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# ICF-SNOMED CT Harmonization a gap analysis

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**Abstract** This poster represents the advancement status of the work on harmonization between SNOMED CT and ICF within the framework of the IHTSDO-WHO collaboration .

## Introduction

In 2010, the World Health Organization (WHO) and the International Health Terminology Standards Development Organisation (IHTSDO) signed a collaboration agreement to harmonize WHO classifications and SNOMED CT. The Authors are members of a Joint Working Group (JWG), set up by WHO and IHTSDO, through their Joint Advisory Group (JAG), to collect and discuss relevant information on the topic of the harmonization between the International Classification of Functioning, Disability and Health (ICF) and SNOMED CT (Fig. 1).

The following activities have been planned:

Phase 1 - Gap analysis: identify all existing SNOMED CT and ICF terms related to functioning and any possible alignment with each other

Phase 2 - New terminology: develop terminology around missing concepts in ICF and SNOMED CT

Phase 3 - Aggregation logic: develop and implement a methodology for aggregating SNOMED CT concepts to higher level ICF concepts.

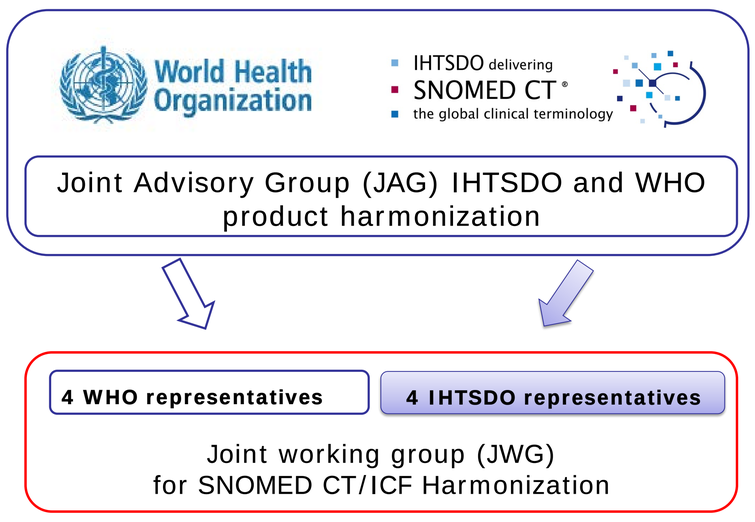


**Fig. 1 – WHO, IHTSDO, JAG and JWG**

## Methods & Materials

The members of the JWG, working in pairs (one from IHTSDO and one from WHO, see Fig. 2), independently reviewed all the ICF categories of *Activities and Participation* (*A&P*), excluding residuals: concept, definition and relationship to other concepts were considered. Equivalence to SNOMED CT concepts was searched in terms of lexical, semantic (content) and hierarchical matching. For every ICF *A&P* category it was defined whether or not a gap existed with SNOMED CT. In the event of concept ambiguity, items were flagged either to WHO or IHTSDO for consideration. The pairs documented their independent reviews and then came together to discuss their findings. Weekly teleconferences were used to seek additional feedback and to review the methodology.

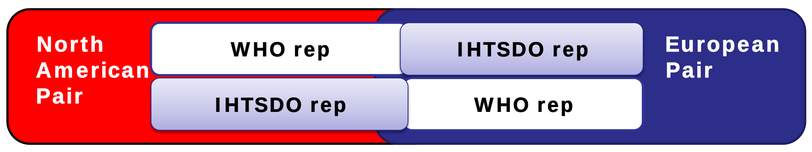


**Fig. 2 – Gap analysis working methodology**

## Results

Although in other components of ICF, such as Body Structures, preliminary work has shown good mapping possibilities, the present gap analysis suggests that the categories of *A&P* in ICF are semantically and hierarchically, and often lexically, different from the concepts in SNOMED CT. There were non-exact matches of various kinds, usually forms of overlap, but for about 40 % of the ICF *A&P* categories there were no matches of any kind. For individual chapters the ratio of non-matching categories ranged from 20 % to almost 90 %.

Thus, there is a need to develop new SNOMED CT content to support mapping to such ICF categories.

As an example, fig. 3 and 4 below, represent the 2 possible match for the ICF *A&P* category *d330 Speaking.* At least two SNOMED CT alternatives exist: *87335007|Ability to speak (observable entity)|* and *87335007|Speaking (observable entity)|*.




**Fig. 3 – SNOMED CT *Ability to speak***

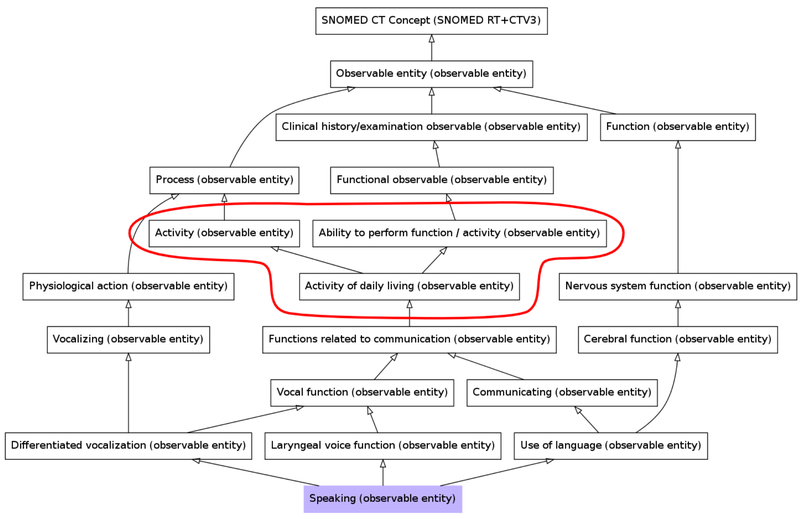


**Fig. 4 – SNOMED CT *Speaking***

Lexically the choice may seem easy with a perfect lexical match between the ICF category and the latter SNOMED CT concept. However, when examining the ancestors of the *Speaking (observable entity)* concept, there are a few issues. There are two concepts *Function* and *Functional observable* where the difference in meaning is unclear.

Also the concept *Activity of daily living (observable entity)* has two parents: *Activity (observable entity)* and *Ability to perform function / activity (observable entity)* (red marking in Fig. 4). Thus, the concept *Activity of daily living*, and thereby all its descendants, including *Speaking (observable entity)*, are to be interpreted as both activities and the ability to perform those activities. A second example is the ICF category *d550 Eating*. According to the ICF note, the category includes several eating related activities, e.g. bringing food to the mouth and opening cans and bottles. There is no single SNOMED CT concept corresponding to this ICF category, but instead a number of distinct candidate SNOMED CT concepts e.g. *289005001|Ability to take food to mouth (observable entity)|*and *288399004|Ability to open and close containers (observable entity)|*.

## Major recommendations for joint consideration

There needs to be agreement between IHTSDO and WHO on a common model for representing the capacity and performance aspects.

In doing this, there will need to be consideration of what SNOMED CT needs to support in the electronic care record

What is also clear from this work that mapping will be impossible between SNOMED CT and ICF unless the two organisations take forward the recommendations and they should be done in a coordinated way to enable all planned phases, i.e. to reach harmonization of SNOMED CT and ICF.

## Conclusions

These results confirm the high value of the WHO-IHTSDO synergy aiming to frame together, in a joint effort, their respective unique contribution and agreed work going forward on ensuring that SNOMED CT and ICF can interoperate in electronic health records.

## Acknowledgements

Members of the JWG: Alarcos Cieza, Kathy Giannangelo, Francesco Gongolo, Daniel Karlsson, Cille Kennedy, Susan Matney, Jane Millar, M. Meri Robinson Nicol.
Additional experts: John Hough, Olivier Bodenreider.

## References

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2. JWG, Draft Methodology for undertaking gap analysis between SNOMED CT and ICF – v0.01

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