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# Guidelines for Management of Translation of SNOMED CT

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# Table of Contents

Executive Summary .....	2
<b>1. Introduction.....</b>	<b>3</b>
1.1 Background .....	3
1.2 Purpose and Scope .....	3
1.3 Audience .....	4
1.4 Attribution .....	4
1.5 Guide Overview .....	5
1.6 Review.....	5
<b>2. Planning Issues.....</b>	<b>6</b>
2.1 The Challenge.....	6
2.2 Establishing the Organisation .....	6
2.3 Establishing an underlying supportive technical infrastructure .....	7
2.4 Establishing linguistic guidelines .....	7
2.5 Identifying quality characteristics.....	8
2.6 International cooperation .....	8
2.7 Education and training of team members .....	8
2.8 Risk management .....	9
<b>3. Translation Preparation.....</b>	<b>10</b>
3.1 Translation subset selection.....	10
3.2 Re-use of translations from external sources (NRC’s or from different code systems) .....	10
3.3 Creating a text corpus .....	12
<b>4. Translation Process.....</b>	<b>13</b>
4.1 Team selection .....	13
4.2 Prioritise translation principles .....	13
4.3 Determine the workflow .....	14
4.4 Progress monitoring and follow-up .....	18
4.5 Content enhancement during translation .....	18
4.6 Collaborating with other NRCs .....	19
4.7 Translation to multiple languages or dialects .....	19
<b>5. Maintenance of a Translation .....</b>	<b>21</b>
5.1 New content .....	21
5.2 Changes in existing content.....	21
5.3. Reactivated content.....	22
5.4 Content change reports .....	22

5.5 Other source for change .....	23
5.6 Maintaining consistency, updating guidelines and principle decisions.....	23
<b>6. Improving Translation Quality .....</b>	<b>25</b>
6.1 Feedback mechanisms .....	25
6.2 Text analysis .....	25
<b>7. Glossary of Terms.....</b>	<b>26</b>
<b>8. Supporting Documents.....</b>	<b>27</b>

The logo for SNOMED International, featuring the word "SNOMED" in a larger font above "International" in a smaller font, both in white text on a blue square background.  
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This document, "Guidelines for Management of Translation of SNOMED CT," provides a comprehensive framework for managing the translation of SNOMED CT, a critical clinical terminology system used worldwide. SNOMED CT plays a pivotal role in healthcare interoperability and information exchange, making accurate translation essential for global healthcare systems.

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## Executive Summary

This document, "Guidelines for Management of Translation of SNOMED CT," provides a comprehensive framework for managing the translation of SNOMED CT, a critical clinical terminology system used worldwide. SNOMED CT plays a pivotal role in healthcare interoperability and information exchange, making accurate translation essential for global healthcare systems.

# 1. Introduction

## 1.1 Background

SNOMED CT is a comprehensive clinical **terminology** that is used to code, retrieve, and analyse health data. It constitutes a basis on which healthcare organisations can plan and document health processes, perform outcome researches, analyse healthcare quality and costs, and develop effective therapeutic recommendations. It resulted from the merger of SNOMED RT (Reference Terminology) and Clinical Terms Version 3. The terminology contains concepts, descriptions and relationships that are necessary to precisely represent clinical information across the scope of health care.

The international edition of SNOMED CT comprises about 360,000 active concepts and is growing. Each concept is **represented** by active descriptions, i.e. "Fully specified names", "Preferred terms", and other synonyms. The concepts are arranged in **hierarchies** (systems of concepts) covering areas like symptoms and signs, disorders, operations, treatments, drugs, administrative items, etc. – i.e. all these categories of information are needed in a health record.

When implemented in software applications, SNOMED CT can be used to represent clinically relevant information consistently, reliably and comprehensively as an integral part of the electronic health record (EHR). Information systems can use the concepts, hierarchies and relationships as a common reference point.

The global dissemination of SNOMED CT increases the need to provide the terminology in many languages. SNOMED CT has a built-in framework to manage languages and dialects. Entire or partial translations of SNOMED CT are available in US English, UK English, Spanish, French, German, Maori, Danish, Swedish, Norwegian, Estonian, Finnish, Dutch, and even some Sanskrit. The translations can be explored in the SNOMED International SNOMED CT browser by searching the relevant extensions (e.g. for Spanish open the [Spanish edition](#)). Translations are also in progress in other SNOMED International Member countries.

The basic objective of any SNOMED CT translation is to provide accurate representations of SNOMED CT concepts in such a way that they are **understandable, reproducible** and **useful** (URU): the principle of *concept-based translation* must be borne in mind. Due to the inevitably normative nature of a translated version of SNOMED CT, defining a set of linguistic guidelines, including syntactical, morphological, and orthographic rules, is crucial.

Since SNOMED CT is meant to be applied in numerous and various settings by users from the most heterogeneous backgrounds, realms and languages, the communicational aspect of concept definition becomes an issue of paramount importance. A qualitative translation of SNOMED CT is a standardisation of the country's terminology, in this instance for health and social care.

## 1.2 Purpose and Scope

These guidelines constitute a part of the SNOMED International quality assurance system for content and are based upon the collective experience from countries that have already translated, are planning to, or are in the process of translating SNOMED CT.

Within the scope of translation of SNOMED CT, these guidelines offer recommendations regarding the management of a translation project. Members of SNOMED International will be able to find advice and documented experience to support their translation efforts and help avoid mistakes. The Guidelines enable projects to build on best practices from both a qualitative and a cost effective perspective and contribute to "lessons learned".

The guidelines identify critical steps of the translation project, but are not prescriptive regarding the detailed sequence of the steps in the translation process, since some steps are highly dependent on how the project is organised locally.

This document is a companion guideline for use in combination with the [Guidelines for Translation of SNOMED CT](#).



## 1.2.1 Translation method

The process described within this document provides for a two-step quality review mechanism that is to be used by translators as well as clinicians. A third level of quality control and assurance (“Improving translation quality”) is described in section 6.

Reverse translation where the produced translations are translated back into English to compare the result to the original English description as a method for quality control is not part of these guidelines since no members has done this yet.

## 1.2.2 Out of scope

This guideline does not include general project management principles, or, reference specific project management methodologies.

This document does not include linguistic guidelines applicable to translations of SNOMED CT. The linguistic guidelines are found in the [Guidelines for Translation of SNOMED CT](#).

## 1.2.3 Assessment of translation quality

Translation Project Owners (TPOs) should strive to ensure that translations comply with the URU (understandability, reproducibility, usefulness) principles on which SNOMED CT was originally based and that information contained in the translated concepts is semantically equivalent to the meaning in the core source terminology (international release). SNOMED International has developed a document describing how to assess translation quality and evaluate the level of compliance. The document “A methodology and toolkit for evaluating SNOMED CT translation quality”, outlines and defines a number of requirements or “quality characteristics” (QCs) and associated metrics.

There are three types of QCs. In the context of translation quality assessment:

- structured QCs that relate to the management and organisation of the translation project
- process QCs that relate to the activities taking place during the actual translation
- outcome QCs that relate to the target language translation result.

A “short-list” of 9 QCs was identified and for each QC, quality metrics (what and how to measure, how to evaluate, etc.), sample questionnaires (to assist with the evaluation) were developed, and an overall “rating” assigned.

It is recommended that TPOs refer to Appendix A of the [Guidelines for Translation of SNOMED CT](#) and to the methodology and toolkit document to ensure that they incorporate any quality metrics designated **mandatory** into their project and quality plans. Metrics to measure translation quality may also be re-formulated as contractual clauses in formal agreements between a TPO and a Translation Services Provider (TSP) for services and service levels to be provided.

## 1.3 Audience

The primary target group for this document are the TPOs: SNOMED International Members, or, other bodies who have been granted permission to translate SNOMED CT, and project managers in charge of managing SNOMED CT translation projects.

## 1.4 Attribution

This document was originally created as one of the key deliverables of the former Translation Standard Processes Project Group (TSPPG), under the guidance and direction of the Translation Special Interest Group (SIG). This second version has been revised and expanded by the Translation User Group (TUG).

## 1.5 Guide Overview

Key activities and actors in the translation process are described in section 4. This is distinguished from:

- project planning activities described in chapter 2
- translation preparation activities described in chapter 3
- translation process described in chapter 4
- maintenance of translation described in chapter 5.
- improving translation quality described in chapter 6.

A brief list of terms and definitions specific for this document can be found in section 7, and a reference list is found in section 8.

## 1.6 Review

### **Template Notes**

This section provides information about the status of the work presented in this guide. It presents the mechanism used to provide feedback, and it clarifies the review schedule.

## 2. Planning Issues

### 2.1 The Challenge

The translation of SNOMED CT must remain faithful to terminological and linguistic principles and at the same time be able to produce national terminologies useful for clinicians in their daily work. This is no easy task and will require several considerations regarding competences of the staff.

#### 2.1.1 Key considerations for the project manager

In the initial phase of the translation project, a number of vital decisions have to be made:

- who has solid knowledge of SNOMED CT concept model?
- who has solid expertise within the healthcare specialties we will focus on?
- what type of education and training is needed – to whom and when?
- who will be responsible for the translated content, from source language to target language?
- which types of IT tools are needed to support translation and the translation process administration/translation management?
- how to ensure the translators have access to relevant information, such as tools, appropriate version of SNOMED CT, maps etc.
- who should write the linguistic guidelines and make principle decisions?
- what should be the strategy for the sequence in which the terminology is to be translated?
- how should the translation process be organised to guarantee the quality of the translation products?

In the sections below, these questions will be addressed.

### 2.2 Establishing the Organisation

#### 2.2.1 Establishing a team of specialists

To achieve a successful outcome, a number of specialists must be engaged in all parts of the translation process. The following roles have been identified:

- subject matter specialist, such as health and social care professionals
- medical translators, e.g.:
  - translators of patient information material in the medical area
  - translators of research papers
  - interpreters
- linguists
- terminologists
- technical coordinator (to create subsets, translation batches, releases, statistics, QA)

Knowledge to be considered for all roles:

- knowledge of current use of health and social care terminology, classification and health informatics
- knowledge of semantics and concept based translation
- knowledge of the structure and content of SNOMED CT.

#### 2.2.2 Establishing the translation process

The translation can be done in-house or by an external translation service provider. In both cases it is important to specify prerequisites and expectations relating to the process and products. Based on experience from other projects, examples of such prerequisites, include:

- emphasis on concept-based translation

- assurance of delivery on time
- contract with the translators
- an agreed number of translated concepts per given time
- maximum allowable error rate
- maximum allowable number of concepts submitted to the editorial board
- use of subject matter experts
- workflow and quality assurance
- agreement on the point in time when a concept's translation is complete
- agreement on which translation tools should be used
- agreement on how feedback should be collected and processed.

Please also see section 2.8 Risk management.

### 2.2.3 Call for tender and contract issues for translation service provider

Based on the specifications for the translation process and the products and services to be delivered, a procurement process should be initiated and a contract signed with the translation service provider. Since such tendering instruments and procurement processes are often dependent on national legislation or other conditions, they are not described further in this guideline.

### 2.2.4 Establishing the editorial board

Parts of the translation project need to be coordinated by an editorial board. The board's major tasks are to

- support the translation process, see section 4
- manage the linguistic guidelines and make principle decisions
- continuously make and publish decisions on linguistic principles, and
- follow up on translation quality.

The interdisciplinary editorial board should ideally be composed of professionals with educational and empirical backgrounds within areas like health and social care terminologies, linguistics, translation science, language technology, terminology and health informatics, with knowledge and understanding of SNOMED CT.

## 2.3 Establishing an underlying supportive technical infrastructure

Administering the translation process requires high performance, reliable IT tools. An ideal toolkit should:

- show all information associated with a concept, most importantly descriptions, relations and hierarchy
- provide a base for terminological services
- support the translation process and the translation team members in every step of the process, including creation, change, delete and edit as well as collaboration, quality assurance and feedback
- control access to the information being processed at any point in time
- produce statistics about progress of the translation work in any stage of the process
- show the current status of the 'life cycle' of each concept throughout the entire translation process
- show workload and progress of activity for all project participants

## 2.4 Establishing linguistic guidelines

The target language version of SNOMED CT should reflect established national linguistic rules, and health and social care staff should recognise the preferred terms used in their daily activities. Well-maintained linguistic guidelines and principle decisions are the prerequisite for a high quality translation, and the use of these are therefore prescriptive for everyone in the translation process. An initial version of the linguistic guidelines should be ready in advance of the first education session for translators, reviewers and editors. The framework and the content of the linguistic guidelines and principle decisions are described in the [Guidelines for translation of SNOMED CT](#).

## 2.5 Identifying quality characteristics

The task of creating quality characteristics and metrics for translations was based on the IHTSDO Quality Assurance Framework. The work was undertaken by the IHTSDO Translation Quality Assessment Project Group that defined quality characteristics for Structure, Process and Outcome. These are described in length in a separate document, **“A Methodology and toolkit for Evaluating SNOMED CT Translation Quality”** and include:

- participants knowledge of terminology and terminology translation processes including translators and reviewers competencies
- content of style guides and reference materials in the target language
- access to translation software
- concept-based translation principle
- translation reviews, two-level or two-stage review process necessary.
- ongoing communication, co-operation and translation project process adjustments between the TPO and the TSP
- term equivalence
- clinical acceptability
- compliance with Translation Standards and Guidelines

## 2.6 International cooperation

### 2.6.1 Quality of the International Release of SNOMED CT

Despite ongoing maintenance, errors and inconsistencies occur in the International Release of SNOMED CT both at the concept model level as well as at the description level. Participants in the translation process will undoubtedly identify a number of these.

The translation project should provide a procedure to document these and provide methods and tools for reporting back to SNOMED International during the translation process.

It is recommended to do this via the NRC and use the SNOMED International Content Request Service (CRS) for reporting any anomalies and inconsistencies found in the International Release of SNOMED CT (<https://confluence.ihtsdotools.org/display/SCTCR/Accessing+CRS>).

## 2.7 Education and training of team members

The translation team members will need education and training regarding the structure and content of SNOMED CT, the translation process and access to the documents and tools supporting it. The following examples outline essential education and training requirements:

- SNOMED CT overview: An introduction to SNOMED CT should be provided for everyone involved in the translation process. [The e-learning pathway for translation of SNOMED CT](#) from SNOMED International is provided for this purpose.
- Subset administration training: This training should be given to selected members of the team involved in planning, identifying, creating and allocating the selected subsets of SNOMED CT that are going to be translated.
- Education in linguistic guidelines and training in how to use them: This should be provided for all translators, reviewers and editors.
- Translation tools training: This will vary depending on the roles and responsibilities of all translation team members but all will need specifically focused training in the use of any supporting translation tools used to perform their roles
- Language technology training such as searching and analysing text corpora if such resources are available.

## 2.8 Risk management

It is essential to have methods and routines for monitoring both progress and quality control in place from the very start of the project. Indicators to monitor progress and quality should be defined and shared with project team members. Risk factors should be identified, and the indicators should be able to reflect project status within high-risk areas. Based on previous project experiences, the following examples of important risk factors which could lead to deficient or insufficient implementation or, inadequate quality of the translation products have been identified:

- poor planning of the translation project at its purpose
- insufficient financing to undertake the project as outlined in plans
- deficient contracts between the TSP and the TPO
- failure of the translation agency to deliver on time
- insufficient translators with experience with the clinical language
- insufficient organisation of the review process and editorial work
- insufficient time allocated for the translation process
- deficient quality assurance of translations with TSP
- insufficient knowledge of SNOMED CT
- insufficient IT tools to support translation and validation
- insufficient training in use of tools
- insufficient access to or use of subject matter experts
- insufficient training in the conceptual principles for translation
- insufficient project management
- ambiguities and errors in the source language
- source language terms only relevant for certain countries
- inappropriate sequence of subsets for translation

## 3. Translation Preparation

All concepts cannot be translated simultaneously and it is necessary to determine which parts of the terminology should be translated in the project and in which sequence. The preparation therefore includes the selection (creation, allocation) of specific translation subsets. Also, in the preparation, re-use of translations from other NRC's and code systems should be considered.

### 3.1 Translation subset selection

The aim of subset selection is to provide translators and reviewers with the best possible prerequisites for their work. The project will benefit from using the same translator working with concepts within the same subject field, e.g. heart conditions including body structures, disorders and procedures.

The choice of order of areas to be translated can be determined by local use cases or by choosing to translate concepts that create maximal efficiency. Different approaches for identifying the initial subsets can be chosen depending on local needs. For example, one could prioritise concepts:

- which recur, link, qualify and confer meaning to other concepts in different contexts, e.g. body structures and qualifier values. Translating such concepts in the beginning of the project maximises re-use of translations, which increases both efficiency and consistency. It is advisable to translate concepts representing attribute targets for clinical finding and disorder concepts before translating the clinical finding hierarchy, using ECL queries. This supports both consistency and efficiency.
- which are relatively easy to translate, because they are similar and/or well-defined – for the same reasons
- which are to be part of pilot projects in a given health or social care context, or part of a specific research project – especially if your resources are limited.

One can also choose to avoid certain branches or types of concepts. Some branches are more difficult to translate than others, because they incorporate more culture- or country-specific concepts. For instance, if there is no private health care in your country, you will have little use for the 49 concepts for *private referral to*. Other branches may contain much more detail than you require. For instance, the branch 418019003 |Accidental event (event)| contains an astonishing wealth of accidents, e.g. 214871001 |Motor vehicle nontraffic accident involving collision, not on public highway, between motor vehicle, except off-road motor vehicle, and pedestrian, passenger on motorcycle injured (event)|. Translating these may require much time for relatively little gain. The same could be said about parts of the food hierarchy. Translating 226674006 |Welsh cake (substance)| into Norwegian makes little sense.

Selection of subsets is preferably managed by a team including specialists in health and social care, terminologists and experts on SNOMED CT.

### 3.2 Re-use of translations from external sources (NRC's or from different code systems)

A pragmatic approach for adding translations may be to “borrow” existing translations from external sources, e.g. other medical terminologies or translations produced by NRC's in different member countries who share the same target language(s) or other code systems, such as Orphanet if already translated into the target language.

When considering the reuse of “legacy” translations, it is important to first analyse any differences in scope, regional variation and formal aspects. In order for the descriptions to become part of the national SNOMED CT extension, the NRC should verify that the translated concepts have the same meaning and granularity, and that the translation has been produced in a qualitative manner including clinical validation, similar to the SNOMED CT translation approach. If this is the case, it is still possible that the translation needs to be adapted in order to comply with regional appropriateness, formal requirements and linguistic guidelines.

Depending on the nature of the external source, there are a number of considerations when selecting and recycling existing translations:

- Translations belonging to the same code system, i.e. SNOMED CT but produced by different NRC's. In other words, the concept in the source language has the same ID, has the same meaning and position in the hierarchy. The target audience however is a different country or region, and the language flavour may imply

semantic, lexical as well as formal differences. For instance, the Belgian NRC uses Dutch descriptions produced by the NRC of The Netherlands as a starting point for untranslated concepts. Even though grammar and spelling is standardised for Dutch in both regions, there may be discrepancies in meaning between Belgium and The Netherlands that need to be verified. In addition, different guidelines related to formatting and formal choices may apply in the two member countries. E.g. in The Netherlands the FSN is translated whereas in Belgium this is not the case.

Example:

703226008   Familial cerebral saccular aneurysm (disorder)	
<b>Belgian Dutch language reference set</b>	PT: familiaal cerebraal sacculair aneurysma
	AS: familiaal intracranieel sacculair aneurysma
	AS: familiaal besaneurysma
<b>Nederlandse taalreferentieset</b>	FSN: familiair sacculair cerebraal aneurysma (aandoening)
	PT: familiair sacculair cerebraal aneurysma
	AS: familiair sacculair hersenaneurysma

Translations belonging to different code systems but for which there is a semantic mapping between (source language) concepts. For instance, the SNOMED CT to Orphanet Map Release is the product of a joint project carried out under a collaboration agreement between the two parties. As this map links rare diseases managed by Orphanet to concepts in SNOMED CT, it could be an option for NRC's to also recycle the translated terms available in Orphanet. As translation guidelines applied by Orphanet may deviate, the NRC needs to make sure that also the formal aspects of the recycled descriptions correspond to their own formal requirements. E.g. CMT2B is an acceptable synonym in Orphanet, however in SNOMED CT every acronym needs to be followed by the fully written out form.

Example:

<b>Orphanet:</b>	PT: Klassiek syndroom van Ehlers-Danlos AS: Klassiek EDS
<b>SNOMED CT:</b>	PT: syndroom van Ehlers-Danlos, klassiek type AS: EDS (Ehlers-Danlos-syndroom), klassiek type AS: Ehlers-Danlos-syndroom, klassiek type

Translations belonging to different code systems and for which there is only a lexical similarity between the concepts in the source language. It may be risky to recycle translations from external sources as the meaning of terms that share the same lexical morphology in the source language may be different (i.e. homonyms but also different level of granularity). Examples of external resources:

- WHO:
  - ICD-10/ICD-11
  - the Anatomical Therapeutic Chemical (ATC) classification system
- International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use (ICH): MedDRA
- SAM V2 (Belgium)
- Terminologia Anatomica



### 3.3 Creating a text corpus

Easy access to medical texts is highly valuable when translating SNOMED CT into the target language. There might already exist text corpora consisting of medical texts in the target language for research purposes at universities or other higher education institutions. If so, this could be re-used for translation of SNOMED CT.

If there is no corpus available, creating one should be considered. It should be noted, however, that this might require quite some time and resources. Criteria such as balance, sampling and representativeness should be taken into account when considering which content to include in a corpus. Also right tooling for searching and analysing the corpus should be made easily available for the translators. One option is to collaborate with researchers of corpus linguistics when creating a text corpus. Another is to seek assistance from a National Language Bank if there is one in the country.

## 4. Translation Process

There is not a single best workflow to recommend for SNOMED CT translation. The workflow most suitable to a country's needs depends on what part of SNOMED CT is likely to be used, the resources (including translators) available and the order in which translation principles are prioritised.

### 4.1 Team selection

It takes a village to translate SNOMED CT, that is to say a group of people with different roles and expertise:

- Terminologists ensure the semantic correctness of the translations: to check whether the translations convey and imply the exact same meaning as the concepts expressed with the FSN and concept relationships. The NRC should contact SNOMED International in case of discrepancies between descriptions and definitions, between English descriptions, and to report duplicate concepts (see chapter 4.5). SNOMED International can facilitate translation by providing text definitions.
- Healthcare professionals, as the target users of the translations, should indicate which translations are most frequently used and recognizable in the healthcare environment.

SNOMED CT contains many concepts that refer to procedures or disorders that are highly specialised, have become obsolete, or convey the same meaning through entirely different descriptions. No single healthcare professional or terminologist can interpret them all. You will need a team of specialists from the relevant healthcare disciplines, who can indicate what an obscure term means, how it is referred to in your language and whether it is relevant for your country or not. If you translate a use case specific reference set, you may be able to limit your team to a single speciality. In that case, the terminologist will need to ensure that the translations are not interpreted into a too specific context, which would render them unsuitable for other use.

- Linguists are required to ensure consistent, concise, grammatical translations that are free of spelling errors. They are more likely to notice and avoid standard (non-medical) translation pitfalls that a healthcare professional new to translation might fall into. Linguists are often trained to use text corpora for translation purposes. Translation, especially in such huge quantities, is a profession in itself: a group of healthcare professionals simply will not make as neat a job of it. By preference, the translators should be specialised in medical translation or assisted by a medical linguist.

Some of these skills may be combined. For example, the Netherlands found it useful to train young Medical Doctors in the use, purpose and structure of SNOMED CT, so they can check both semantic correctness and recognizability of the translation, increasing efficiency. Alternatively, translators can be trained as terminologists, or healthcare professionals with a linguistics background can be found. However, combining multiple skills or expertise in a single person will make it harder to find suitable people and increase the cost of their labour.

### 4.2 Prioritise translation principles

The [Guidelines for Translation of SNOMED CT](#) discuss the translation principles that are vital to know when translating SNOMED CT, including the idea of concept-based translation. Translations should be unambiguous, linguistically correct, consistent and both recognisable and acceptable to healthcare professionals. Unfortunately, these requirements conflict. In order to resolve these daily dilemmas most quickly, you should prioritise them and let this priority influence your workflow. If you rate recognisability and acceptability highest, then the healthcare professional should have the final say over each translation. If on the other hand you value consistency and linguistic correctness more, then a medical linguist or translator should have that honour. This prioritisation should be done in close collaboration with the editorial board and made available in the national language guidelines for translation.

In difficult cases an editorial board can ensure consensus about the best possible translation (or compromise). The use of synonyms can be used to support different jargons between specialist groups, spelling variants or even patient-friendly terms. To distinguish translations that adhere to all principles from those that deliberately violate some (e.g. contain spelling errors, are meant for patients rather than medical professionals, or are ambiguous) you can choose to create multiple language reference sets. Please note that adding synonyms or language reference sets does increase the burden of maintenance.

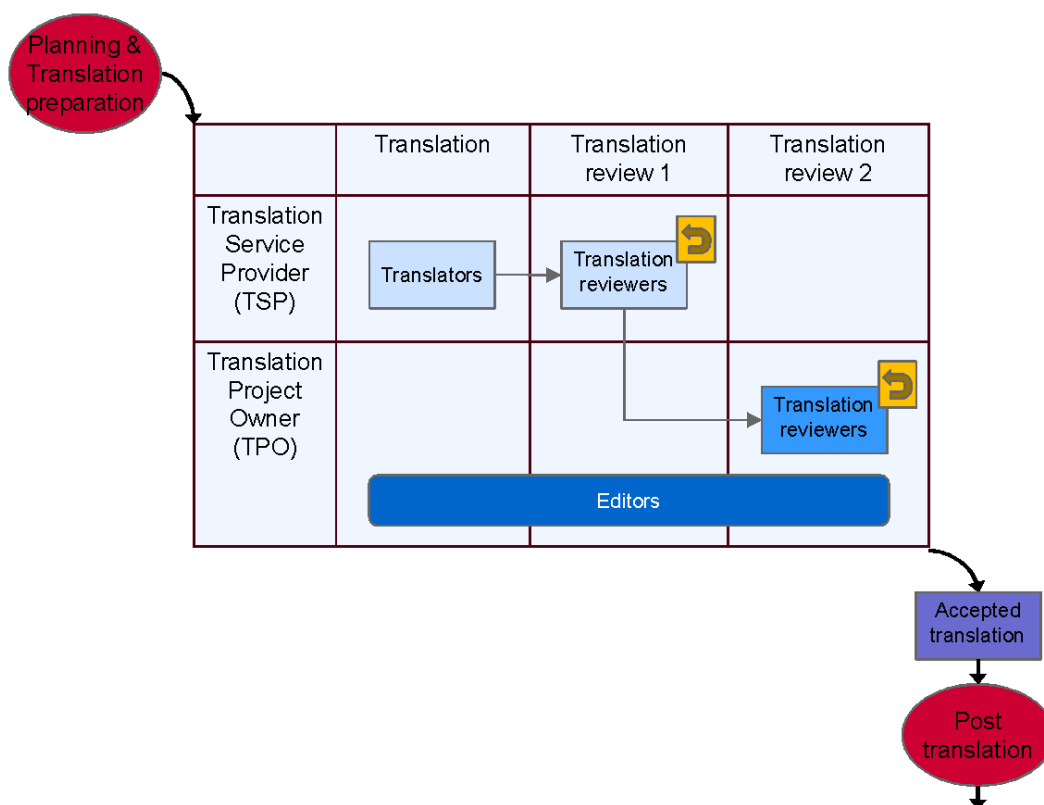
You should also decide in advance how to handle obsolete or erroneous concepts. Do you want to translate them anyway (which leads to an imperfect result), ignore them (which leads to an incomplete translation) or resolve them with SNOMED International (which leads to a large amount of work both for you and for SNOMED International) However, it is highly recommended to submit obsolete and erroneous concepts to improve the quality and reduce the burden of future translations into other languages. The time spent on discussion regarding bad concepts will multiply for each new translation unless they are resolved by Snomed International.

### 4.3 Determine the workflow

There is no single best workflow. The choices you have made above restrict the number of workflows that are suitable to your situation. However, some principles hold true in all cases:

- Each translation should be concept-based. Concept-based translation is explained in chapter 4 in “Guidelines for Translation of SNOMED CT”.
- Each translation should be viewed by at least two team members, and any change made, however trivial, should be reviewed by a colleague.
- You will need an editorial board to maintain linguistic guidelines, correcting any translations that do not comply, and resolve difficult cases.
- You should be able to track the process of each translated concept through the workflow.
- You need some kind of quality assurance (described in “A methodology and toolkit for evaluating SNOMED CT translation quality”).

Different member countries have translated using very heterogeneous workflows. The previous version of this document recommended the workflow in Figure 4-1, based on the experiences of Sweden and Denmark.



**Figure 4-1: Translation process recommended after Swedish and Danish translation**

This workflow was short and thus efficient, but required translators, reviewers or editors who possessed knowledge within healthcare, linguistics and terminology. In this setup clinical validation is expected to be done in the post translation process.

Conversely, the Netherlands adopted a complex workflow where each expertise owned its own workflow status (see Figure 4-2). This made it easier to find suitable team members, but increased the amount of time needed per translation and required abundant and careful communication to coordinate the different expertise groups.

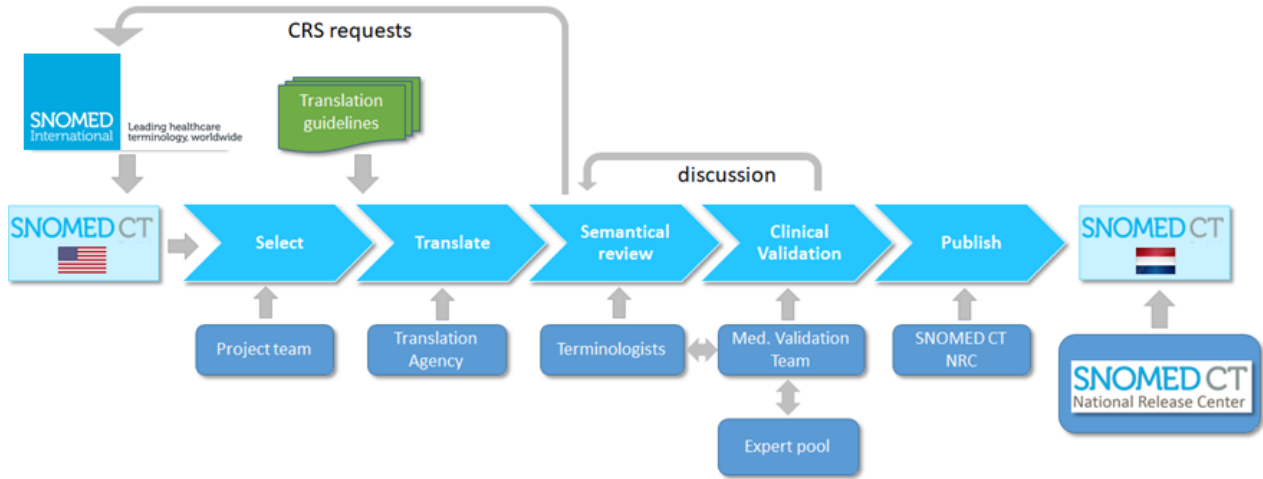
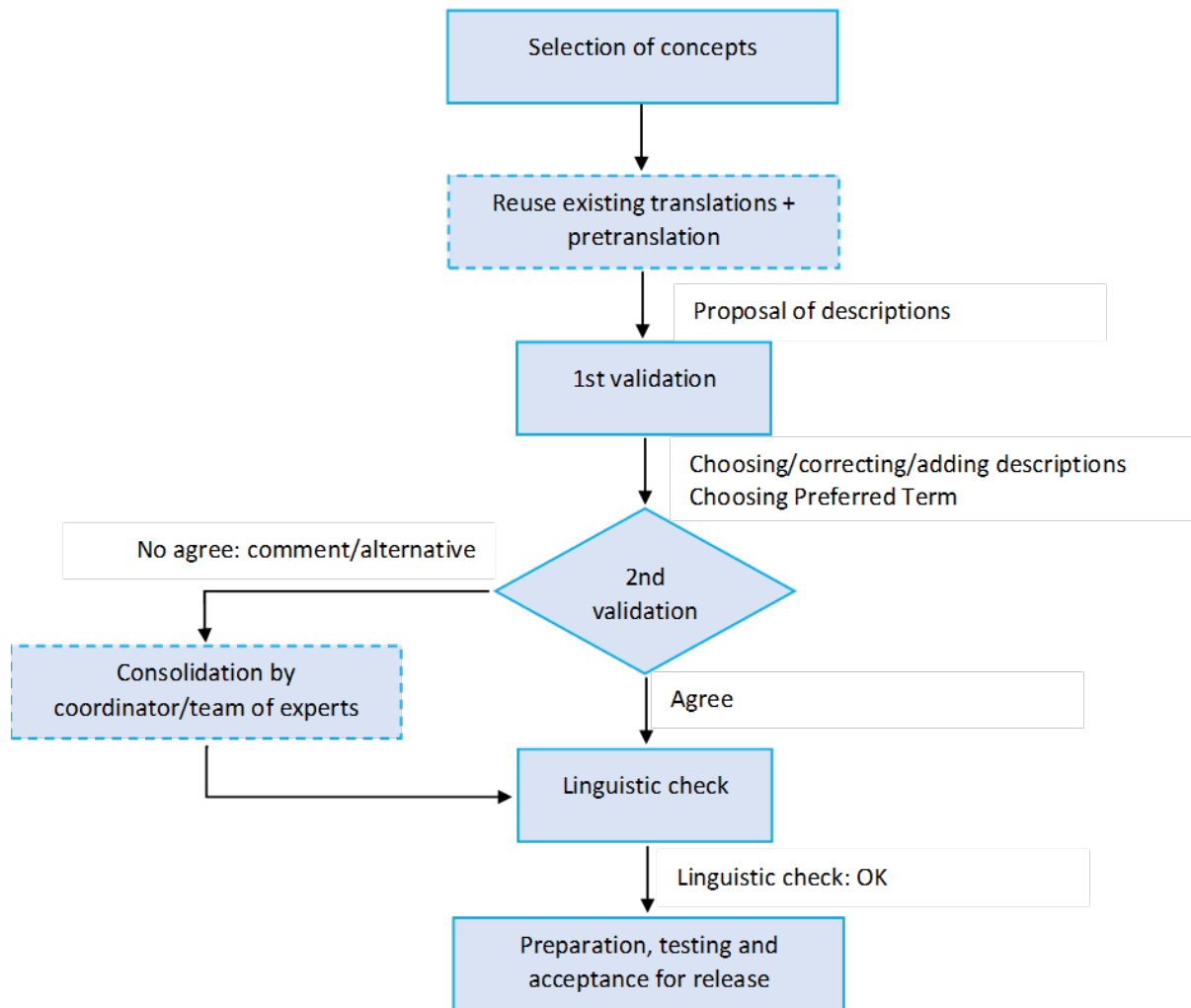


Figure 4-2: Translation process in the Netherlands

The Belgian workflow distinguishes two types of reviewers: the domain specialist who validate the translation from a clinical point of view and the linguist who verify the grammatical adequacy of the term (see Figure 4-3)



**Figure 4-3: Translation process in Belgium**

In Norway, domain specialists selected the subsets, an external agency translated, and medical students of the final year did the review with the support of domain experts, see [Figure 4-4](#). A coordination unit consisting of four terminologists (two health care workers and two linguists) facilitated the process and resolved issues continuously, either by itself or by consulting the domain experts or the Editorial Board.

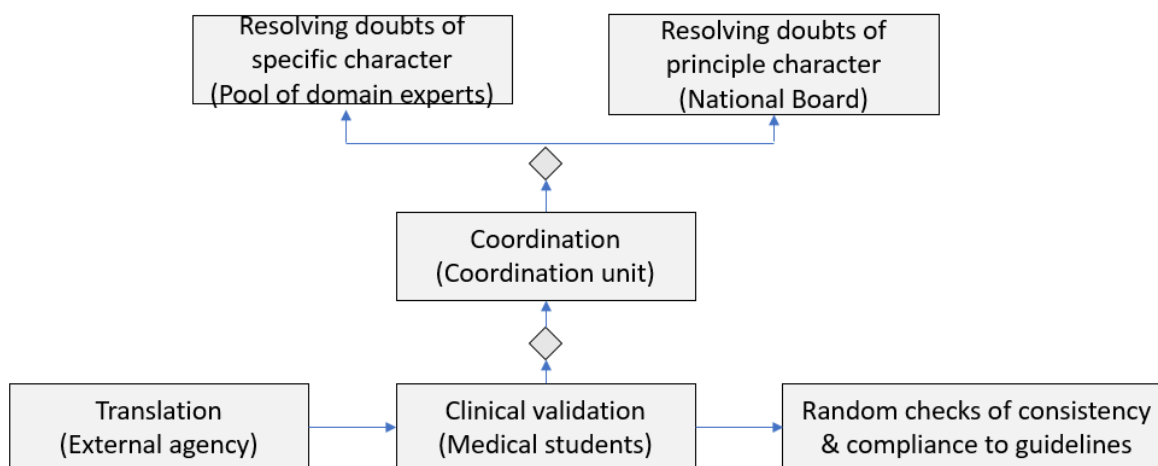


Figure 4-4: Translation process in Norway

### 4.3.2 Pro’s and con’s of different workflows

Workflow	Pro’s	Con’s
<b>Standard</b>	<ul style="list-style-type: none"> <li>• Fewer review steps</li> <li>• Requires only small team</li> </ul>	<ul style="list-style-type: none"> <li>• No clinical validation during translation process</li> </ul>
<b>Belgium</b>	<ul style="list-style-type: none"> <li>• Validation of terms can only be done by experts who have clinical experience and who belong to the target audience (future users of SNOMED CT in EHR): involving them is important for buy-in</li> <li>• Clinical validation by more than one domain expert implies choice of terms used in clinical practice</li> <li>• Leveraging existing translations reduces time</li> <li>• Domain experts do not need to bother about formal aspects of the translate terms as linguists verify its adequacy and consistency, and make sure that the guidelines are being adhered to</li> </ul>	<ul style="list-style-type: none"> <li>• It is difficult to match selected concepts with specific domain expertise of clinical validators.</li> <li>• Domain experts with clinical practice are difficult to recruit and lack time to work on projects</li> </ul>
<b>Netherlands</b>	<ul style="list-style-type: none"> <li>• Easy to recruit team members: professional translators, healthcare professionals for medical validation, training med students as terminologists</li> <li>• Minimising burden on the healthcare professionals (who are most difficult to recruit)</li> <li>• Thorough review of each concept by multiple persons and from multiple expertises</li> </ul>	<ul style="list-style-type: none"> <li>• Expensive</li> <li>• Medical review step introduces a lot of inconsistency in translations</li> </ul>

<p><b>Norway</b></p>	<ul style="list-style-type: none"> <li>• External translation agency can provide large-scale translations</li> <li>• Easy to recruit students as clinical validators</li> <li>• Reducing burden on healthcare professionals</li> <li>• More economical to use students as clinical validators (wage/hour)</li> <li>• Lesser degree of personal preference with regard to term choice among multiple synonyms</li> </ul>	<ul style="list-style-type: none"> <li>• External translators tend to translate word-by-word in specialised areas</li> <li>• Less clinical experience and knowledge among students, giving rise to translation errors and higher burden on terminological coordination, especially in specialised areas</li> <li>• Difficult for The National Editorial Board to acquire sufficient knowledge of SNOMED CT.</li> </ul>
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**Table 4-1: Pro’s and con’s of different workflows**

## 4.4 Progress monitoring and follow-up

The following issues related to the translation process should be monitored and considered:

- regular adjustment of the linguistic guidelines;
- adjustment of the resources in the translation processes in order to continuously optimise the process;
- workflow statistics;
- correction of translations that do not comply with the linguistic guidelines. This includes changing older translations to comply with a new guideline.

The following issues of project progress should be monitored:

- follow-up on quantity, e.g. the number of approved translated concepts, the number of unresolved problem concepts sent to the editorial board, the number of errors made by the translators;
- follow-up on quality, e.g. how well the translation complies with the linguistic guidelines, how well the translation complies with language corpora and concordances of respected medical journals and other relevant sources;

follow-up on costs;

- follow-up on deviations from goals;
- follow-up on translation service provider issues;
- follow-up on performance of IT tools.

## 4.5 Content enhancement during translation

The translation process provides an excellent form of quality assurance for SNOMED CT, both in terms of a review of existing content, and also the identification of SNOMED CT concepts which could be added to the release, either as international content additions or by addition to national extensions where these exist. Guidance for content requests can be found here - [SNOMED CT Content Request Service](#).

If promoting national concepts to the international edition, the FSN and PT have to be translated into English (US). This requires in depth knowledge of the Editorial Guide and naming conventions related to the hierarchy the concepts belong to.

Regarding all requests, whether to the International or National Release, should be supplied with a detailed description of the problem, along with a statement of requirements to inform the resolution. In the case of requests originating from translation activities, this should include details of the problem related to translation with a description including concept/description translations to provide additional clarity.

An NRC may use their own tool, such as JIRA, to collect and filter requests for SNOMED International; or they can use a tool that SNOMED International provides: <https://be-rmp.snomedtools.org/fr/>. This latter tool is convenient because it can be used to escalate an issue to SNOMED International.

The Translation User Group (TUG) uses a [JIRA environment](#) to signal and discuss translation issues among translating countries. This is a good venue to ask how other countries have solved a particular translation issue. When the group agrees that the issue is with the international edition and warrants a change request, the group can submit the request through CRS using the TUG's project code.

## 4.6 Collaborating with other NRCs

The Translation User Group meets regularly with a dual purpose: to create and update guidelines such as these, and also to share experiences and expertise. When you encounter a particular translation dilemma, such as an ambiguous source concept or term, you can raise an issue in our JIRA project: <https://jira.ihtsdotools.org/projects/SCTF/summary>.

We invite every organisation or professional developing a SNOMED CT translation to join the group. Details can be found on <https://confluence.ihtsdotools.org/display/TRANSLATIONUSERGROUP/Translation+User+Group+Home>.

## 4.7 Translation to multiple languages or dialects

Performing translation and validation to a target language which is official in several countries potentially involving different NRCs will normally require a different approach, such as Spanish, French and German. However, a language being shared across borders, may present differences regarding spelling or lexical choices which have to be taken into account. This section will present some experiences of multiple languages and dialects.

### 4.7.1 The Swiss Experience

The Swiss Extension includes German, French and Italian. The following are the experiences and workflows of the Swiss NRC.

The concepts are initially translated by the internal translation service of the Federal Office of Public Health (FOPH). eHealth Suisse then checks whether the initial translations comply with the guidelines and the translation guides of the respective language of SNOMED International. If necessary, the translations are additionally validated by experts.

Depending on the language, a different process is initiated.

The German translations are compared with existing translations from Germany or Austria and supplemented if necessary. Subsequently, the German translations are submitted to the German Translation Group (GTG). The translations are checked again by the GTG and, if necessary, supplemented with further synonyms. After review, the translations are published in the German Community Browser of SNOMED International and a public commenting phase is started. During this phase, anyone can comment on the translations. Once the commenting phase has been completed and evaluated, the translations will be incorporated into the joint German edition of the GTG.

French translations that are not already in SNOMED's "Common French Translation" will be submitted to the French Translation Collaboration Group and included in the "Common French Translation". Unlike the German-language group, the French-language group does not provide for public comment.

Italian translations do not go through an International Working Group, as none currently exists. Italian translations are validated by appropriate subject matter experts after the initial translation, if needed, and then imported directly into the Swiss Extension.

Based on the Swiss experience, there are advantages and disadvantages of a sequential and a parallel translation process:

	Sequential translation	Parallel translation
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<p>Advantages</p>	<p>Translators can use existing translations as a guide and also perform quality assurance. The organisation and coordination effort is lower.</p>	<p>It takes significantly longer to translate a concept into all desired languages.  If the first translation is not correct, it can affect subsequent translations.</p>
<p>Disadvantages</p>	<p>The organisational and coordination effort is greater than for sequential.  Depending on the language, the translation process can be different, which makes the whole process more complex.</p>	<p>The entire translation process is shorter because translations are done into all desired languages at the same time.  In validation, experts can rely on all translations.  Feedback from one language can be immediately incorporated into the other languages.</p>

## 5. Maintenance of a Translation

Once a translation is completed, the burden of translation lessens considerably. However, translating SNOMED CT is shooting at a moving target, or like chasing Aristotle's famous turtle: whenever a finish line has been crossed, the turtle has moved on.

With every new release, SNOMED CT expands with new concepts; moreover, the definition or even the FSN of the concepts that are already translated may change and render an earlier translation inaccurate. In order to keep a translation usable, it must be maintained.

This chapter will address the different streams of incoming work of mature translations (new content, changes in existing content, reactivated content). Also, maintaining consistency, updating guidelines and principle decisions after the initial translation is included.

### 5.1 New content

New content is added to the SNOMED CT International Edition by monthly releases.

On average, 700 new concepts per month based on releases in 2022, with significant variability in hierarchy composition.

- all of them require translation *if* the complete SNOMED CT is to be available in the target language. Most of the new concepts require manual translation, but for selected areas such as clinical drugs, template-based batch translation might be leveraged, but this depends on the target language characteristics and the results of ongoing research.
- less than 5% of new concepts are direct replacements of ambiguous inactivated concepts with a similar translation
- 15-20% of new concepts are aligned with the SNOMED CT International Drug Model. Those usually benefit (and sometimes require, like most clinical drugs) template-based translation or quality assurance, as naming conventions for multi-ingredient clinical drugs are complex to craft or review manually
- average 50-100 new descriptions in existing concepts. In concept-based translations those might be ignored, or triaged to a simplified manual inspection workflow that closes the task if no changes are deemed necessary.

### 5.2 Changes in existing content

Changes in the lexical representation of existing source concepts are made in every new international release.

- FSN changes usually require manual inspection to identify potential shifts in meaning or a need to align to recent remodelling or new naming conventions (e.g. recent new perspective on osteotomies).
- In recent releases FSN changes usually arise from the enforcement of new naming conventions and the QI project. While the new conventions are usually only enforced on new content and on areas being revised by the QI project, translation projects might prefer on a case by case basis to extend the revision to existing translations sharing the same source pattern.
- Inactivated source descriptions may require manual inspection as old translations might have been influenced by obsolete (e.g. deprecated organism names) or terms inactivated as not semantically equivalent.
- Changes in preferred terms should not affect concept-based translations that base their synonyms on descriptions that accurately represent the meaning of the source FSN. However, the use of translation memories, machine pre-translations and template-based text generation might have introduced undesirable characteristics of term-to-term translations if the target preferred term is directly derived from the source preferred term.

### 5.3. Reactivated content

Reactivated concepts usually represent a very small portion of content updates, but they might result in duplicate translations in some cases.

Inactivated concepts that have active translated descriptions are not usually considered a priority to trigger reviews, but in some cases they are relevant to local implementations and require follow up (particularly if the concept was inactivated as ambiguous).

### 5.4 Content change reports

Snomed International publishes monthly release notes which give an overall view of the content change in the last release. However, for translation there is a need for a record of each change. Also, NRCs which have only translated parts of the international edition, there is also a need for filtering out changes which affect the national edition.

NRCs which are using Managed Service, can access the Reporting Platform, where several reports are available for the national extension, for example the Inactivated translation concepts report.

A	B	C	D	E	F	G
Id	FSN	SemTag	Translation(s)	Reason	Assoc Type	Assoc Value
413440007	Acute lymphoblastic leukemia - category (morphologic abnormality)	(morphologic abnormality)	akutt lymfatiske leukemi, kategori, akutt lymfoblastisk leukemi, kategori	OUTDATED	REPLACED BY	128822004  Precursor cell lymphoblastic leukemia (morphologic abnormality)
413443009	Acute myeloid leukemia - category (morphologic abnormality)	(morphologic abnormality)	akutt myelogen leukemi	OUTDATED	REPLACED BY	1162928000  Acute myeloid leukemia (morphologic abnormality)
17788007	Acute myeloid leukemia, no International Classification of Diseases (morphologic abnormality)	(morphologic abnormality)	akutt myelogen leukemi, ingen ICD-O-und	OUTDATED	REPLACED BY	1162928000  Acute myeloid leukemia (morphologic abnormality)
409703003	Adrenal cortical adenoma - category (morphologic abnormality)	(morphologic abnormality)	adrenalt kortikalt adenom, kategori	OUTDATED	REPLACED BY	1156661006  Benign adrenal cortical adenoma (morphologic abnormality)
16107003	Adult rhabdomyoma (morphologic abnormality)	(morphologic abnormality)	adult rabdomyom	OUTDATED	REPLACED BY	1179040000  Adult cellular rhabdomyoma (morphologic abnormality)
399908004	Benign adenomatous neoplasm - category (morphologic abnormality)	(morphologic abnormality)	godartet adenomatos tumor, kategori, godartet adenomatos svulst, kategori, godartet adenomatos neoplasi, kategori	OUTDATED	REPLACED BY	1187227004  Benign adenomatous neoplasm (morphologic abnormality)
400207007	Benign epithelial neoplasm - category (morphologic abnormality)	(morphologic abnormality)	ondartet epitelial svulst, kategori, malign epitelial neoplasi, kategori, malign epitelial tumor, kategori	OUTDATED	REPLACED BY	1187163006  Benign epithelial neoplasm (morphologic abnormality)
400185007	Benign fibrohistiocytic neoplasm - category (morphologic abnormality)	(morphologic abnormality)	godartet fibrohistiocytaer svulst, kategori, benign fibrohistiocytaer tumor, kategori, benign fibrohistiocytaer neoplasi, kategori	OUTDATED	REPLACED BY	1187238004  Benign fibrohistiocytic neoplasm (morphologic abnormality)
400078005	Benign fibromatous neoplasm - category (morphologic abnormality)	(morphologic abnormality)	benign fibromatos tumor, kategori, godartet fibromatos svulst, kategori, benign fibromatos neoplasi, kategori	OUTDATED	REPLACED BY	1187134008  Benign fibromatous neoplasm (morphologic abnormality)
400169002	Benign leiomyomatous neoplasm - category (morphologic abnormality)	(morphologic abnormality)	godartet leiomyomatos svulst, kategori, benign leiomyomatos tumor, kategori, benign leiomyomatos neoplasi, kategori	OUTDATED	REPLACED BY	1162890002  Leiomyoma (morphologic abnormality)
400103003	Benign neuroendocrine neoplasm - category (morphologic abnormality)	(morphologic abnormality)	benign nevroendokrin tumor, kategori, godartet nevroendokrin svulst, kategori, benign nevroendokrin neoplasi, kategori	OUTDATED	REPLACED BY	1187127006  Benign neuroendocrine neoplasm (morphologic abnormality)
399919001	Carcinoma in situ - category (morphologic abnormality)	(morphologic abnormality)	preinvasivt karsinom, kategori, carcinoma in situ, kategori	OUTDATED	REPLACED BY	1187138006  Carcinoma in situ (morphologic abnormality)
443489009	Chondrosarcoma - category (morphologic abnormality)	(morphologic abnormality)	kondrosarkom, kategori	OUTDATED	REPLACED BY	1163016002  Chondrosarcoma (morphologic abnormality)

**Figure 5-1: Screenshot of the Inactivated translated concept report (Reporting Platform) for Norwegian (january 2022)**

Content change reports are also available in other SNOMED CT tool environments, such as TermSpace:

202203 FSN change	618
202203 New concepts - body structure	41
202203 New concepts - disorder - finding	371
202203 New concepts - medicinal product - medicinal product form - clinical drug	94
202203 New concepts - observable entity	20
202203 New concepts - organism	10
202203 New concepts - other semtags	106
202203 New concepts - procedure	87
202203 New concepts - situation	7
202203 New description in existing concept	51
202203 Preferred change	21
202203 Reactivated concepts	8
202203 Retired Concepts	493
202203 Retired description	18

**Figure 5-2: Screenshot of content change report of the international edition during the March 2022 release in the TermSpace environment.**

## 5.5 Other source for change

Other translation maintenance tasks originate in other sources than changes in SNOMED CT international edition: external feedback, internal quality improvement projects, or changes in editorial policies or style guides.

- change requests from users detecting typos or incorrect translations issues detected by the translation team
- translation consistency across different translation periods (complete translations take years and editorial policies might change over time)
- changes in naming conventions related to the ongoing QI project might require extensive revision of previous translation.

## 5.6 Maintaining consistency, updating guidelines and principle decisions

When taking the step from initial translation to translation maintenance, a much smaller team will be required. Although in an ideal world one would keep a large and diverse group of clinicians and domain experts to review the recurring translations, this will most likely not be feasible once the initial translation project is ended. One should still strive for building up a system where domain expertise is available to a reasonable extent, such as a pool of volunteers or through formal collaboration with medical specialist organisations or by other means. A key question is, also, whether it possible to both have a small team and ensure national consensus

In a situation where the complete set of concepts in SNOMED CT are translated (this is the case e.g. in Sweden) the translation cycles might be performed quite fast and specialised terms may not receive an optimal translation, even if the overall translation is of reasonable quality. In this situation, the improvements of the translation will be

organic and driven by demands of users. Such a translation will be a result of actual use: SNOMED CT areas and branches that are subjects for development projects on different levels will be reviewed as the need arises.

During the translation project, but of course to an even greater extent once the initial project is completed, staff may leave and be replaced. This poses the challenge to preserve knowledge and maintain the expertise required to keep the new translations consistent with the older translations. Each new member of staff must be trained in the use of the guidelines, tools and processes.

During or after the translation project inconsistencies in translations may come to light. For instance, in Dutch the word ‘thyroid’ can be translated to ‘schildklier’, ‘thyroid’ or ‘glandula thyroidea’. The first two are equally frequently used and thus different translators and reviewers will not choose consistently unless there is a guideline that governs the choice.

One approach for handling guidelines is to collect fundamental linguistic and terminological guidelines of the translation in a basic document that is kept stable over the years. Editorial agreements on principle issues which are raised during every translation cycle are documented in a separate, complementary document. This document is where decisions about individual term choices are to be found, i.e. which term of two or more possible ones the translator should choose (see Figure 5-3). The translators could also find instructions on how to spell an expression, if there are several spelling variants. The document also contains advice on such fairly general expressions that recur in the SNOMED CT material and which in the translation work should be handled in a similar way. This document is continuously replenished, which means that newer decisions revoke older ones.

	A	B	C	D	E	F	G	H
	Date of decision:	Concept/English term:	Don't use-term (in Swedish):	Term to use (sv:P), in Swedish:	Approved synonym (sv:A)	Comment:	Key word:	Reference:
1	2020-09-28 (REV.) 2008-10-27 (URSPR.)	whooping cough		kikhosta	pertussis ok	Undantag: I substansöversättningar översätts <i>Bordetella pertussis</i> med <i>Bordetella pertussis</i> , inte <i>kikhosta</i> .		Red.; Björn Smedby
27	2019-09-26 (REV.) 2009-05-14 (REV.) 2008-02-27 (URSPR.)	mass	massa	resistens		Kontextberoende:  När det rör sig om morfologiskt avvikande struktur översätts <i>mass</i> till <i>resistens</i> . Längre ner i Snomedstrukturen kan det vara mer idiomatiskt riktigt att översätta <i>mass</i> med t.ex. <i>knöl</i> , <i>tumör</i> , <i>knuta</i> , <i>svulst</i> .		Red.
28	2009-09-16 (REV.) 2007-12-19 (URSPR.)	WBC ALT. white blood cells ALT. leucocytes ALT. leukocytes	WBC	leukocyter	vita blodkroppar ok	<i>Nodule</i> översätts med <i>knuta</i> som efterföljare till Använd <i>leukocyt-</i> i sammansättningar.		Red.
29								

Figure 5-3: Spreadsheet with principle issues for translation, Swedish version

Once a guideline is established, to achieve consistency it is not sufficient to apply it to all future translations; all finished translations that contain the term must be revised so that they will adhere to the guideline in the next edition. The efficient usage of ECL queries, including the description filters, is useful for detecting inconsistencies. This issue also emphasises the need for an easy and effective tool for batch changes.

The use and implementation of the terminology, or changes in a new version of the international edition, may periodically provide new insights that require updates of the linguistic guidelines; which in its turn may require revision of older translations.

## 6. Improving Translation Quality

When the translation cycle has ended, there are several ways to enhance the quality. First and foremost, feedback mechanisms should be facilitated. Also, the NRC could take initiatives based on text analysis to ensure that the descriptions are in alignment with the actual usage among specialists.

Results of this process may be:

- target language synonyms are proposed and added
- a change to the preferred term is proposed
- a new concept is proposed
- a concept is not used in clinical practice or should be inactivated

### 6.1 Feedback mechanisms

The NRC should establish an infrastructure where end users can give feedback on issues like misspellings, missing synonyms, acceptability changes or even translation errors. This infrastructure could be a portal based on tickets which allows for queuing, prioritising and communication between the user and the NRC. Several countries are using a submission portal, e.g. Norway and the Netherlands. A decision on who should be granted the rights to submit issues, has to be decided: Open feedback or restricted to licence holders, for example. Also, the users should be able to access the translation guidelines and - where applicable - the principle decisions (see chapter 5).

The feedback infrastructure could also be made available through the national SNOMED CT Browser. In the Swedish edition the functionality of a Concept Feedback button is activated in the interface of each concept entry in the browser. The button gives access to a feedback form, which will be sent to the Swedish NRC when completed.

Feedback can also be a part of a strategy to reach out to users in the clinical and social care setting. The German translation is based on community based feedback from users from countries such as Germany, Austria and Switzerland. Such crowdsourcing could also be performed at a more local level, like a hospital, which was the case of the Spanish translation during a period.

### 6.2 Text analysis

If there are medical text corpora available in the target language, it is possible to perform text analysis to improve the quality of the translation. Analysing genres such as casuistics or medical journal articles could provide a list of terms being used frequently by medical experts. The Norwegian NRC is exploring how automatic extraction of terms in such texts can be performed to check whether terms are missing in the translations. This can be done in collaboration with academic institutions as it requires specific tools.

This approach is an inversion of using text corpora and text analysis during the translation and validation process. The point of departure are terms being used in texts, not identifying translated terms representing the concept during the translation process.

## 7. Glossary of Terms

Term	Description	Source
concept	unit of knowledge created by a unique combination of characteristics	ISO 1087: 2019
SNOMED CT concept	a clinical idea to which a unique concept identifier has been assigned.	SNOMED CT Glossary: SNOMED CT Concept
CRS	SNOMED International Content Request Service	
definition	representation of a concept by a descriptive statement which serve to differentiate it from related concepts	ISO 1087: 2019
description	An association between a human-readable phrase (term) and a particular SNOMED CT concept  Each of the descriptions in SNOMED CT is given a separate row in the Descriptions Table. Each description is assigned a unique description identifier and connects a term and a concept.	<a href="#">SNOMED CT Glossary</a>
linguistic guidelines	set of rules of grammar or terminology to be observed for the type of concept in question	
QI project	A Snomed International project deployed to improve internal structural consistency and ensure compliance with editorial policy related to the stated modelling of content	
realm	The authority, expertise, or preference that influences the required range or frequency of use of components. A Realm may be a nation, an organisation, a professional discipline, a specialty, or an individual user.	<a href="#">SNOMED CT Glossary</a>
relationship	An association between a source concept and a destination concept (each identified by a conceptId). The nature of the association is indicated by a relationship type. Each relationship is represented by a row in the Relationships Table.	<a href="#">SNOMED CT Glossary</a>
source language	language of the source language content	ISO 17100:2015
target language	language into which the source language content is translated	ISO 17100:2015
term	designation of a general concept in a specific subject field	ISO 1087-1:2019
translate	render information in the source language into the target language in written form	ISO 17100:2015
TSP	Translation Service Provider; person or organisation supplying translation services	ISO 17100:2015
TPO	Translation Project Owner	
TUG	The Translation User Group	

## 8. Supporting Documents

Documents consulted for the development of these guidelines:

- Guidelines for Translation of SNOMED CT, 2022.
- Språkliga riktlinjer för översättningen av SNOMED CT till svenska, Version 11. Socialstyrelsen, Stockholm 2010-12-31.
- ISO 704:2022 Terminology work – Principles and methods.
- ISO 860:2007 Terminology work – Harmonization of concepts and terms.
- ISO 1087-1:2019 Terminology work – Vocabulary – Part 1: Theory and application.
- ISO 15188:2001 Project management guidelines for terminology standardization.
- ISO 17100:2015 Translation services.