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Testing the French casemix system on a Belgian hospital discharge dataset: feasibility and challenges

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Summary

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The Belgian landscape

- Coding: ICD-10-CM & ICD-10-PCS *(since 2015 – earlier ICD-9-CM)*
- Grouping: APR-DRG
- Hospital data: inpatient & one-day stays

- Budget of acute hospitals:
  - ~ 40% fee-for-service (« mostly independent physicians)
  - ~ 40% prospective financing ("BFM") *~ DRG*
  - fixed fees for medication, medical imaging & biology and some pathologies with "low care variability" *~ DRG*
  - various income

The Belgian situation

- Political will to evolve to a new costing model:
  « all-in » activity based funding

- **BUT:**
  - What exactly will be IN the « all-in » ?
  - How much costs a hospitalization in each DRG/SOI-group ?

Aim of the study

- Test the French casemix system on a Belgian hospital discharge dataset
- **Why?**
  - France has a long experience with all-in payment
  - France has a similar demography and morbidity
  - France has a similar coding logic, including coding per specialism
  - France has a detailed cost assessment of each DRG/SOI
- **BUT:**
  - coding: CIM-10-FR & CCAM
  - grouping: GHM

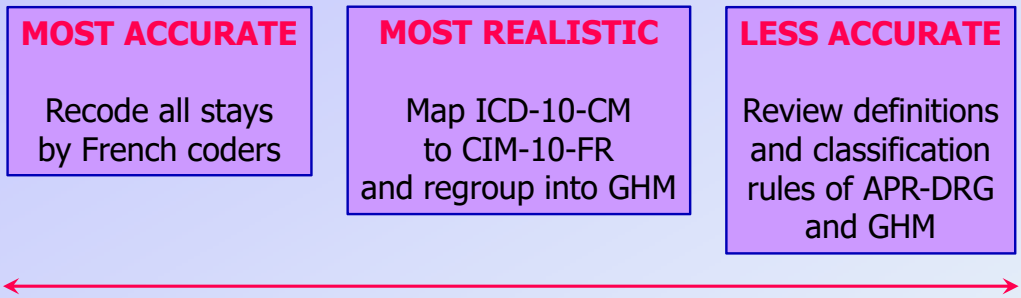
Materials

- HDDS of 8 Belgian hospitals (2019)
- ~ 250.000 hospital stays and one-day contacts
- No access to patient record

Methods

- How can we use/ convert Belgian hospital data
  - ICD-10-CM
  - ICD-10-PCS
  - APR-DRG's

  to group them into French GHM (DRG)?



Diagnoses at a glance

- **ICD-10-CM vs. CIM-10-FR** *(without external causes)*

Should be "doable": same ICD-root

ICD-10-CM	CIM-10-FR
64,676 codes	13,860 codes
laterality?	

What can we expect seeing this?

- some codes are identical
- some codes are more detailed in ICD-10-CM
- some codes are more detailed in CIM-10-FR

Procedures at a glance

- **ICD-10-PCS vs. CCAM**

  Will be "difficult":

  - **PCS**: anatomical point of view
    - e.g. partial resection of sigmoid ≅ sigmoid biopsy
  - **CCAM**: proprietary French system, also used for patient reimbursement

Going into details (1)

- 11.3% strictly identical codes [A]
- **BUT:** not necessary an identical content!

F06.30 Mood disorder due to known physiological condition, unspecified	F06.30 Trouble maniaque organique
F06.31 Mood disorder due to known physiological condition with depressive features Depressive disorder due to known physiological condition, with depressive features	F06.31 Trouble bipolaire organique
F06.32 Mood disorder due to known physiological condition with major depressive-like epi Depressive disorder due to known physiological condition, with major depressive-like epis	F06.32 Trouble dépressif organique
F06.33 Mood disorder due to known physiological condition with manic features Bipolar and related disorder due to a known physiological condition, with manic features Bipolar and related disorder due to known physiological condition, with manic- or hypomanic-like episodes	F06.33 Trouble affectif mixte organique
F06.34 Mood disorder due to known physiological condition with mixed features Bipolar and related disorder due to known physiological condition, with mixed features Depressive disorder due to known physiological condition, with mixed features	

Going into details (2)

- 79.9% more detailed codes at CM side [B]
- 2.5% more detailed codes at FR side [C]

B20 Human immunodeficiency virus [HIV] disease

Includes: acquired immune deficiency syndrome [AIDS]
AIDS-related complex [ARC]
HIV infection, symptomatic

I25.111 Atherosclerotic heart disease of native coronary artery with angina pectoris documented spasm

Excludes1: angina pectoris with documented spasm without atherosclerotic hear

I25.112 Atherosclerosic heart disease of native coronary artery with refractory angi

I25.118 Atherosclerotic heart disease of native coronary artery with other forms of

Excludes1: other forms of angina pectoris without atherosclerotic heart disease (

I25.119 Atherosclerotic heart disease of native coronary artery with unspecified ang
Atherosclerotic heart disease with angina NOS
Atherosclerotic heart disease with ischemic chest pain

Excludes1: unspecified angina pectoris without atherosclerotic heart disease (I20.

B20	**Immunodéficience humaine virale [VIH], à l'origine de maladies infectieuses et parasitaires** ***À l'exclusion de :*** syndrome d'infection aigüe par VIH (B23.0)
B20.0	**Maladie par VIH à l'origine d'une infection mycobactérienne** Maladie par VIH à l'origine de tuberculose
B20.1	**Maladie par VIH à l'origine d'autres infections bactériennes**
B20.2	**Maladie par VIH à l'origine d'infections à cytomégalovirus**
B20.3	**Maladie par VIH à l'origine d'autres infections virales**
B20.4	**Maladie par VIH à l'origine de candidose**
B20.5	**Maladie par VIH à l'origine d'autres mycoses**
B20.6	**Maladie par VIH à l'origine de pneumopathie à Pneumocystis carinii** Maladie par VIH à l'origine d'une pneumopathie à Pneumocystis jirovecii
B20.7	**Maladie par VIH à l'origine d'infections multiples**
B20.8	**Maladie par VIH à l'origine d'autres maladies infectieuses et parasitaires**
B20.9	**Maladie par VIH à l'origine d'une maladie infectieuse ou parasitaire non précisée** Maladie par VIH à l'origine d'une infection SAI

Going into details (3)

	CHAPTER	A%	B%	C%
01	Certain infectious and parasitic diseases (A00-B99)	61,6%	36,8%	1,6%
02	Neoplasms (C00-D49)	30,6%	66,7%	2,7%
03	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism (D50-D89)	65,6%	34,4%	0,0%
04	Endocrine, nutritional and metabolic diseases (E00-E89)	41,1%	52,6%	6,3%
05	Mental, Behavioral and Neurodevelopmental disorders (F01-F99)	29,3%	10,8%	59,9%
06	Diseases of the nervous system (G00-G99)	39,0%	55,7%	5,3%
07	Diseases of the eye and adnexa (H00-H59)	1,7%	97,7%	0,6%
08	Diseases of the ear and mastoid process (H60-H95)	1,3%	98,7%	0,0%
09	Diseases of the circulatory system (I00-I99)	31,8%	63,5%	4,7%
10	Diseases of the respiratory system (J00-J99)	56,8%	38,5%	4,7%
11	Diseases of the digestive system (K00-K95)	42,1%	55,5%	2,4%
12	Diseases of the skin and subcutaneous tissue (L00-L99)	44,4%	54,4%	1,2%
13	Diseases of the musculoskeletal system and connective tissue (M00-M99)	12,8%	76,6%	10,5%
14	Diseases of the genitourinary system (N00-N99)	48,7%	43,5%	7,9%
15	Pregnancy, childbirth and the puerperium (O00-O9A)	7,4%	91,9%	0,7%
16	Certain conditions originating in the perinatal period (P00-P96)	69,5%	27,6%	2,9%
17	Congenital malformations, deformations and chromosomal abnormalities (Q00-Q99)	68,0%	31,7%	0,3%
18	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified (R00-R99)	49,4%	48,4%	2,2%
19	Injury, poisoning and certain other consequences of external causes (S00-T88)	0,1%	99,9%	0,0%
21	Factors influencing health status and contact with health services (Z00-Z99)	31,9%	55,5%	12,5%

And many other challenges …

- Differences in **code combination**
  - e.g. HIV-infection: CM use additional code
    FR combinated codes
- Differences in **code sequencing**
  - e.g. *code first* vs. *use additional code*
- Codes / categories that **completely do not match**
  - e.g. dengue fever: CM A90–A91
    FR A97.-
- Extensive use of **chapter 'U'** (Codes for special purposes) in France

Dealing with this …

- Use of NLP on **French code title wording** (CM ↔ FR)
  → neutralizing the laterality
  → attribution of confidence indicator (%)
- Comparison on **base severity of each code** (APR-DRG ↔ GHM)
  → attribution of severity gap
- **Manually review by 2 experimented coders**
- Review and validated mapping table limited (today)
  to 15,800 ICD-10-CM codes present in our sample!

Dealing with procedures

- Use of NLP on **French code title wording** (PCS ↔ CCAM)
  → low confidence indicator because of a totally different semantic logic
- Comparison on **CCAM chapter** and **organ system**
  → creating logical groups
- **Manually mapping by 2 experimented coders**
- Review and validated mapping table limited (today)
  to 5,200 ICD-10-PCS codes present in our sample!

Behind the code mapping

- Our goal: use of the mapping table to regroup into French GHM
- **BUT:**
  - different coding rules and conventions (e.g. code sequencing rules) can bias correct GHM attribution
  - much 'unspecified' codes are rejected as PDX
  - some medical concepts require more precision in the target system
- These problems can only be addressed by chart review
- An illustration of the importance of good coding quality
  … and good 'coding culture'

Discussion

- It's a first step … It's feasible, but it's a really challenge!
- A priori unexpected observations:
  - greater differences between ICD-10-CM and CIM-10-FR than expected
  - different code granularity per chapter in both systems
  - differences in principal diagnose code assignment
  - a huge difference in procedure coding logic and assignment method
- Some variations between both coding systems are, from a scientific point of view, difficult to explain

Conclusions

- Very much people – from coders to policy makers – do not realize that
  international classification
  does not mean
  universal classification
- Looking forward to ICD-11, a first lesson learned is to
  avoid country specific coding systems with different granularity
  to enhance international comparisons and supranational interoperability

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Questions

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Thank you

Hvala vam