



Semantic interoperability

Belgian Strategy

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Semantic Interoperability, Purpose


Registration in Electronic Patient Record
Reuse in multiple applications

- Expert systems
 - Medical (drug surveillance, clinical pathways, EBM...)
 - Administrative support (Chapter IV, ...)
- Secondary coding
 - Billing (RIZIV, MKG,...)
 - Epidemiology (ICD-11)
 - Studies, work load,...
- Interoperability between systems
 - Eg EPD <-> Register



Patient Summary

Overzicht - Test, Nancy V010101TT010



Patient
Test, Nancy - V010101TT010
Huisarts

Antecedenten & basisinfo
Laatste resultaten
Planning & medicatie
Labo
Hospitalisaties

IIO_HOSPITALISATIENS

Actuele problemen & diagnoses [toevoegen](#)

Inclusief passieve

- [CVA met hemorragische transformatie](#) 25/07/08
- [coma \(passief\)](#) 25/07/08 - 07/08/08
- [bedlegerig](#) 25/07/08
- [blaassonde \(passief\)](#) 25/07/08 - 08/08/08
- [slikstoornis \(passief\)](#) 25/07/08 - 08/08/08
- [hemiplegie links](#) 25/07/08
- [intermittente verwardheid](#) 08/08/08
- [decubitus ulcus](#) 14/08/08

Allergieën [toevoegen](#)

Actieve geneeskundige antecedenten [toevoegen](#)


- [arteriele hypertensie](#) 22/08/88
- [diabetes mellitus type II](#) 22/08/98
- [voorkamerfibrillatie](#) 22/08/07
- [obesitas](#)

Passieve geneeskundige antecedenten [toevoegen](#)

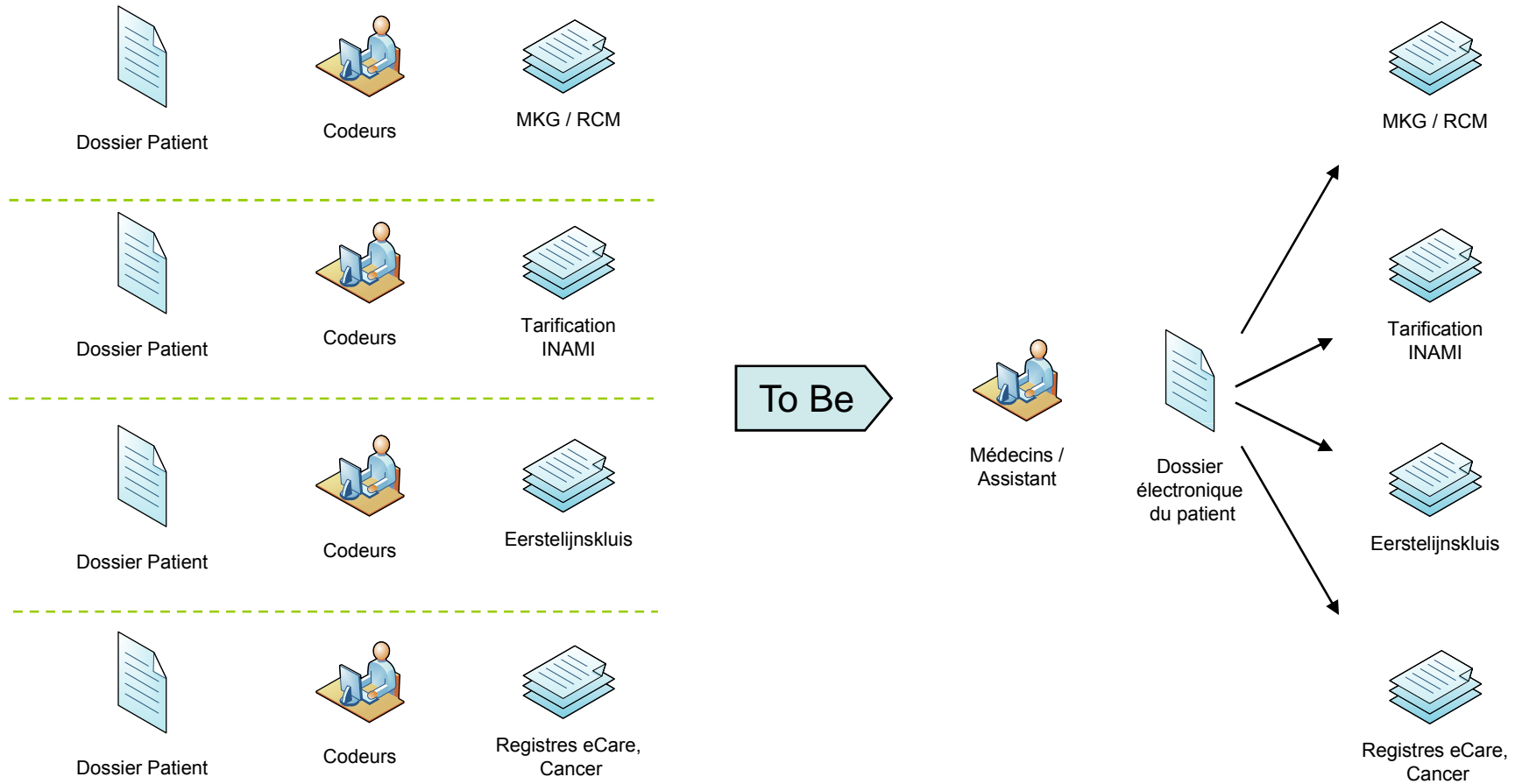
- [borstneo links met negatieve klieren \(passief\)](#) 22/08/04

Heelkundige antecedenten [toevoegen](#)

- [tumorectomie re. borst met klierenvidenment \(passief\)](#) 22/08/04

 *Rechts klikken op een item toont een menu met extra mogelijkheden.*

Objective



Passer d'une vision de travail en « silo » des besoins vers une vision intégrée et interopérationnelle

Semantic interoperability

- Definition/Objectif
- Reference terminology
 - National terminology
 - Snomed CT
 - Translation
 - Mapping
- Terminology server
 - Terminology interface
 - Terminology management system
- Terminology centre
- Testing Terminology
 - Hospitals
 - General Practice



Reference terminology

ICD_10_Code	SNOMEDID	Snomed CT number	EN_Clinical_Label	Fr_Belgium	NI_Belgium
C08.9	M-81473	34603009	Basal cell adenocarcinoma	adénocarcinome basocellulaire	basaalcel adenocarcinoom
C16.9	M-81423	37995004	Linitis plastica	linite plastique	linitis plastica
C25.4	M-81513	20955008	Insulinoma, malignant	insulinome malin	maligne insulinoom
C25.4	M-81523	66515009	Glucagonoma, malignant	glucagonome malin	maligne glucagonoom
C25.4	M-81533	19756007	Gastrinoma, malignant	gastrinome malin	maligne gastrinoom
C44.9	M-84013	57141000	Apocrine adenocarcinoma	adénocarcinome apocrine	apocrien adenocarcinoom
C45.9	M-90503	62064005	Mesothelioma, malignant	mésothéliome	mesotheloom
C49.9	M-91333	54124005	Epithelioid hemangioendothelioma, malignant	hémangioendothéliome épithélioïde malin	hemangio-endotheliaalsarcoom
C56	M-86003	57622002	Thecoma, malignant	thécome malin	maligne thecoom
C69.2	M-95123	12354007	Retinoblastoma, undifferentiated	rétinoblastome indifférencié	ongedifferentieerd retinoblastoom
C71.9	M-938FF	115240006	Glioma	gliome	gloom
C71.9	M-94233	12943006	Polar spongioblastoma	spongioblastome polaire	polair spongioblastoom
C71.9	M-94243	78838008	Pleomorphic xanthoastrocytoma	xanthoastrocytome pléomorphe	xanthoastrocytoom
C71.9	M-94423	35262004	Gliosarcoma	gliosarcome	gliosarcoom
C71.9	M-94733	39781001	Primitive neuroectodermal tumor	tumeur primitive neuro-ectodermique	primitieve neuro-ectodermale tumor
C75.5	M-86803	9903002	Paraganglioma, malignant	paragangliome malin	maligne paragangloom
C75.5	M-86933	32512003	Extra-adrenal paraganglioma, malignant	paragangliome extrasurrénalien malin	maligne extra-adrenaal paragangloom
D27	M-84600	22116003	Papillary serous cystadenoma	cystadénome papillaire séreux	sereus papillair cystadenoom
D27	M-90000	74739000	Brenner tumor	tumeur de Brenner	Brennertumor
D76.3	M-77880	15960008	Reticulohistiocytic granuloma	granulome réticulo-histiocytaire	reticulohistiocytair granuloom

Belgian Reference terminology

- Clinical terminology for medical record
 - NI / French

- Max. based on Snomed
 - **Subset Snomed**

- Possibility to add own concepts
 - **Extension Snomed**
 - Belgian Namespace

Development Reference Terminology

- Starting from existing lists
 - Snomed, Thesauri / Nomenclatures / EPD / Registers ...
- Selection concepts
 - Criteria for selection
 - Clinical, preferred terms only, not ambigü, actual ...
 - How in Snomed?
 - Validation by two independent terminologists
- Translation Fr/NI
 - Always second validation
- Mapping with
 - (inter)national classifications
- Rule base
 - Chapter IV, Clinical paths, Decision support

Elimination of Snomed CT concepts

- Too vague / Ambiguous
 - And/or : n = 3.000
 - Without n = 1.095
 - Abnormal n = 1.000
 - Uncertain n = 1.000
- 'On examination' n = 1.230
- Concept replaced by Postcoordination
 - Drugs & Substances n = 10.000
 - 'History of' n = 700
 - Events n = 1.500
 - Time indications (recurrent, old, ...) n = 500
 - Indications severity ('decrease,....') n = 500

Concept linkage

- Instance 1
 - clinical finding, procedure, encounter,...
- Instance 2
 - clinical finding, procedure, encounter,...
- Linkage concept
 - 'reason for', 'indication for', 'complication of', 'due to'

Negative expressions

- Absence of
- Without
- Closed

Time indication

- Episode registration
 - Start / stop
- No terms like 'old', 'recent...'

Pre-coordination

- non-small cell lung cancer
 - epithelial growth factor receptor negative non-small cell lung cancer
 - epithelial growth factor receptor positive non-small cell lung cancer
 - non-small cell carcinoma of lung, TNM stage 1
 - non-small cell carcinoma of lung, TNM stage 2
 - non-small cell carcinoma of lung, TNM stage 3
 - non-small cell carcinoma of lung, TNM stage 4
 - nonsquamous nonsmall cell neoplasm of lung

Post-coordination

- Disorder
 - primary malignant neoplasm of lung
- Morphology
 - clear cell adenocarcinoma
- Localisation
 - structure of left upper lobe of lung
- pathologic TNM stage grouping
 - TNM stage 1
 - TNM stage 2
 - TNM stage 3
 - TNM stage 4

Snomed browser (e.g. CliniClue)

CliniClue Xplore: SctIntl_20100731 [Registered user: DemoUser051379@CliniClue.demo]

File Edit Language Layout Tools Help

ConceptId: 93880001 **primary malignant neoplasm of lung**
(Type = clinical finding)

DescriptionId: 510792012

Words - any order

Eind | malign neo lung

- primary malignant neoplasm of lung
- secondary malignant neoplasm of lung
- metastatic malignant neoplasm to lung
- h/O: malignant neoplasm of lung
- screening for malignant neoplasm of lung
- history of malignant neoplasm of lung
- malignant neoplasm of upper lobe of lung
- malignant neoplasm of lower lobe of lung
- malignant neoplasm of middle lobe of lung
- ... more matches ...

Hierarchy Subtype hierarchy

- primary malignant neoplasm of intrathoracic organs
 - primary malignant neoplasm of respiratory tract
 - malignant tumour of lung
 - primary malignant neoplasm of lung
 - bronchioloalveolar carcinoma - disorder
 - carcinoma of lung parenchyma
 - carcinoma in situ of lung parenchyma
 - large cell carcinoma of lung
 - clear cell carcinoma of lung
 - giant cell carcinoma of lung
 - large cell carcinoma of lung, TNM stage 1
 - large cell carcinoma of lung, TNM stage 2
 - large cell carcinoma of lung, TNM stage 3
 - large cell carcinoma of lung, TNM stage 4
 - small cell carcinoma of lung
 - non-small cell lung cancer
 - epithelial growth factor receptor negative non-small cell lung cancer
 - epithelial growth factor receptor positive non-small cell lung cancer
 - non-small cell carcinoma of lung, TNM stage 1
 - non-small cell carcinoma of lung, TNM stage 2
 - non-small cell carcinoma of lung, TNM stage 3
 - non-small cell carcinoma of lung, TNM stage 4
 - nonsquamous nonsmall cell neoplasm of lung
 - overlapping malignant neoplasm of bronchus and lung
 - Pancoast tumor
 - primary malignant neoplasm of hilus of lung

Concept Status: **current**

- Descriptions
 - Lang: fr-CA
 - Lang: en-US
- Definition: Fully Defined as ...
 - is a
 - malignant tumour of lung
 - is a
 - primary malignant neoplasm of intrathoracic organs
 - is a
 - primary malignant neoplasm of respiratory tract
 - Group
 - associated morphology
 - neoplasm, malignant (primary)
 - finding site
 - lung structure
- Qualifiers
 - episodicity
 - episodicities
- Codes
 - Original SNOMED Id : D2-F1103
 - Read Code (Ctv3Id) : XU06H

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Terminology server

- Terminology management system
- Run time components (optional)
 - Syntactic and semantic search
 - Context sensitive pick list
 - Rule Based Code convertor

Terminology Interface

- Context sensitive pick lists
 - Fast data entry
 - Check list
 - E.g. preop. Anesthesiology
 - **Work flow**
 - **Clinical path**
 - **Rule base**
 - **E.g. Chapter IV, drug surveillance**
- Syntactic search
 - Fast (search with 6 characters)
- Semantic search
 - Natural Language

Terminology Interface

Context sensitive picklist 'retrosternal pain'

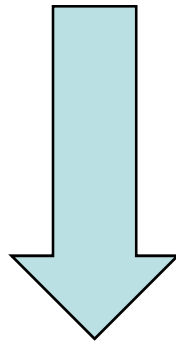
x	Aspegic
x	Dolantine
x	ECG
x	Labo complet + MB/Tn

Terminology Interface

- Context sensitive pick lists
 - Fast data entry
 - e.g. Operatiekwartier abdominaal chirurg
 - Check list
 - E.g. preop. Anesthesiology
 - Work flow
 - Clinical path
 - Rule base
 - E.g. Chapter IV, geneesmiddelenbewaking
- Syntactic search
 - Fast (search with 6 characters)
- Semantic search
 - Natural Language

Term Finder in UZ Brussel

Syntactic



Semantic

Creatie

Diagnose

^ SYNTACTISCHE RESULTATEN

- chronische obstructieve longziekte (COPD)
- obstructieve chronische bronchitis (COPD)
- exacerbatie obstructieve chronische bronchitis (COPD)
- infectieuze exacerbatie obstructieve chronische bronchitis (COPD)

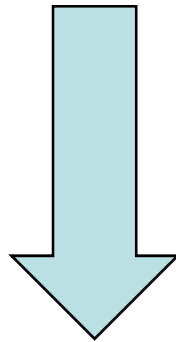
^ SEMANTISCHE RESULTATEN

- panacinair emfyseem
- acut vesiculair emfyseem
- chronisch obstructief emfyseem
- centri-acinair emfyseem
- paraseptaal emfyseem
- unilateraal emfyseem
- toxisch emfyseem
- chronische bronchitis met emfyseem
- litteken emfyseem
- atrofisch emfyseem
- pulmonair emfyseem
- chronische astmatische bronchitis
- exacerbatie obstructieve chronische bronchitis (COPD)
- Herpes simplex
- verkoudheid
- parainfluenza virus rhinofaryngitis
- catarre
- nasofaryngitis

Bewaar Undo Sluit

Term Finder in UZ Brussel

Syntactic



Semantic

hartinfarct

^ SYNTACTISCHE RESULTATEN

hemorragisch darminfarct

^ SEMANTISCHE RESULTATEN

myocardinfarct
 acuut myocardinfarct met ventrikelwandruptuur
 acuut myocardinfarct
 coronaire occlusie
 linker coronair occlusie
 rechter coronair occlusie
 transiënte myocardischemie
 ST-elevatie myocardinfarct
 myocardnecrose
 atriumruptuur
 acute coronaire occlusie zonder myocardinfarct
 acuut coronair syndroom met ST-elevatie zonder infarct
 acuut infarct atrium
 acuut infarct musculus papillaris
 acuut myocardinfarct atrium
 acuut myocardinfarct septum
 non ST-elevatie anterolateraal myocardinfarct
 non ST-elevatie myocardinfarct
 non ST-elevatie anteroapicaal myocardinfarct
 non ST-elevatie anteroseptaal myocardinfarct
 non ST-elevatie voorwandinfarct myocard

Testing Terminology 2013

- Integration of Terminology in local applications
- Requirements
 - Validated terminology with eventual mapping
 - Terminology interface
 - Syntactic search, Code convertor,...
 - Local application
 - Medical problem list, Patient Summary, ...
 - Connection secondary system
 - Evidence Based Medicine, Reimbursement, Hospital discharge, ...