'Experience of deploying a SNOMED CT based EMR using a French translated subset in an academic Belgian hospital'

Olivier Le Moine, MD, PhD
Associate Medical Director for IT

Hôpital Erasme, ULB, Brussels, Belgium
Semantic interoperability of health care data, using SNOMED CT, is a cornerstone of the Belgian eHealth plan 2015-2018.

As the Belgian software market does not provide a solution fully-based on SNOMED CT, we developed an in-house EMR able to exploit the richness of the terminology.

The objective is to share with you this Belgian experience, targeting deployment of a newly available SNOMED CT (subset) translation.
METHODS: FRENCH SUBSET OF SNOMED CT

Belgian NRC subset
- Selection & translation in french and dutch of 43% and 70% of Clinical Findings and Procedures, respectively.
- Retrospective testing on hospital records -> 85% adequate coverage
- Flat lists, no use of relationships
- Translation still ongoing

Erasme Hospital extension
- French NRC subset +
- Standardization, adding parent concepts and terms asked by medical specialists
- Only preferred terms, no synonyms
- Precoordinated expressions
METHODS: EMR

- Hospital IT team development (Snomed CT backbone)
- **Artifacts covered**: reason for admission, risk factors (allergies, implants, nutritional, addictions, social factors…), systematic review of systems, physical examination, past history (personal & familial), active problems, procedures, staging & scales
- Artifacts and values are coded in Snomed CT
- Free text is only allowed to improve the granularity of a structured item
- Only 3 general templates (admission, discharge, consultation) for all medical / surgical specialties
Expert mode: lists and letters to select the adequate description
Methods: Data Entry (2)

- **Template mode:** check boxes, short lists (may include postcoordination), if necessary access to expert mode.
METHODS: OUTPUTS (READY FOR INTEROPERABILITY)
METHODS: DEPLOYMENT STRATEGY

- Strong support from executives
- Information on Snomed CT & EMR benefits (all care givers) during the year before deployment
- Creation of a specific Multidisciplinary Support Group for information, training and support
- Training to EMR 1 month before deployment
- Continuous education/training (new doctors, students)
- Continuous information (new releases)
- Continuous information to users about EMR usage (statistics) in the Hospital
SETTING:

- Academic Hospital (tertiary/quaternary)
- ~ 900 beds
- ~ 45,000 admissions
- ~ 360,000 outpatients
- ~ 3,500 employees
- ~ 500 doctors & medical students

INITIAL SCOPE of the EMR: inpatients excluding One-Day clinic and some clinical departments having already an IT solution
RESULTS: MASSIVE DEPLOYMENT OVER 6 MONTHS
Discharge reports generated monthly since September 2015

- Validation J15
- Validation J0
- All reports

- 70% inpatient activity
- 55,000 discharge letters
- >1,000,000 concepts
TERMINOLOGY REQUESTS ONLINE / REALTIME !
NUMBER OF CHANGE REQUESTS TO TERMINOLOGY OVER TIME: A CONTINUOUS CHALLENGE
### PROPORTION OF CHANGE REQUESTS: TERMINOLOGY IS A CONTINUOUS CHALLENGE AS OF JULY 2017

<table>
<thead>
<tr>
<th>Type of request</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missing terms</td>
<td>92% (2080)</td>
</tr>
<tr>
<td>Erroneous terms</td>
<td>7% (161)</td>
</tr>
<tr>
<td>Obsolete terms</td>
<td>1% (20)</td>
</tr>
</tbody>
</table>
## ACTUAL NUMBER OF TRANSLATED CONCEPTS (JUNE 2017)

<table>
<thead>
<tr>
<th>Hierarchy</th>
<th>Number in french (preferred terms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Findings</td>
<td>36477</td>
</tr>
<tr>
<td>Procedures</td>
<td>19139</td>
</tr>
<tr>
<td>Qualifiers</td>
<td>1195</td>
</tr>
<tr>
<td>Body structure</td>
<td>8826</td>
</tr>
<tr>
<td>Substances</td>
<td>2149</td>
</tr>
<tr>
<td>Objects</td>
<td>1440</td>
</tr>
<tr>
<td>Organisms</td>
<td>24563</td>
</tr>
<tr>
<td>Social context</td>
<td>432</td>
</tr>
<tr>
<td><strong>Total Erasme extension (Be)</strong></td>
<td><strong>94221</strong></td>
</tr>
<tr>
<td><strong>Total SNOMED CT en USA</strong></td>
<td><strong>326905</strong></td>
</tr>
<tr>
<td><strong>Total Rouen extension (Fr)</strong></td>
<td><strong>181105</strong></td>
</tr>
</tbody>
</table>
 TERMS USAGE COMPARISON BETWEEN JUNE 2016 AND AUGUST 2017 (~ 20% OF THE EXTENSION)
Initially they are not convinced or even refractory…

Afterwards they become interested and even addicted…

- Reuse of data (enter once, use many)
- Personal database
- Department database
- Queries (audits or research)
- Transversal queries (infection control…)

Then, they participate to improvement
STRUCTURATION: A PRIORI OR A POSTERIORI DATA ENTRY?

A priori encoding
- Direct validation
- User Interface!
- Few loss of information
- Education

A posteriori encoding
- Intermediation of validation
- NLP, Cost in HR!
- Loss of information
- No education

An adequate mix of two

Patients Database
- Local
- Hospital
- Group of Hospitals
- National
- International
Specific templates for specialties not yet deployed

Snomed CT Terminology Server (relationships, synonyms, Refsets of specialties using constraint language)

Implementation of MRCM for the use of postcoordination

NLP to prepopulate patient charts from different sources
TAKE HOME MESSAGES

▪ End-Users most often do not know what SNOMED CT is and the benefits to adopt it. Information and Education are paramount.

▪ When implementing a newly translated subset of SNOMED CT, reactivity to end-users requests is cornerstone for adoption.

▪ Prepare (IT) to deploy all the functionalities of Snomed CT and interoperability of healthcare data.
COAUTHORS OF THIS PAPER FROM THE IT DEPARTMENT

- Allard Alain
- Barbiaux Robert
- Bayle Florent
- Lefever Lénaic
- Panzer Jérémie

THANKS TO THEM !