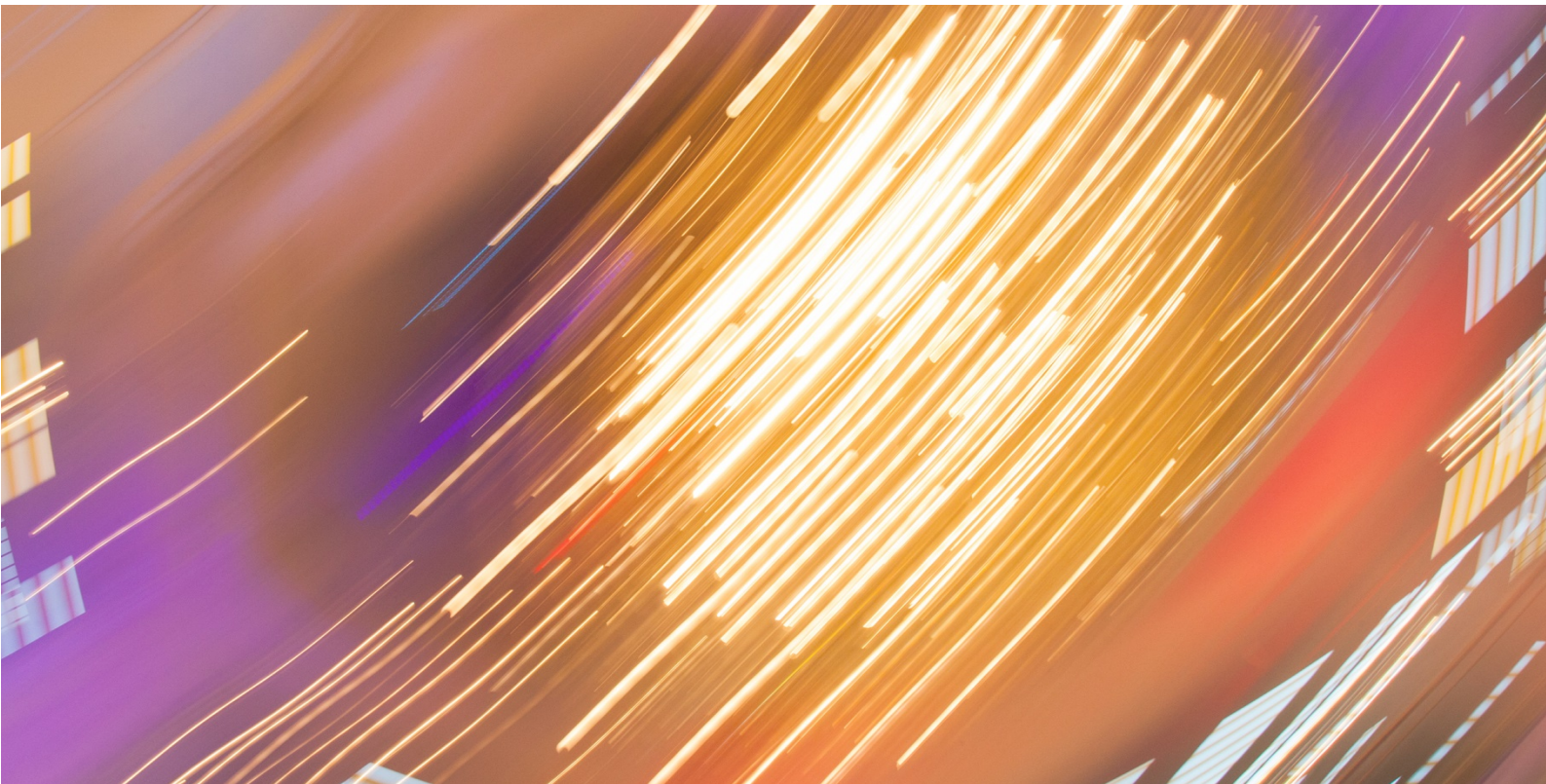


Guidance on the use of CodeableConcept

Including the Extension-coding-sctdescid

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1. Introduction

The CodeableConcept is one of the most important data items in HL7's Fast Healthcare Interoperability Resources (FHIR®) and is defined in the FHIR® specification as:

“a value that is usually supplied by providing a reference to one or more terminologies or ontologies, but may also be defined by the provision of text. This is a common pattern in healthcare data.”

<http://hl7.org/fhir/stu3/datatypes.html#CodeableConcept>

NHS Digital has introduced an extension to the base CodeableConcept data type to carry information chosen by the end user (or held in the end user's system) that originated from the SNOMED CT terminology and cannot be expressed using just the SNOMED CT preferred term and concept id.

Aimed at FHIR developers, this document shows you how to process the CodeableConcept, including:

- How to populate the code
- How to receive the code
- How to render the code to a user
- How to deal with multiple codes
- What to do if the coded data is not understood by receiving systems

The extent of the CodeableConcept data type (including the Extension-coding-sctdescid extension) is as follows:

```
<code>
  <coding>
    <extension
      url="https://fhir.hl7.org.uk/STU3/StructureDefinition/Extension-coding-
      sctdescid">
      <extension url="descriptionId">
        <valueId value=""/>
      </extension>
      <extension url="descriptionDisplay">
        <valueString=""/>
      </extension>
    </extension>
    <code value=""/>
    <display value=""/>
    <system value=""/>
    <version value=""/>
    <userSelected value=""/>
  </coding>
</text/>
</code>
```

1.1 Description of elements (in terms of SNOMED CT)

Element	Description
<code>	The wrapper element for the CodeableConcept.
<coding>	The wrapper element for the coded part of the CodeableConcept.
<extension>	The wrapper element for the SNOMED description extension.
<extension url="descriptionId">	The wrapper for the SNOMED CT description identifier.
<valueId value="">	Holds the SNOMED CT description identifier.
<extension url="descriptionDisplay">	The wrapper for the SNOMED CT description display.
<valueString="">	Holds the SNOMED CT description display.
<code value="">	Holds the SNOMED CT concept identifier.
<display value="">	Holds the SNOMED CT concept display.
<system value="">	Holds the SNOMED CT system identifier (http://snomed.info/sct).
<version value="">	Is not used for SNOMED CT.
<userSelected value="">	Indicates that this concept was chosen by the user.
<text>	Represents the text that was originally displayed to the user when the code was recorded.

2. Populating the CodeableConcept

This section shows you how to populate each field where the code carried is a SNOMED code and where it's not a SNOMED code. It also includes population scenarios with examples.

2.1 Field by field population guidance

Level	Field	Directions
1	Coding (SNOMED CT)	Populate this group if a SNOMED CT concept id is recorded with the item.
2	System	Set to " http://snomed.info/sct ".
2	Code	The SNOMED CT concept id recorded with the item.

Level	Field	Directions
2	Display	The text of the preferred term of the SNOMED CT concept id. Must not be populated if the SNOMED CT concept id is a translation from another codeset (READ, CTV, etc). Note: The preferred term is not populated for translations as it could potentially confer a meaning that was not intended when the item was originally coded.
2	DescriptionId	The SNOMED CT description id recorded with the item. Only populated if a description id exists.
2	DescriptionDisplay	The text of the description id. Only populated if a description id exists and is not the preferred term.
2	Userselected	Set to TRUE if a user selected the SNOMED Code when creating/updating this item. Otherwise, do not populate.
1	Coding (other)	Populate this group if a clinical code other than SNOMED CT is recorded with the item. If there are multiple codes (that is,. the item has been translated multiple times) there is a group entry per code.
2	System	Identifies the codeset.
2	Code	The clinical code URI associated with the item.
2	Display	The text associated with the clinical code.
2	DescriptionId	Do not populate (SNOMED CT only).
2	DescriptionDisplay	Do not populate (SNOMED CT only).
2	Userselected	Set to TRUE if a user selected this code when creating/updating this item. Otherwise, do not populate.
1	Text	The original text selected/manually entered by the user for the item. Only populate when there is no user selected codeset with a display or description display recorded. If the text displayed to the user when they entered the code on the system is different to the term of the code then the displayed text must be populated here. Note: This occurs when either the original entry was not coded or the original coding has been lost.

2.2 Sending a SNOMED CT concept with its associated preferred term

When sending a SNOMED CT concept id with its preferred term or if sending a non-SNOMED code (such as Read2 or CTV3) then code.coding.code and code.coding.system SHALL be populated.

In the example below, there is no DescriptionID and DescriptionDisplay extension required as the concept id was entered by the user and the preferred term was displayed to them when it was added.

```
XML
<code>
```

```

<coding>
  <code value="22298006"/>
  <display value="Myocardial infarction"/>
  <system value="http://snomed.info/sct"/>
</coding>
</code>

JSON
{
  "code": {
    "coding": [{
      "code": "22298006",
      "display": "Myocardial infarction",
      "system": "http://snomed.info/sct"
    }]
  }
}

```

Example 1

2.3 Sending a concept where the coding system and code is unknown

In the exceptional case that the code is not known, then the code.text element can be populated without the need to populate a coding element.

```

XML
<code>
<text>Myocardial infarction</text>
</code>

JSON
{
  "code": {
    "text": "Myocardial infarction"
  }
}

```

Example 2

2.4 Sending a translation set

In the case where the code was entered into the clinical system using a legacy coding system, the code is likely to have been mapped to a SNOMED translation. Where these mappings have been created in most cases they will have been mapped to a SNOMED CT concept id. In SNOMED, concept ids do not have a concept description. They will have a number of associated description ids that include a preferred term and a fully specified name. However, where mappings have been completed to correspond to a concept id there is not a particular description that is mapped and in these cases the description originally

entered by the clinician in the legacy coding system is considered to be the clinically relevant text.

```
XML
<code>
  <coding>
    <code value="4414.00"/>
    <display value="Serum potassium"/>
    <system value="http://read.info/readv2"/>
    <userSelected value="true"/>          <!--flags the coding
originally actually selected by the user -->
  </coding>
  <coding>
    <system value="http://snomed.info/sct"/>
    <code value="22298006"/>
  </coding>
  <text>Serum potassium level</text>      <!-- what the user saw on
screen, from a data entry template -->
</code>

JSON
{
  "code": {
    "coding": [{
      "code": "4414.00",
      "display": "Serum Potassium ",
      "system": "http://read.info/readv2",
      "userSelected": "true"
    },
    {
      "system": "http://snomed.info/sct",
      "code": "22298006"
    }
  ],
  "text": "Serum potassium level"
}
```

Example 3

2.5 Sending a description id that is also the preferred term

If the description id that is being sent represents the preferred term, then there is no need to include the extension for the description display as this would be identical to the term that is sent in code.coding.display.

```
XML
<code>
<coding>
  <extension url="https://fhir.hl7.org.uk/STU3/StructureDefinition/Extension-coding-sctdescid">
    <extension url="descriptionId">
      <valueId value="37436014"/>
    </extension>
  </extension>
  <code value="22298006"/>
  <display value="Myocardial infarction"/>
  <system value="http://snomed.info/sct"/>
</coding>
</code>

JSON
{
  "code": {
    "coding": [{
      "extension": [{
        "url":
"https://fhir.hl7.org.uk/STU3/StructureDefinition/Extension-coding-sctdescid",
        "extension": [{
          "url": "descriptionId",
          "valueId": 37436014
        }]
      }],
      "code": 22298006,
      "display": "Myocardial infarction",
      "system": "http://snomed.info/sct"
    }]
  }
}
```

Example 4

2.6 Sending a description id that is not the preferred term

In this case, the description id represents a description that is different from the preferred term and therefore the description will be different from that used to populate the `code.coding.display` element. In this case, the extension for `DescriptionDisplay` should be populated with the term corresponding to the description id.

XML

```
<code>
<coding>
  <extension url="https://fhir.hl7.org.uk/STU3/StructureDefinition/Extension-coding-sctdescid">
    <extension url="descriptionId">
      <valueId value="37443015"/>
    </extension>
    <extension url="descriptionDisplay">
      <valueString value="Heart attack"/>
    </extension>
  </extension>
  <code value="22298006"/>
  <display value="Myocardial infarction"/>
  <system value="http://snomed.info/sct"/>
</coding>
</code>
```

JSON

```
{
  "code": {
    "coding": [{
      "extension": {
        "url":
"https://fhir.hl7.org.uk/STU3/StructureDefinition/Extension-coding-sctdescid",
        "extension": [{
          "url": "descriptionId",
          "valueId": "37443015"
        }],
        {
          "url": "descriptionDisplay",
          "valueString": "Heart attack"
        }
      ]
    },
    "code": "22298006",
    "display": "Myocardial infarction",
    "system": "http://snomed.info/sct"
  ]
}
```

Example 5

2.7 Sending a description id NOT in the UK Edition, but for a concept id that IS in the UK Edition

Includes the case where the description id is locally declared to be the preferred term.

```
XML
<code>
<coding>
  <extension url="https://fhir.hl7.org.uk/STU3/StructureDefinition/Extension-coding-sctdescid">
    <extension url="descriptionId">
      <valueId value="787121000006116"/> <!-- descriptionId from EMIS
namespace -->
    </extension>
    <extension url="descriptionDisplay">
      <valueString value="Ideal weight"/>
    </extension>
  </extension>
  <code value="170804003"/> <!-- conceptId from SNOMED International
CORE -->
  <display value="Ideal body weight"/>
  <system value="http://snomed.info/sct"/>
</coding>
</code>

JSON
{
  "code": {
    "coding": {
      "extension": [{
        "url":
"https://fhir.hl7.org.uk/STU3/StructureDefinition/Extension-coding-sctdescid",
        "extension": [{
          "url": "descriptionId",
          "valueId": "787121000006116"
        }], {
          "url": "descriptionDisplay",
          "valueString": "Ideal weight"
        }
      ]},
      "code": "170804003",
      "display": "Ideal body weight",
      "system": "http://snomed.info/sct"
    }
  }
}
```

Example 6

2.8 Sending a description id and concept id where NEITHER is in the UK Edition

XML

```

<code>
<coding>
  <extension url="https://fhir.hl7.org.uk/STU3/StructureDefinition/Extension-
coding-sctdescid">
    <extension url="descriptionId">
      <valueId value="253790221000087110"/>      <!-- descriptionid
from Canadian extension -->
    </extension>
    <extension url="descriptionDisplay">
      <valueString value="Use of illicit drugs unknown"/>  <!-- synonym
from Canadian extension -->
    </extension>
  </extension>
  <code value="186782131000087106"/>      <!-- conceptId from
Canadian extension -->
  <display value="Use of illicit type drug unknown"/>  <!-- preferred term
from Canadian extension -->
  <system value="http://snomed.info/sct"/>
</coding>
<text> Not known whether uses illicit drugs</text>      <!-- what the user
saw on screen, from a data entry template -->
</code>

```

JSON

```

{
  "code": {
    "coding": {
      "extension": {
        "url":
"https://fhir.hl7.org.uk/STU3/StructureDefinition/Extension-coding-sctdescid",
        "extension": [
          {
            "url": "descriptionId",
            "valueId": 253790221000087110
          },
          {
            "url": "descriptionDisplay",
            "valueString": "Use of illicit drugs
unknown"
          }
        ]
      }
    }
  }
}

```

```

    },
    "code": 186782131000087106,
    "display": "Use of illicit type drug unknown",
    "system": "http://snomed.info/sct"
  },
  "text": " Not known whether uses illicit drugs"
}

```

Example 7

3. Processing data from a CodeableConcept

3.1 Clinical codes

3.1.1 Storage

When storing the item, the receiving system may choose to store any or all of the clinical codes associated with the item.

However, where the system supports SNOMED CT codes it **MUST** store any SNOMED CT codes associated with the item.

Where the receiving system does not understand any of the supplied codes associated with the item (or no clinical codes were supplied), it may choose to record the item under a degraded code. The appropriate SNOMED degrade code should be used within the system to store the code.

Degraded Drug Allergies	196461000000101 - Transfer-degraded drug allergy
Degraded Non-Drug Allergies	196471000000108 - Transfer-degraded non-drug allergy
Degraded Medications	196421000000109 - Transfer-degraded medication entry
Degraded Plan	196451000000104 - Transfer-degraded plan
Degraded Referral	196431000000106 - Transfer-degraded referral
Degraded Request	196441000000102 - Transfer-degraded request
Other degrade	196411000000103 - Transfer-degraded record entry

3.1.2 Display

When displaying the item to end users, it is the choice of the receiving system to design their system and user experience in a safe manner that best suits their users.

3.1.3 Propagation

When propagating coded data to another system, the system which received the item may choose which clinical codes to include when sending the item.

If a receiving system receives a SNOMED code that it does not understand it COULD store this code and propagate it onwards if the data is exported. If systems decide to do this they should consider what would happen if the data item is changed/edited.

Note: Whilst it is the receiving systems decision which clinical codes are appropriate for it to store, NHS England requires that SNOMED CT is supported across the entire NHS estate by April 2020.

3.2 Original term text

3.2.1 Storage

When processing an item, the receiving system MUST always store the original term text of the item. That is, the text chosen/manually entered by the clinician/user to describe the item they are recording. Failure to do this could result in the intended meaning of the item being altered.

The original term text will be available in one of the following fields in order of descending priority:

1. Text
2. Coding.DescriptionDisplay where Userselected = TRUE (or is unpopulated, and only one Coding element is present)
3. Coding.Display where Userselected = TRUE (or is unpopulated, and only one Coding element is present)

Where the receiving system can derive the original term text from the clinical code and the derived text is lexically identical to the original term text, then the receiving system is not required to store the text separately.

3.2.2 Display

When displaying an item to end users, the receiving system MUST always display the original term text of the item.

3.2.3 Propagation

When propagating an item to another system, the receiving system MUST always include the original term text of the item.

4. Degradation

Degradation is a process used in clinical systems interoperability for dealing with codes that are not understood by receiving systems. When codes are degraded the original text entered by a user is then associated with an appropriate degrade code. For example, a drug allergy code that is not understood will be associated with a code for 'Degraded drug allergy'.

4.1 Why and how does it happen?

When clinical codes move between systems sometimes the receiving system may not understand all the clinical codes that it was sent. This can be for a number of reasons:

- The receiving system may use a different terminology than the sending system. An example of a place in which this happens is in primary care where TPP SystmOne uses Clinical Terms Version 3 and EMIS Web uses Read version 2.
- Clinical systems may be using different versions of the same terminology. In the UK, terminologies are updated regularly, usually 6 monthly. When they are updated new codes are added and old codes deprecated. If one system updates before another then for a period it may contain new codes that systems using an older version do not understand.

There may be many other reasons that codes are not understood between systems but the above are some of the most common reasons. Here they are intended to illustrate that degrades happen, but are not intended to be an exhaustive list.

4.2 Why do we need a process to deal with it?

Where codes are not understood by clinical systems, having a degrade process enables us to improve interoperability and related functionality. Having appropriate degrade codes enables us to retain the structure and semantics. For example, degraded allergies appear in allergies view, medication degrades appear in medication module.

Some examples of how this can work are:

- Where allergies are degraded, associating the item that was not understood with an allergy degrade code that the clinical system understands can enable it to trigger (for example) additional prescribing safety decision support systems and workflows
- Where medication codes are not understood and the data item is associated with a medication degrade code, the information can be displayed alongside all other medications in the clinical system.

4.3 What do degrades look like?

Where items are degraded, how they appear can vary depending on how a clinical system chooses to display them to a user. In many cases, depending on whether the actual code is displayed to the user, the degrade may appear to be similar to any code natively added in a system.

When they are then exported into a FHIR resource they will be exported as a degrade code with the text originally entered by the user in the code.text element.

4.3.1 FHIR message examples

Example of a degraded medication:

```
{
  "code": {
    "coding": [{
      "display": "Transfer-degraded medication entry",
      "code": "196421000000109",
      "system": "http://snomed.info/sct"
    }],
    "text": "Aspirin 75mg dispersible tablet"
  }
}
```

Example of a degraded drug allergy:

```
{
  "code": {
    "coding": [{
      "display": "Transfer-degraded drug allergy",
      "code": "196461000000101",
      "system": "http://snomed.info/sct"
    }],
    "text": "Amoxicillin 250mg capsules"
  }
}
```