epSOS

Introduction to Semantic Services

AGENCE DES SYSTÈMES D'INFORMATION PARTAGÉS DE SANTÉ

January 26th, 2010

Once upon a time…….

Semantic Interoperability
WP 3.5

Once upon a time…….

- **Semantic Interoperability** is the ability of communicating entities to share unambiguous meaning
- **The sender of the document** must be able to reliably transmit all sufficient and necessary information
- **The receiver of the document** must be able to correctly interpret its interlocutor
- Both must be **aware of, and agree upon**, each other behaviors for given interactions.

Once upon a time…….

- **Semantic Interoperability** needs to have the same
  - Concepts
  - Syntax
  - Terminology

Flashback – April 2009

- Data elements being defined by functional work packages (WP3.1 and WP3.2)
- Elements need to be coded as much as possible
- Keep contextual meaning
- Different code systems
- Looking for already existing and tested solutions present in the industry
- Solution tested
- ==========
- Integration Statements (IHE) - 2 X Connectahon – proven solutions part of RFP – save time & costs
- (Semantic-tathon) - ?

Some…coded data elements

	A	B
1	**Number**	**Coded element name**
2	1	Patient Information
3	2	Patient Name
4	3	Family Name/Surname
5	4	Given Name
6	5	Gender
7	6	Birth Date
8	7	Patient Identifiers
9	8	Primary Patient Identifier
10	9	Regional/National Health Id
11	10	Secondary Patient Identifier
12	11	Social/Insurance Number
13	12	Patient Address
14	13	Street
15	14	Number of Street
16	15	City
17	16	Postal Code
18	17	State or Province
19	18	Country
20	19	Patient's Telecommunication
21	20	Telephone
22	21	E-mail

116	115	Duration of treament
117	116	Date of onset of treatment
118	117	Date of end of treatment
119	118	Instructions to patient
120	119	Advise to the dispenser
121	120	Substitution
122	121	Patient Summary
123	122	Allergy
124	123	Allergy Description
125	124	Allergy description id code
126	125	Allergy Onset Date
127	126	Allergy Agent Description
128	127	Allergy Agent Code
129	128	Medical Alerts
130	129	Medical Alert Information (other alerts not included in allergies)
131	130	Health Care Alert description
132	131	Health Care Alert Code
133	132	History of past illness and disorders
134	133	Problem Description
135	134	Problem Code

Flashback – April 2009

- **Tasks**
  - **T3.5.1**: Establishing a common definition of the medical knowledge to be used
  - **T3.5.2:** Examine the existing terminology used
  - **T3.5.3:** Determine a mechanism for managing terminology
  - **T3.5.4:** Defining a common clinical data structure
  - **T3.5.5.** Service specifications

9 MONTHS!!!

Results – January 2010

- D.3.5.2_Appendix_A_Glossary_v0.0.2_20100118.pdf
- D.3.5.2_Appendix_A_Glossary_v0.0.2_20100118.doc
- D3.5.2_Appendix_B_Data Elements Correspondence_v0.0.5_20100122.doc
- D3.5.2_Appendix_B_Data Elements Correspondence_v0.0.5_20100122.pdf
- D3.5.2_Appendix_C_Specifications_v0.0.5._Pivot_Documents_Specifications.doc
- D3.5.2_Appendix_C_Specifications_v0.0.5._Pivot_Documents_Specifications.pdf
- D3.5.2_Appendix_D_epSOS_Master_Value_Set_Catalogue_v0.0.2_20100118.doc
- D3.5.2_Appendix_D_epSOS_Master_Value_Set_Catalogue_v0.0.2_20100118.pdf
- D.3.5.2_Appendix_E_Ontology_v0.2_20100118.doc
- D.3.5.2_Appendix_E_Ontology_v0.2_20100118.pdf
- D3.5.2_Appendix_F_Terminology_Access_Services_v0.0.3_20100122.doc
- D3.5.2_Appendix_F_Terminology_Access_Services_v0.0.3_20100122.pdf
- D3.5.2_Appendix_G_EN13606_implementation_v20091007.doc
- D3.5.2_Appendix_G_EN13606_implementation_v20091007.pdf
- D3.5.2_epSOS_WP3_5_v0.0.4_20100125.doc
- D3.5.2_epSOS_WP3_5_v0.0.4_20100125.pdf
- epSOS_MTC_V0.01.xls
- epSOS_MVC_V0.82.xls

Approach to semantic interoperability

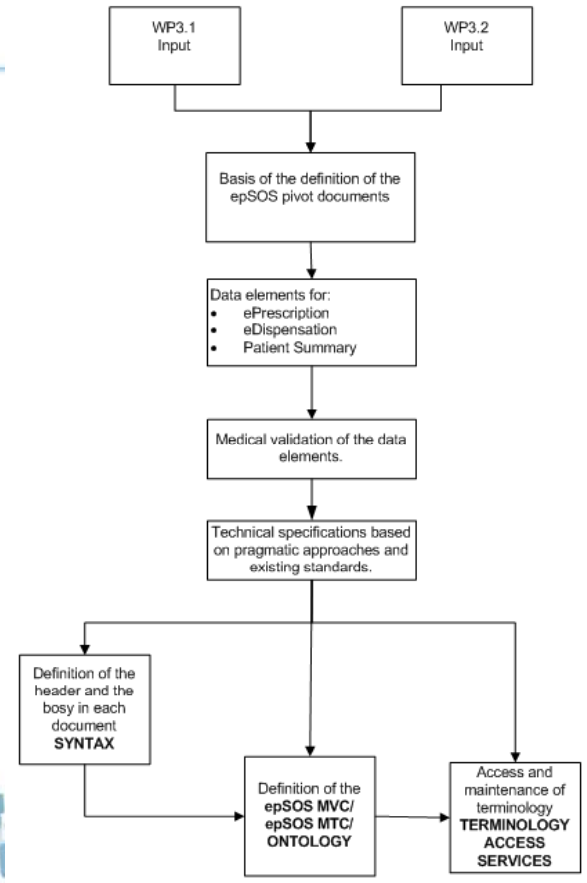
For Regulatory purposes, we'd like to enter this as "Data Element B"

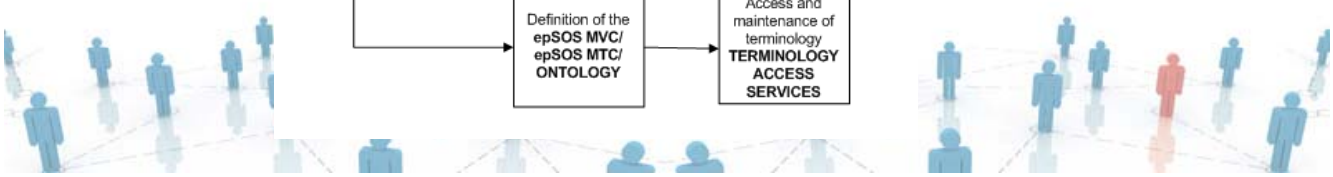
Syntax = How the data is structured (archetypes or templates)

Terminology = How the data is coded in different coding systems (LOINC, SNOMED)

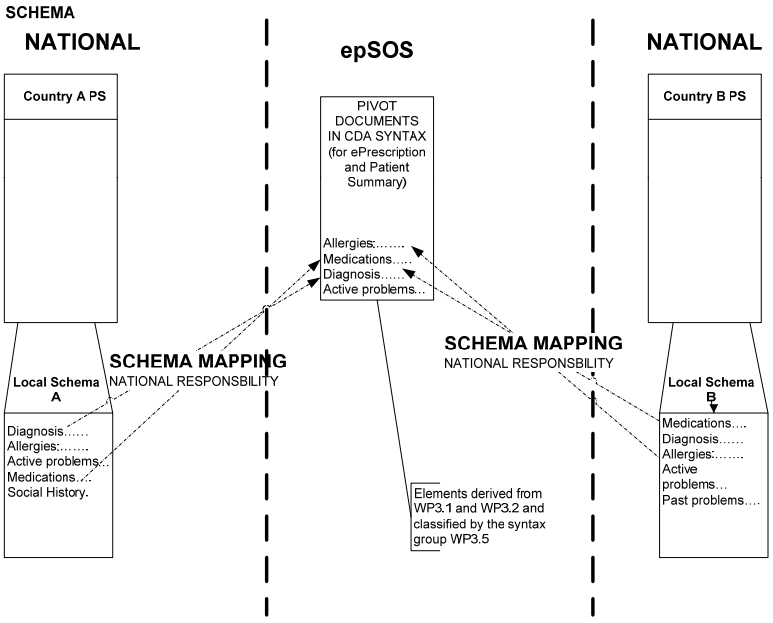
[Standards & Terminologies
The Drive to Achieve - Computable Semantic Interoperability - Charles Jaffe, MD, PhD]

General Methodology

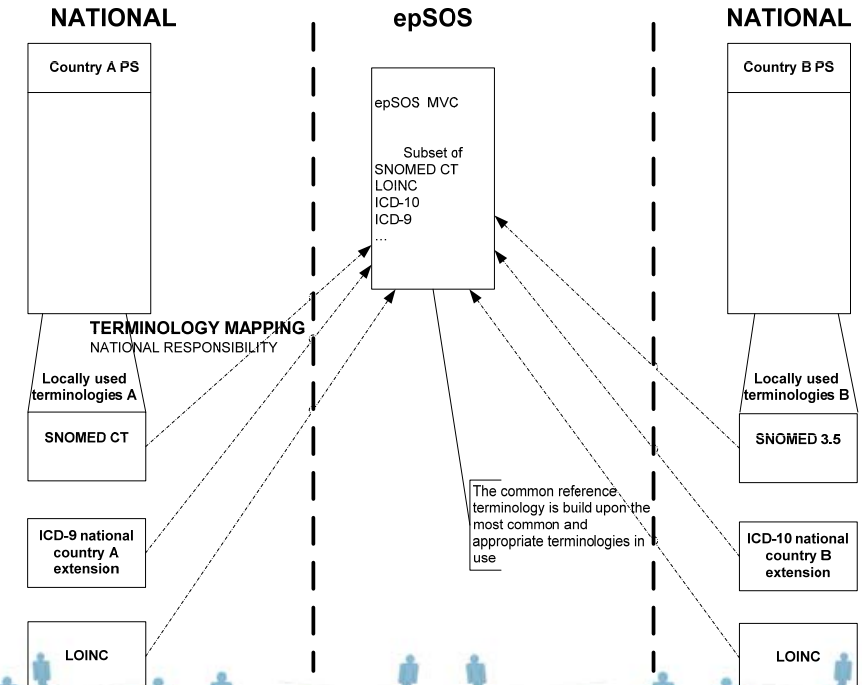




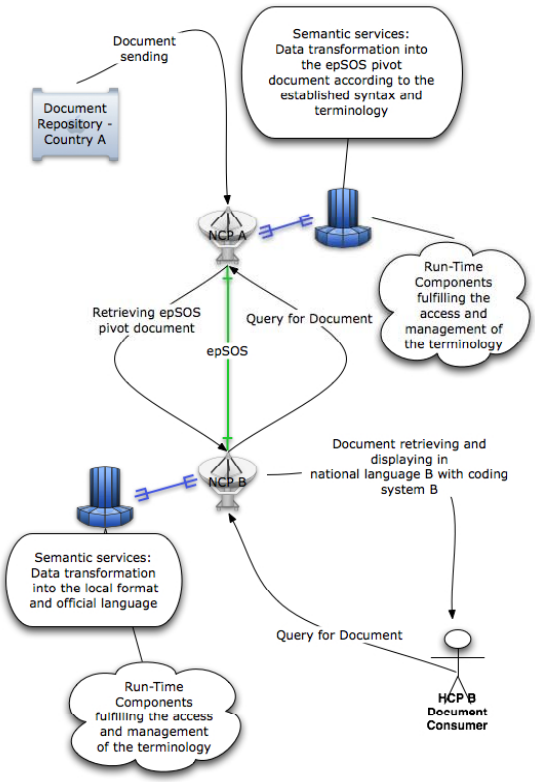
Syntax - Perimeter



Terminology - Perimeter

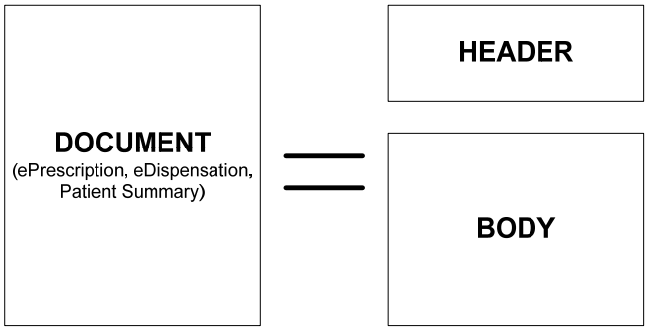


General Flow of Information



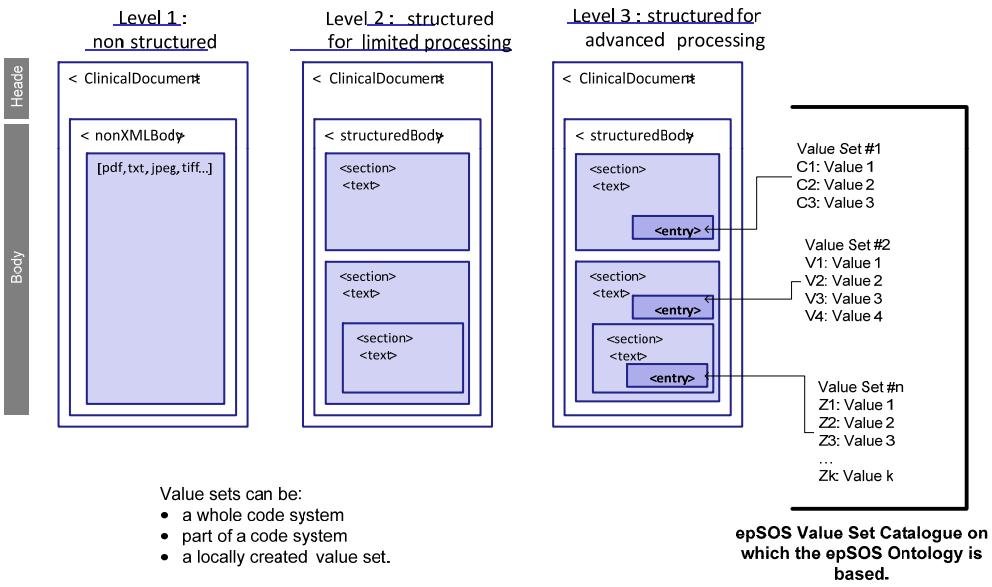
Document Structur

Data elements



Clinical Document Architecture

CDA: Three levels of structuration



Value sets can be:

- a whole code system
- part of a code system
- a locally created value set.

epSOS Value Set Catalogue on which the epSOS Ontology is based.

Clinical Document Architecture

```
<section>
   <code code="10153-2" codeSystem="2.16.840.1.113883.6.1"
    codeSystemName="LOINC"/>
   <title>Past Medical History</title>
   <text>
    There is a history of <content ID="a1">Asthma</content>
   </text>
-------------------------------------------------------------
   <entry>
      <observation classCode="OBS" moodCode="EVN">
         <code code="84100007"
          codeSystem="2.16.840.1.113883.6.96"
          codeSystemName="SNOMED CT"
          displayName="history taking (procedure)"/>
         <value xsi:type="CD" code="195967001"
          codeSystem="2.16.840.1.113883.6.96"
          codeSystemName="SNOMED CT"
          displayName="Asthma">
            <originalText>
               <reference value="#a1"/>
            </originalText>
         </value>
      </observation>
   </entry>
</section>
```

Narrative Block

Corresponding coded, structured part

IHE PCC Content Modules

History of Present Illness	(1.3.6.1.4.1.19376.1.5.3.1.3.4)
Hospital Course	(1.3.6.1.4.1.19376.1.5.3.1.3.5)
Active Problems	(1.3.6.1.4.1.19376.1.5.3.1.3.6)
Discharge Diagnosis	(1.3.6.1.4.1.19376.1.5.3.1.3.7)
History of Past Illness	(1.3.6.1.4.1.19376.1.5.3.1.3.8)
Encounter Histories	(1.3.6.1.4.1.19376.1.5.3.1.1.5.3.3)
History of Outpatient Visits	(1.3.6.1.4.1.19376.1.5.3.1.3.9)
History of Inpatient Visits	(1.3.6.1.4.1.19376.1.5.3.1.3.10)
List of Surgeries	(1.3.6.1.4.1.19376.1.5.3.1.3.11)
Coded List of Surgeries	(1.3.6.1.4.1.19376.1.5.3.1.3.12)
Allergies and Other Adverse Reactions	(1.3.6.1.4.1.19376.1.5.3.1.3.13)
Family Medical History	(1.3.6.1.4.1.19376.1.5.3.1.3.14)
Coded Family Medical History	(1.3.6.1.4.1.19376.1.5.3.1.3.15)
Pre-procedure Family Medical History	(1.3.6.1.4.1.19376.1.5.3.1.1.9.5)
Social History	(1.3.6.1.4.1.19376.1.5.3.1.3.16)
Functional Status	(1.3.6.1.4.1.19376.1.5.3.1.3.17)
Coded Functional Status	(1.3.6.1.4.1.19376.1.5.3.1.1.12.2.1)
Pain Scale Assessment	(1.3.6.1.4.1.19376.1.5.3.1.1.12.2.2)
Braden Score Assessment	(1.3.6.1.4.1.19376.1.5.3.1.1.12.2.3)
Geriatric Depression Scale	(1.3.6.1.4.1.19376.1.5.3.1.1.12.2.4)
Physical Function	(1.3.6.1.4.1.19376.1.5.3.1.1.12.2.5)
Review of Systems	(1.3.6.1.4.1.19376.1.5.3.1.3.18)

Data Defined by the work packages WP3.1 and 3.2

Requirement number	Data element CDA / IHE PCC	PCC Template CDA XPath expression	Required/ Optional Cardinality (eP / eD / PS)	HL7 V3 Data Type	Note	Vocabulary Code System Name OID
R3.5.1	Patient Information	1.3.6.1.4.1.19376.1.5.3.1.1.1 /ClinicalDocument/recordTarget/patientRole	R / R / R	PN		
R3.5.1.1	Family Name/Surname	1.3.6.1.4.1.19376.1.5.3.1.1.1 /ClinicalDocument/recordTarget/patientRole/patient/name/family	R / R / R 1..*	PN		
R3.5.1.2	Prefix O / O / O	/ClinicalDocument/recordTarget/patientRole/patient/name/prefix/	O / O / O 0..*	PN	N1	HL7:EntityNamePartQualifier 2.16.840.1.113883.5.1122
R3.5.1.3	Given Name	1.3.6.1.4.1.19376.1.5.3.1.1.1 /ClinicalDocument/recordTarget/patientRole/patient/name/given	R / R / R 1..*	PN		
R3.5.1.4	Gender	1.3.6.1.4.1.19376.1.5.3.1.1.1 /ClinicalDocument/recordTarget/patientRole/patient/ administrativeGenderCode	O/O/R use nullFlavor = UNK 1..1	CE		HL7:AdministrativeGender 2.16.840.1.113883.5.1
R3.5.1.5	Date of Birth	1.3.6.1.4.1.19376.1.5.3.1.1.1 /ClinicalDocument/recordTarget/patientRole/patient/birthtime	R / O / R 1..1 The patient DOB may be a partial date such as only the year.	TS		
R3.5.2	Patient Identifiers	1.3.6.1.4.1.19376.1.5.3.1.1.1 /ClinicalDocument/recordTarget/patientRole/patient/id	see R3.5.2.1 and R3.5.2.2	II		
R3.5.2.1	Primary Patient Identifier	1.3.6.1.4.1.19376.1.5.3.1.1.1 /ClinicalDocument/recordTarget/patientRole/patient/id	R / R / R 1..1	II		
R3.5.2.2	Secondary Patient Identifier	1.3.6.1.4.1.19376.1.5.3.1.1.1 /ClinicalDocument/recordTarget/patientRole/patient/id	O / O / O 0..*	II		
R3.5.3	Patient Address	/ClinicalDocument/recordTarget/patientRole/addr	see R3.5.4.X	AD		

Data Defined by the work packages WP3.1 and 3.2

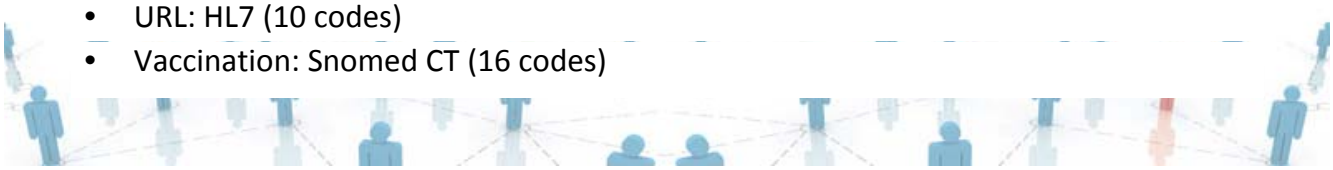
Require-ment number	Data element CDA / IHE PCC	PCC Section Template ID Or CDA expression Section number in Appendix C	Entry content modules	Required/ Optional (eP/eD/PS) Cardinality	Note	HL7 V3 Data Types	Vocabulary Code System OID
			Code='ACTI']/ingredient/code				
		Prescription Section 1.3.6.1.4.1.12559.11.10.1.3.1.2.1	**Prescription Item Entry Content Module 1.3.6.1.4.1.12559.11.10.1.3.1.3.2** entry/substanceAdministration[templateId/[@root='1.3.6.1.4.1.12559.11.10.1.3.1.3.2']/consumable/medication/administerableMedicine/ingredient/[@classCode='ACTI']/ingredient/code				
		Dispensation Section 1.3.6.1.4.1.12559.11.10.1.3.1.2.2	**Dispensed Medicine Entry Content Module 1.3.6.1.4.1.12559.11.10.1.3.1.3.3** entry/supply[templateId/@root='1.3.6.1.4.1.12559.11.10.1.3.1.3.3']/product/medication/administerableMedicine/ingredient/[@classCode='ACTI']/ingredient/code				
R3.5.18.4	Strength of the medicinal product	Medication Summary Section 1.3.6.1.4.1.12559.11.10.1.3.1.2.3	**Medication Item Entry Content Module 1.3.6.1.4.1.12559.11.10.1.3.1.3.4** entry/substanceAdministration[templateId/[@root='1.3.6.1.4.1.12559.11.10.1.3.1.3.4']/consumable/code/originalText	R /R/RNFA		TXT	
		Prescription Section 1.3.6.1.4.1.12559.11.10.1.3.1.2.1	**Prescription Item Entry Content Module 1.3.6.1.4.1.12559.11.10.1.3.1.3.2** entry/substanceAdministration[templateId/[@root='1.3.6.1.4.1.12559.11.10.1.3.1.3.2']/consumable/code/originalText	R /R/RNFA			
		Dispensation Section 1.3.6.1.4.1.12559.11.10.1.3.1.2.2	**Dispensed Medicine Entry Content Module 1.3.6.1.4.1.12559.11.10.1.3.1.3.3** /entry/supply[templateId/@root='1.3.6.1.4.1.12559.11.10.1.3.1.3.3']/product/code/originalText	R /R/RNFA			
R3.5.18.5	Medicinal product package	Medication Summary Section 1.3.6.1.4.1.12559.11.10.1.3.1.2.3	**Medication Item Entry Content Module 1.3.6.1.4.1.12559.11.10.1.3.1.3.4**	R / R / NS		CD	epSOS:Package

epSOS Master Value-set Catalogue

- Active ingredients: full ATC
- Adverse Event Type: Snomed CT (9 codes)
- Allergies without Drugs: Snomed CT (84 codes)
- Blood Group: Snomed CT (12 codes)
- Blood Pressure: LOINC (2 codes)
- CodeNoMedication: Snomed CT (3 codes)
- CodeProb: Snomed CT (7 codes)
- Confidenciality: HL7 Confidenciality (7 codes)
- Country: ISO 3166-1
- Document Title: LOINC (3 codes)
- Dose form: EDQM (490 codes)
- EntityNamePartQualifier: HL7 (11 codes)
- Gender: HL7 administrative gender (3 codes)
- HCP: International Standard Classification of Occupations (ISCO) (8 codes)
- IHEActCodeVocabulary: IHE (8 codes)
- IHERoleCodeVocabulary: IHE (4 codes)
- IllnessesandDisorders: ICD10-WHO-en (1726 codes)

epSOS Master Value-set Catalogue

- Medical Devices Implants: Snomec CT (223 codes)
- Nullflavor: HL7 (12 codes)
- Package: EDQM (75 codes)
- ParticipationTypePatientContact: HL7 (3 codes)
- PersonalRelationshipRoleType: HL7 (34 codes)
- PregnancyInformation: LOINC (3 codes)
- Procedures: Snomed CT (62 codes)
- ReactionAllergy : Snomed CT (8 codes)
- RoutesofAdministration: EDQM (69 codes)
- Sections. LOINC – IHE template (17)
- Severity: Snomed CT (from 3 to 8 codes)
- StatusCode: Snomed CT (4 codes)
- TelecommunicationAddressUse: HL7 (8 codes)
- Units: UCUM (27 codes)
- unknownInformation: Snomed CT (7 codes)
- URL: HL7 (10 codes)
- Vaccination: Snomed CT (16 codes)



MVC/MTC

Parent Code System Name: ICD-10-WHO-en

OID Parent Code System: 2.16.840.1.113883.6.90

epSOS Value Set Name: epSOSIllnessesandDisorders

epSOS OID: 1.3.6.1.4.1.12559.11.10.1.3.1.42.5

website: http://apps.who.int/classifications/apps/icd/icd10online/

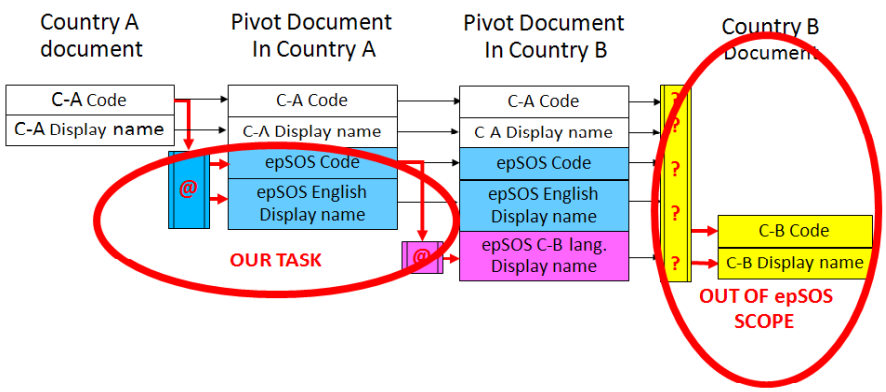
version: 2007

Keep for traceability purposes, not part of the final MVC		In this case the items are not alphabetically arranged, but they are kept ordered by the code as most countries deal with them like this	Must come out, responsibility of member states, can be included in MTC as a starting guide			
Source	**WHOICD10**	**English Diplay Name**	**German**	**Danish**	**Spanish**	**Latin**
ICD 10 three digits	N16	Renal tubulo-interstitial disorders in diseases classified elsewhere	Tubulointerstitielle Nierenkrankheiten bei anderenorts klassifizierten Krankheiten	Tubulointerstitiel nyresygd ved sygd klass ansted		
ICD 10 three digits	N17	Acute renal failure	Akutes Nierenversagen	Akut tubulointerstitiel nyresygd (ATIN)	Insuficiencia renal aguda	Insufficientia renalis acuta
ICD 10 three digits	N18	Chronic renal failure	Chronische Niereninsuffizienz	Kronisk nyreinsufficiens	Insuficiencia renal crÃ³nica	Insufficientia renalis chronica
ICD 10 three digits	N19	Unspecified renal failure	Nicht näher bezeichnete Niereninsuffizienz	Nyreinsufficiens uden specifikation	Insuficiencia renal no especificada	Insufficientia renalis, non specificata
ICD 10 three digits	N20	Calculus of kidney and ureter	Nieren- und Ureterstein	Sten i nyre og urinleder	CÃ¡lculo del riÃ±Ã³n y del urÃ©ter	Nephrolithiasis et ureterolithiasis
ICD 10 three digits	N21	Calculus of lower urinary tract	Stein in den unteren Harnwegen	Sten i nedre urinveje	CÃ¡lculo de las vÃas urinarias inferiores	Calculus tractus urinarii inferioris
ICD 10 three digits	N22	Calculus of urinary tract in diseases classified elsewhere		Urinvejssten ved sygd klassificeret andetsteds		
ICD 10 three digits	N23	Unspecified renal colic	Nicht näher bezeichnete Nierenkolik	Nyrekolik uden specifikation	CÃ³lico renal no especificado	Colica renalis, non specificata
ICD 10 three digits	N25	Disorders resulting from impaired renal tubular function	Krankheiten infolge Schädigung der tubulären Nierenfunktion	Forstyrret tubulær nyrefunktion	Trastornos resultantes de la funciÃ³n tubular renal alterada	Dysfunctio tubulorum renis
ICD 10 three digits	N26	Unspecified contracted kidney	Schrumpfniere, nicht näher bezeichnet	Skrumpenyre uden specifikation	RiÃ±Ã³n contraÃdo no especificado	Ren contractus, non specificatus
ICD 10 three digits	N27	Small kidney of unknown cause	Kleine Niere unbekannter Ursache	Små nyrer af ukendt årsag	RiÃ±Ã³n pequeÃ±o de causa desconocida	Atrophia renis, causa ignoto
ICD 10 three digits	N28	Other disorders of kidney and ureter, not elsewhere classified	Sonstige Krankheiten der Niere und des Ureters, anderenorts nicht klassifiziert	Sygd i nyre og urinleder, andre ikke klass ansted	del urÃ©ter no clasificados en otra parte	Morbi renis sive ureteris alii in morbis aliis

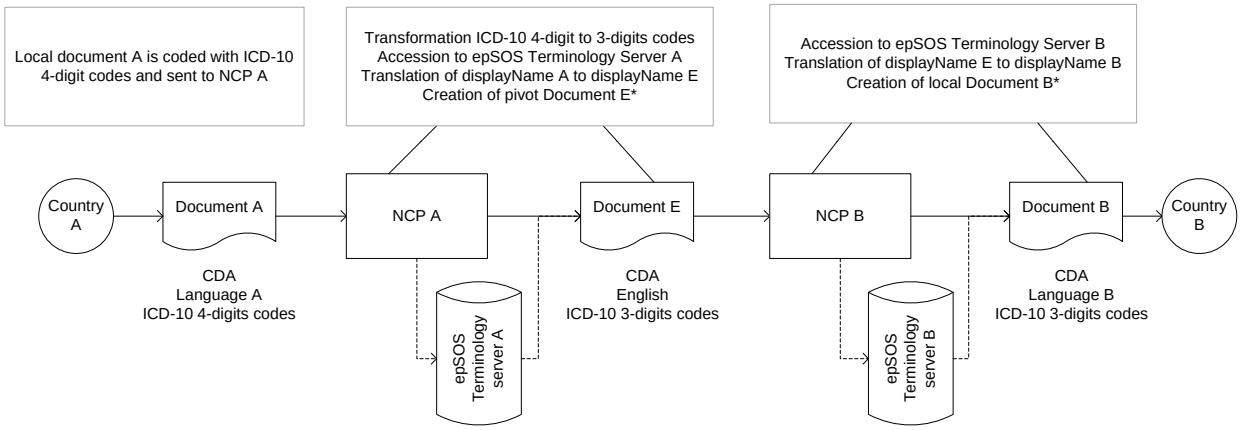
Data Transformation

- Data Transformation
  - Syntax – Pivot Documents
  - Translation
  - Transcoding (if necessary)

Translation/Transcoding



Translation/Transcoding



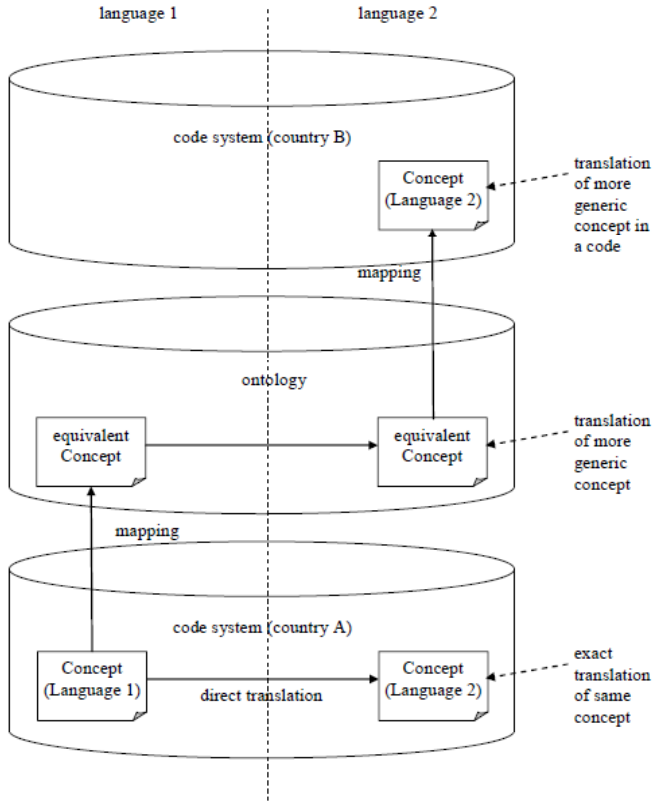
* Initial 4-digits code with displayName A are kept into CDA documents E and B and are still available

Translation/Transcoding

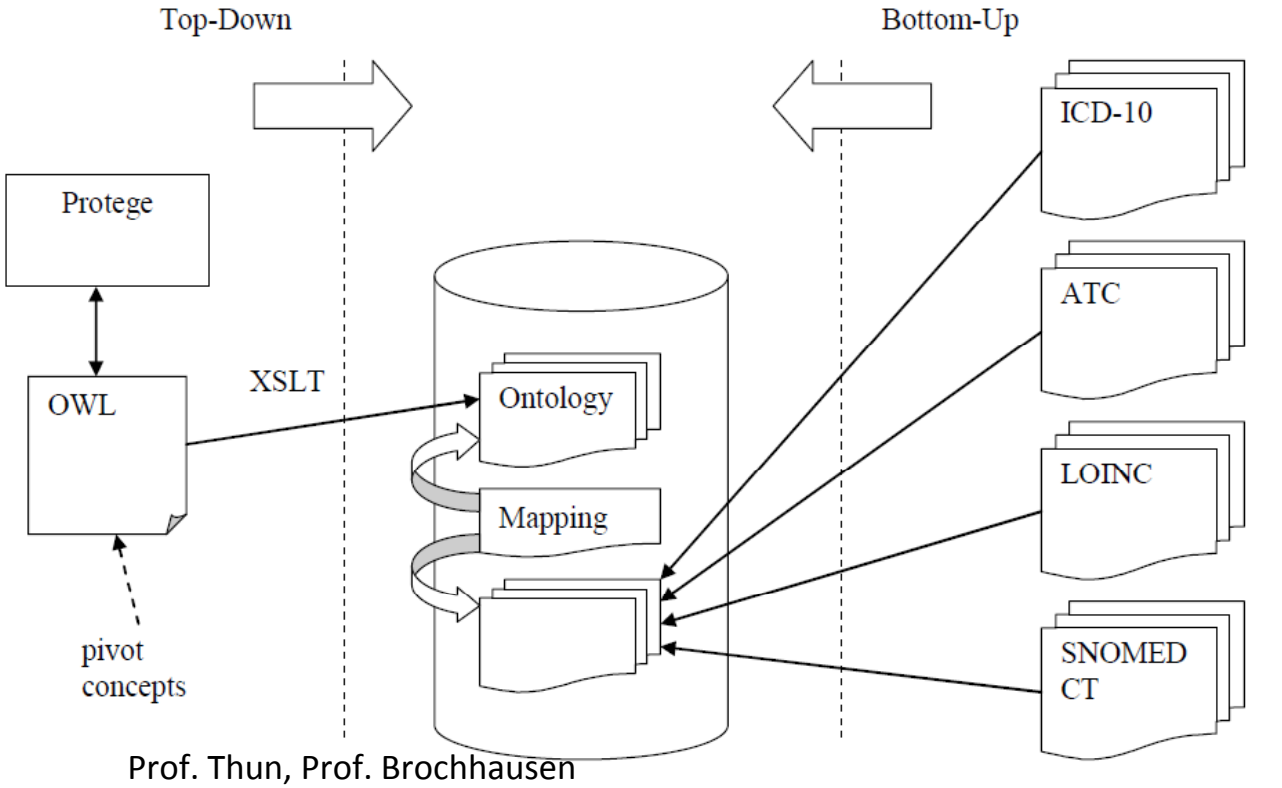
3. Translation Code

	Country A (France)	*NCP A-> NCPB*	*Country B (Austria)*
Document	*Document A*	*Document E*	*Document B*
Code System	*ICD-10*	*epSOSIllnessesandDisorders*	*epSOSIllnessesandDisorders*
Code	*S80.1*	*S80*	*S80*
Language	*French*	*English*	*German*
DisplayName	Contusion de parties autres et non précisées de la jambe	Superficial injury of lower leg	Oberflächliche Verletzung des Unterschenkels
CDA schema	<value xsi:type="CE" code="S80.1" codeSystem="2.16.840.1.113883.6.3" codeSystemName="ICD10" displayName="Contusion de parties autres et non précisées de la jambe "> </value>	<value xsi:type="CE" code="S80" codeSystem="1.3.6.1.4.1.12559.11.10.1.3.1.42.5" codeSystemName="epSOSIllnessesandDisorders" displayName="Superficial injury of lower leg "> <translation code="S80.1" codeSystem="2.16.840.1.113883.6.3" codeSystemName="ICD10 " displayName="Contusion de parties autres et non précisées de la jambe"> </translation> </value>	<value xsi:type="CE" code="S80" codeSystem="1.3.6.1.4.1.12559.11.10.1.3.1.42.5" codeSystemName="epSOSIllnessesandDisorders" displayName="Oberflächliche Verletzung des Unterschenkels "> <translation code="S80.1" codeSystem="1.3.6.1.4.1.12559.11.10.1.3.1.42.5" codeSystemName="ICD10 " displayName="Contusion de parties autres et non précisées de la jambe "> </translation> </value>

Translation/Transcoding

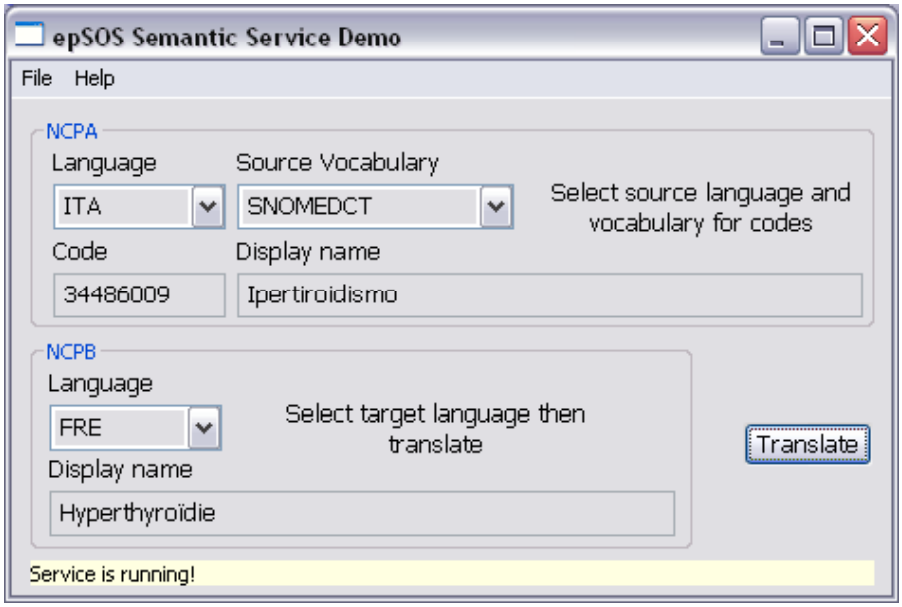


Translation/Transcoding



Prof. Thun, Prof. Brochhausen

Demonstrator



Thank you for your attention

Questions?