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THE EXPERIENCE OF SELECTING THE CODE SYSTEMS FOR THE DEVELOPMENT OF THE EPSOS MASTER VALUE CATALOGUE (MVC)

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Summary

Semantic interoperability requires representing the meaning of clinical information in standardized ways that allow both humans and computers to understand clinical information. It requires the effective use of standards to support accurate and complete clinical documentation that is faithful to the patient's situation, and for electronic health record (EHR) data to be transferred and structurally mapped into a receiving repository in a way that enables its clinical content to be interpreted with a meaning that is commonly understood – by computers as well as by persons. In other words the terminology must be agreed upon.

One code system for all needed information or?

The Semantic team started with a general discussion first where the question regarding should we select one code system representing all the needed information if such existed or should we find several code systems which individual support a specific type of information. Only one code system was agreed to have this potential and that is the clinical terminology SNOMED CT. SNOMED CT was the only chance for some clinical important information such as allergies because no other terminology exists, not even in a “less granular mode”.

This discussion turned very fast out be a political, organizational, procedural and economical discussion instead of a semantically and clinical discussion. SNOMED CT is owned by the SDO named IHTSDO. IHTSDO is a member owned organization and in order use SNOMED CT one must have a license with IHTSDO. Several of the participating countries were not in that position why they legally did not have the right to continue with using the content selected based on SNOMED CT. No agreement was made with SDO at the present time that the participating nation could continue using their content after project end. Furthermore, not being adopted at national level, transcoding had to be performed. This was stated as to high level of a risk from several of the countries. It was agreed that SNOMED CT was not selected to represent the content needed for all the information in the 3 documents. Instead should each information type be identified and a suitable code system identified.

General methodology

In order to support the semantically interoperability exchange of the 3 identified documents in epSOS: ePrescription (eP), eDispensation (eD) and the Patient Summary (PS), a work was required on identifying the terminology, based on international standard coding systems, to be associated to each document data element. The code systems were identified in order to clinically express a section in the documents (a coded element), by applying a set of selection criteria. Each terminology was saved as a Value set (a collection references to a code system related to a specific context).

The appropriate DataSets identified for PS, eP, eD were afterwards adopted for Health Care Encounter Report (HCER) and Medication Related Overview (MRO).

First phase was therefore the analysis of the 3 documents. It had been agreed that they should technically be based on HL7 CDA version 2 Level 3 documents and exchange by IHE XDS, which therefore set some requirement to the methodology and the code system selection.

HL7 CDA documents consist of 2 overall parts: a header and body wherein there are several coded elements.
In epSOS it was decided to exchange two versions of documents: the structured and coded document, by adopting the CDA Level 3, and the original document in PDF format, embedded in the body of a CDA Level 1. The two versions have in common the header.
The method was therefore to go through each data element in the documents. Whether it was the header or the body it was examined for a suitable context, but without a code system selection. If the data element has a close match with an already existing CDA Content Module, then the code system recommended was studied to see if it responded:

- To the functional requirements. If the functional requirements where met,
- Then the coded element was further conceptually studied, from a medical point of view and a patient safety point of view, in order to determine whether the full code system was needed or just a part of the code system.

A set of criteria was defined by the epSOS Semantic Core Expert Team as part of the deliverables of WP 3.5.2 in order to support the process of selecting the needed code systems which were not identified in the CDA Content Module:
http://www.epsos.eu/uploads/tx_epsosfileshare/D3.5.2_epSOS_Semantic-Services-Definition_01.pdf
For readability of this document the criteria are repeated in this document.

Coding Systems Selecting Criteria

Internationally Used: An international code system such as those released by ISO or WHO, for example, has the advantage that it was elaborated by experts having vast experience with terminology implementation and application. The internationally used code systems have implementation guidelines that are used at a national level, as well as maintenance guidelines. The code system used in the Value Sets Catalogue must be internationally recognized. The suitability should be evaluated by experts in the field, both medical and non-medical.

In Use: The second most important criterion in selecting the code system is its use in the PNs. A survey was conducted among the experts working on the epSOS Value Sets Master Catalogue in order to have an accurate representation of the code systems used in each country.

Existence of translation in Different Languages: The existence of translations into different languages is another key element to be evaluated, since it will dramatically reduce the activity of translating the Value Sets Catalogue terms into the local (national) language. If a code system exists in the local (national) version, it is likely that existing translations have been already validated / certified and kept aligned when newer versions are released.

Has a Maintenance Process: A code system that has an official maintenance process is highly desirable. The release of new versions should be taken into account during deciding process. The maintenance process should include specifications for distribution and support.

Existence of Transcoding Systems / Services: The existence of officially defined or at least of consolidated systems / services to perform transcoding from one code system to another one is a desirable element in order to reduce costs and risks. However it is known that this is an important issue that most Standard Organization Bodies are struggling with. Nevertheless, whenever official attempts exist to map one code system to another it is considered very useful as this provides guidance for mapping.

Cost of licenses, implementation and maintenance: Although for research purposes most of the code system licenses are provided for free, the cost might prove to be prohibitive. In addition to the cost of the licenses, the cost of the implementation and maintenance need to be considered.

The code system must be easily implementable: The code system must be easily implementable based on a sound methodology which takes into account both the syntactic and vocabulary aspects.

Value Sets Selecting Criteria

Once a coding system was selected, focus was put in the definition of the “Value Set”: the subset of concepts derived from the coding system, used in association with a specific coded element. For example not all SNOMED-CT is associated to the implanted devices, but a sub-set of terms referring to the most commonly used implanted devices.

It was decided that a Value Set can be created from one and only one coding system. This decision appears now a significant limitation in some cases.

The following criteria were adopted in order to define a Value Set

1. If the coding system is adopted by the large majority of the PNs and translations are available for all the languages and it is fully in scope with the associated dataset:

   a. The full coding system is adopted as Value Set. The example is ATC for active ingredients.
2. If the Coding System is adopted by the large majority of the PNs and translations are available for all the languages, but there are terms non related to the Data Set
   a. Terms related to the Data Set are selected. The example ISO for languages, EDQM for route of administration and dose form; in this case there are also limitations on translations.
3. If the selected coding system is not adopted by the large majority of the PNs (transcoding is required) and the translations are not available:
   a. A careful analysis is performed with the domain experts (physicians, pharmacists) in order to identify the needed Value Set to provide adequate capability of covering the large majority of the clinical cases, limiting the effort of translation and avoiding, as far as possible, the risk of having potential one-to-many mapping alternatives (avoiding ambiguities). Examples are all the SNOMED-CT related Value Set and ICD10 for Problems.

The Code systems selected - representing the information in the 5 documents:

Based on the selection criteria's 45 different value sets were identified based on 24 different code systems to represent the needed information in the 5 documents. Some of the identified content is general for the documents other content is specific for each document.

The content can be divided into 4 categories:

1. Technically required content by document type and exchange format
2. Patient, Health Professional and Document content mainly common in the 5 documents (Header section)
3. Specific content related to the eP/eD (Body section)
4. Specific content related to the PS (Body section). HCER and MRO are derived from PS.

Code systems technically required for validation and exchange of the documents:

As earlier mentioned some of the identified content was mandatory based on the technical choice of using HL7 CDA as document types made for the documents and IHE XDS for the exchange of the documents. These code systems were already part of the CDA Content Module and therefore no further validation process was made except for the epSOSDisplayLabels, which is an epSOS proprietary code system.

The technically required code systems/value sets:

IHEActCode:

This is a technical value set, which describes what kind of information (immunization, intolerance, instructions) is related to the entry. Describes what the entry is all about. For example it describes the purpose of acts, e.g. a comment on another act, to distinguish the act of immunization from the act of treating a patient with a medication. This was part of the CDA Content Module and it matched the functional requirement and was selected without any further validation process.

HL7 - NullFavor:

This technical code system was selected for describing why non-mandatory elements throughout the entire document are not specified. This was part of the CDA Content Module, it matched the functional requirement and was selected without any further validation process.

LOINC - DocumentCode:

This value set was selected to define which type of the 5 documents the document is: Patient Summary, Prescription, Dispensation, Health Care Encounter Report or Medication Related overview. This was part of the CDA Content Module, it matched the functional requirement and was selected without any further validation process.

LOINC - Sections:

This technical Value Set is used for naming the sections used by the 5 CDA documents. This was part of the CDA Content Module and it matched the functional requirement and was selected without any further validation process.

epSOS Proprietary code system - epSOS Display Labels:

Since the epSOS project has defined 5 new documents (project proprietary documents), which goals were and still are to become the European standard for these type of information, no code system existed to present the label content in the 5 documents.

There was a huge debate if such a code system should be developed since no agreement was in place when it comes to maintain responsibility of such a code system. Still the project felt is necessary in order to ensure clinical readability and prevent misunderstanding of a portal application displaying the information from the 3 documents, that the display labels and messages shown in the Display application should be translated into the local language of the participating country. All the information types from the 3 documents were gathered, as they would serve as labels plus the few messages agreed for the portal application.

The epSOSDisplayLabel code system was distributed for reviewed by the participating countries in order to have a common agreement on that all needed labels and messages was included in the new code system and then accepted.

Patient, Health Professional and Document information common in the 5 documents Header section:

The information the content represent in this category is identification information of the Patient, Guardians, Health Professional, HealthCare Facility and the document. The information's are common for the 5 documents, therefore the identification of the code systems and the value sets therefore was a one-time job and then re-used in all the documents.

It is within this category that many of the code systems were already part of the CDA Content Module and therefore only validation against the functional requirements. All matched the functional requirements and was selected without any further validation process.

The Patient, Health Professionaland Document information code systems:

HL7:EntityNamePartQualifier:
The code system was selected to define the type of prefixes or suffixes to be added (if any) to the patient's name. This code system is part of the CDA Content Module and it matched the functional requirement and was selected without any further validation process.

HL7 - AdministrativeGender:
This code system was selected to define the gender of a person used for administrative purposes (as opposed to clinical gender). This code system is part of the CDA Content Module and it matched the functional requirement and was selected without any further validation process.

HL7 - Confidentiality:
This code system was selected to define for encoding the confidentiality level of the entire CDA. It encodes the level of access with regards to the content of the code system – for example N concerns all the medical team, R is restricted for specialist that take care of the patient in certain circumstances, and VIP would be for the persons that need the Privacy Officer present or other special consideration (for example a celebrity hospitalized who needs their records protected). This code system is part of the CDA Content Module and it matched the functional requirement and was selected without any further validation process.

HL7 - URL Scheme
The code system was selected (in this very case) to make the distinction between telephone numbers and e-mails in contact information for all roles involved, also for coding any other forms of communication. This code system is part of the CDA Content Module and it matched the functional requirement and was selected without any further validation process.

ISO 3166-1:
This code system was selected to identify the nationality of all persons and organizations. Only the participating countries were selected for a value set. Therefore no further validation process was needed.

ISO 639-1:
The code system was selected to identify the language the document will be written with, as well as the patient's preferred language. Only the languages for the participating countries were selected for a value set. Therefore no further validation process was needed.

ISCO-08:
The code system was selected to code the Health Professional's profession (functional code). It is mandatory for each Prescriber (author) in the prescription message and optional for all other Health Care Professionals. The code system was selected based on the fact it is an international recognized classification for this type of information. A reduction was made to 2 relevant sub-hierarchies of this code system, including 39 terms, as members for a value set based on a review process among the Semantic team.

The code system mapped to the information type of the Headers:

Patient Information	**Patient Name**	**Familly Name / Surname**	
		Prefix	epSOSEntityNamePartQualifier (OrganizationNamePartQualifier) (HL7:EntityNamePartQualifier)
	Gender		epSOSAdministrativeGender (HL7:AdministrativeGender)
	Patient's Address	Street	
		Country	epSOSCountry (ISO 3166-1)
	Patient's Telecommunication	**Telephone Number**	epSOSURL (HL7:URL Scheme) / epSOSTelecomAddress (HL7:TelecommunicationAddressUse)
		E-mail Address	epSOSURL (HL7:URL Scheme) / epSOSTelecomAddress (HL7:TelecommunicationAddressUse)
	Patient's Guardian	**Familly Name / Surname**	
		Given Name	
		Guardian's Address	
			epSOSCountry (ISO 3166-1)
		Guardian's Telecommunication	epSOSURL (HL7:URL Scheme) / epSOSTelecomAddress (HL7:TelecommunicationAddressUse)
			epSOSURL (HL7:URL Scheme) / epSOSTelecomAddress (HL7:TelecommunicationAddressUse)
	HCP Identification	**HCP Familly Name / Surname**	
		HCP Profession	epSOSHealthcareProfessionalRole (ISCO-08)
		HCP Telecom	epSOSURL (HL7:URL Scheme) / epSOSTelecomAddress (HL7:TelecommunicationAddressUse)
			epSOSURL (HL7:URL Scheme) / epSOSTelecomAddress (HL7:TelecommunicationAddressUse)
	Healthcare Facility	**Address**	

			epSOSCountry (ISO 3166-1)
		Telecom	epSOSURL (HL7:URL Scheme) / epSOSTelecomAddress (HL7:TelecommunicationAddressUse)
			epSOSURL (HL7:URL Scheme) / epSOSTelecomAddress (HL7:TelecommunicationAddressUse)
	Document Identification	**Clinical Document Code**	epSOSDocumentCode (LOINC)
		Confidentiality Code	epSOSConfidentiality (ConfidentialityByAccessKind) (HL7:Confidentiality)
		Document Language Code	epSOSLanguage (ISO 639-1)

Specific content related to the eP/eD

The information the content represent in this category is information of the Patients prescribed medicine and a dispensation notification. It was the content identified to complete the information available for the 2 documents: ePrescription and eDispensation.

Several information should be covered when we selected the code systems for these 2 documents: information of which medicine was prescribed, the form of it, the package type, how is should be taken and if substitution was allowed.

Substance or Product information?

The first discussion started with which medicine was prescribed. Should it be the product or the substance, which determined. All participating countries current documentation methods were discussed in order to focus on something which the implementation knowledge upon existed. Some countries required one of them, other both, but a decision was early taken that the most clinical trust worthy information was the substance information.

ATC or SNOMED CT?

Today the code system ATC is used in most of the countries being a requirement agreed by European Medicatrion Agency (EMA) and the National Agencies, but this code system was made for statistical purpose and missed some important information e.g. with the combination medication: some countries wanted more information than ATC was able to express. Therefore SNOMED CT was the alternative to represent this information, but his also lacked in some areas. Current review of this area in SNOMED CT was already launched by the IHTSDO (Owner SDO of SNOMED CT) but would not be finished within the timeline of the epSOS project.

There was also the suggestion to build an epSOS SNOMED CT extension in order to have information needs meet, but this was agreed to be a too big of a task within the timeline of epSOS. Therefore is was agreed that the best suited code system to act as a minimum dataset would be the ATC even if some information was not fully met. ATC was already implemented in many countries throughout Europe and translated into many languages, so the translation burden would also be minimized.

ATC was selected as the code system to represent the Active Ingredient information and there was a unanimous agreement that no information could be excluded why the whole ATC code system was selected for this content value set. It ended up to be the biggest value set of all the value sets selected for epSOS with its 5592 concepts.

EDQM or SNOMED CT?

The next discussion was about the information types:
Medicine package,
Routes of administration
Doseform

Again the participating countries current documentation method was discussed. Some countries required used EDQM other SNOMED CT bust most countries used national or locale code systems to represent these information's.
The European medication Agency indicates to adopt EDQM to describe these data sets.

The code systems distributed by EDQM to describe medicine was not implemented in that many of the participating countries even if it is the European Directorate of Quality of Medicine (EDQM) but on the other hand the EDQM was already translated into must of the needed languages. So again the afterwards translation burden would be minimum. But still a constraint was discovered during implementation: that even if translation exist, they were not always "ready to use" because they were not public and therefore not able to be used by the PN's.

Value sets for Package, Doseform and Route of Administration information was gathered from both EDQM and SNOMED CT and compared by pharmacists and the result was a match for both code systems.

The decision was taken on the political part and EDQM was selected since this was a European project and we would support the European initiative if they matched the project needs, which the code system from EDQM did for this use case. Also not all participating countries was/is a member of IHTSDO and therefore did not have the right to use SNOMED CT after the project ended.

Substitution code system

Information in both the eP and the eD was needed to indicate if the replacement of a prescribed medication was allowed if it was not available in country where the dispensation was performed.
At the beginning, an epSOS proprietary code system was created named epSOSSubstitutionCode and incorporated in the epSOS Master Value set Catalogue.
Afterwards, an appropriate HL7 selected code system was identified.
The code system epSOSSubstitutionCode was retired and the HL7 Substitution code system: HL7:substanceAdminSubstitution was selected instead since it matched the requirements.

The code system mapped to the information type of the eP:

Prescription	**Prescription ID**		
	Prescriber		
	Prescriber Credentialing Organization Identification	Name	
		Identifier	
	Prescription Item ID		
Medication Description (for each Prescription Item)	Country A crossborder / regional / national medicinal product code		
	Brand name of the medicinal product prescribed in country A		
	Active Ingredient		epSOSActiveIngredient (ATC WHO)
	Strength of the medicinal product		
	Medicinal Product Package		epSOSPackage (EDQM)
	Pharmaceutical Dose Form		epSOSDoseForm (EDQM)
	Route of Administration		epSOSRouteOfAdministration (EDQM)
	Number of packages		
		Package Size	
	Number of units per intake		
	Frequency of intakes		
	Duration of treatment		
	Date of onset of treatment		
	Date of end of treatment		
	Instructions to patient		
	Advise to the dispenser		
	Substitution		epSOSSubstitutionCode (HL7:substanceAdminSubstitution)

The code system mapped to the information type of the eD:

Prescription	Prescriber		
	Prescription Item ID		
Dispenese	Dispenser's Credentialing Organization	Name	
		Identifier	
Medication Description (for each Item)	**Dispensed Medicine ID**		
	Country A crossborder / regional / national medicinal product code		
	Brand name of the medicinal product prescribed in country A		
	Active Ingredient		epSOSActiveIngredient (ATC WHO)
	Strength of the medicinal product		
	Medicinal Product Package		epSOSPackage (EDQM)
	Pharmaceutical Dose Form		epSOSDoseForm (EDQM)
	Route of Administration		epSOSRouteOfAdministration (EDQM)
	Number of packages		
		Package Size	
	Substitution		epSOSSubstitutionCode (HL7:substanceAdminSubstitution)

Specific content related to the PS

The data set of Health Care Encounter Report and Medication Related Overview are not separately discussed in this document, being a sub-set of the PS ones.

The selected code systems for the Allergy information

Several models were discussed for representing the Allergy information. Especially because there was set a requirement that the information should express the difference between an allergy and intolerance, which have clinically 2 very different meanings. Should be build a model on our own or did a standard models exist which matched our use case? The Semantic team was considering adoption the HL7 CDA/CCD model for allergies where "adverse event type" is used with a terminology such as SNOMED high-level classification, so that the distinction between allergies versus intolerances can be managed. The whole model was not adopted, but a simplified version of it due the fact it contained too many dimensions, which were out of scope for the PS use case.
The distinction between reactions to substances/food versus drugs was also a request and thereby explicit handled, with appropriate value sets.

SNOMED CT was selected to 3 information types in the selected Allergy model:
Reaction Allergy:
The Value Set was selected to code the clinical manifestations of allergy developed by patient in the "Allergies and Other Adverse Reactions" section of the patient Summary (along with epSOSActiveIngredient). This value set was inherited as defined in CDA/CCD Allergy Model, since the choice of the Allergy model was taken.

AdverseEventType:
The value set was selected to code the patient's kind of adverse reactions against substance, food or drugs. This value set was inherited as defined in CDA/CCD Allergy Model, since the choice of the Allergy model was taken.

Allergen No drugs:
The Value Set was created to code the allergenic agents (apart from drugs) against which the patient has developed an adverse reaction due to the fact that this type of information was not part of the CDA/CCD Allergy Model. The value set was created in a 5-step workflow (created, review by clinician, reviewed by semantic team, revised by clinician, reviewed and approved by Semantic Team). Relevant sub-hierarchies in SNOMED CT were selected and some single terms. The value set was validated by the Semantic Team for acceptance as a minimum value set/data set.

ATC for the allergies to drugs:
The ATC code system was selected to represent which drug a patient has an allergy towards. It was decided to use the already agreed Active ingredient value set selected for the eP/eD without no further validation process.

ICPC, ICD-9, ICD-10 or SNOMED CT for the illness information?

All participating countries current documentation for illness information was discussed in order to focus on something that existed and there was implementation knowledge upon. 3 code systems were identified: ICD-9, ICD-10 and SNOMED CT, but the majority of the participating countries had implemented ICD-10.

ICPC is used by Patient Record systems in some countries, but not largely used. Too heavy translation and transcoded would have been needed. Hence it was excluded.

SNOMED CT was quickly rejected based on the political discussion explained earlier in this document. Therefore the choice was left on ICD-9 and ICD-10 where ICD-10 was selected with the argument to use the latest version of a code system.
The next question in this discussion was now on how much of the ICD-10 code system was needed to express the needed information? Should the whole ICD-10 code system be used or should a data reduction be made?

The awaiting mapping burden for the countries that still were using ICD-9 was a big argument for minimizing the value set/data set as much as possible but of course without the risk of introducing use cases couldn't be supported. Discussions on the data reduction went on if a limitation should be made to including only all 3-char codes from the ICD-10 or also to include all 4-char codes? After a vote in the Semantic team the decision was made on making an initial validation based on only the 3-char codes. The value set was created based on this decision and validated in each participating country where clinicians were consulted to see if their use cases were supported by the 3-char value set. In general it accepted but there was some single important codes missing which was 4-char codes and they got added e.g. concept: 150.0 Congestive heart failure.

It was also agreed to revise the decision when more experience from the practical use could be gathered. This process is ongoing now, to decide if it is worth adopting the full ICD-10 in MVC1.9. It has to be noted that it is an opportunity while transcoding from ICD-9 CM to ICD-10, to increase granularity, and not losing knowledge if ICD-10 is already adopted in the Country of affiliationion.
It is an obligation for the PNs using ICD-9 CM, to provide the full ICD-10 translation; in order to be able to correctly display received PS as Country of Treatment.

SNOMED CT selected for the vaccine information

To describe the Vaccine information of a patient the HL7 Vaccine value set based on SNOMED CT was inherited and since this value set was part of the CDA Content Module and it matched the functional requirement it was selected without any further validation process. Later on in the project 2 vaccines was added after a clinician validation.

SNOMED CT selected for the procedure information

First of all it has to be highlighted that the Clinical Team, during the functional specification of epSOS PS decided to limit the procedures to the surgical procedures.

A discussion between the participating countries showed that the implemented code system for the procedure information was very differently implemented like with the doseform and package information why multi possibilities was available. However The Hospital Data Project (HDP) was presented where there had been made a comparison of hospital activity within Europe ~30 countries. It included the most common used diagnosis (~250) and procedures groups (18). The procedures groups identified in this project were based on SNOMED CT and it selected as the procedure value set. The total sum of the procedures of that project was the 100 most common used procedures in Europe, which therefore was selected as a minimum dataset. Like with the Vaccines 2 more procedures was needed and added identified during the first Projectathon test of the epSOS documents.

SNOMED CT selected for the blood group information

Also for the blood group information the implementation in the participating countries was very different. Therefore it was decided to make a minimum dataset for this information based on SNOMED CT. The values set was created and review in the Semantic Team and agreed upon.

SNOMED CT selected for the Medical Device information

This Value set was heavily discussed in the Semantic Team because should this information ever be coded. No standard Value set on this information type was commonly implemented or developed and getting an agreement on what was enough would have so many opinions as there is humans on the earth. But the team wished to have as high level of coded information as possible why they agreed to create a minimum Value set/data set for this information type.
Like with the AllergenNoDrugs Value set a value set was created in a 5-step workflow (created, review by clinician, reviewed by semantic team, revised by clinician, reviewed and approved by Semantic Team). Relevant sub-hierarchies in SNOMED CT were selected and some single terms. The value set was validated by the Semantic Team for acceptance as a minimum value set/data set.

UCUM or SNOMED CT for the Unit Measurements information?

Two code systems was discussed to represent the Unit measurement information UCUM (Unified Code of Unit Measurements codes for unambiguously representing measurement units to both humans and machines) and SNOMED CT. Again there was no common implementation through out the participating countries but most if this information was coded, then it was with one of these 2 code systems, why a choice needed to be taken between these 2 code systems. Again SNOMED CT was rejected due to the political reason and UCUM was selected.

HL7, LOINC and SNOMED CT value set was inherited for several information's

Several HL7 and IHE value set was inherited was selected as is for different type of information and since this value set was part of the CDA Content Module and it matched the functional requirement it was selected without any further validation process.

The list of Value sets based on LOINC:

epSOSBloodPressure

epSOSPregnancyInformation

The list of Value sets based on SNOMED CT:

CodeNoMedication
CodeProb
ResolutionOutcome
Severity
SocialHistory
SstatusCode
UnknownInformation
MedicalEquipment

The list of Value sets based on HL7 code systems:

RoleCode
RoleClass
ObservationInterpretation
ActSite
ActCode
TimingEvent

The code system mapped to the information type of the PS:

PS	**Allergy**	**Allergy Description**		epSOSReactionAllergy
		ID Code		AdverseEventType
		Allergy Onset Date		
		Allergy Agent	**Code**	epSOSActiveIngredient / epSOSAllergenNoDrugs
	History of past illness	Problem Description		
		Code		epSOSIllnessesandDisorders
		Problem Onset Date		
		Problem End Date		
		Resolutioon Circumstances		URI/epSOSResolutionOutcome
	Vaccinations	Brand Name		
		Description	ID Code	epSOSVaccine!
		Date		
	Surgical procedures prior past six months	Procedure description		
		ID Code		epSOSProcedures
		Date		
	Major Surgical Procedures Past 6 Motnhs	**Procedure description**		
		ID Code		epSOSProcedures
		Date		
	List of Current Poroblems/ Diagnosis	**Problem Description**		
		Problem Code		epSOSIllnessesandDisorders
		Problem Onset Date		
	Medical Devices and Implants	**Device and Implant Description**		
		Device ID Code		epSOSMedicalDevices
		Device Implant Date		
	Treatment Recommendations			

	Autonomy/ Invalidity	Invalidity Description		
		Invalidity ID Code		
	Social History	Social History Observation	Smoke	epSOSSocialHistory
			Alcohol	epSOSSocialHistory
			Diet	epSOSSocialHistory
		Reference date range		
	Pregnancy History	Expected Date of Delivery		
	Physical Findings	Vital signs Observation	Blood pressure	epSOSBloodPressure
			Date Measured	
	Diagnostic Tests	Result of Blood Group		epSOSBloodGroup
		Date Determined		
Medication Summary	**Active ingredient**	**ID Code**		epSOSActiveIngredient
	Strenght			
	Number of units per intake			
	Frequency of intake			
	Duration of treatment			
	Date of onset			
	Pharmaceutical Dose Form			epSOSDoseForm

Retired Code systems (Value sets):

epSOS Coded Elements:

An epSOS proprietary code system named Coded Elements was created used to denominate all the coded fields present in the 3 specification documents. But it was never used why it was decided to be retired.

IHERoleCode:

This technical value set was in cooperated as one of the set of all the technical required content defined by IHE to represent certain roles that entities play or are scoped by. The Value Set was not mentioned in the 3.9.1 specification why it was decided to be retired.

epSOS Error codes:

Another epSOS proprietary code system named: ErrorCodeMessages was discussed if it should be developed. The goal was to develop this during the implementation based on experienced needs, but it was dropped in the end.

Reflections

The Semantic Team in epSOS have gone through an enormous journey in developing the Master value set Catalogue for the epSOS project. It has not been easy but definitely an experienced learning that the team value very much.

Many reflections can be made and again their will probably many opinions but 5 general recommendations are to be given to future similar work based on the experience of this work:

Selection criteria's:
The semantic Team will definitely recommend that any work similar to this set up a set of selection criteria. They have been used several times in this Semantic development as the majority vote when a decision needed to be taken.

IP and license:
Developing semantic will rely on work own by SDO's. Therefore our recommendation is that agreement with the SDO's should be made prior to the development of the semantic work. This is for two reasons:

1. Not to delay the work license to use the (relevant part of the) code system during a project period is agreed upon and
2. To dismiss any discussions on who may use the developed work afterwards in order to ensure the sustainability of the semantic work.

Many decisions in epSOS would probably have been easier if agreements with the SDO have been made that the Value sets/data sets developed in the project was to be used for free after the project end

Tooling:
Creating and storing the code system and the value sets first started out in epSOS with the use of spreadsheets. This very fast resulted in errors especially around the versioning part also it was difficult to have full traceability and god change logs in such a big work. The epSOS project therefore decided to implement a terminology server and tooling.
The recommendation is therefore to ensure to have some tooling support in similar work like this for having better code system overview for the clinicians when they need to understand what a code system contains. Data set selection tool with versioning control to have the full change log and traceability and last but not least a central repository so everyone can access the selected code systems.

Common Import formats for code systems:
This recommendation is to the SDO's to generate a minimum common import format of the code systems in order to allow project like this to easier import and access their code system in a repository. It took the project many hours to collect and re-format the many different formats the code systems were delivered in.

Value set Metainformation
This recommendation is to the SDO's to generate a minimum Metainformation containing the most needed information for a value set including information of how the value set was created. This would have supported the epSOS project to function as a log of the semantic work, which then easily can be passed on to future project for adoption.