Type of legal intervention, ambush situation
  - **XE1DD** Type of legal intervention, civil disorder
  - **XE0RZ** Type of legal intervention, handling, transporting, or custody of prisoner
  - **XE7AT** Type of legal intervention, execution of a legal sentence

The value set for the type of legal intervention axis

The axis name in the ICD API is: http://id.who.int/icd/schema/typeOfLegalIntervention.

4.13.2.16 Sports activity descriptor

Definition

The *sports activity descriptor* axis documents the type and phase of the sport or exercise activity in which the injury occured, as well as the personal and environmental countermeasures that have been used.

The *sports activity* axis can be postcoordinated on four aspects:

- Type of sport or exercise activity,
- Phase of sport or exercise activity,
- Personal countermeasures in sport or exercise, and
- Environmental countermeasures in sport or exercise.

The value set for the *sports activity descriptor* axis comes from the *Aspects of sports injury events* of the *Dimensions of external causes hierarchy*, and it is split into four hierarchies corresponding to the four aspects. The value set is shown below:

- Aspects of sports injury events
  - Type of sport or exercise activity
    - XE3GK Team ball sports
    - XE2BF Team bat or stick sports
    - XE2BG Team water sports
    - XE85T Boating sports
    - XE6W9 Individual water sports
    - XE9DF Ice or snow sports
    - XE3L1 Individual athletic activities
    - XE4HZ Acrobatic sports
    - XE9SK Aesthetic activities
    - XE0KE Racquet sports
    - XE2NY Target or precision sports
    - XE3E4 Combative sports
    - XE1EU Power sports
    - XE42Q Equestrian activities
    - XE3T3 Adventure sports
    - XE85A Wheeled motor sports
    - XE4DA Wheeled non-motored sports
    - XE7BS Multidiscipline sports
    - XE03W Aero (non-motored) sports
    - XE68C Other school-related recreational activities

▼ Phase of sport or exercise activity ▶ XE9ET Phase of sport or exercise activity - Training or practice XE8MZ Phase of activity, pre-event XE2D1 Phase of activity, warm-up ▶ XE5TJ Phase of sport or exercise activity - Competition or participation XE1P9 Phase of activity, cool down XE2BD Phase of activity, post-event XE49R Phase of activity, recreational participation XE0QV Phase of activity, other specified phase of activity XE8ZT Unspecified phase of activity
▼ Personal countermeasures in sport or exercise XE4K4 Personal countermeasures, no protective devices used XE8Z8 Personal countermeasures, braces, guards or orthoses XE75U Personal countermeasures, rigid taping of joint XE9TY Personal countermeasures, padding of joint, bony prominence, or muscle XE10N Personal countermeasures, thermal devices XE0LS Personal countermeasures, splints XE16J Personal countermeasures, jock strap or protective cup XE4RU Personal countermeasures, gloves XE49L Personal countermeasures, mouth guard XE338 Personal countermeasures, eye goggles or protective glasses XE2ZG Personal countermeasures, helmet XE3RM Personal countermeasures, face mask or shield XE7K8 Personal countermeasures, foot wear XE26E Personal countermeasures, personal flotation device
▼ Environmental countermeasures in sport or exercise XE3U8 Environmental countermeasures, no protective devices used XE0DA Environmental countermeasures, protective padding on competition surface XE0W0 Environmental countermeasures, padded goal posts, or corner markers XE8UC Environmental countermeasures, barrier between area of activity and spectators or surrounds XE0LL Environmental countermeasures, safety restraints or vehicle restraints
The value set for the *sports activity descriptor* axis showing the four aspects in different rows.

The axis name in the ICD API is: http://id.who.int/icd/schema/sportsActivityDescriptor.

4.13.3 ICHI Postcoordination

The International Classification of Health Interventions (ICHI) is being developed to provide a common tool for reporting and analysing health interventions for statistical purposes

Definition

> A **health intervention** is an act performed for, with or on behalf of a person or a population whose purpose is to assess, improve, maintain, promote or modify health, functioning or health conditions.

ICHI covers interventions carried out by a broad range of providers across the full scope of health systems and includes interventions on: diagnostic, medical, surgical, mental health, primary care, allied health, functioning support, rehabilitation, traditional medicine, and public health.

Each stem code in ICHI is described in terms of three axes:

- ***target*** - entity on which the *action* is carried out
- ***action*** - deed done by an actor to the *target*
- ***means*** - processes and methods by which the *action* is carried out

Each axis consists of a coded list of descriptive categories. Each stem code is represented by a title and a unique seven-character code denoting the axis categories for that intervention: three characters for the Target, two characters for the Action and two characters for the Means. Each ICHI stem code has a unique combination of categories from the three axes. Not every possible combination of the three axes is represented as an ICHI code. Many stem code titles in ICHI are commonly-used terms.

For example, *Echocardiography* (HZZ.BA.BJ) is a health intervention that is precoordinated on the three axis: ***target*** - *Entire heart, heart or great vessel, unspecified*; ***action*** - *Imaging*; and ***means*** - *Ultrasound*, as shown below:

ICHI code	**HZZ.BA.BJ**
Target	HZZ - Entire heart, heart or great vessel, unspecified
Action	BA - Imaging
Means	BJ - Ultrasound
ICHI descriptor	**Echocardiography**

Additional information about an intervention can be added as needed using postcoordination on the **Extension Codes**, including codes for therapeutic and assistive products, medicaments, essential pathology tests and telehealth, as well as information such as quantification, laterality, and a more detailed description of anatomy. Additional targets may be specified, using the range of targets available in the *Target* axis.

ICHI interventions are grouped into the following four sections, based on intervention target:

- Interventions on Body Systems and Functions (Chapters 1-12)
- Interventions on Activities and Participation Domains (Chapters 13-21)
- Interventions on the Environment (Chapters 22-26)
- Interventions on Health-related Behaviours (Chapter 27)

For more information on ICHI, please consult the ICHI Beta-3 Reference Guide.

4.13.3.1 Target

Definition

The *target* axis represents the entity on which the *action* corresponding to the health intervention is carried out.

In a release of the ICHI classification, the *target* axis is precoordinated. The *target* is coded in the health intervention using the first three characters.

For example, *Cholecystectomy* (ICHI code: KCF.JK.AA) – **the *target* (KCF)** is *Gall bladder*, *action* (JK) is *Excision, total*, and *means* (AA) is *Open approach*, as shown below:

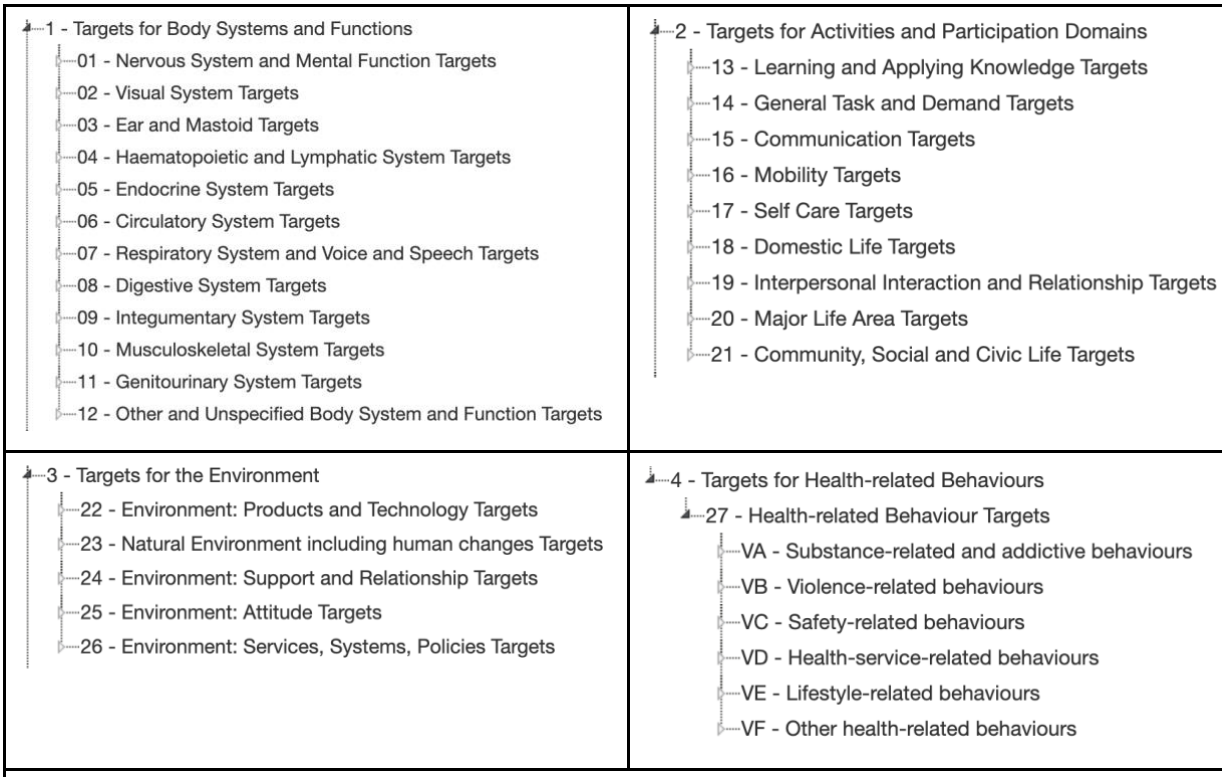
ICHI code	**KCF.JK.AA**
Target	KCF - Gall bladder
Action	JK - Excision, total
Means	AA - Open approach
ICHI descriptor	**Cholecystectomy**

If a second target is needed to code the health intervention, the *additional target* axis or the *specific anatomical detail* axes can be used with an extension code corresponding to one of the two axes.

The value set for the *target* axis comes from the *Target* tree, and it is split into four hierarchies:

- *Targets for Body Systems and Functions*,
- *Targets for Activities and Participation Domains*,
- *Targets for the Environment*, and
- *Targets for Health-related Behaviours*.

The value set is shown below:



The value set for the *target* axis showing the four target hierarchies.

The axis name in the ICD API is: http://id.who.int/icd/schema/hasTarget.

4.13.3.2 Action

Definition

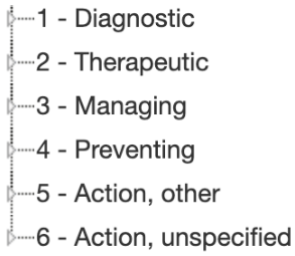
The *action* axis represents the deed done by an actor to the *target* of the health intervention.

In the release of the ICHI classification, the *action* axis is precoordinated. The *action* is coded in the health intervention as two characters following the three characters for the *target*.

For example, the *Biopsy of thyroid gland* (EBA.**AD**.AA) is precoordinated on the *action* axis with *Biopsy* (AD), as shown below:

ICHI code	**EBA.AD.AA**
Target	EBA - Thyroid gland
Action	AD - Biopsy
Means	AA - Open approach
ICHI descriptor	**Biopsy of thyroid gland**

The value set for the *action* axis comes from the *Action* tree, and it is split into six hierarchies as shown below:



The value set for the *action* axis showing the 6 main hierarchies.

The axis name in the ICD API is: http://id.who.int/icd/schema/hasAction.

4.13.3.3 Means

Definition

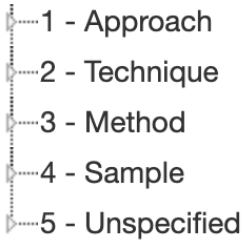
The *means* axis represents the processes and methods by which the *action* of a health intervention is carried out.

In a release of the ICHI classification, the *means* axis is precoordinated. The *means* is coded in the health intervention as the last two characters (following the three characters for the *target*, and two characters for the *action*).

For example, the *Closed biopsy of ventricles of brain* (AAE.AD.**AB**) is precoordinated on the *means* axis with *Percutaneous endoscopic* (AB), as shown below:

ICHI code	**AAE.AD.AB**
Target	AAE - Ventricular system of brain
Action	AD - Biopsy
Means	AB - Percutaneous endoscopic
ICHI descriptor	**Closed biopsy of ventricles of brain**

The value set for the *means* axis is coming from the *Means* tree, and it is split into the following five hierarchies:



The value set for the *means* axis showing the five hierarchies.

The axis name in the ICD API is: http://id.who.int/icd/schema/hasMeans.

4.13.3.4 ICHI Extension codes axes

Additional information about an intervention can be added by the use of extension codes which expand the detail and granularity of ICHI stem codes.

The ICHI extension code axes can be used for postcoordination of health intervention entities, and are as following:

- assistive products
- telehealth
- additional target
- topology
- quantifiers
- essential pathology tests
- additional descriptive information
- therapeutic products
- medicaments
- specific anatomic detail

The remaining of this section provides details about each of the extension code axes.

Note: The value sets for some of the axes are still work-in-progress as they are aligned with the ICD value sets, and they may change in the future.

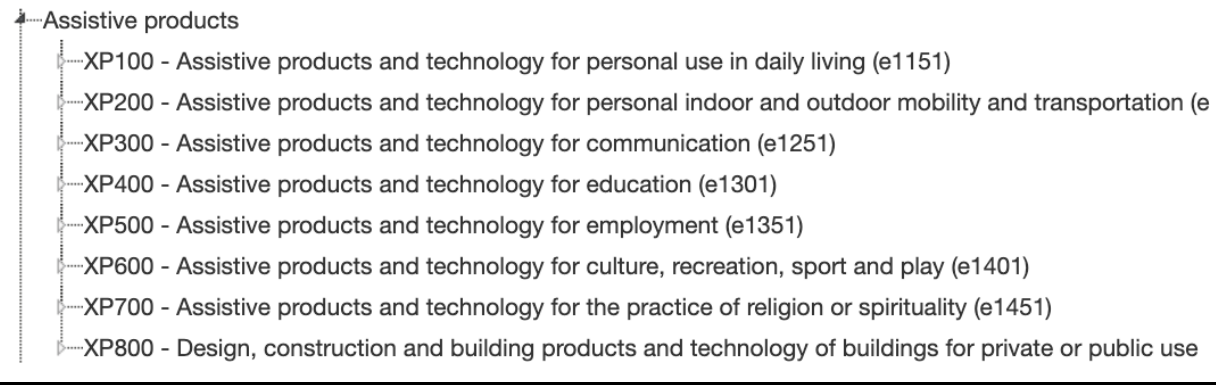
4.13.3.4.1 Assistive products

Definition

The *assistive products* axis is used to record further information regarding an assistive product in association with a health intervention.

For example, to code a health intervention *Provision of digital hearing aids*, the stem code *Provision of products and technology for communication* (UAF.RD.ZZ) can be postcoordinated on *assistive products* with *Hearing aids (digital) and batteries* (XP305.01).

The value set for the *assistive products* axis is coming from the *Assistive products* tree of the ICHI Extension Codes, and it is shown below:



Value set for the *assistive products* axis.

The axis name in the ICD API is: http://id.who.int/icd/schema/assistiveProduct.

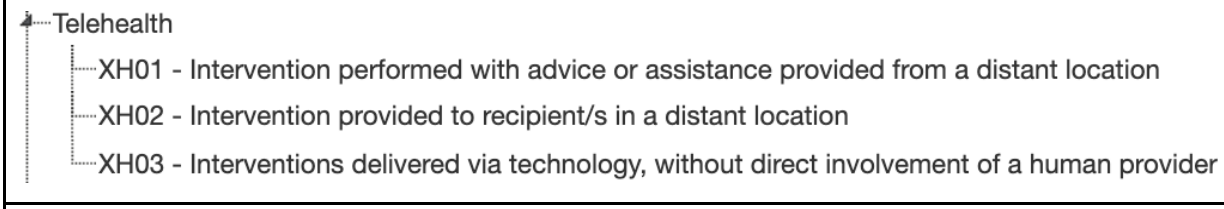
4.13.3.4.2 Telehealth

Definition

The *telehealth* axis is used to record information about health interventions that occur in or from a distant location.

For example, to code a health intervention from an interactive website providing tailored advice on smoking cessation, the stem code *Advising about tobacco use behaviours* (VAB.PN.ZZ) can be postcoordinated on the *telehealth* axis with *Interventions delivered via technology, without direct involvement of a human provider* (XH03).

The value set for the *telehealth* axis is coming from the *Telehealth* tree of the ICHI Extension Codes, and it is shown below:



Value set for the *telehealth* axis.

The axis name in the ICD API is: http://id.who.int/icd/schema/telehealth.

4.13.3.4.3 Additional target

Definition

The *additional target* axis is used to record an additional ICHI *target*, when more than one target is referred to in the description of the health intervention.

For example, to code *Ventriculoperitonostomy*, the stem code *Ventricular shunt* (AAE.LI.AA) can be postcoordinated on the *additional target* axis with *Peritoneum* (XXKMA).

The value set for the *additional target* axis is coming from the *Target* tree of the ICHI.

The axis name in the ICD API is: http://id.who.int/icd/schema/additionalTarget.

4.13.3.4.4 Topology

Definition

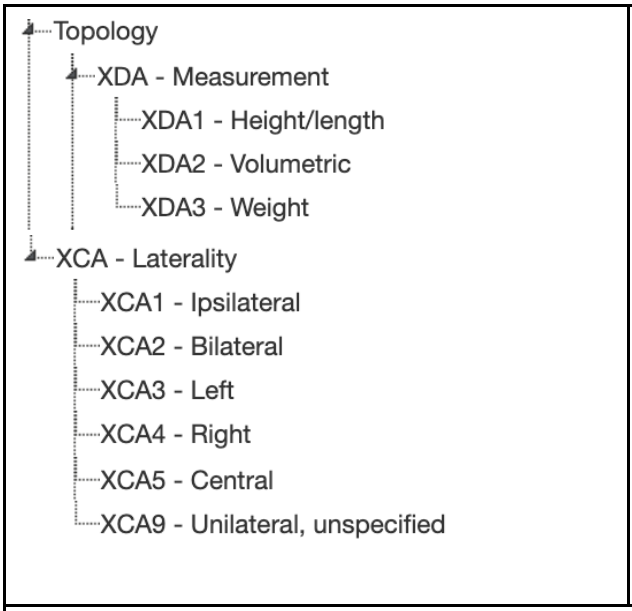
The *topology* axis is used to record information pertaining to the laterality, measurements, and relational location of a health intervention.

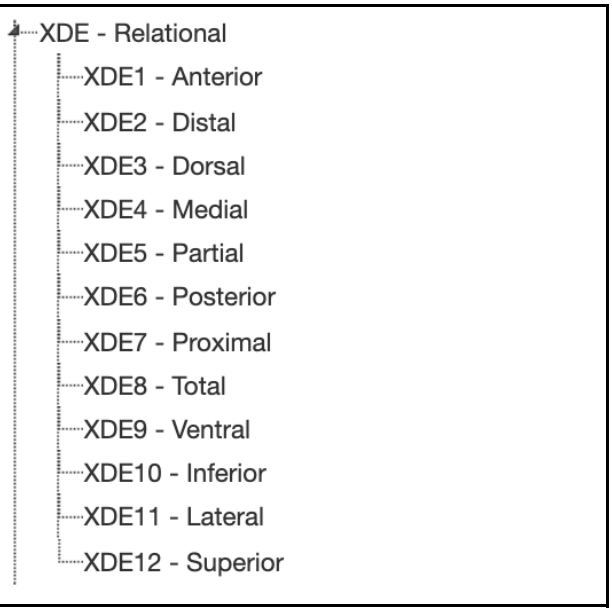
The topology axis has the following three aspects that can be coded:

- laterality
- measurement
- relational.

For example, to code a health intervention *Meniscoplasty of right knee*, the stem code *Meniscoplasty of knee* (MMD.ML.AA) is postcoordinated on the *topology laterality* axis with extension code *Right* (XCA4).

The value set for the *topology* axis is coming from the *Topology* tree of the ICHI Extension Codes, and it is split into three hierarchies corresponding to the three aspects of the axis. The value set is shown below:





The value set of the *topology* axis showing the three hierarchies corresponding to the *laterality*, *measurement*, and *relational* aspects.

Note: In future work, the value set for the ICHI topology axis might be aligned with the ICD Topology value set.

The axis name in the ICD API is: http://id.who.int/icd/schema/ichiTopology.

4.13.3.4.5 Quantifiers

Definition

The *quantifiers* axis is used to quantify different aspects of a health intervention.

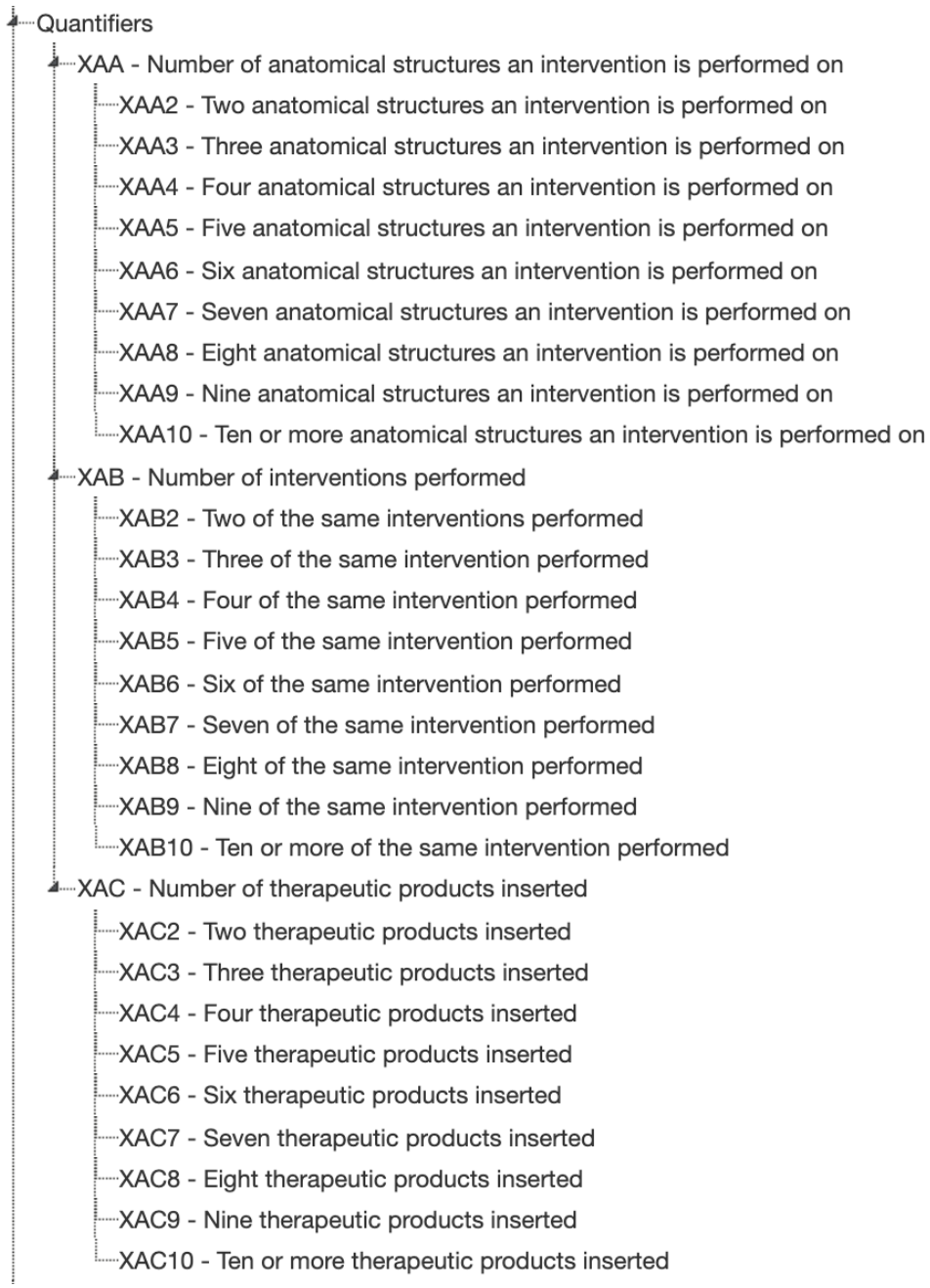
These *quantifiers* axis can be used to record the number of:

- anatomical structures an intervention is performed on

- the same interventions performed in one episode of care
- therapeutic products inserted or implanted during an intervention

For example, to code the restoration of two teeth by filling, the stem code *Restoration of tooth* (KAE.MK.AC) is postcoordinated on the *quantifiers* axis with the extension code *Two anatomical structures an intervention is performed on* (XAA2).

The value set for the *quantifiers* axis is coming from the *Quantifiers* tree of the ICHI Extension Codes, and it is split into three hierarchies as following:



The value set for the *quantifiers* axis showing the three hierarchies.

The axis name in the ICD API is: http://id.who.int/icd/schema/quantifier.

4.13.3.4.6 Essential pathology tests

Definition

The *essential pathology tests* axis records the pathology tests performed on a specimen.

The Essential Pathology Tests extension comprises the pathology tests included by the WHO in its Model List of Essential In-Vitro Diagnostics 2019.

The value set of the *essential pathology tests* axis is coming from the *Essential pathology tests* tree from the ICHI Extension Codes.

4.13.3.4.7 Additional descriptive information

Definition

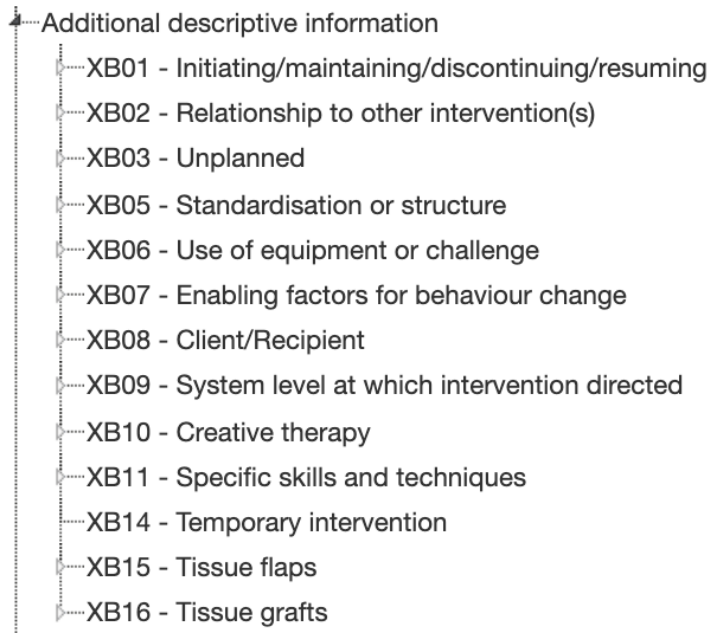
The *additional descriptive information* axis is used to provide additional information for a health intervention that is otherwise not available in the other extension codes.

The coverage of information for the *additional descriptive information* axis can be best understood by inspecting its value set (see below).

One section of the *Additional descriptive information* extension codes cover behaviour change. Behaviour change interventions often address factors that influence the behavioural choices people make. This extension code can be used to record additional information concerning the mechanism by which the intervention is intended to bring about change in a health-related behaviour, that is, to describe how the intervention is intended to work.

For example, to code the health intervention *Peer support program to help problem gamblers*, the stem code *Provision of peer support for gambling behaviours* (VAE.RE.ZZ) is postcoordinated on the *additional descriptive information* axis with the extension code *Motivation* (a subclass of *Enabling factors for behaviour change*).

The value set for the *additional descriptive information* axis is coming from the Additional descriptive information tree of the ICHI Extension Codes, and it is shown below:



Value set for the additional descriptive information axis.

The axis name in the ICD API is:
http://id.who.int/icd/schema/additionalDescriptiveInformationForIntervention.

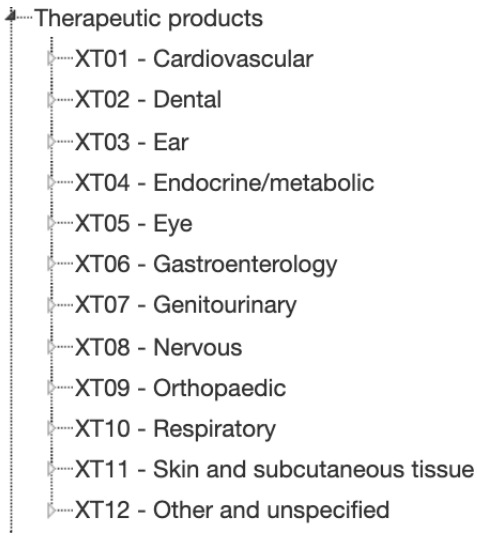
4.13.3.4.8 Therapeutic products

Definition

The *therapeutic products* axis records further information regarding a therapeutic product in association with an intervention.

For example, to code *Insertion of bone anchoring conduction hearing device*, the stem code *Implantation of internal device in middle ear, not elsewhere classified* (CBA.DN.AC) is postcoordinated on the *therapeutic products* axis with *Bone anchoring system* (XT03.02).

The value set for the *therapeutic products* axis is coming from the *Therapeutic products* tree of the ICHI Extension Codes, and it is shown below:



The value set for the *therapeutic products* axis.

The axis name in the ICD API is: http://id.who.int/icd/schema/therapeuticProduct.

4.13.3.4.9 Medicaments

Definition

The *medicaments* axis records the use of a medication in a health intervention.

For example, to code *Medical induction of labour with Oxytocin*, the stem code *Percutaneous medical induction of labour* (NME.SH.AE) is postcoordinated on the *medicaments* axis with *Oxytocin* (XM9SN0).

The value set for the *medicaments* axis is coming from the ICD Extension Codes Medicaments.

The axis name in the ICD API is: http://id.who.int/icd/schema/medication.

4.13.3.4.10 Specific anatomical detail

Definition

The *specific anatomical details* axis records anatomical details of a health intervention for the case in which an *additional target* cannot be assigned.

For example, to code *Reconstruction of the volar intercarpal ligaments of the hand*, the stem code *Reconstruction of ligaments and fascia of hand or fingers* (MGL.ML.AA) is postcoordinated on the *specific anatomical details* axis with *Volar intercarpal ligaments* (XA47N4).

The value set for the *specific anatomical details* axis is coming from the ICD Extension Codes Anatomy and Topography.

The axis name in the ICD API is: http://id.who.int/icd/schema/specificAnatomy.

4.14 Logical definitions (Foundation-only)

Definition

> A **Logical Definition** provides a way to formally define the meaning of an entity by specifying a parent entity with combinations of postcoordination axes with their corresponding values.

The WHO-FIC Foundation allows the editing of precoordinated entities, i.e., entities that are fully logically defined as specializations of an ancestor with the values of some or all of the postcoordination axes set.

For an introduction to logical definitions, we urge the reader to consult the Logical Definitions section from the beginning of the Guide.

An example of a precoordinated entity is *CA40.00 Pneumonia due to Chlamydophila pneumoniae*, which is formed by combining the parent *Bacterial pneumonia* with the postcoordination axis *infectious agent* set to *Chlamydia pneumoniae*.

Logical definitions can only be created in the Foundation, and they are edited in iCAT.

To create a logical definition for a precoordinated entity, at least one of its ancestors needs to be postcoordinatable. The selected ancestor used to create the logical definition is called the **precoordination parent**. In the example used before, "*Bacterial pneumonia*" is the precoordination parent.

The value for a postcoordination axes in a logical definition has to be in the value set of the axes as defined in the postcoordination of the ancestor.

A logical definition has the form:

```
Precoordination_parent and
        (postcoordination_axes_1 = value_1) and
        (postcoordination_axes2 = value_2) and
        …
(postcoordination_axes_n = value_n)
```

The meaning of the logical expression is the intersection of the precoordination parent and of the assignment of the postcoordination axes to their values. If a postcoordination axes has multiple cardinality, then multiple values can be assigned in the logical definition to the axes.

ICD REST API The Logical Definitions are currently not exposed in the ICD API, but they may be in the future.

4.15 Necessary conditions

Definition

> A **Necessary Condition** provides a way to formally describe the things that are always necessarily true about an entity by assigning values to postcoordination axes.

An example of a necessary condition for *Gastritis* is that it appears in the stomach, i.e., the *specific anatomy* axis is set to *Stomach*.

For an introduction to necessary conditions, please consult the Necessary Conditions section from the beginning of this Guide.

The "things'' that can be encoded as necessary conditions are represented by the postcoordination axes (e.g., *specific anatomy*, *severity*, *has manifestation*). The allowed values for the postcoordination axes come from the value sets of the specific axes.

A necessary condition has the form:

```
(postcoordination_axes_1 = value_1) and
        (postcoordination_axes2 = value_2) and
        …
(postcoordination_axes_n = value_n)
```

The difference between necessary conditions and logical definitions are explained in this section.

ICD-API REST API

The Necessary Conditions are not exposed in the ICD API at the time of the writing of this Guide, but they will likely be in the future.

4.16 Backwards compatibility

Some of the classifications represented in WHO-FIC Foundation, such as ICD, have prior revisions and variations that are still in use. The content model of an entity stores backward compatibility information of the entity for the different revisions and variations of the older revisions.

For example, the content model stores backwards compatibility information for ICD-10, and various ICD-10 tabulation lists.

Based on this information, more granular mappings have been developed between ICD-10 and ICD-11 which are available for download at the ICD-11 Browser home page.

5 Resources

For further details related to WHO-FIC, the WHO Family of Classifications, and the current processes for creating the classifications, please see the following resources:

1. WHO-FIC website: https://www.who.int/classifications/en/

2. ICD-11 website: https://icd.who.int/
3. ICD-11 browser: https://icd.who.int/browse11
4. ICD-11 browser user guide: https://icd.who.int/browse11/Help/en
5. ICD-11 Reference Guide: https://icd.who.int/icd11refguide/en/index.html
6. ICD-11 API: https://icd.who.int/icdapi

7. ICHI Reference Guide: https://mitel.dimi.uniud.it/ichi/docs/ICHI%20Beta-3%20Reference%20Guide.pdf

6 Appendix

6.1 Appendix: JSON Context Property Mappings

Each JSON response has a link to the context file which provides the mappings between the property names used in the JSON response and the corresponding property identifier from the ICD Schema.

The Foundation JSON Context Property Mappings are found at the URL:
http://id.who.int/icd/contexts/contextForFoundationEntity.json

The Foundation property mappings are:


```
"@context": {
   "title": "http://www.w3.org/2004/02/skos/core#prefLabel",
   "definition": "http://www.w3.org/2004/02/skos/core#definition",
   "longDefinition": "http://id.who.int/icd/schema/longDefinition",
   "parent": "http://www.w3.org/2004/02/skos/core#broaderTransitive",
   "child": "http://www.w3.org/2004/02/skos/core#narrowerTransitive",
   "synonym": "http://www.w3.org/2004/02/skos/core#altLabel",
   "fullySpecifiedName": "http://id.who.int/icd/schema/fullySpecifiedName",
   "narrowerTerm": "http://id.who.int/icd/schema/narrowerTerm",
   "exclusion": "http://id.who.int/icd/schema/exclusion",
   "inclusion": "http://id.who.int/icd/schema/inclusion",
   "browserUrl": "http://id.who.int/icd/schema/browserUrl",
   "foundationReference": "http://id.who.int/icd/schema/foundationReference"
 }
```


The Linearization JSON Context Property Mappings are found at the URL:
http://id.who.int/icd/contexts/contextForLinearizationEntity.json

The Linearization property mappings are:


```
"@context": {
   "parent": "http://www.w3.org/2004/02/skos/core#broaderTransitive",
   "child": "http://www.w3.org/2004/02/skos/core#narrowerTransitive",
   "definition": "http://www.w3.org/2004/02/skos/core#definition",
   "longDefinition": "http://id.who.int/icd/schema/longDefinition",
   "code": "http://id.who.int/icd/schema/code",
   "title": "http://www.w3.org/2004/02/skos/core#prefLabel",
```

```
  "fullySpecifiedName": "http://id.who.int/icd/schema/fullySpecifiedName",
  "source": "http://id.who.int/icd/schema/source",
  "inclusion": "http://id.who.int/icd/schema/inclusion",
  "exclusion": "http://id.who.int/icd/schema/exclusion",
  "indexTerm": "http://id.who.int/icd/schema/indexTerm",
  "classKind": "http://id.who.int/icd/schema/classKind",
  "browserUrl": "http://id.who.int/icd/schema/browserUrl",
  "foundationChildElsewhere": "http://id.who.int/icd/schema/foundationChildElsewhere",
  "postcoordinationScale": "http://id.who.int/icd/schema/postcoordinationScale",
  "axisName": "http://id.who.int/icd/schema/axisName",
  "requiredPostcoordination": "http://id.who.int/icd/schema/requiredPostcoordination",
  "allowMultipleValues": "http://id.who.int/icd/schema/allowMultipleValues",
  "scaleEntity": "http://id.who.int/icd/schema/scaleEntity",
  "codingNote": "http://id.who.int/icd/schema/codingNote",
  "codeRange": "http://id.who.int/icd/schema/codingRange",
  "blockId": "http://id.who.int/icd/schema/blockId",
  "foundationReference": "http://id.who.int/icd/schema/foundationReference",
  "linearizationReference": "http://id.who.int/icd/schema/linearizationReference"
}
```

6.2 Appendix: ICD API Foundation Example

This is an example of a REST call to retrieve different parameters of the entity "***Scarlet fever***" (`http://id.who.int/icd/entity/107294155`) from the Foundation.

Request:

```
curl -X GET "https://id.who.int/icd/entity/107294155?releaseId=2020-09" -H "accept: application/json" -H "API-Version: v2" -H "Accept-Language: en" -H  "Accept-Language: en" -H "Authorization: (your authorization code from OAuth)"
```

Response:

{ "@context": "http://id.who.int/icd/contexts/contextForFoundationEntity.json", "@id": "http://id.who.int/icd/entity/107294155", "**parent**": ["http://id.who.int/icd/entity/1631069488", "http://id.who.int/icd/entity/1150956218", "http://id.who.int/icd/entity/1539889147", "http://id.who.int/icd/entity/175967539"], "**child**": ["http://id.who.int/icd/entity/1512229243"], "browserUrl": "NA",	CONTEXT AND HIERARCHY
"**title**": { "@language": "en", "@value": "Scarlet fever" },	TITLE
"fullySpecifiedName": { "@language": "en", "@value": "Tuberculosis attributable to Mycobacterium tuberculosis" },	FULLY SPECIFIED NAME
"synonym": [	SYNONYMS

{
"label": {
"@language": "en",
"@value": "Scarlatina NOS"
}
}
],	

"definition": { "@language": "en", "@value": "A disease caused by an infection with the gram-positive bacteria Streptococcus pyogenes. This disease is characterised by a sore throat, fever, and a red rash. Transmission is commonly by inhalation of infected respiratory secretions, direct skin contact, or indirect contact." },	DEFINITION
"longDefinition": { "@language": "en", "@value": "Scarlet fever is a disease caused by exotoxins released by Group A beta-haemolytic streptococci. It is most commonly associated with streptococcal tonsillitis or pharyngitis. The majority of cases occur in childhood. It is characterized by sudden onset of sore throat, headache, high fever, anorexia, nausea and malaise. The rash appears 12–48 hours after the onset of fever as a confluent, rough-textured erythema initially involving the neck, chest and axillae but soon becoming generalized. The rash blanches upon pressure, spares the skin around the mouth (“circumoral pallor”) and has been likened to “sunburn with goose pimples”. In the mouth there are signs not only of streptococcal pharyngotonsillitis but also of glossitis (strawberry tongue). The rash begins to fade three to four days after onset with desquamation (peeling) affecting particularly the hands and feet. Scarlet fever may lead to a variety of complications including acute glomerulonephritis and rheumatic fever." },	ADDITIONAL INFORMATION

"inclusion": [
{
"label": {
"@language": "en",
	INCLUSIONS

"@value": "Scarlatina NOS" } },],	

"exclusion": [
{
"label": {
"@language": "en",
"@value": "streptococcal sore throat"
},
"foundationReference": "http://id.who.int/icd/entity/1642172022"
},
{
"label": {
"@language": "en",
"@value": "Staphylococcal scarlatina"
},
"foundationReference": "http://id.who.int/icd/entity/449652676"
}
]
	EXCLUSIONS

Example for retrieving the different parameters from the Foundation for entity "*Scarlet fever*" (id: http://id.who.int/icd/entity/107294155). The left column shows the JSON response for the REST API call, and the right column marks the different blocks in the JSON response (e.g., title, synonyms, etc.)

6.4 Appendix: ICD API Linearization Example

This is an example of a REST call to retrieve different parameters of *Scarlet fever* (`http://id.who.int/icd/entity/107294155`) from the ICD-11 Mortality and Morbidity Statistics (MMS) linearization.

Request:

```
curl -X GET "https://id.who.int/icd/release/11/2020-09/mms/107294155" -H "accept: application/json" -H "API-Version: v2" -H "Accept-Language: en" -H "Authorization: (your authorization code from OAuth)"
```

JSON Response:

{ "@context": "http://id.who.int/icd/contexts/contextForLinearizationEntity.json", "@id": "http://id.who.int/icd/release/11/2020-09/mms/107294155", "**parent**": ["http://id.who.int/icd/release/11/2020-09/mms/1539889147"], "**browserUrl**": "https://icd.who.int/browse11/l-m/en#/http%3a%2f%2fid.who.int%2ficd%2fentity%2f107294155",	CONTEXT AND HIERARCHY
"**code**": "1B50", "**source**": "http://id.who.int/icd/entity/107294155", "**classKind**": "category",	CODING INFO
"**title**": { "@language": "en", "@value": "Scarlet fever" },	TITLE

"indexTerm": [
{
"label": {
"@language": "en",
"@value": "Scarlet fever"
}
	INDEX TERMS

},
{
"label": {
"@language": "en",
"@value": "Scarlatina NOS"
}
},
{
"label": {
"@language": "en",
"@value": "Otitis media in scarlet fever"
},
"foundationReference": "http://id.who.int/icd/entity/1512229243"
}
]	

"definition": { "@language": "en", "@value": "A disease caused by an infection with the gram-positive bacteria Streptococcus pyogenes. This disease is characterised by a sore throat, fever, and a red rash. Transmission is commonly by inhalation of infected respiratory secretions, direct skin contact, or indirect contact." },	DEFINITION
"longDefinition": { "@language": "en", "@value": "Scarlet fever is a disease caused by exotoxins released by Group A beta-haemolytic streptococci. It is most commonly associated with streptococcal tonsillitis or pharyngitis. The majority of cases occur in childhood. It is characterized by sudden onset of sore throat, headache, high fever, anorexia, nausea and malaise. The rash appears 12–48 hours after the onset of fever as a confluent, rough-textured erythema initially involving the neck, chest and axillae but soon becoming generalized. The rash blanches upon pressure, spares the skin around the mouth (“circumoral pallor”) and has been likened to “sunburn with goose pimples”. In the mouth there are signs not only of streptococcal pharyngotonsillitis but also of glossitis (strawberry tongue). The rash begins to fade three to four days after onset with desquamation (peeling)	ADDITIONAL INFORMATION

affecting particularly the hands and feet. Scarlet fever may lead to a variety of complications including acute glomerulonephritis and rheumatic fever." },	

"inclusion": [
{
"label": {
"@language": "en",
"@value": "Scarlatina NOS"
}
}
],
	INCLUSIONS

"exclusion": [
{
"label": {
"@language": "en",
"@value": "streptococcal sore throat"
},
"foundationReference": "http://id.who.int/icd/entity/1642172022",
"linearizationReference": "http://id.who.int/icd/release/11/2020-09/mms/1642172022"
},
{
"label": {
"@language": "en",
"@value": "Staphylococcal scarlatina"
},
"foundationReference": "http://id.who.int/icd/entity/449652676",
"linearizationReference": "http://id.who.int/icd/release/11/2020-09/mms/449652676"
}
],
	EXCLUSIONS

"postcoordinationScale": [{ "@id": "http://id.who.int/icd/release/11/2020-09/mms/107294155/postcoordinationScale/specificAnatomy",	POSTCOORDINATION

```
    "axisName": "http://id.who.int/icd/schema/specificAnatomy",
    "requiredPostcoordination": "false",
    "allowMultipleValues": "AllowAlways",
    "scaleEntity": [
      "http://id.who.int/icd/release/11/2020-09/mms/1644747126",
      "http://id.who.int/icd/release/11/2020-09/mms/687250607",
      "http://id.who.int/icd/release/11/2020-09/mms/1509166126"
    ]
  },
  {
    "@id": "http://id.who.int/icd/release/11/2020-
09/mms/107294155/postcoordinationScale/hasManifestation",
    "axisName": "http://id.who.int/icd/schema/hasManifestation",
    "requiredPostcoordination": "false",
    "allowMultipleValues": "AllowAlways",
    "scaleEntity": [
      "http://id.who.int/icd/release/11/2020-09/mms/871612151",
      "http://id.who.int/icd/release/11/2020-09/mms/197163558",
      "http://id.who.int/icd/release/11/2020-09/mms/705971711",
      "http://id.who.int/icd/release/11/2020-09/mms/270373865",
      "http://id.who.int/icd/release/11/2020-09/mms/1079654421",
      "http://id.who.int/icd/release/11/2020-09/mms/197934298",
      "http://id.who.int/icd/release/11/2020-09/mms/509821856",
      "http://id.who.int/icd/release/11/2020-09/mms/632678885",
      "http://id.who.int/icd/release/11/2020-09/mms/1639304259",
      "http://id.who.int/icd/release/11/2020-09/mms/396939646/unspecified",
      "http://id.who.int/icd/release/11/2020-09/mms/1498660177",
      "http://id.who.int/icd/release/11/2020-09/mms/476391827"
    ]
  }
]
```


Example for retrieving the different parameters from the MMS for "*Scarlet fever*" (id: http://id.who.int/icd/entity/107294155). The left column shows the JSON response for the REST API call, and the right column marks the different blocks in the JSON response (e.g., title, inclusions, exclusions, etc.)

6.5 Appendix: Postcoordination axis names in the ICD API

In the ICD Linearization API, the postcoordination axis are identified by the axis name. Find below a table with the axis names of the postcoordination axes available in the ICD API:

6.5.1 ICD Diseases Postcoordination Axes

Post coordination axis	axisName in the ICD API
specific anatomy	http://id.who.int/icd/schema/specificAnatomy
histopathology	http://id.who.int/icd/schema/histopathology
course	http://id.who.int/icd/schema/course
temporal pattern / onset	http://id.who.int/icd/schema/temporalPatternAndOnset
time in life	http://id.who.int/icd/schema/timeInLife
severity	http://id.who.int/icd/schema/severity
causality	http://id.who.int/icd/schema/causality
infectious agent	http://id.who.int/icd/schema/infectiousAgent
chemical agent	http://id.who.int/icd/schema/chemicalAgent
causing condition	http://id.who.int/icd/schema/hasCausingCondition
medication	http://id.who.int/icd/schema/medication
laterality	http://id.who.int/icd/schema/laterality
relational	http://id.who.int/icd/schema/relational
regional	http://id.who.int/icd/schema/regional
distribution	http://id.who.int/icd/schema/distribution
injury type	http://id.who.int/icd/schema/typeOfInjury
fracture subtype	http://id.who.int/icd/schema/fractureSubtype

fracture open or close	http://id.who.int/icd/schema/fractureOpenOrClosed
joint involvement in fracture	http://id.who.int/icd/schema/jointInvolvementInFracture
extent of burn by body surface	http://id.who.int/icd/schema/extentOfBurnByBodySurface
extent of full thickness burn by body surface	http://id.who.int/icd/schema/extentOfFullThicknessBurnByBodySurface
outcome of full thickness burn	http://id.who.int/icd/schema/outcomeOfFullThicknessBurn
pupil reaction score	http://id.who.int/icd/schema/hasPupilReactionScore
GCS eye reaction score	http://id.who.int/icd/schema/hasGCSEyeScore
GCS motor score	http://id.who.int/icd/schema/hasGCSMotorScore
GCS verbal score	http://id.who.int/icd/schema/hasGCSVerbalScore
diagnosis method confirmation	http://id.who.int/icd/schema/diagnosisConfirmedBy
has manifestation	http://id.who.int/icd/schema/hasManifestation
associated with	http://id.who.int/icd/schema/associatedWith

6.5.2 ICD External Causes Postcoordination Axes

Post coordination axis	axisName in the ICD API
object or substance producing injury	http://id.who.int/icd/schema/objectOrSubstanceProducingInjury
activity when injured	http://id.who.int/icd/schema/activityWhenInjured
occupational descriptor	http://id.who.int/icd/schema/occupationalDescriptor
place of occurrence	http://id.who.int/icd/schema/placeOfOccurrence
alcohol use in injury	http://id.who.int/icd/schema/alcoholUseInInjury

psychoactive drug use in injury	http://id.who.int/icd/schema/psychoactiveDrugUseInInjury
transport event descriptor	http://id.who.int/icd/schema/transportEventDescriptor
aspects of assault and maltreatment	http://id.who.int/icd/schema/aspectsOfAssaultAndMaltreatment
aspects of intentional self harm	http://id.who.int/icd/schema/aspectsOfIntentionalSelfHarm
aspects of armed conflict	http://id.who.int/icd/schema/aspectsOfArmedConflict
type of legal intervention	http://id.who.int/icd/schema/typeOfLegalIntervention
sports activity descriptor	http://id.who.int/icd/schema/sportsActivityDescriptor

6.5.3 ICHI Postcoordination Axes

The ICHI postcoordination axes are still work-in-progress at the time of writing this guide.

Post coordination axis	axisName in the ICD API
target	http://id.who.int/icd/schema/hasTarget
action	http://id.who.int/icd/schema/hasAction
means	http://id.who.int/icd/schema/hasMeans
assistive products	http://id.who.int/icd/schema/assistiverProduct
telehealth	http://id.who.int/icd/schema/telehealth
additional target	http://id.who.int/icd/schema/additionalTarget
topology	http://id.who.int/icd/schema/ichiTopology
quantifiers	http://id.who.int/icd/schema/quantifier

additional descriptive information	http://id.who.int/icd/schema/additionalDescriptiveInformationForIntervention
therapeutic products	http://id.who.int/icd/schema/therapeuticProduct
medicaments	http://id.who.int/icd/schema/medication
specific anatomical details	http://id.who.int/icd/schema/specificAnatomy