

A methodology and toolkit for evaluating SNOMED CT® Translation Quality

This document describes the use of the IHTSDO methodology and toolkit for evaluating SNOMED CT® translation quality

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Review Timetable

This is the review date of the Guidelines as agreed by IHTSDO Management Board

| Review date | Responsible owner | Comments |
|--------------|-------------------|---|
| January 2015 | IHTSDO | Undertake review of all IHTSDO Translation guidance documents |
| | | |

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1 Introduction

Several countries are in the course of translating, or, intend to translate SNOMED CT® into their national language(s), in order to use the terminology effectively in health records. Correct translation based on each concept's meaning is essential to support evidence-based decision-making and is critical for patient safety. Additionally, the data may potentially be re-used for administrative and statistical purposes such as health delivery planning, health promotion and chronic disease management. Furthermore, the global use of SNOMED CT® allows for the transmission of consistent, universally understandable clinical information, without language barriers. That is vitally important to a victim of disease or accident to enhance the patient's chances of speedy, efficient and correct treatment, regardless of where he or she may be.

This ideal situation can only be obtained if semantic interoperability is ensured. Any translated version of the terminology must comply with the principles on which SNOMED CT® was originally based, (i.e. comprehensibility, reproducibility, and usefulness), and the information contained in the translated concepts must be equivalent to that contained in the core terminology (i.e. international release / original source language). In order to ensure compliance with these requirements, a set of standard quality assessment measurement tools is needed for translation projects.

This document, the “Methodology and toolkit for evaluating SNOMED CT® translation quality”, builds on earlier work described in the background document “Developing a methodology and toolkit for evaluating SNOMED CT® translation quality” which contained the results of a literature scan and three (3) lists of candidate quality characteristics from which a “short-list” of nine (9) quality characteristics was derived. The core components of this document include:

- The “short-list” of selected quality characteristics with quality metrics and targets defined for each characteristic;
- Sample questionnaires for use when applying the metrics

The creation of the “short-list” of nine (9) candidate quality characteristics was primarily guided by IHTSDO source documentation and clinicians' preferences.

This document was reviewed by the IHTSDO Translation Special Interest Group (SIG) and the IHTSDO Translation Quality Assessment Project Group (TQAPG). Additionally, reference is made to translation quality assessment in the current versions of the IHTSDO Translation Guideline(s).

A Reference List is included in Section 5.

The information will be maintained by the IHTSDO Quality Assurance Committee.

2 How to use this toolkit

It is the intention that the IHTSDO Quality Framework should cover all identifiable aspects of IHTSDO activity, including:

- Organisational processes and support
- Data products (terminology reference data, mappings, translations, subsets)
- Documentation
- IHTSDO-responsible services and tooling provision.

It is expected that localisation activities (subset development, content extensions) could adopt a similar and comparable framework, but specific targets, metrics and methodologies may vary between settings. It cannot be assumed that all quality processes will be automatically appropriate for all settings, however where differences occur these should be clearly stated, and, where relevant, any necessary remedial steps to move towards more stringent standards should be indicated.

According to the IHTSDO Quality Framework, **components** are described as the structural, process or product/service outcomes that can be quantified or measured (and can be modified), in order to improve the quality of IHTSDO activities. They might be people, technical infrastructure/tooling artefacts, documented processes and procedures, as well as the product and service outputs of the IHTSDO. Following from that, **quality metrics** are the agreed methods and means for measuring the quality characteristics of components, and, **quality targets** are agreed levels of achievement, performance or conformance of a component for any given quality characteristic.

The determination of the appropriate measurement metrics and targets that should be used to assess translation quality while undertaking a translation project was primarily guided by the IHTSDO Quality Framework and Toolkit.

The sample questionnaires included in this document were designed to be used during a translation project for qualifying and/or quantifying the metrics and targets for the quality characteristics and to help identify any appropriate corrective actions.

In summary, the set of quality characteristics along with defined quality metrics, targets and supplementary questionnaires are designed to measure translation quality and help attain reproducible results.

A proposed measurement plan is included with each metric. Frequency of metric measurements is described in section 3.7.

An optional, sample template found in section 4.10 can be used to create a Translation Quality Assessment Metrics Results report that summarises the findings resulting from applying the quality metrics. Local policies will likely determine if this report is going to be completed, distributed and/or published.

3 Metrics Development

Quality metrics have been developed for the “short-list” of nine (9) quality characteristics derived from the three (3) lists of characteristics identified in the background document “Developing a methodology and toolkit for evaluating SNOMED CT® translation quality”.

The **structure** of the quality metrics however is based on the IHTSDO Quality Framework.

Since it is quite common in translation projects for some characteristics to be related to more than one party, (i.e. the Translation Service Provider (TSP), the Translation Project Owner (TPO), and / or the IHTSDO), one or more target groups have been indicated for those characteristics.

The IHTSDO Quality Assurance Committee is responsible for updating the quality characteristics and metrics based on Community of Practice feedback.

3.1 Selected quality characteristics

The following “short-list” of **structure**, **process** and **outcome**-related **quality characteristics** were selected:

| Component | Characteristic | Description of characteristic/indicator | Gilreath Group |
|-----------|--|---|-------------------|
| Structure | Participants knowledge of terminology and terminology translation processes (characteristic also includes translators and reviewers competencies) | Translation Service Providers' (TSP) knowledge and Translation Project Owners' (TPO) knowledge of SNOMED CT®, and, of the translation process. Includes educational background and professional experience of translators (i.e. skills in medical translation and/or clinical practice domains) | |
| Structure | Content of style guides and reference materials in target language | Existence of style guides, dictionaries and reference materials with relevant content (i.e. linguistic guidelines) in target language. | |
| Structure | Access to translation software | Tooling capable of supporting concept-based translation and offering features such as translation memory, direct access to electronic text books, medical dictionaries, etc. Tooling requires explicit specifications and tested software. | |
| Process | Concept-based translation principle | Relates to “semantic adequacy”. Check that all translation process participants are well aware of the importance of this principle. | Semantic adequacy |
| Process | Translation reviews | Two-level, or, two-stage review process necessary | |
| Process | Ongoing communication, co-operation and translation project process adjustments between Translation Project Owner (TPO) and Translation Service Provider (TSP) | Existence of an agreement establishing “ways of working” including regularly scheduled project meetings and exceptional meetings, and, evidence of compliance (documented meeting minutes and actions) with the agreed ways of working. Another example could relate to rejection rates within the translation workflow. High (or unacceptable) rejection rates from the Translation Project Owner (TPO) should result | |

| Component | Characteristic | Description of characteristic/indicator | Gilreath Group |
|-----------|---|---|--------------------|
| | | in process adjustments/changes, i.e. Translator education, and/or, a change in the Translator Service Provider (TSP). The challenge with this example is to qualify and/or quantify what “High” (or unacceptable) rejection rates” means. | |
| Outcome | Term equivalence | Relates to “semantic adequacy” and “precision” – the degree to which the term clearly delineates the designated concept. Target-language terms must semantically correspond to source-language terms. One way this may be measured is via the use of “back-translation”. | Semantic adequacy |
| Outcome | Clinical acceptability | Related primarily to term rejection by end-users (i.e. if so, how often?) but also to “precedent” which is the degree to which the term is in harmony with established terms, and, to “series uniformity”, which is the degree of consistency with the series of terms to which it belongs. | Pragmatic adequacy |
| Outcome | Compliance with Translation Guidelines and Standards Note: Attention should also be paid to other IHTSDO Editorial Guidelines and Policies. When fully specified names (FSNs) are translated into a target language or target language dialect, the target language FSN should comply with the specifications for FSNs defined in the IHTSDO Editorial Guidelines relating to the underlying core terminology (international release / original source language). | Translation of the FSN and Preferred Term (PT) respectively, must comply with IHTSDO Translation Guidelines, SDO Standards and national language-specific guidelines/decisions of principle developed for local project use. | Form correctness |

3.2 SMART criteria and the SMART rating

A small set of significant measures and targets can be agreed that are essentially a re-working of the SMART criteria frequently applied to personal and organisational objectives, as follows:

- **Specific:** The agreed component-characteristic pairing should be sufficiently precise to allow subsequent testing and evaluation against targets
- **Meaningful:** The agreed component-characteristic pairing should be interpretable by all stakeholders as a meaningful attribute of the activity under consideration
- **Achievable:** The targets chosen for corresponding metrics should be achievable within anticipated resources and when compared with best estimates/empirical evidence.
- **Realistic:** The agreed component-characteristic (and the planned corresponding metrics) should be possible given anticipated resources, tooling and workflow.
- **Timely:** Corresponding metrics (and the ability to respond when metric results are below targets set) should be available in a timely fashion to all stakeholders.”

The SMART criteria were used for grouping the quality characteristics with all the associated metrics and to arrive at one of these three overall SMART “ratings”:

- **GREEN**: Suitable for IHTSDO use and mature enough for immediate use
- **YELLOW**: Probably suitable for IHTSDO use and mature enough for immediate use – i.e. further discussion required and some refinement probably needed
- **RED**: Difficult to use within the IHTSDO and not mature enough for immediate use – i.e. further discussion required, and, improvement needed

The SMART rating indicated for each quality metric also takes into account the quality characteristics description as well as the questionnaires (see section 4).

3.3 Structure characteristics and metrics

Three (3) structure characteristics were selected. These metrics are related to the Translation Project Owner (TPO), or, to the TPO's expectations with respect to the Translation Service Provider (TSP).

| Component: Structure | |
|---|---|
| Quality characteristic: Participants knowledge of terminology and terminology translation processes (also includes translators and reviewers competencies). | |
| Note: It is noted in the background document that two similar characteristics regarding participants' educational competencies and their knowledge of SMOMED CT were merged. | |
| Quality Metrics: | |
| Target Group(s): | Translation Project Owner (TPO) and Translation Service Provider (TSP) |
| Target: | To ensure that translators possess translation competencies at a level corresponding to expert levels, like a master's degree in translation, preferably combined with previous experience with medical translation and/or clinical practice experience AND to ensure that reviewers possess relevant medical or specialty clinical practice expertise or experience, and, a basic understanding of linguistic principles |
| Measurement Plan: | 1. Questionnaire 1a to be completed by the TPO and 1b by the TSP. 2. Analysis of data collected |
| Level Achieved: | Evaluation of educational background and experience of participants. Results are expressed as “expert”, “medium”, or, “low” competencies |
| Response/Corrective Action: | If any translation process participants' skills score below the recommended level, the TPO and/or the TSP should reconsider their participation in the translation process |
| Description of Quality Metric: | This metric gives a broad indication of education, experience and competency level. The TSP will need to examine participants CV's and analyse their education and experience. Even at this cursory level, information in CVs is useful and can be quickly assessed. Judgement is required when assigning points in the questionnaire. The idea is to obtain an acceptable score. For example, it could be possible to have less formal education in healthcare domains but that could be compensated for by greater experience in medical language translation. |
| SMART Rating: | GREEN |

| Component: Structure | |
|---|--|
| Quality characteristic: Content of style guides and reference materials in the target language | |
| Quality Metrics: | |
| Target Group(s): | Translation Project Owner (TPO) |
| Target: | To ensure the existence of style guides, dictionaries and reference materials with relevant content (i.e. linguistic guidelines) in the target language. Reference materials that contain directions regarding basic general and target language specific terminological conventions and linguistic principles are also described in the IHTSDO Guidelines for Translation of SNOMED CT® (sections 4.2 and 4.3). |
| Measurement Plan: | <ol style="list-style-type: none"> Self-assessment can be performed by the TPO checking if the style guides and other materials fulfill the target above. The level can also be assessed by completing Questionnaire 3. |
| Level Achieved: | YES/NO |
| Response/Corrective Action: | If the recommended level is not achieved, the TPO should revise local guidelines, at minimum taking into account sections 4.2 and 4.3 of the IHTSDO Guidelines for Translation of SNOMED CT®. |
| Description of Quality Metric: | The measures are considered “meaningful”, “achievable”, “realistic”, and “timely”. The responses to questions depend largely on the TPO’s subjective evaluation. Using the checklist provided in the questionnaire provides for more meaningful measures. |
| SMART Rating: | GREEN |

The “Access to translation software” structure-related characteristic below refers to both the IHTSDO Workbench Translation Tooling Requirements and to any requirements specified in the Guidelines for Management of Translation of SNOMED CT® regarding translation tooling. Also, the need for “Technical resources” is cited in the EN 15038 (paragraph 5.3.2.1).

| Component: Structure | |
|---|--|
| Quality characteristic: Access to translation software | |
| Quality Metrics: | |
| Target Group(s): | Translation Project Owner (TPO) |
| Target: | To ensure the availability of translation tooling that facilitates and supports the fundamental principle of concept-based translation and offers features such as translation memory, direct access to electronic text books, medical dictionaries, etc. |
| Measurement Plan: | Questionnaire 2 to be completed by the TPO and the TSP regarding their use of translation software; this software tool should be consistent with the IHTSDO Workbench Translation Tooling requirements. |
| Level Achieved: | <p>In October 2010, the IHTSDO Chief Technical Officer provided the TQAPG with a short set of basic requirements relating to translation tooling and to translation quality. They included the following:</p> <ul style="list-style-type: none"> Provide facilities for the management of translation projects, including creation and allocation of work packages, and reporting of progress. Provide workflow facilities covering the translation and review process to enable efficient quality assurance controls on the translation of SNOMED CT® |

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| | <p>terms.</p> <ul style="list-style-type: none"> • Enable collaboration on translation projects. • Enable the ongoing easy maintenance of existing translations, with updates resulting either from changes to SNOMED CT® content or elsewhere. • Produce releases in the new SNOMED CT® release format (RF2). • Allow configuration of quality assurance rules that can be run at edit time and release time. <p>The level achieved could be measured against the relevant requirements above following the (future) completion of the development and testing of the translation tooling application software.</p> <p>The translation software developers IHTSDO Workbench Translation Tooling Steering Group and Member countries with an interest in translation have also been engaged in the development and testing of the software with respect to its capability to support concept-based translation and other key requirements. Again, explicit specifications and tested software are required.</p> |
| Response/Corrective Action: | If tooling requirements are not well-defined and adequately tested production-grade software is not available for use, management action must be taken. |
| Description of Quality Metric: | <p>A common platform / tool for those involved in the translation process is an important factor in obtaining high quality translation in an efficient manner, co-ordinated throughout all the translation workflow processes.</p> <p>However, as the requirements have not yet been fully formulated, nor, testing completed by the IHTSDO work groups, questions 3 to 8 in the questionnaire have currently been left “open”.</p> <p>This metric should be reviewed, after these missing questions and measures have been added into the questionnaire.</p> |
| SMART Rating: | RED. When explicit specifications and tested production-grade software are available, this metric should be reviewed for a potential rating upgrade. |

3.4 Process characteristics and metrics

Three (3) process characteristics have been included. These are related to the translation process and all of them include both the TSP and the TPO.

The principle of concept-based translation is described in several sources found in the References.

| Component: Process | |
|--|---|
| Quality characteristic: Concept-based translation | |
| Quality Metrics: | |
| Target Group(s): | TPO and TSP |
| Target: | To ensure that all those involved are aware that in order to obtain the desired outcomes the translation must be “concept-based”. Ensure that all translation process participants are well aware of the importance of, and comply with, this principle. |
| Measurement Plan: | <ol style="list-style-type: none"> 1. Questionnaire 4 to be completed by the TPO and the TSP. 2. Describe how the translators proceed through the process using the principle of concept-based translation by presenting them with a checklist of steps (as |

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| | described in IHTSDO Guidelines for Translation of SNOMED CT®. 3. Analysis of collected data |
| Level Achieved: | YES/NO |
| Response/Corrective Action: | If one or more recommended steps are missing from the responses, the TSP must perform an assessment of their translators and organise additional training. |
| Description of Quality Metric: | Although the measures may be considered meaningful, the responses to the questions depend largely on the TPO's subjective judgement. |
| SMART Rating: | YELLOW |

| Component: Process | |
|--|---|
| Quality characteristic: Ongoing communication, co-operation and translation project process adjustments between the TPO and the TSP | |
| Quality Metrics: | |
| Target Group(s): | TPO and TSP |
| Target: | To ensure ongoing communication and co-operation between the TPO and the TSP regarding any initiative that may facilitate and enhance the translation process (i.e. ensure linguistic correctness and semantic equivalence). Ensure existence of an agreement establishing "ways of working" including regularly scheduled project meetings and exceptional meetings, and, evidence of compliance (documented meeting minutes and actions) with the agreed ways of working. |
| Measurement Plan: | <ol style="list-style-type: none"> 1. Use of questionnaires by TPO and TSP that confirm the existence of an agreement establishing "ways of working" including for example regularly scheduled project meetings, and evidence (i.e. documented meeting minutes and actions) supporting compliance with the agreed ways of working. 2. Analysis of data collected in Questionnaire 5a from the TPO and 5b from the TSP |
| Level Achieved: | <ul style="list-style-type: none"> • YES/NO: Existence of agreement; • YES/NO: Adherence to agreement. |
| Response/Corrective Action: | If level not achieved, appropriate management action must be taken. |
| Description of Quality Metric: | Information about co-operation between the TPO and TSP is considered "meaningful" and useful for adjusting the translation processes. Many questions refer to formal co-operative agreements and are therefore considered "specific". Some questions rely on subjective evaluation, but since the questionnaires are completed by both the TPO and the TSP, the results can be cross-checked. The measures are also considered "achievable", "realistic", and "timely". |
| SMART Rating: | GREEN |

| Component: Process | |
|---|--|
| Quality characteristic: Translation reviews (two-level, or, two-stage review process necessary). Includes: | |

- review by 2nd translator for linguistic correctness
- review by Subject Matter Expert, someone with relevant medical expertise, for clinical appropriateness and acceptability

| Quality Metrics: | |
|--------------------------------|--|
| Target Group(s): | TPO and TSP |
| Target(s): | <ol style="list-style-type: none"> 1. To ensure that two-level or two-stage reviews necessary to assure terminology consistency, term equivalence and compliance with local guidelines, take place. 2. To ensure that reviews for clinical usability and psychological acceptability, take place. |
| Measurement Plan: | <ol style="list-style-type: none"> 1. Questionnaire 6a to be completed by the TPO and Questionnaire 6b by the TSP. 2. Analysis of collected data |
| Level Achieved: | YES/NO |
| Response/Corrective Action: | The TPO and/or the TSP must implement appropriate translation review processes if this has not already been done. |
| Description of Quality Metric: | Some questions refer to facts about the review process and are considered “meaningful” and “specific”. Other questions are more generic and function as a checklist and a reminder to both the TSP and the TPO of the importance of revisiting review processes with the translation team members. The measures are also considered “achievable”, “realistic”, and “timely”. |
| SMART Rating: | GREEN |

3.5 Outcome characteristics and metrics

Three (3) outcome characteristics have been included. Some can be measured during the translation process; others will require feedback resulting from practical experience and use by end-users of the translated terminology.

| Component: Outcome | |
|---|---|
| Quality characteristic: Clinical acceptability | |
| Quality Metrics: | |
| Target Group(s): | TPO |
| Target: | To verify that terms in the target language are psychologically acceptable and usable in a clinical setting |
| Measurement Plan: | <p>Extract information from an electronic feedback (survey) tool to find the percentage of approved terms rejected by end-users because they were deemed unacceptable by all professionals within that particular specialty (Note: It should not be a question of regional preference only).</p> <p>This feedback may be the result of a clinical review following the translation flow, or, it may be feedback from end-users after implementing the terminology.</p> <p>Alternative measurement plans can be used, such as:</p> <ul style="list-style-type: none"> • An assessment of diagnoses could be carried out by letting clinicians / Subject Matter Experts (SMEs) evaluate a target language sample of the most common diagnoses (e.g. based on NLM's list, or, national extracts) • A general assessment of concepts from different hierarchies could be carried out by checking the frequency of selected terms in national language corpora |
| Level Achieved: | To be defined locally, depending on the measurement technique selected. |

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| Response/Corrective Action: | TPO's demands to the TSP and their SMEs and TPO's demands to their own reviewers – if the percentage is too high, review procedures involving clinical professionals must be enhanced. |
| Description of Quality Metric: | This is a very important quality characteristic, but very resource-intensive. Some information may be extracted from an electronic translation tool for automatic comparison with external sources, but algorithms need to be developed. Manual checks, using lists of source FSNs and target descriptions aided by the use of standard terminology browsers are easier to implement. However, methodologies and procedures need to be carefully designed to ensure the proper training of reviewers and evaluators, especially as it relates to concept-based translation content. |
| SMART Rating: | YELLOW |

| Component: Outcome | |
|---|---|
| Quality characteristic: Compliance with Translation Guidelines and Standards | |
| Quality Metrics: | |
| Target Group(s): | TPO |
| Target(s): | <ol style="list-style-type: none"> 1. To ensure that the translation of Fully Specified Names (FSNs) complies with the IHTSDO policies; 2. To ensure that the translation of Preferred Terms (PTs) complies with national guidelines and decisions of principle made over the course of a translation project. |
| Measurement Plan: | <ol style="list-style-type: none"> 1. Several issues can be automatically checked by software utilities, i.e. use of acronyms in FSNs (check for two or more upper case characters in one word); any words ending with 'ing' in Procedure concepts; any verb forms in procedure concepts which ought to have been nouns; lower case initial letters in all terms except Eponyms; use of singular instead of plural at lower hierarchy levels, etc. 2. Compliance with many other target-language specific translation guidelines can be evaluated using a sampling process. 3. Check compliance with decisions of principle taken by the local editorial board versus the instructions in the guidelines. 4. Extract information from an electronic translation tool and correlate with manual checks |
| Level Achieved: | To be defined locally. In principle, <u>all</u> guidelines should be complied with, but real-world implementation challenges may dictate for a gradual adherence to specific sections of the guidelines. |
| Response/Corrective Action: | If levels defined are not achieved, the TPO should reconsider the requirements it provided to the TSP regarding the translation of PTs, and, should also seek to ensure compliance with the IHTSDO editorial policies regarding FSNs. |
| Description of Quality Metric: | <p>A lot of "meaningful" and "specific" information can be extracted from translation software. The measures are also considered "achievable", "realistic", and "timely". However, the extraction algorithm needs to be developed.</p> <p>Furthermore, compliance checks correlating decisions of principle taken by a local editorial board and the instructions in the guidelines will be time-consuming and resource-intensive. This kind of information should normally be available from</p> |

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| | translation tooling application software, but as that is not currently the case, this is an argument to set the SMART rating to YELLOW. |
| SMART Rating: | YELLOW |

| Component: Outcome | |
|--|---|
| Quality characteristic: Term Equivalence. Relates to “semantic adequacy” and “precision” – Target language terms must semantically correspond to source language terms. | |
| Quality Metrics: | |
| Target Group(s): | TPO |
| Target: | To verify that each target-language term reflects precisely the same content as the corresponding source-language term. In other words, target-language terms must semantically correspond to their source-language counterparts. |
| Measurement Plan: | <p>One way this may be measured is via the use of “back-translation”. To back-translate a subset of translated concepts, the number and type of concepts must be decided locally; the subset could consist of random concepts or concepts belonging to particularly problematic areas.</p> <p>Note re Plan: Refer to Figure 1. below.</p> <p><i>translator</i> (preferably with native speaker competency in the source language) translates the target language term into the source language (the outcome = the back-translated term);</p> <p><i>reviewer</i> with clinical background and very good competencies in both languages checks the back-translated term, compares it with the original term and checks the semantic content by referring to the relations (number of concepts involved in these random checks needs to be defined)</p> |
| Level Achieved: | 1) OK (“Pass”) or 2) Mistake (“Fail”). Acceptable error rates should be locally defined. |
| Response/Corrective Action: | 2a) If back-translation wrong - Advise Editorial Board member or participant that approved the term or that there is a mistake in back-translation, or, 2b) If semantic mistake is in approved term, or, 2c) If error/query is in the SNOMED CT® source terminology - Send comment to Editorial Board who must advise the IHTSDO. |
| Description of Quality Metric: | Term equivalence relates to “semantic adequacy” and “precision” – Target language terms must semantically correspond to their source language counterpart terms. Although this is an extremely important and useful metric, the measurement plan of “back translation” may be characterized by some intrinsic uncertainty. Also, carrying out the measurement plan is quite costly and may present substantial difficulties because of the need for participants with both linguistic and health-related backgrounds. However, when the “back translation” is made with the relevant competencies involved, the results are expected to be reliable. The overall evaluation therefore results in a YELLOW SMART rating. |
| SMART Rating: | YELLOW |

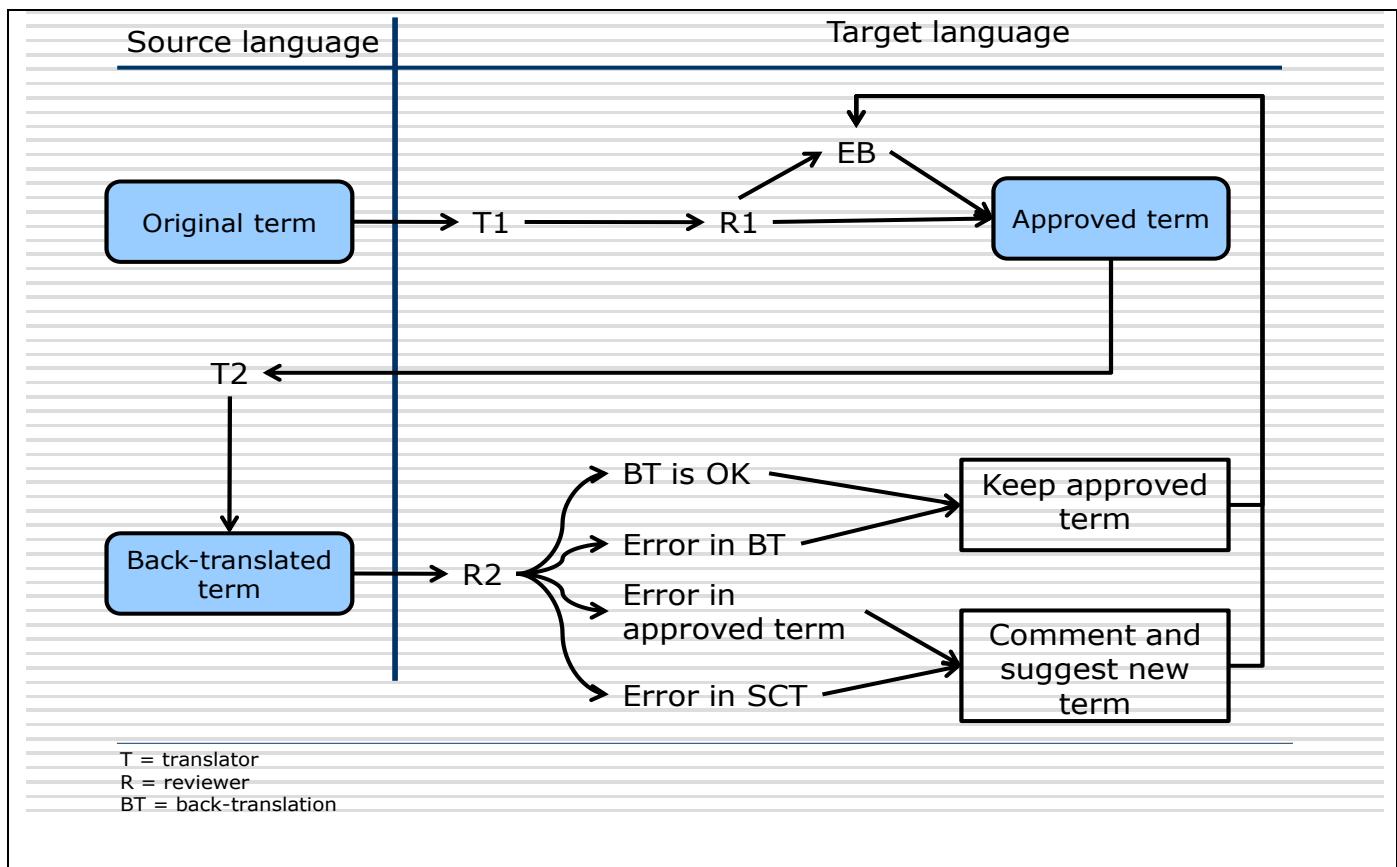


Figure 1. Process for back-translation (related to term equivalence)

For description of the process for back-translation, please see the quality characteristics for term equivalence above. Pertaining to the translators and reviewers, it is recommended that:

- The T1 translator should preferably have native speaker competency in the target language.
- The T2 translator should preferably have native speaker competency in the source language.
- The R1 reviewer should have a clinical background and be a native speaker, or, have very good competency in the target language
- The R2 reviewer should have a clinical background and have very good competencies in both languages

The issue of term equivalence is discussed in several sources included in the references.

3.6 Translation quality assessment metrics suitable for use

The following four (4) **structure** and **process**-related quality characteristics and associated quality metrics that have a **SMART** rating of **GREEN**, are deemed **suitable** for IHTSDO use and mature enough for immediate use:

| Component | Quality Characteristic | SMART Rating |
|-----------|--|--------------|
| Structure | Participants knowledge of terminology and terminology translation processes (also includes translators and reviewers competencies) | GREEN |
| Structure | Content of style guides and reference materials in the target language | GREEN |
| Process | Ongoing communication, co-operation and translation project process | GREEN |

| Component | Quality Characteristic | SMART Rating |
|-----------|--|--------------|
| | adjustments between the TPO and the TSP | |
| Process | Translation reviews (two-level, or, two-stage review process necessary). | GREEN |

Note: Since the preceding quality metrics with a **SMART** rating of **GREEN** are now deemed suitable for IHTSDO use and mature enough for immediate use, translation projects should now consider them **mandatory** for use.

The following four (4) **process** and **outcome**-related quality characteristics and associated quality metrics with a **SMART** rating of **YELLOW**, are deemed probably suitable for IHTSDO use, and, mature enough for immediate use – i.e. further discussion required, and, some refinement probably needed.

| Component | Quality Characteristic | SMART Rating |
|-----------|--|--------------|
| Process | Concept-based translation | YELLOW |
| Outcome | Clinical acceptability | YELLOW |
| Outcome | Compliance with Translation Guidelines and Standards | YELLOW |
| Outcome | Term Equivalence | YELLOW |

The following **structure**-related quality characteristic and associated quality metrics with a **SMART** rating of **RED**, is deemed difficult to use within the IHTSDO, and, not mature enough for immediate use – i.e. further discussion required, and, improvement needed.

| Component | Quality Characteristic | SMART Rating |
|-----------|--------------------------------|--------------|
| Structure | Access to translation software | RED |

3.7 Proposed frequency of metric measurements

Some metrics are more sensitive to change than others. Once the translation project is established, structure characteristics will change less often than process or outcome characteristics may change. Therefore the set of quality metrics will have a variable measurement schema. The table below describes the suggested frequency of measurement for the quality metrics. Some of the quality metrics need to be measured based on events (i.e. personnel changes); for others, the measurement frequency might depend on the result of the last measurement (i.e. an insufficient score needs re-measurement sooner than a sufficient score).

| Component | Characteristic | Measurement Frequency |
|-----------|--|---|
| Structure | Participants knowledge of terminology and terminology translation processes (also includes translators and reviewers competencies) | <ul style="list-style-type: none"> Measure at the start of the translation process Measure after a new member has been added to the translation team |
| Structure | Content of style guides and reference materials in the target language | <ul style="list-style-type: none"> Measure at the start of the translation process Measure again after each major update of the language-specific linguistic guidelines |
| Structure | Access to translation software | <ul style="list-style-type: none"> Measure at the start of the translation process Measure after each new software release |
| Process | Concept-based translation | <ul style="list-style-type: none"> Measure at the start of the translation |

| Component | Characteristic | Measurement Frequency |
|-----------|---|---|
| | | <p>process</p> <ul style="list-style-type: none"> Measure after a new member has been added to the translation team Measure once initially, and repeat if there are changes on the team composition or expertise. |
| Process | Ongoing communication, co-operation and translation project process adjustments between the TPO and the TSP | <ul style="list-style-type: none"> Measure at the start of the translation process Measure every three months (quarterly) for the first year; reduce to every six months (semi-annually) for the second and subsequent years. |
| Process | Translation reviews (two-level, or, two-stage review process necessary). | <ul style="list-style-type: none"> Measure at the start of the translation process Measure every three months (quarterly) for the first year; reduce to every six months (semi-annually) for the second and subsequent years. |
| Outcome | Clinical acceptability | <p>The translation software should be able to automatically generate statistics for the percentage of approved terms rejected by end-users.</p> <ul style="list-style-type: none"> An analysis of these statistical measurements should be performed monthly by the TPO and the TSP. <p>If the translation software does not produce these statistics, a representative sampling should be taken and manually assessed.</p> <ul style="list-style-type: none"> Measure every three months (quarterly) for the first year; reduce to every six months (semi-annually) for the second and subsequent years. |
| Outcome | Compliance with Translation Guidelines and Standards | <p>The translation software should be able to automatically detect linguistic conventions, such as:</p> <ul style="list-style-type: none"> acronyms in an FSN, any words ending with 'ing', verb forms in procedure concepts, upper case initial letters (initial capital status), singular form versus plural form, and, any other target-language specific rules that have been locally defined as rules within the application software. <p>An analysis of the above statistics should be</p> |

| Component | Characteristic | Measurement Frequency |
|------------------|-----------------------|---|
| | | <p>performed monthly by the TPO and the TSP. If the translation software does not provide this functionality, a representative sampling should be taken and manually assessed.</p> <ul style="list-style-type: none"> Measure every three months (quarterly) for the first year; reduce to every six months (semi-annually) for the second and subsequent years. |
| Outcome | Term Equivalence | <p>A representative sampling should be taken and assessed for this metric.</p> <ul style="list-style-type: none"> Measure every three months (quarterly) for the first year; reduce to every six months (semi-annually) for the second and subsequent years. |

4 Sample Questionnaires

4.1 Questionnaire 1a:

| Questionnaire 1a: For use by TSP's translators and reviewers | | | |
|--|--|--|---|
| Component: Structure | | | |
| Quality characteristic: Translation process participants' competencies | | | |
| <p>The background for this metric's requirements is that translators possess the following competencies described in 3.2.2 of the EN 15038:</p> <ul style="list-style-type: none"> • translating competence • linguistic and textual competence in the source and the target language • research competences, information acquisition and processing competences • cultural competence • technical competence • health sciences competence <p>These competencies are acquired through a combination of education and experience. This questionnaire identifies the level of competencies of each participant interpreted as the total number of points scored. If minimum scores are not achieved, further education, courses, or experience is recommended.</p> | | | |
| Name: [xxx] | | | |
| <i>Competency</i> | <i>High score (3 points)</i> | <i>Medium score (2 points)</i> | <i>Low score (1 point)</i> |
| Educational Background: Languages | <i>University degree in languages, Masters level</i> <input type="checkbox"/> | <i>University or other degree in languages, Bachelors level</i> <input type="checkbox"/> | <i>Basic linguistic education</i> <input type="checkbox"/> |
| Experience: Medical Language Translation | <i>At least 5 yrs experience in medical language translation</i> <input type="checkbox"/> | <i>At least 2 yrs experience in medical language translation</i> <input type="checkbox"/> | <i>Limited experience in medical language translation</i> <input type="checkbox"/> |
| Educational Background: Healthcare, Health-related | <i>University degree in a relevant healthcare profession, MA or BA level</i> <input type="checkbox"/> | <i>Other relevant health-related education</i> <input type="checkbox"/> | <i>Limited health-related education</i> <input type="checkbox"/> |
| Total Score: Educational Background and Experience <i>Minimum total of 5 points recommended</i> | | | |
| Evaluated level of SNOMED CT®-related competencies: Knowledge of: <ul style="list-style-type: none"> • SNOMED CT®, obtained through courses • IHTSDO style guide and guidelines for translation • local guidelines | <i>High score (3 points)</i> <input type="checkbox"/> | <i>Medium score (2 points)</i> <input type="checkbox"/> | <i>Low score (1 point)</i> <input type="checkbox"/> |
| Score: SNOMED CT®-related competences <i>Minimum total of 2 points for SNOMED</i> | | | |

| | |
|---|--|
| CT® competencies recommended | |
| Additional comments relating to competencies above: | |

4.2 Questionnaire 1b:

| Questionnaire 1b: For use by TPO's reviewers | | | |
|---|--|--|---|
| Component: Structure | | | |
| Quality characteristic: Translation process participants' competencies | | | |
| <p>The background for this metric's requirements is that reviewers possess the following competencies:</p> <ul style="list-style-type: none"> • basic linguistic and textual discourse competencies in both the source and the target languages • competencies in information acquisition and processing • thorough knowledge of one or several areas within a health-related, healthcare or social care domain • competency using SNOMED CT® translation tooling <p>These competencies are acquired through a combination of education and experience. This questionnaire identifies the level of competencies of each participant interpreted as the total number of points scored. If minimum scores are not achieved, further education, courses, or experience is recommended.</p> | | | |
| Name: [xxx] | | | |
| <i>Competency</i> | <i>High score (3 points)</i> | <i>Medium score (2 points)</i> | <i>Low score (1 point)</i> |
| Educational Background: Healthcare Professional | <i>University degree in relevant healthcare profession, MA or BA level</i> <input type="checkbox"/> | <i>Other relevant health-related education</i> <input type="checkbox"/> | <i>Limited health-related education</i> <input type="checkbox"/> |
| Score: Educational Background <i>Minimum total of 2 points recommended</i> | | | |
| Evaluated level of SNOMED CT®-related competencies; Knowledge of: <ul style="list-style-type: none"> • SNOMED CT®, obtained through courses • IHTSDO style guide and guidelines for translation • local guidelines | <i>High score (3 points)</i> <input type="checkbox"/> | <i>Medium score (2 points)</i> <input type="checkbox"/> | <i>Low score (1 point)</i> <input type="checkbox"/> |
| Score SNOMED CT®-related competences <i>Minimum total of 2 points for SNOMED CT® competencies recommended</i> | | | |
| Additional comments relating to competencies above: | | | |

4.3 Questionnaire 2:

| Questionnaire 2: For use by TSP and TPO | | |
|---|-----|----|
| Component: Structure | | |
| Quality characteristic: Access to translation software | | |
| The background for this metric is that all participants should have access to one common tool. This is an important factor for securing both translation consistency and translation process transparency. | | |
| The IHTSDO has defined a number of key requirements for a translation software tool. | | |
| If the translation functionality of the IHTSDO tool is used, the requirements are considered to be fulfilled. If another tool is used, question 3 to 8 must be answered, and action must be taken for any negative responses. | | |
| Question | Yes | No |
| 1. Do all translators and reviewers have access to one common translation software tooling platform? | | |
| 2. Are you using a software tool developed by the IHTSDO? (<i>If so, do NOT answer questions 3 to 8</i>) | | |
| <i>Note: If you are using a translation software tool other than the IHTSDO tool, please ANSWER questions 3 to 8</i> | | |
| 3. Provide facilities for the management of translation projects, including creation and allocation of work packages, and reporting of progress. | | |
| 4. Provide workflow facilities covering the translation and review process to enable efficient quality assurance controls on the translation of SNOMED CT terms. | | |
| 5. Enable collaboration on translation projects. | | |
| 6. Enable the ongoing easy maintenance of existing translations, with updates resulting either from changes to SNOMED CT content or elsewhere. | | |
| 7. Produce releases in the new SNOMED CT release format (RF2). | | |
| 8. Allow configuration of quality assurance rules that can be run at edit time and release time. | | |
| Additional comments relating to the questions above: | | |

4.4 Questionnaire 3:

Questionnaire 3: For Use by TPO

Component: Structure

Quality characteristic: Content of target language specific linguistic guidelines

The background for this metric is the requirement that the TPO has taken into consideration the IHTSDO Guidelines for Translation (sections 4.2 and 4.3) when setting up local guidelines. For negative responses to questions 2 and 3, the TPO should take action to review and enhance the local guidelines.

| Question 1 | Yes | No |
|--|------------|-----------|
| Do your local guidelines contain rules regarding: | | |
| 4.2 General linguistic principles: | | |
| 4.2.1 What to do with ambiguities in the source language | | |
| 4.2.2 Selecting the best term for the concept | | |
| 4.2.3 Concept equivalence problems | | |
| 4.2.4 Translation techniques and syntactical issues | | |
| 4.2.5 Choice of lexical variants | | |
| 4.3 Specific linguistic principles: | | |
| 4.3.1 Organism names (bacteria, viruses, plants, animals, etc.) | | |
| 4.3.2 Chemical and biochemical designations, ingredients in medications, enzyme and hormone names | | |
| 4.3.3 Foreign (loan) words and foreign abbreviations | | |
| 4.3.4 Eponyms | | |
| 4.3.5 Determinate versus naked form | | |
| 4.3.6 Plural versus singular | | |
| 4.3.7 Lower case versus upper case letters | | |
| 4.3.8 Punctuation, typographical signs, symbols, and digits | | |
| 4.3.9 Abbreviations and measurement units | | |
| 4.3.10 Hyphens | | |
| 4.3.11 Other particular issues | | |
| Question 2 | | |
| Do you believe that overall, your local guidelines cover the above points to a sufficient degree? | | |
| Question 3 | | |
| Have you made sure that you have established a process for updating and communicating changes to the target-language specific guidelines, based on relevant feedback received from the translation process participants? | | |
| Additional comments relating to questions above: | | |

4.5 Questionnaire 4:

| Questionnaire 4: For Use by TSP and TPO | | |
|---|------------|-----------|
| Component: Process | | |
| Quality characteristic: Concept-based translation | | |
| <p>The background for this metric is that all those involved must be aware that to obtain the desired outcome, the translation must be concept-based. That implies the use of the steps described in the IHTSDO Translation Guidelines. The sequence of steps in the cycle is shown below. For any negative responses, steps to ensure further training of participants should be undertaken.</p> <pre> graph TD 1[1. Read source language term] --> 2[2. Check the concept's IS-A relationship(s) + its position in the hierarchy] 2 --> 3[3. Check the concept's attribute relationships] 3 --> 4[4. In case of any doubt, find examples of the source term used in context in order to elucidate the meaning] 4 --> 5[5. Find equivalent concept and term in target language (if necessary verify the use of the target term in contexts)] 5 --> 6[6. Write target language term] 6 --> 1 </pre> | | |
| Question | Yes | No |
| 1. Have you reviewed your processes to ensure that you are using the "concept based" translation principle? | | |
| 2. Have you taken steps to ensure ongoing educational training relating to the concept-based translation principle? | | |
| Additional comments relating to questions above: | | |

4.6 Questionnaire 5a:

| Questionnaire 5a: For Use by TSP | | |
|---|-----|----|
| Component: Process | | |
| Quality characteristic: Ongoing co-operation between TSP and TPO The background for this metric is the importance of on-going co-operation between the TSP and the TPO. Management action should be taken for negative responses to questions 1 to 3, or, a positive response to question 4. | | |
| Question | Yes | No |
| 1a. Is there a formal agreement between you and the TPO to meet at certain intervals or at certain dates to discuss questions regarding any aspect of the translation process? | | |
| 1b. If so, do you consider that the TPO adheres to this agreement to a satisfactory degree? | | |
| 2. Do you contact the TPO in order to arrange meetings as required, i.e. whenever you find there is a need for discussing questions regarding any aspect of the translation process? | | |
| 3. Do you find that you get the feedback you need from the TPO regarding the translation process, the software tool, and the linguistic/terminological questions? | | |
| 4. Do you find that any elements in your co-operation may be in need of enhancement? | | |
| Additional comments relating to questions above: | | |

4.7 Questionnaire 5b:

| Questionnaire 5b: For Use by TPO | | |
|---|------------|-----------|
| Component: Process | | |
| <p>Quality characteristic: Ongoing communication and co-operation between Translation Project Owner (TPO) and Translation Service Provider (TSP)</p> <p>The background for this metric is the importance of on-going co-operation between the TSP and the TPO. Management action should be taken for negative responses to questions 1 to 3, or, a positive response to question 4.</p> | | |
| Question | Yes | No |
| 1a. Is there a formal agreement between you and the TSP to meet at certain intervals or at certain dates to discuss questions regarding any aspect of the translation process? | | |
| 1b. If so, do you consider that the TSP adheres to this agreement to a satisfactory degree? | | |
| 2. Do you contact the TSP in order to arrange meetings as required, i.e. whenever you find there is a need for discussing questions regarding any aspect of the translation process? | | |
| 3. Do you find that you get the feedback you need from the TSP regarding any problems or questions that arise in the course of translation? | | |
| 4. Do you find that any elements in the co-operation may be in need of enhancement? | | |
| Additional comments relating to questions above: | | |

4.8 Questionnaire 6a:

| Questionnaire 6a: For Use by TSP | | |
|--|------------|-----------|
| Component: Process | | |
| Quality characteristic: Translation reviews | | |
| <p>The background for this metric is to ensure that a review of terminology consistency, term equivalence and compliance with target language specific guidelines is carried out.</p> <p>This includes review by the 2nd translator and review by a Subject Matter Expert (SME) or a person with relevant health-related education, i.e. a healthcare professional</p> <p>Management action should be taken for negative responses to any questions.</p> | | |
| Question | Yes | No |
| 1. Are all translated concepts reviewed and validated by a reviewer? | | |
| 2. Have you made sure that your translators are aware of the importance of terminology consistency and term equivalence, and that they check this when reviewing? | | |
| 3. Have you made sure that your translators are aware of the importance of linguistic correctness and compliance with the target language specific guidelines and principles, and that they check this when reviewing? | | |
| Additional comments relating to questions above: | | |

4.9 Questionnaire 6b:

| Questionnaire 6b: For Use by TPO | | |
|---|------------|-----------|
| Component: Process | | |
| Quality characteristic: Translation reviews | | |
| <p>The background for this metric is to ensure that a review of clinical usability and psychological appropriateness are carried out.</p> <p>This includes an additional review by a Subject Matter Expert (SME) or a person with a relevant health-related education, i.e. a health care professional (HCP).</p> <p>In case of any negative replies to any questions, appropriate management action should be taken.</p> | | |
| Question | Yes | No |
| 1. Have you set up a system to ensure that any translated concepts could be readily reviewed by an SME or an HCP? | | |
| 2. Have you made sure that your SMEs/HCPs are well aware that their main task is to verify if the translations comply with the principles of clinical usability and psychological acceptability? | | |
| 3. Have you made sure that your SMEs/HCPs are aware of the importance of terminology consistency, and have they been instructed also to take local guidelines and principles into consideration? | | |
| Additional comments relating to questions above: | | |

4.10 Reporting results

A template similar to the one shown below could be used to design a formatted report for reporting results:

| Translation Quality Assessment Metrics Results | | |
|---|--|---------------------------|
| Organization: | | |
| Metric | Result (Brief text summary of results) | Date (yyyymmdd) |
| 1. TSP members competencies and knowledge | | |
| 2. TPO members competencies and knowledge | | |
| 3. Access to translation software | | |
| 4. Content of linguistic guidelines | | |
| 5. Concept-based translation | | |
| 6. Ongoing cooperation reported by TSP | | |
| 7. Ongoing cooperation reported by TPO | | |
| 8. Translation reviews: Consistency | | |
| 9. Translation reviews: Clinical usability | | |
| 10. Clinical acceptability | | |
| 11. Compliance with Translation Guidelines and Standards | | |
| 12. Term equivalence | | |
| Additional comments relating to quality characteristics or metrics above. | | |

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