

# Belgian SNOMED CT Subset coverage

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## Abstract

**Introduction:** The decision has been taken to use Snomed CT for the coding of the EHR in Belgium. In 2010 the development of a Belgian SNOMED CT subset has been started with physicians and terminologists.

**Objective:** This study aims at estimating the coverage of the Belgian SNOMED CT subset for concepts used in the Electronic Health Record (EHR) in hospitals.

**Design:** 4 Belgian hospitals each had to select 100 admissions randomized over the different specialisms. For these 400 admissions, the EHR labels for clinical findings and procedures were coded in SNOMED CT. The SNOMED CT concepts resulting from this translation were then matched against a Belgian Subset for clinical findings and procedures in Dutch and French.

**Results:** For clinical findings, 84% of the codes were covered by the current Dutch subset and 73% by the French subset. For procedures, 81% of the codes were covered by the current Dutch subset for the Clinical findings and 86% by the French subset.

**Conclusion:** To limit the number of additions in a later stage it is desirable to complete the subset and add translations before using it for routine coding.

## Methods

4 Belgian hospitals each had to select 100 admissions randomized over the different specialisms.

A physician or professional coder coded the EHR labels in SNOMED CT using a browser of choice which always contained the full SNOMED CT Core .

Coding could be done with a compound SNOMED CT expression (post-coordination) if no pre-coordinated concept was found. EHR labels could eventually be decomposed in more than one primary concept.

SNOMED CT coding was expressed using compositional grammar.

A reason was provided when an EHR label could not be coded.

The resulting SNOMED CT concepts were joined with the Belgian.

The codes which were out of join were the "missing" concepts. The missing concepts were reviewed in order to evaluate if the concept could be coded with other codes from the subset. If this was not the case the concept was labeled as really missing.

Really missing concepts are defined as codes from the study data, which were eliminated from the Belgian subset and which could not be expressed by a synonym or post-coordinated expression of the subset.

Different user interfaces were used. All interfaces contained the SNOMED CT core.

Hospital	Language	Terminology Interface
CHU Charleroi	French	Indizen, Cliniclue
CHR Citadelle, Liège	French	Indizen, Cliniclue
CHU Erasme, Brussels	French	Cliniclue
UZ Leuven	Dutch	KASB (in-house)

## Results

Hundred admissions have been selected by any of the 4 hospitals.

The admissions (n=400), covered 41 medical an surgical specialties, although the admissions in medical specialties were over represented. We've counted 273 admissions in a medical specialty and 127 admissions in a surgical specialty.

From the 400 admissions 3.321 EHR labels were registered. Some labels were used multiple times and so the number of unique labels was 2.748 in total.

Hospital	Number EHR labels	Number unique EHR labels	% Recurrence
CHU Charleroi	1.080	784	27%
Citadelle	595	550	8%
CHU Erasme	868	720	17%
UZL	778	706	9%
<b>Total</b>	<b>3.321</b>	<b>2.748</b>	<b>18 %</b>

The 3.321 EHR labels were divided in 3.344 primary concepts of which 2.641 labels could be coded with a single SNOMED CT concept.

Coding of the EHR label was not done or disregarded in 703 cases for the further analysis.

Coding qualification	Number records
EHR label ambiguous	112
Out of scope: medication	101
Out of scope: diagnostic procedures, admission	45
Coding was done after closing of review and analysis	178
Primary concept could not be expressed with one single code	171
Other (doubles,...)	96
<b>Total</b>	<b>703</b>

In 6 % (n=171) the primary concept could not be expressed with one single code but needed the combination of two or more SNOMED CT concepts.

## Results

This resulted in 1.277 unique concepts (all hospitals).

Top level concept	Total
clinical finding	1.019
procedure	258
<b>Total</b>	<b>1.277</b>

Coverage gives the percentage of all primary concepts coded in the sample which were present in the Belgian subset.

### Coverage Clinical findings

Of the 1.019 unique concepts of the sample, about 84% of the codes were covered by the current Dutch subset and 73% by the French subset.

Missing codes for the 1.019 unique codes of sample (n=243).

Reason for missing	NI		Fr	
eliminated from Subset	122	12%	102	10%
code eliminated because synonym	17	2%	7	1%
not done	2	0%	129	13%
to be reviewed	18	2%	26	3%
<b>Total</b>	<b>159</b>	<b>16%</b>	<b>264</b>	<b>27%</b>

### Coverage Procedures

Of the 227 unique concepts of the sample, about 81% of the codes were covered by the current Dutch subset for the Clinical findings and 86% by the French subset.

Missing codes for the 389 codes of the study sample (n=56).

Category Reason for elimination	NI		Fr	
eliminated from Subset	31	8%	13	3%
code eliminated because synonym	15	4%	7	2%
not done	4	1%	42	11%
under review	6	2%	1	0%
<b>Total</b>	<b>56</b>	<b>14%</b>	<b>63</b>	<b>16%</b>

## Conclusion

To limit the number of additions in a later stage it is desirable the subset to be as complete as possible at the beginning of routine coding. When codes are missing during routine use they should be added on request by the physician.

This does not mean that the whole SNOMED CT Core should be selected and translated. Synonyms, obsolete and navigational concepts must be excluded.

The subset should be concise with distinctive and valid concepts which can be used in combination with sub-concepts for the refinement of attributes.

The final Belgian subset should be the same for Dutch and French users.

At this stage there is a good correspondence for clinical findings between the temporary French and Dutch subset (kappa=0.80). However the concordance for procedures is poor (kappa = 0.34).

## References

International Health Standards Development Organisation (IHTSDO) (2008) Guidelines for translation of SNOMED CT

International Health Standards Development Organisation (IHTSDO) (2014) SNOMED CT Technical Implementation Guide.

