

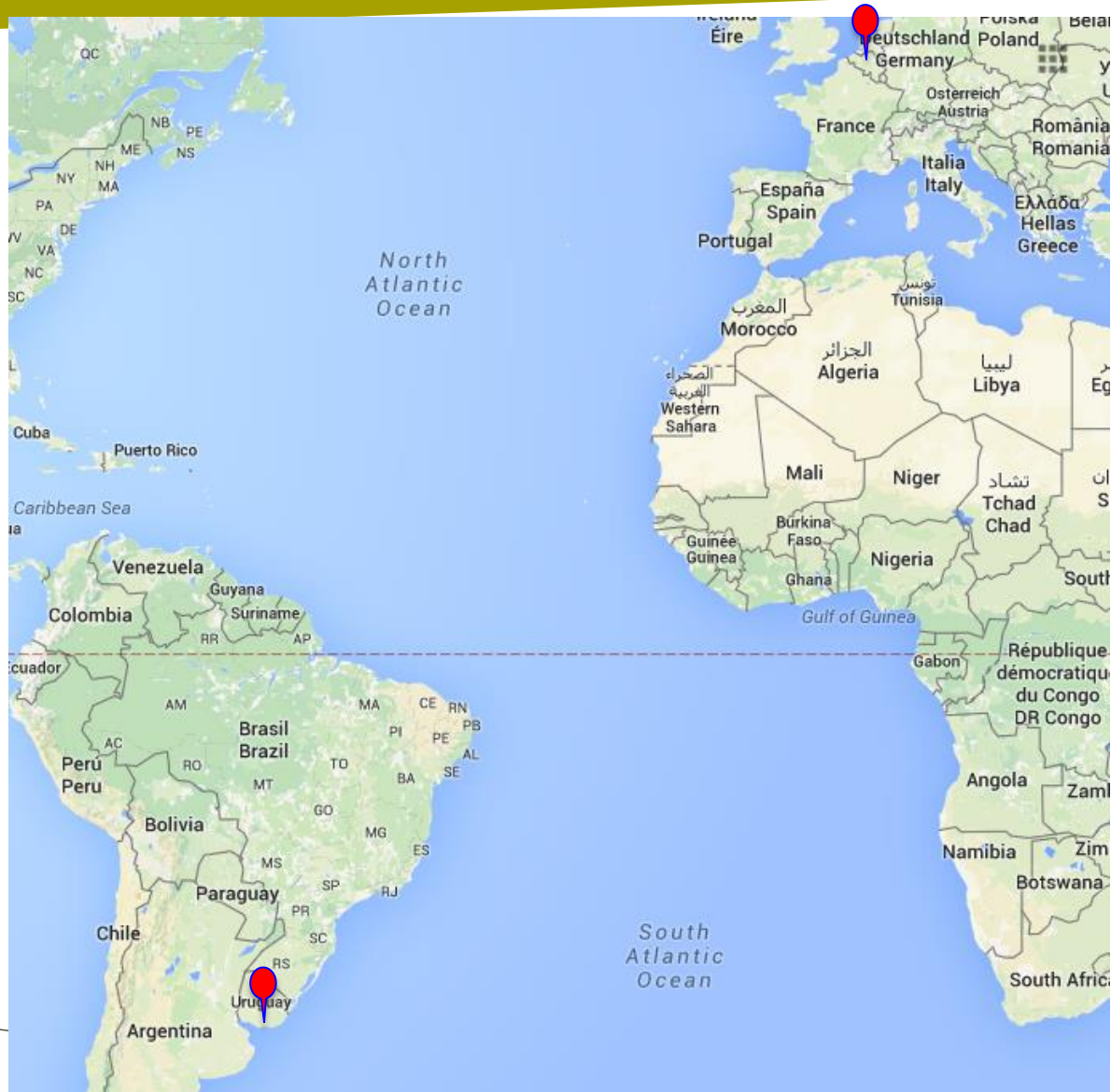
Extracting mappings based on existing mappings between SNOMED CT and ICD-10-CM

Sven Van Laere

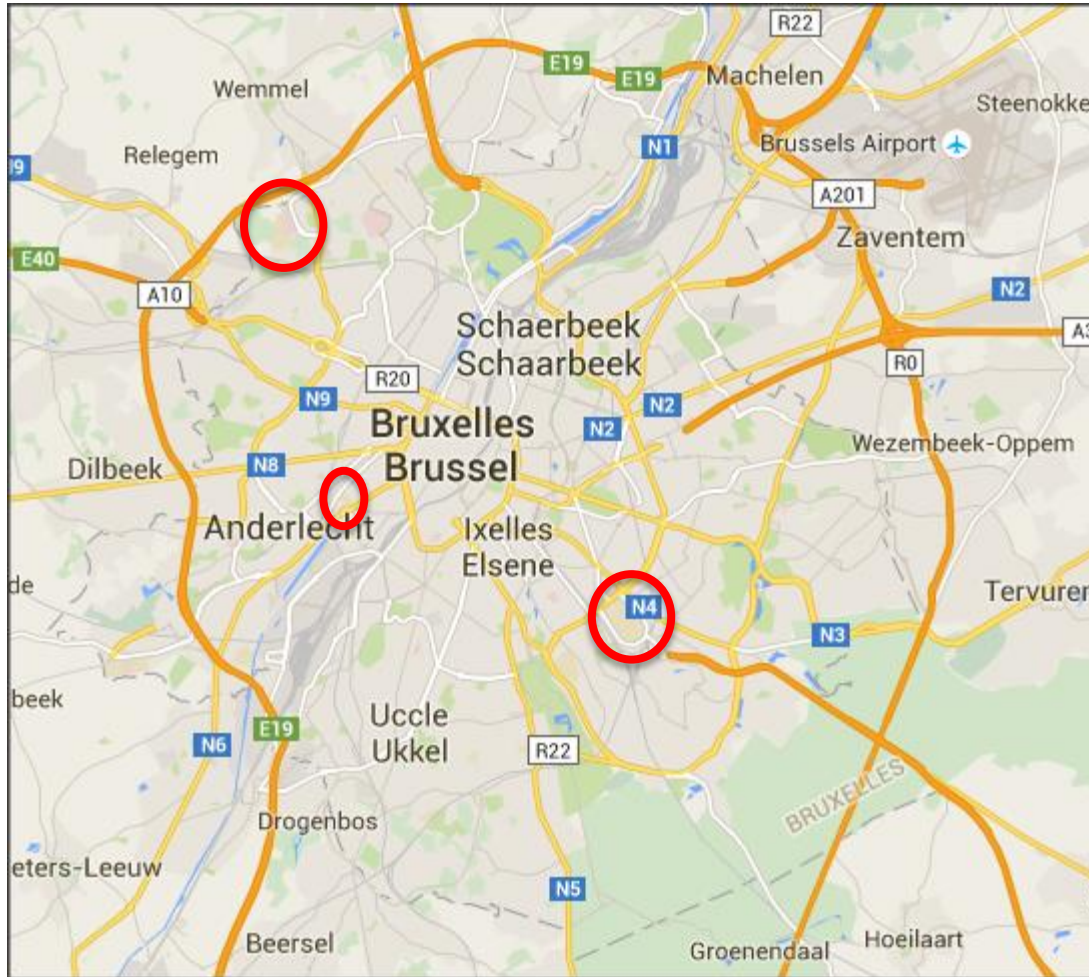
30 October 2015

@ SNOMED CT Expo – Montevideo, Uruguay

Location



Location



Location





- *Motivation*

- Healthcare with too many standards

- ICPC-2
- SNOMED CT
- ICD-10-CM

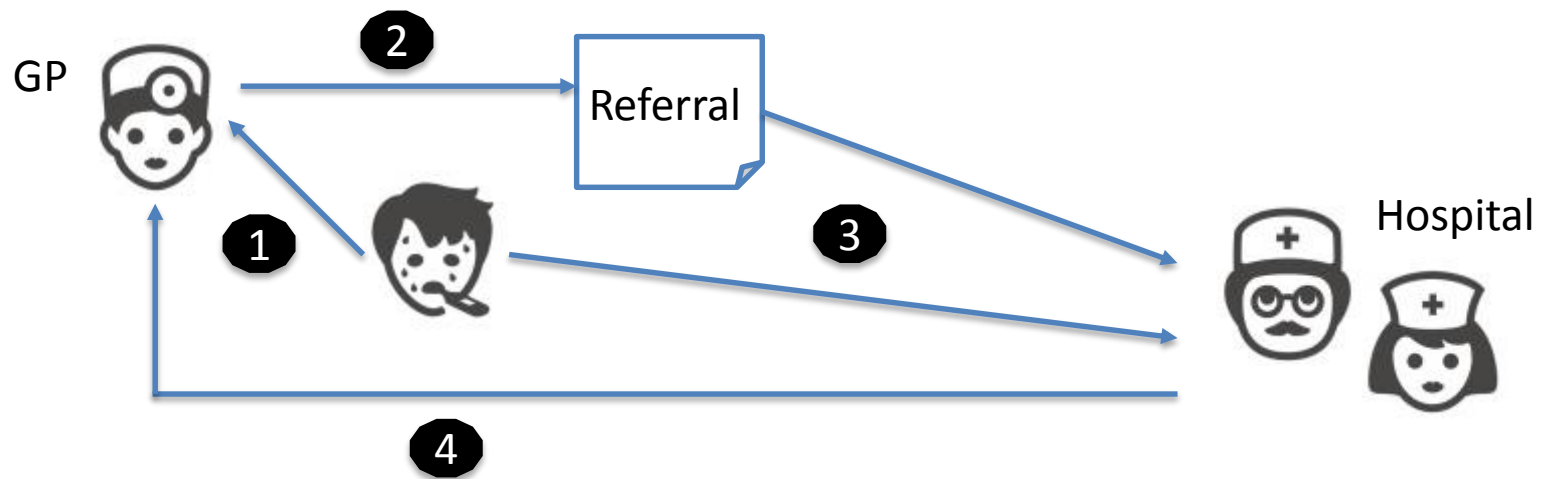
- Different purposes

- | | | |
|-------------|----------|----------------|
| • ICPC-2 | used by | GP |
| • SNOMED CT | used for | coding |
| • ICD-10-CM | used for | reimbursements |

Motivation



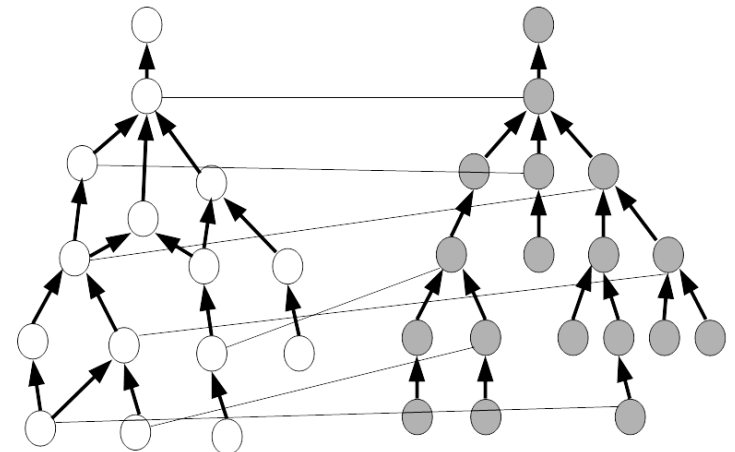
- *Motivation*
 - No continuity in healthcare



Solution



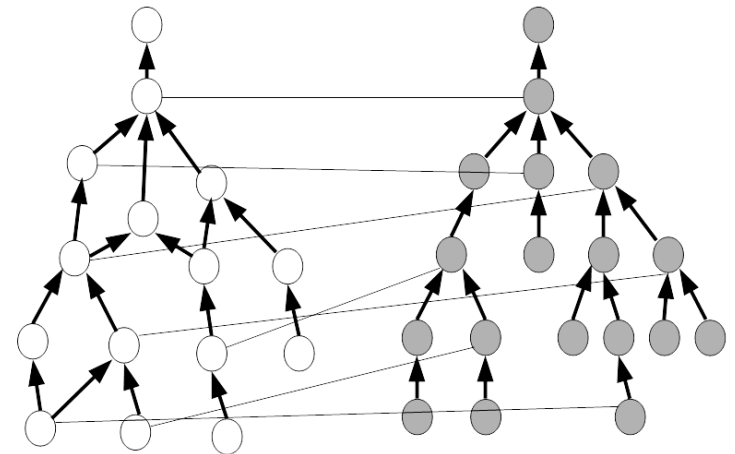
- *Mappings to SNOMED CT bring a solution*
 - Consider the **place in the hierarchy** of a terminology standard
 - Consider the **semantics** of a concept
 - Consider the **relationship** with other concepts **around a concept**



Solution

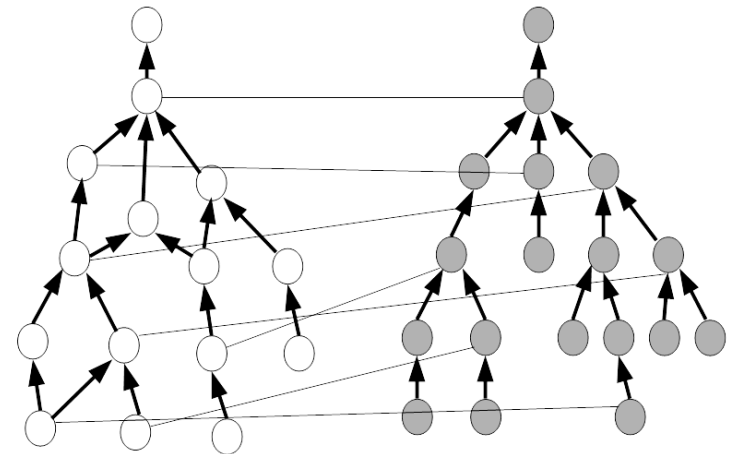


- *How to map...*
 - Manual mapping
human knowledge of medical experts,
linguists, terminology experts, ...
 - Semi-automatic mapping
Computer algorithm
identifies candidate
mappings based on
descriptions (human
review necessary)



Idea

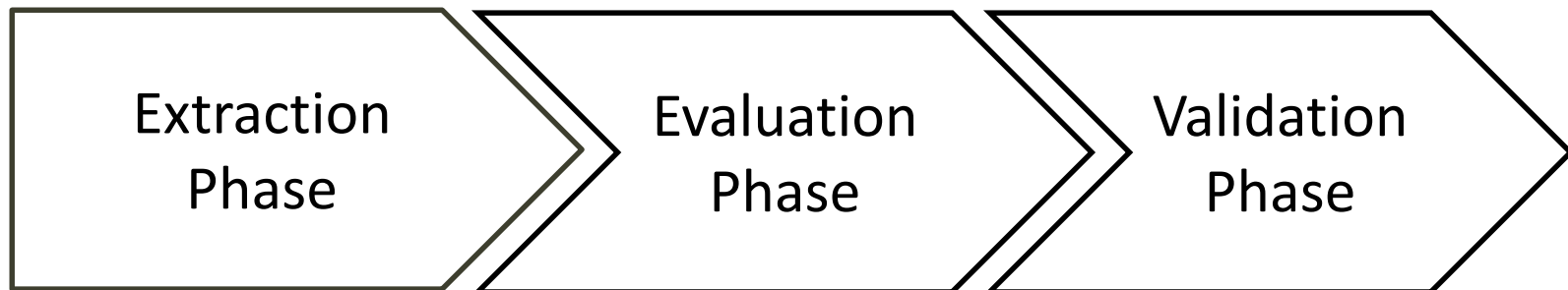
When a mapping between two concepts exist, it is possible to find a new equivalence relationships between the parents of these concepts.



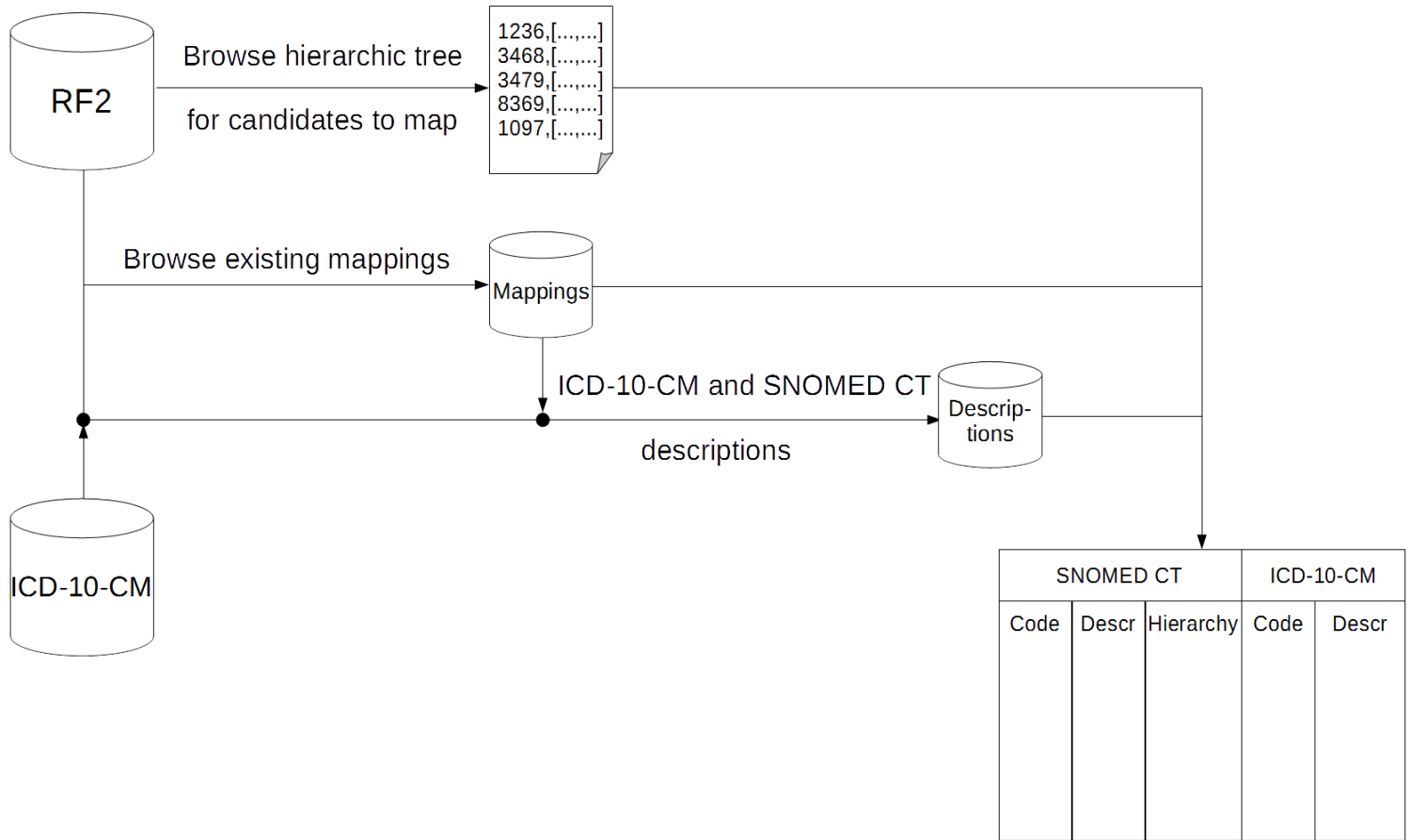
Test case



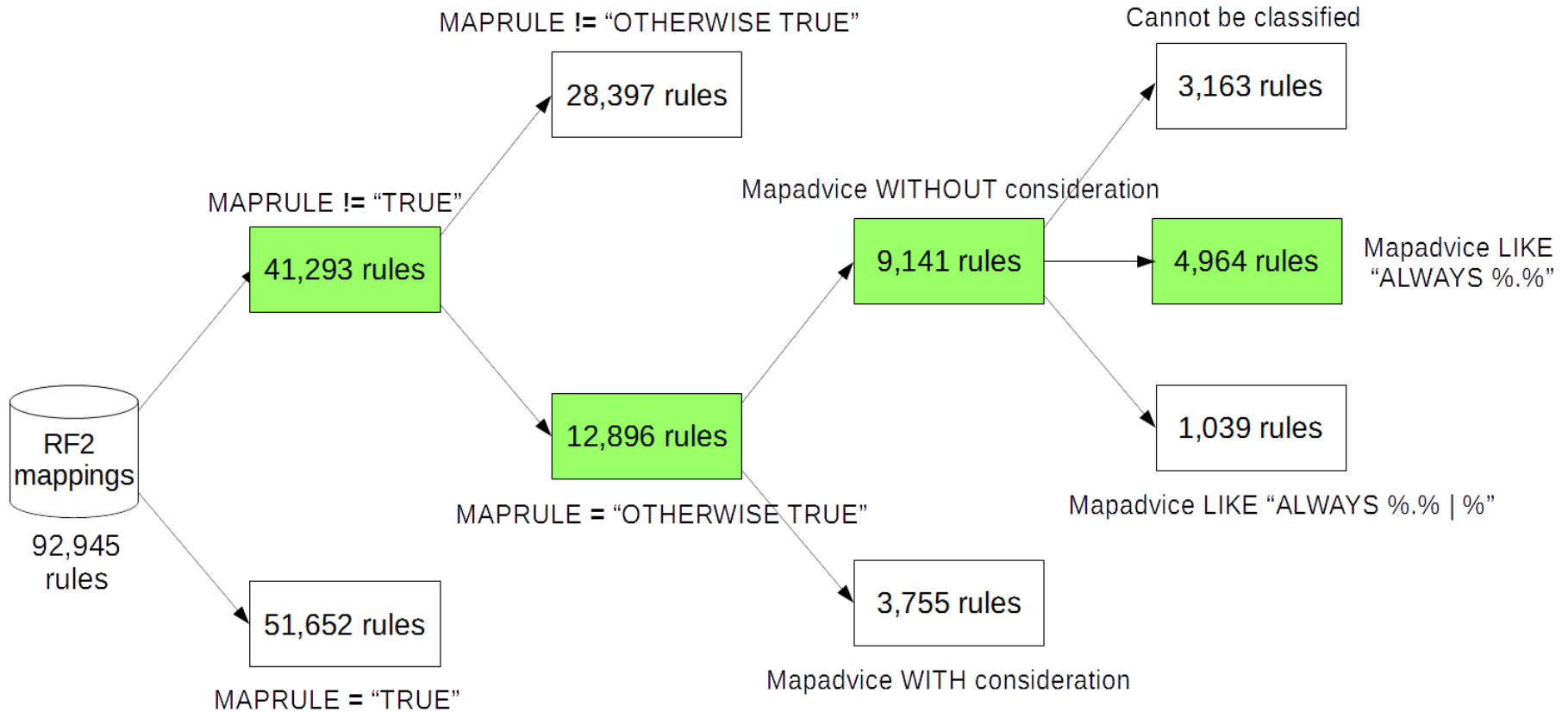
- SNOMED CT to ICD-10-CM
 - Extraction phase
 - Evaluation phase
 - Validation phase



Test case – extraction phase



Test case – extraction phase



Test case – extraction phase

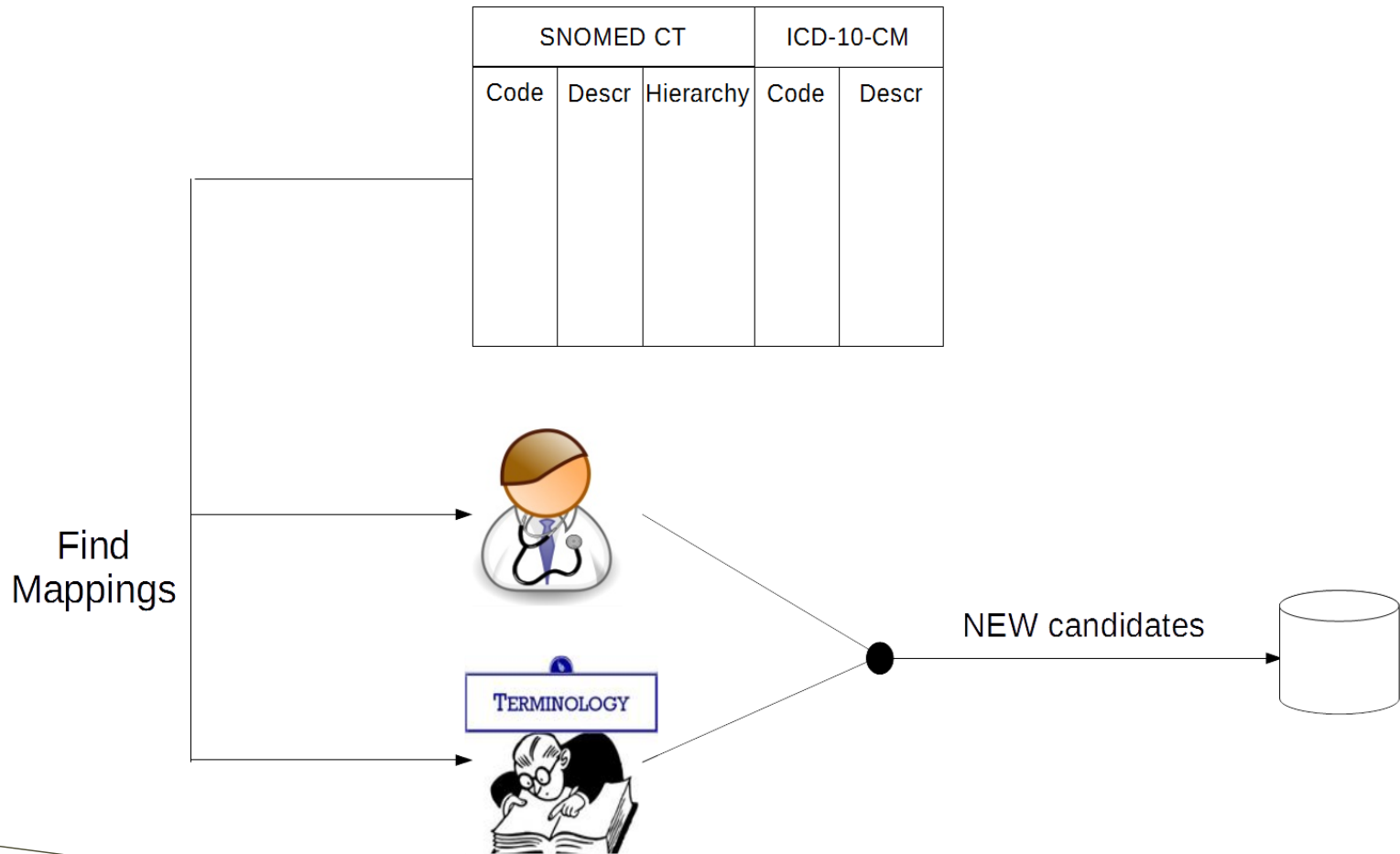


- 4,964 mapping rules to start

FUNGAL MENINGITIS

1. 24321005 **maps to** B39.5
 if histoplasma duboisii with meningitis
2. 24321005 **maps to** B39.4
 if histoplasma capsulatum with meningitis
3. ...
4. ...
5. ...
6. ...
7. **24321005 maps to B49 in every other case**

Test case – evaluation phase



Test case – evaluation phase



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Terminologist

Ba Applied Informatics,
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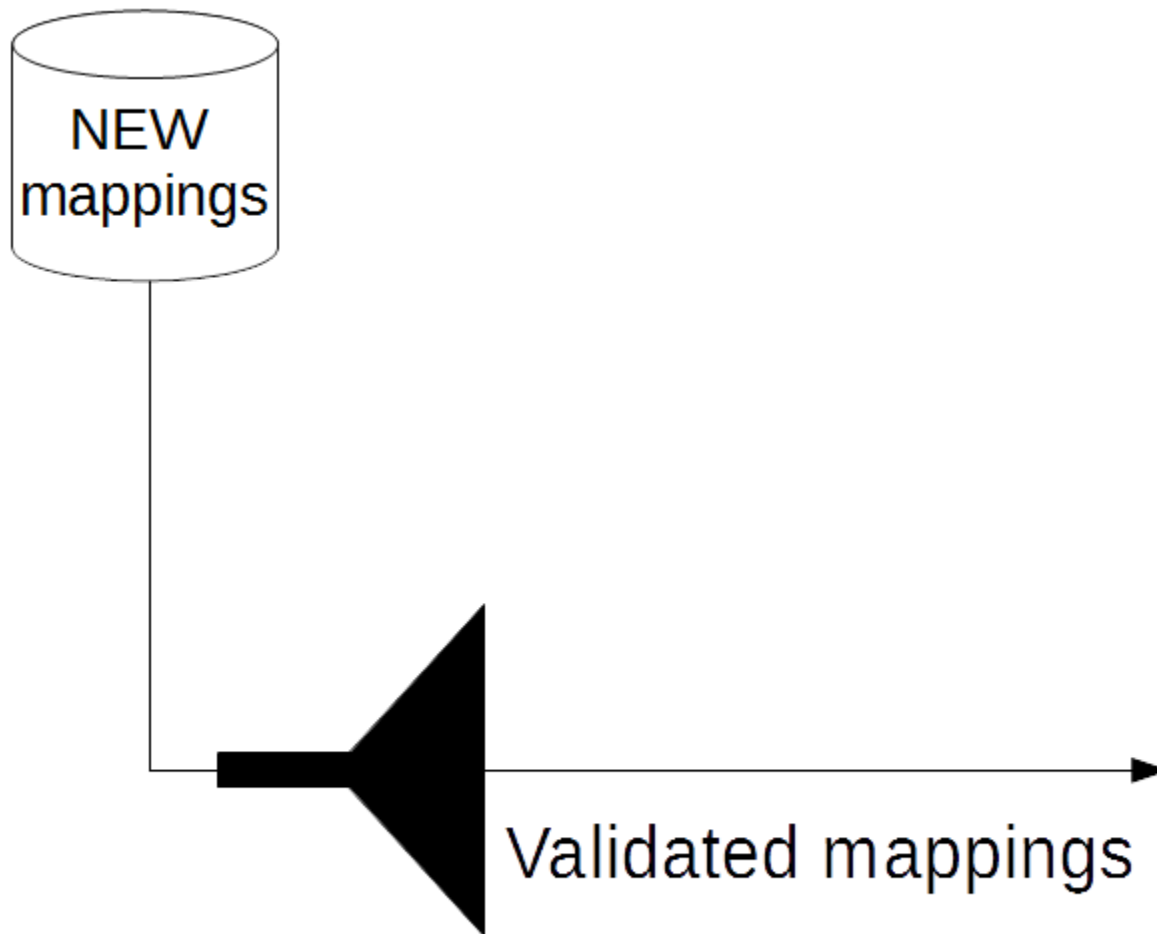
Test case – evaluation phase



- 10 test cases for evaluation
 - randomly chosen based on number of hierarchic relations
- 3/10 success

When a **mapping** between two concepts **exist**, it is possible to find a **new equivalence relationships** between the **parents** of these concepts

Test case – validation phase



Test case – validation phase



- Validation
 - Are the new found mappings really NEW?
 - 2/3 newly found mappings didn't meet this criterium
 - 1/3 was completely NEW
 - Can other relationships be found in this validation phase?
 - ICD-10-CM is a classification that sometimes groups 2 concepts
 - Parent in SNOMED CT maps to same ICD-10-CM code as child
 - In some existing mappings, parents cannot be mapped



Intermezzo – ICD-10-CM

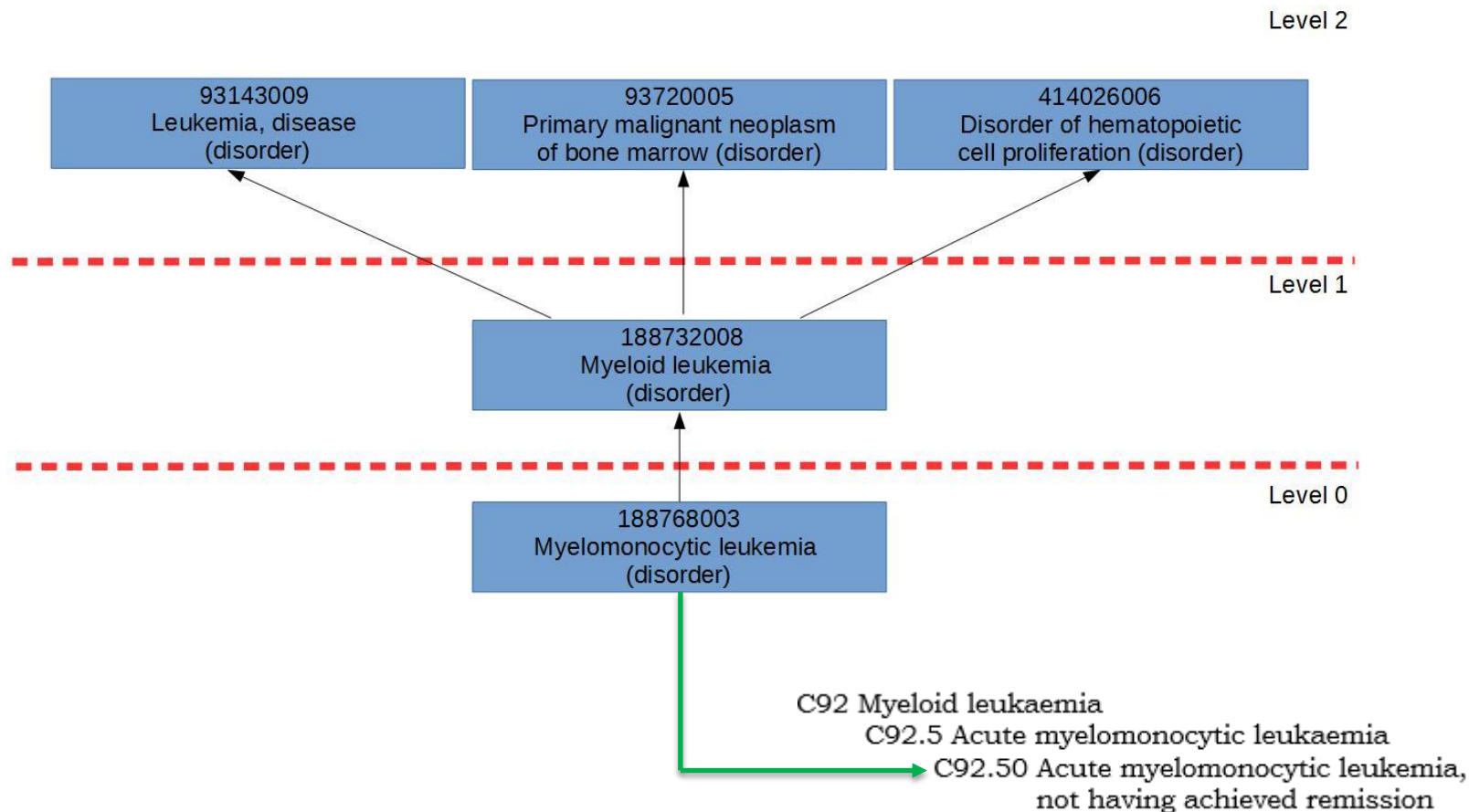
- ICD-10-CM code
 - 21 chapters

• A00-B99	☞	Certain infectious and parasitic diseases
• C00-D49	☞	Neoplasms
• D50-D89	☞	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism
• E00-E89	☞	Endocrine, nutritional and metabolic diseases
• F01-F99	☞	Mental, Behavioral and Neurodevelopmental disorders
• G00-G99	☞	Diseases of the nervous system
• H00-H59	☞	Diseases of the eye and adnexa
• H60-H95	☞	Diseases of the ear and mastoid process
• I00-I99	☞	Diseases of the circulatory system
• J00-J99	☞	Diseases of the respiratory system
• K00-K95	☞	Diseases of the digestive system
• L00-L99	☞	Diseases of the skin and subcutaneous tissue
• M00-M99	☞	Diseases of the musculoskeletal system and connective tissue
• N00-N99	☞	Diseases of the genitourinary system
• O00-O9A	☞	Pregnancy, childbirth and the puerperium
• P00-P96	☞	Certain conditions originating in the perinatal period
• Q00-Q99	☞	Congenital malformations, deformations and chromosomal abnormalities
• R00-R99	☞	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified
• S00-T88	☞	Injury, poisoning and certain other consequences of external causes
• V00-Y99	☞	External causes of morbidity
• Z00-Z99	☞	Factors influencing health status and contact with health services

- Codes of 3, 4, 5, 6 or 7 digits

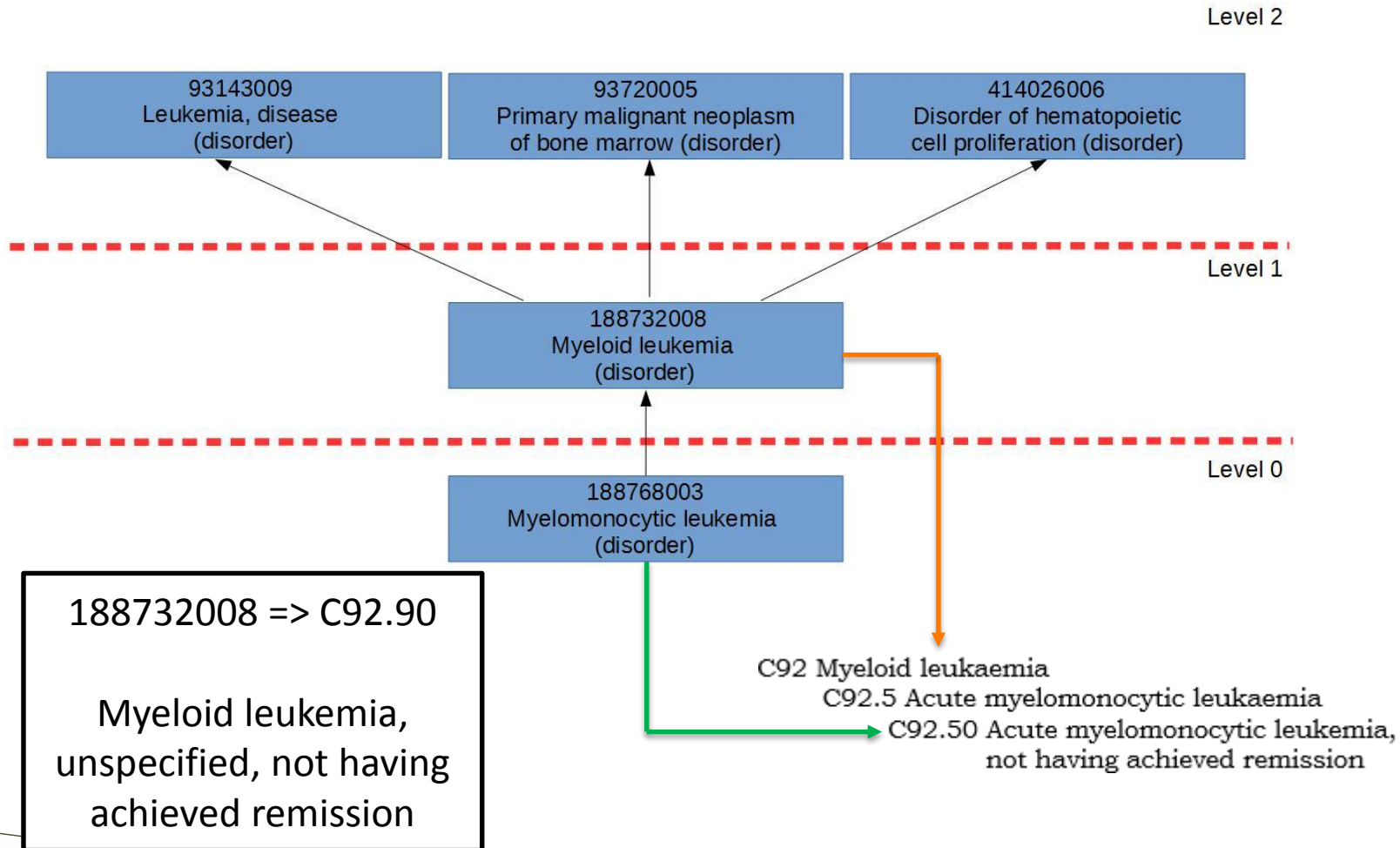


Findings - existing mapping

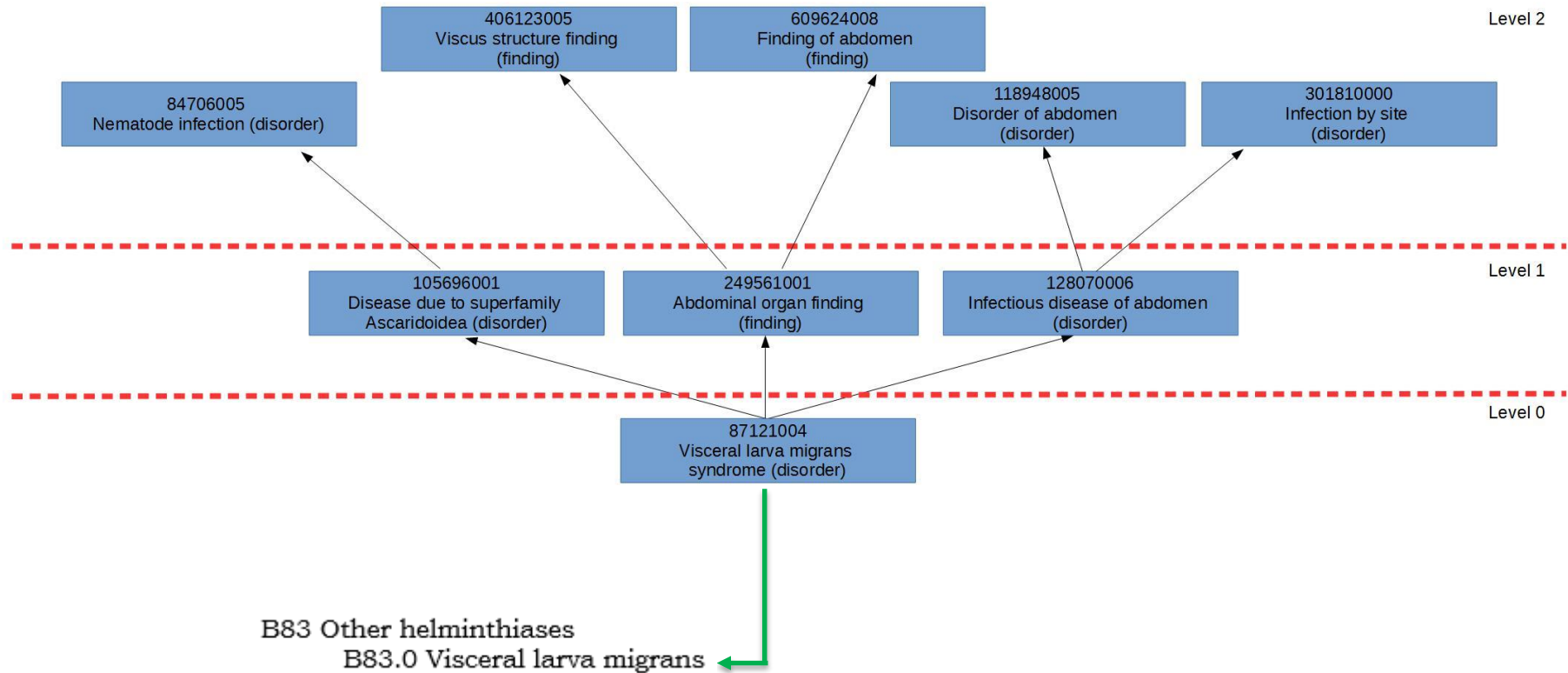


Existing mapping

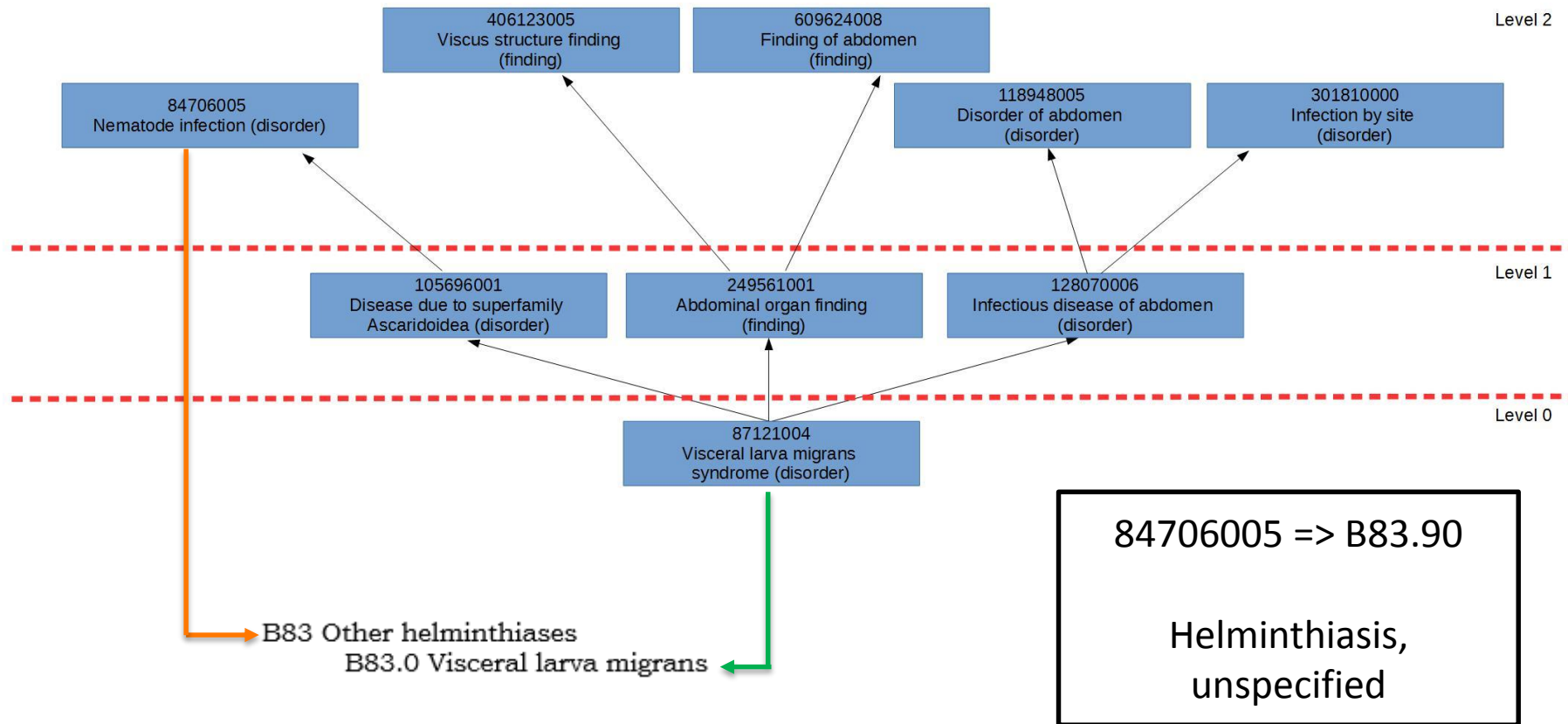
Findings - existing mapping



Findings – new mapping



Findings – new mapping



Findings – ICD classification



Level 2

84229001
Fatigue
(finding)

418799008
Finding reported by subject or
history provider (finding)

Level 1

272060000
Fatigue - symptom
(finding)

Level 0

267031002
Tiredness symptom
(finding)

→ R53 Malaise and fatigue
R53.8 Other malaise and fatigue
R53.83 Other fatigue ←

→ Existing mapping
→ POSSIBLE mapping

Findings – ICD classification



Level 2

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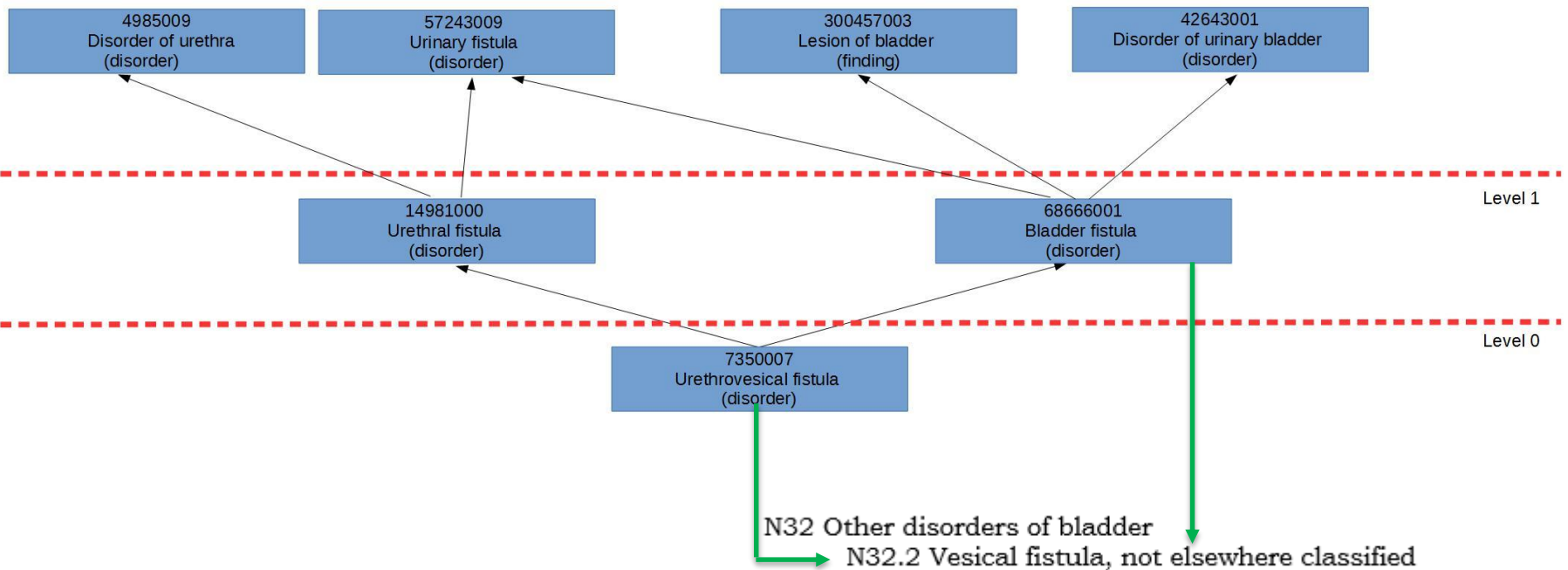
→ R53 Malaise and fatigue
R53.8 Other malaise and fatigue
R53.83 Other fatigue ←

→ Existing mapping
→ POSSIBLE mapping

Findings – Parenting & Children



Level 2



Level 1

Level 0

Existing mapping

Findings – No parents in ICD



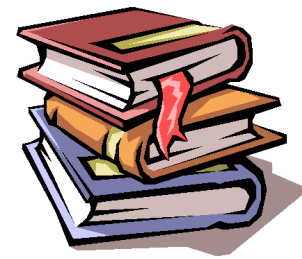
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No hierarchic parents to support our idea

Conclusions



- Motivation
 - Mappings to SNOMED CT can bring interoperability
 - Mappings can ease the coding issue for billing
 - “Code once” principle
- Findings
 - Method of looking to parents WORKS
 - 2 mappings already existed
 - 1 mapping was new
 - SNOMED is more comprehensive=>
 - ICD-10-CM code includes 2 distinct clinical thoughts
 - mapping of parent to child mapped concepts is possible
 - Using this approach is sometimes just not possible

Thank You For Listening

Any Questions?



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