Terminological resources in e-Health

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Overview

• Electronic Health Record (EHR) in Italy
• Project «Technological Architecture to support EHR»:
  1. Definition of an Italian Medical Language for prescription
  2. Definition of an encoding system for laboratory test
L@bdoc Overview

- Documentation Laboratory (1996)
- Center of excellence in Knowledge Management (2002)
- URT (Unità di Ricerca presso Terzi) del CNR - Indexing and classification systems (2007)

- Information and knowledge organization
Italian EHR

Definition: group of information related to the health patient, produced during a course of treatment in the public healthcare system

- Patient vital statistics
- Health care documents (ex. X-ray)
- Patient health history
What is doing in Italy?

E-government plan (2012) Minister of Public Administration and Innovation

• Simplifying and digitization services such as: prescription, medical certificate and etc...
• Creating an infrastructure specifically for people

Project: “Technological Architecture to support Eletctronic Health Record”
Our task ..........

Definition of ontological model and vocabulary to support EHR

- Italian medical language for diagnosis ICD9-CM*
- Encoding system for laboratory test LOINC**

* International Classification of Diseases 9th Revision - Clinical Modification
** Logical Observation Identifiers Names and Codes
ICD9-CM

Work steps

• Collection of biomedical resources

• Comparison of ICD9-CM with a sample group of prescriptions

• Integration of ICD9-CM
Why normalize?

<table>
<thead>
<tr>
<th>AOBO</th>
<th>ICD9-CM inglese</th>
<th>ICD9-CM italiano</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPOEMA *</td>
<td>364.41 Hyphema</td>
<td>Cod. 364.41 Ifema</td>
</tr>
<tr>
<td>OBESITA' **</td>
<td>Cod.278 Overweight, obesity and other hyperalimentation</td>
<td>Cod. 278 Sovrappeso, obesità e altri stati di iperalimentazione</td>
</tr>
<tr>
<td></td>
<td>Cod.278.0 Overweight and obesity</td>
<td>Cod.278.0 Sovrappeso e obesità</td>
</tr>
<tr>
<td></td>
<td>Cod.278.00 Obesity, unspecified</td>
<td>Cod.278.00 Obesità non specificata</td>
</tr>
<tr>
<td></td>
<td>Cod.278.01 Morbid obesity</td>
<td>Cod.278.01 Obesità grave</td>
</tr>
<tr>
<td></td>
<td>Cod.278.02 Overweight</td>
<td>Cod.278.02 Sovrappeso</td>
</tr>
</tbody>
</table>

* Ipoema e Ifema are synonyms

** Obesità does not appear alone
ICD9-CM Plus

ICD9-CM

L1
.
.
L10

ICD9-CM Plus
Tool

V.I.L.M.A.

Vocabolari Italiani Lessici di Medicina e Sanità

EVENTUALI RELAZIONI

<table>
<thead>
<tr>
<th>VM</th>
<th>UF</th>
<th>BT</th>
<th>NT</th>
<th>RT</th>
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<tbody>
<tr>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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</table>
Conclusions

- The language used by doctors is not controlled
- The Italian version of ICD9-CM does not consider the real use of the biomedical language

Necessity

- Revision and contextualization of the translation
LOINC

Work steps

• Encoding system for economical purposes
• Translation of LOINC parts name
• Translation of LOINC Users’ Guide
• Implementation of LOINC Tool
Italian background

<table>
<thead>
<tr>
<th>Laboratory</th>
<th>Internal code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab1</td>
<td>1183</td>
<td>Citrato</td>
</tr>
<tr>
<td>Lab2</td>
<td>9835</td>
<td>Citraturia</td>
</tr>
<tr>
<td>Lab3</td>
<td>8519</td>
<td>Ammoniuria</td>
</tr>
</tbody>
</table>
What is LOINC?

- System for clinical data exchange
- Contains universal identifiers for clinical tests
- Each record includes:
  - ID code
  - Formal name
  1. Component
  2. Property
  3. Time aspect
  4. System
  5. Scale type
  6. Method type
Italian LOINC Group

- CNR
  - ITB - Unità Sanità Elettronica, Roma
  - URT - Indexing and Classification Systems, Cosenza
- Molinette Clinical Center, Torino
- Arsenàl Consortium, Treviso
- Bruno Kessler Foundation, Trento
- Castelfranco Veneto Hospital, ULSS Asolo (TV)
- APSS-Trento
<table>
<thead>
<tr>
<th>FORMAL_NAME</th>
<th>DISPLAY_NAME</th>
<th>YOUR_TRANSLATION</th>
<th>YOUR_SYNONYMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.25H post XXX challenge</td>
<td>1.25 hours post XXX challenge</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Translation Rules

### Latin names

<table>
<thead>
<tr>
<th>EN</th>
<th>Saccharomyces cerevisiae</th>
<th>IT</th>
<th>Saccharomyces cerevisiae</th>
</tr>
</thead>
</table>

### Acronyms and abbreviations

<table>
<thead>
<tr>
<th>EN</th>
<th>CSF</th>
<th>IT</th>
<th>LCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN</td>
<td>DNA</td>
<td>IT</td>
<td>DNA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EN</th>
<th>BPU</th>
<th>IT</th>
<th>Unità di prodotto sangue</th>
</tr>
</thead>
</table>

### Order words

<table>
<thead>
<tr>
<th>EN</th>
<th>Dog epithelium</th>
<th>IT</th>
<th>Epitelio cane</th>
</tr>
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</table>
## Translation issues

### DIFFERENT NAME

<table>
<thead>
<tr>
<th>LOINC</th>
<th>Italian Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coagulation thrombin induced</td>
<td>Tempo di trombina</td>
</tr>
<tr>
<td></td>
<td>Coagulazione della trombina</td>
</tr>
</tbody>
</table>

### CONTEXT DIFFERENCIES

<table>
<thead>
<tr>
<th>LOINC</th>
<th>Italian Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Borrelia hermsii</td>
<td>Genus of the Spirochaetaceae family, widespread mainly in the western United States and Canada.</td>
</tr>
</tbody>
</table>

### WORD EQUIVALENCE

<table>
<thead>
<tr>
<th>LOINC</th>
<th>Italian Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cat dander</td>
<td>Forfora gatto</td>
</tr>
</tbody>
</table>
Italian LOINC Tool

1. Labs
2. Scientific Committee
1. CNR
Results

• Translation of LOINC parts name (11,748)

• Release of Italian LOINC
  - December 2010
  - June 2011
Realization of a Documentation center about energy efficiency and the use of renewable sources in building construction in Lombardy
Mission

- Disclose project’s results
- Supervise the knowledge evolution
- Organize content documents
- Answer to users information request
Future perspective

- Definition of a glossary related to the specific domain
- Realization of a Faced Theaurus
Thank you for your attention!