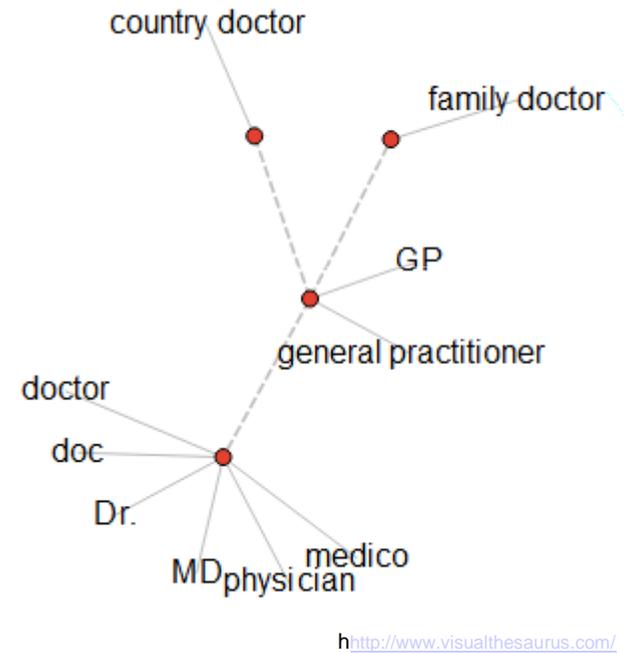
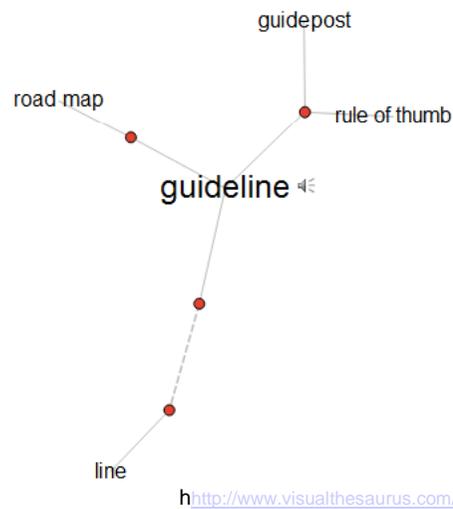


Analyse des termes d'une recommandation de bonne pratique de medecine de famille en utilisant ICPC, ICD, SNOMED-CT et UMLS

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PROBLEM STATEMENT

Guidelines in general practice are narrative documents.

Words and terms used in guidelines are not coded into standard nomenclatures and classifications.

For a guideline to be used in daily care, integration into the Electronic Health Record is needed.

In the Electronic Health Record, medical registration of clinical information needs coding by standard classifications, nomenclature or terminologies.

Belgium has acquired recently the SNOMED-CT licence

Matching guidelines to the EHR will not be easy.

METHODS

155 clinical concepts were carefully identified in a Belgian bilingual GP guideline for heart failure and coded in ICPC and ICD.

Correspondence with SNOMED CT concepts was established through the UMLS SNOMED-CT browser. This also allows to find the corresponding Unique Identifier in UMLS.

Dedicated browser tools were used for each of these terminology systems

L'anamnèse²⁹ doit particulièrement cibler³⁰:

- anamnèse de pathologie cardiovasculaire documentée : hypertension, infarctus du myocarde, angor, chirurgie des coronaires, fibrillation auriculaire, pathologie valvulaire, artériopathie périphérique, accident vasculaire cérébral (AVC), accident ischémique cérébral transitoire (AIT)

- anamnèse suggestive d'une pathologie cardiaque : douleur thoracique pouvant correspondre à de l'angor, palpitations cardiaques

- facteurs de risque cardiovasculaire documentés : hypertension, diabète sucré, tabagisme, consommation excessive d'alcool, obésité

- médicaments utilisés : médicaments à effet inotrope négatif (antagonistes calciques³¹ comme le vérapamil et le diltiazem, les anti-arythmiques de la classe I); médicaments provoquant une rétention sodée et hydrique (AINS, corticostéroïdes)

- autres pathologies étiologiques ou aggravantes : hyper ou hypothyroïdie, anémie, myopathie, rhumatisme articulaire aigu, irradiation médiastinale, syndrome des apnées obstructives du sommeil

- pathologie respiratoire chronique (BPCO) associée ; en cas de BPCO, le diagnostic d'insuffisance cardiaque est plus difficile à poser, les plaintes étant communes ; la coexistence d'une BPCO et d'une insuffisance cardiaque n'est pas rare.

Une anamnèse familiale est également à conseiller pour relever les facteurs favorisant d'une insuffisance cardiaque : pathologies athérosclérotiques, décès cardiaque brutal, myopathie, troubles de la conduction cardiaque (pacemaker nécessaire), tachyarythmie, cardiomyopathie, ...).

Looking manually for concepts

Each item is identified in

The screenshot shows the WHO-ICPC browser interface. The browser address bar displays 'icpc.who-fic.nl/browser.aspx'. The page title is 'Browser - 1-ICPC-2e (en) v4.2beta'. Below the title, there are two dropdown menus: '1-ICPC-2e (en) v4.2beta' and '1-ICPC-2e-42xBeta.cla:A01'. A search bar contains the text 'English'. There are 'Search' and 'Top' buttons. On the left, a tree view shows the hierarchy: 'Process codes' > 'A General and unspecified' > 'A.1 Symptoms and complaints' > 'A01 Pain general/multiple sites'. On the right, a detailed view for 'A01 Pain general/multiple sites' is shown, including a 'Short title' (Pain general/multiple sites), an 'Inclusion' (chronic general pain; multiple aches), and 'ICD10' codes ([R52.0](#); [R52.1](#); [R52.2](#); [R52.9](#)).

ICPC

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ICD-10

The screenshot shows the WHO ICD-10 browser interface. The browser address bar displays 'apps.who.int/classifications/icd10/browse/2010/en'. The page title is 'ICD-10 Version:2010'. There is a search bar and a '[Advanced Search]' button. A green 'ICD-10' button is visible. The main content area shows a hierarchical tree view of infectious diseases: 'ICD-10 Version:2010' > 'I Certain infectious and parasitic diseases' > 'A00-A09 Intestinal infectious diseases' > 'A00 Cholera' > 'A00.0 Cholera due to Vibrio cholerae 01, biovar cholerae', 'A00.1 Cholera due to Vibrio cholerae 01, biovar eltor', 'A00.9 Cholera, unspecified'. Below the tree view, there is a section titled 'International Statistics' with the text 'You may browse the classification by...' and 'More information on how to...'. A mouse cursor is visible over the 'More information' text.

Followed by search at UMLS webpages

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UMLS Terminology Services
SNOMED CT Browser

Unified Medical Language System®

UTS Home Applications SNOMED CT Resources Downloads Documentation UMLS Home

Search Tree Recent Searches

SNOMED CT Version: 2011_07_31

Term ConceptID DescriptionID

dyspnea at exertion Go

Active concepts only:

Restrict results to: --None--

Search Results (1)

[60845006](#) Dyspnea on exertion

Report View

Concept: [60845006] Dyspnea on exertion

UMLS information

CUI: [C0231807] Dyspnea on exertion

Semantic Types: [Sign or Symptom](#) [T184]

ConceptStatus	IsPrimitive	SnomedId	CTV3Id
Current (0)	1	F-20050	X76Gz

Descriptions (10)

Id	Description	Type
799842016	Dyspnea on exertion (finding)	FullySpecifiedName (3)

SNOMED-CT browser

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UMLS metathesaurus browser

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Descriptions (10)

Id	Description	Type
799842016	Dyspnea on exertion (finding)	FullySpecifiedName (3)

RESULTS

UMLS

SNOMED-CT

ICD 10

ICPC 2

English

French

84	C0036916	Sexually Transmitted Diseases	Disease or Syndrome	CSP/PT	diseases due to or propagated by sexual contact.	822200015	Sexually transmitted infectious disease (disorder)	(A50-A64)	Infections with a predominantly sexual mode of transmission	Y	Male Genital	Sexually transmitted diseases	infection sexuellement transmissible
85	C0036916	Sexually Transmitted Diseases	Disease or Syndrome	CSP/PT	diseases due to or propagated by sexual contact.	822200015	Sexually transmitted infectious disease (disorder)	(A50-A64)	Infections with a predominantly sexual mode of transmission	X	Female Genital	Sexually transmitted diseases	infection sexuellement transmissible
86	C0018801	Heart failure	Disease or Syndrome	CSP/PT	inability of the heart to pump blood at an adequate rate to fill tissue metabolic requirements or the ability to do so only at an elevated filling pressure.	825890014	Heart failure (disorder)	I50	Heart failure	K77	Heart failure	Cardiac insufficiency	insuffisance cardiaque
87	C0264714	Acute heart failure	Disease or Syndrome	-	-	795213010	Acute heart failure (disorder)	I50	Heart failure	K77	Heart failure	Acute cardiac insufficiency	insuffisance cardiaque aiguë
88	C2960127	Heart failure with normal ejection fraction	Disease or Syndrome	-	-	2881211010	Heart failure with normal ejection fraction (disorder)	I50	Heart failure	K77	Heart failure	Cardiac insufficiency with preserved ejection fraction	insuffisance cardiaque avec fraction d'éjection préservée (FEV>50%)
89	C0264728	Low output heart failure	Disease or Syndrome	-	-	755874010	Low output heart failure (disorder)	I50	Heart failure	K77	Heart failure	Cardiac insufficiency with low ventricular ejection fraction	insuffisance cardiaque avec fraction d'éjection ventriculaire (FEV) diminuée

Cardiomyopathy: very generic; open to 3 ICPC rubrics

Code_UMLS	CUI_UMLS	umls_sem_type	umls_def_source	def_umls	SOMED-CT ID	SNOMED-CT FSN	ICD_10_code	ICD_10_term	ICPC_code	ICPC_2_title	Items < RBP (French)
Co878544	Cardiomyopathies	Disease or Syndrome	CSP/PT	condition in which there is a deviation from or interruption of the normal structure or function of the myocardium, the middle and thickest layer of the heart wall, composed of heart muscle.	828047013	Cardiomyopathy (disorder)	I42	Cardiomyopathy	K84	Heart disease other	cardiomyopathi
Co685703	Congenital hypertrophy of cardiac ventricle	Congenital abnormality / Disease or Syndrome	-	-	836735012	Congenital hypertrophy of cardiac ventricle (disorder)	I42.4	Congenital cardiomyopathy	K73	Congenital anomaly cardiovascular	cardiomyopathi
C1960867	Ischemic congestive cardiomyopathy	Disease or Syndrome	-	-	2661468018	Ischemic congestive cardiomyopathy (disorder)	I25.5	Ischaemic cardiomyopathy	K76	Ischaemic heart disease w/o angina	cardiomyopathi
Co007192	Cardiomyopathy, Alcoholic	Disease or Syndrome	NCI/PT	A dilated cardiomyopathy which is associated with consumption of large amounts of alcohol over a period of years.	825173017	Dilated cardiomyopathy secondary to alcohol (disorder)	I42.6	Alcoholic cardiomyopathy	K84 + P15	Heart disease other + Chronic alcohol abuse	cardiomyopathi alcoologique
Co007192	Cardiomyopathy, Alcoholic	Disease or Syndrome	NCI/PT	A dilated cardiomyopathy which is associated with consumption of large amounts of alcohol over a period of years.	138527014	Alcoholic cardiomyopathy (Syn.)	I42.6	Alcoholic cardiomyopathy	K84 + P15	Heart disease other + Chronic alcohol abuse	cardiomyopathi alcoologique

Alcoholic cardiomyopathy, double coding needed in ICPC

Exact match in SNOMED-CT through synonym

Semantic mismatch

Looking for Dry mouth through UMLS SNOMED-CT browser

	UMLS			UMLS def		SNOMED-CT	ICD-10		ICPC-2	English	French	
C0043352	Xerostomia	Finding	CSP/PT	dryness of the mouth due to salivary gland secretion dysfunction.	830247014	Aptyalism (disorder)	R68.2	Dry mouth, unspecified	D20	Mouth/tongue/lip symptom/complt.	Dry mouth	bouche sèche
C0478155	Dry mouth, unspecified	Sign or Symptom	-	-	593253013	[X]Dry mouth, unspecified (disorder)	R68.2	Dry mouth, unspecified	D20	Mouth/tongue/lip symptom/complt.	Dry mouth	bouche sèche

in UMLS semantic type, in SNOMED (semantic tag) used for meaning precision

First row; from links to right :
dry mouth preferred term is **Aptyalism (disorder)** in SNOMED-CT
Corresponding to **Xerostomia/finding** in UMLS

Second row; from right to link :
Coming back from UMLS **Dry mouth, unspecified/sign or Symptom**
corresponding to **[X]Dry mouth, unspecified (disorder)** in SNOMED-CT
[X] means that this occurrence is not more in use

Looking for Sexual problems through UMLS SNOMED-CT browser

Generic term
3 ICPC rubrics

	UMLS		UMLS Def		SNOMED-CT		ICD		ICPC		
C0011124	Decreased Libido	Sign or Symptom	NCI /CT CA FPT A disorder characterized by a decrease in sexual desire.	825232010	Reduced libido (finding)	F52.0	Lack or loss of sexual desire	P07	Sexual desire reduced	Sexual problems	
C0497312	Sexual fulfilment reduced	Sign or Symptom	-	-	-	F52.1	Sexual aversion and lack of sexual enjoyment	P08	Sexual fulfilment reduced	Sexual problems	
C0242350	Erectile dysfunction	Disease or Syndrome	NCI /PT A disorder characterized by the persistent or recurrent inability to achieve or to maintain an erection during sexual activity.	1765722013	Impotence (disorder)	N48.4	Impotence of organic origin	Y07	Impotence NOS	Sexual problems	
C0555785	H/O:sexual problem - female	Finding	-	-	2610026018	History of - sexual problem - female (situation)	-	-	P	Psychological	Sexual problems
C0559168	H/O: male sex function problem	Finding	-	-	2610323016	History of - male sex function problem (situation)	-	-	P	Psychological	Sexual problems
C0549622	Sexual Dysfunction	Finding	NA N/P T Change in sexual function that is viewed as unsatisfying, unrewarding, inadequate	795491010	Abnormal sexual function (finding)	-	-	P	Psychological	Sexual problems	

And semantic discrepancies

More entries in SNOMED & UMLS
Male / female & Abnormal

Semantic markers very different

UMLS finding

≠

SNOMED finding

No symptoms in SNOMED

UMLS	#
Disease or Syndrome	80
Sign or Symptom	19
Finding	18
Pathologic function	12
diagnostic procedure	5
Mental or Behavioral Dysfunction	4
Mental process	4
Organism Attribute	3
Organism Function	3
Clinical Attribute	2
Congenital Abnormality	2
Injury or Poisoning	2
Neoplastic Process	2
Anatomical Abnormality	1
Functional Concept	1
Hazardous or Poisonous Substance	1
Health care activity	1
Individual Behavior	1
Intellectual product	1
Medical device	1
Organ or Tissue Function	1
Physiologic Function	1
Qualitative Concept	1
Quantitative Concept	1

UMLS semantic type distribution

SNOMED-CT	#
disorder	96
finding	28
observable entity	18
procedure	5
situation	2
qualifier value	2
event	2
substance	1
physical object	1
assessment scale	1

SNOMED-CT Semantic tag distribution

ICD 10	
Disease	92
Symptoms, signs & findings (Chap. R)	36
Factors influencing health status (Process) (Chapter Z)	3

ICD-10 Components distribution

ICPC	#
Diagnosis	85
Process	8
Symptom/complaint	43

ICPC Components distribution

Table 4 Semantic types and components identified in the guideline.

Very different world of reference

UMLS (source UMLS web pages)

Disease or Syndrome; A condition which alters or interferes with a **normal process, state, or activity of an organism. It is usually characterized by the **abnormal** functioning of one or more of the host's systems, parts, or organs. Included here is a complex of symptoms descriptive of a disorder.**

SNOMED-CT (source :IHTSDO web pages)(sic)

Disorders; necessarily **abnormal, temporal persistence, possibility of being treated, in remission, or quiescent even though the disorder itself still present with underlying pathological process.**

ICPC (source ; Wonca dictionary 2003)

Disease is a biological **dysfunction on basis of well-known pathological or pathophysiological processes or with a well-known etiology. Disease is a concept of reality and can therefore exist without a physician's judgment**

Discussion

Finding the correspondences between ICPC, ICD, SNOMED-CT & UMLS is difficult but possible

Many terms of the guidelines are very generic. Lack of precision could induce problems of interpretation

Semantic values of the terms are different in the 4 tools

World of reference of the 4 organisations are very different

A rich and sophisticated end-user terminology will be needed for implementation of guidelines in EHRs

Conclusion

The interface between language, clinical information, terminologies and classifications is hard to manage.

Next step:
from legacy nomenclatures, terminologies, classifications, lexicons, ontologies, to a well organised role distribution between them in the era of the semantic web.

