

Lessons Learned from the Development & Use of Intensional Value Sets



Presented by:

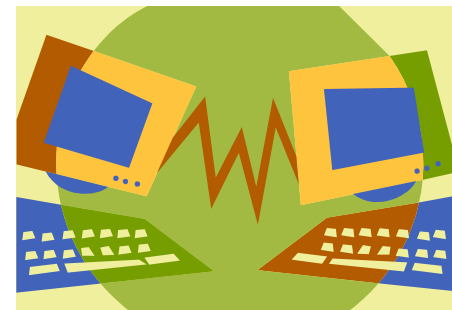
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Objectives

- To demonstrate how intensional value sets were developed for use by Canada Health Infoway.
- To discuss the successes and challenges when creating rule based value sets using SNOMED CT.

Value Sets

- Are used to facilitate semantic interoperability by using agreed upon values
- Two Types
 - Extensional
 - Enumerated as an exact list of codes
 - Intensional -
 - Defined by computable expressions that can be resolved to give an exact list of codes



Why Two Types?

- Enumerated
 - Static
 - Used for pick list
 - Usually smaller N
 - Commonly placed in “vocabulary tables” by vendors
 - Quality measures – consistent values for research
- Intensional
 - Dynamic - created at run time
 - Large value sets such as diagnoses
 - Hierarchy may change frequently – such as medication product
 - Requires services to hit the terminology to run rules

Canada Health Infoway Intensional Value Sets

- 33 Value sets used to support interoperability
- Implemented in the late 1990s
 - Initial sets used SNOMED RT
 - Updated routinely
 - Recently re-evaluated and updated early 2013
- Evaluation Process
 - References
 - The HL7 (now outdated) Terminfo document
 - Canada subject matter experts
 - Done by a clinical terminologist

Value Set Creation Challenges

- Difficult to obtain a succinct subset for specific types
 - Symptoms
 - Interventions
 - Concern
- Value sets with members from multiple domains
- Numerous exclusion criteria
- No clear SNOMED CT guidelines for the development (and/or use) of intensional value sets.
- Content in development with SNOMED/LOINC.
- Canada Health Infoway definitions vague.

Value Set Rule Structure

Level	Operation	Filter Type	Code/Property	Description
0	Include	With Property	Human	
0	Intersect	With Property	Status=Current	
0	Intersect	Content Below		
1	Include	Specializations of Code	118956008	Body structure, altered from its original anatomical structure (morphologic abnormality)
1	Include	Content Below		
2	Include	Specializations of Code	404684003	Clinical finding
2	Exclude	Code and Specializations	307824009	Administrative statuses
2	Exclude	Code and Specializations	405533003	Adverse incident outcome categories
2	Exclude	Code and Specializations	217020008	Medical and surgical procedures as the cause of abnormal reaction of patient or later complication, without mention of misadventure at the time of procedure
2	Exclude	Code and Specializations	420134006	Propensity to adverse reactions (disorder)
2	Exclude	Code and Specializations	365858006	Prognosis/outlook finding (finding)
2	Exclude	Code and Specializations	285153007	Sequelae of external causes and disorders (finding)
1	Include	Specializations of Code	272379006	Event
1	Include	Specializations of Code	413350009	Context-dependent finding
1	Include	Specializations of Code	57177007	Family history of
1	Include	Specializations of Code	4908009	Past history of

Value Set Example: Complex Value Set DiagnosisValue

Description DiagnosisValue	Issues
A medical condition found to be present in a subject.	Filter issues e.g. "Past history of" – is ambiguous, morphologic abnormality-qualifier not a finding

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Value Set Example: Multiple Exclusions ActProfessionalServiceCode

Description	Issues
Denotes the specific service that has been performed. This is obtained from the professional service catalogue pertaining to the discipline of the health service provider.	<p>Scope including exclusion of lab or DI exclusions is only present in the filter.</p> <p>Domain expert questions: If lab is excluded, should Blood bank be excluded (it was currently included)?</p>

Level	Operation	Filter Type	Code/Property	Description
0	Include	With Property	Human	
0	Intersect	With Property	Status=Current	
0	Intersect	Content Below		
1	Include	Code and Specializations	71388002	Procedure
1	Exclude	Code and Specializations	14734007	Administrative procedure (procedure)
1	Exclude	Code and Specializations	108252007	Laboratory procedure
1	Exclude	Code and Specializations	389084004	Staff related procedure
1	Exclude	Code and Specializations	363679005	Imaging (procedure)

Value Set Example: Vague Definition CommonClinicalObservationResultValue

Description

The non-laboratory, non-diagnostic imaging coded (non-numeric) result of the coded observable or "question" represented by the paired concept from the NonLabDICodedObservationType domain.

Issues

Description needs clarification. Filters need considerable work.

- Qualifier value includes lots of concepts that do not fit scope (languages)
- Includes lab result value

Level	Operation	Filter Type	Code/Property	Description
0	Include	With Property	Human	
0	Intersect	With Property	Status=Current	
0	Intersect	Content Below		
1	Include	Specializations of Code	362981000	Qualifier value
2	Exclude	Code and Specializations	258666001	Unit
2	Exclude	Code and Specializations	278277004	Fractions
2	Exclude	Code and Specializations	277277001	Mathematical expression
2	Exclude	Code and Specializations	276135000	Mathematical signs
2	Exclude	Code and Specializations	260299005	Numbers
2	Exclude	Code and Specializations	272104009	Absolute times
2	Exclude	Code and Specializations	277846009	Inch measurements
2	Exclude	Code and Specializations	282409001	Nominated concentrations
2	Exclude	Code and Specializations	228785007	Patient dimensions
1	Include	Specializations of Code	302083008	Finding of Apgar score
2	Exclude	Code and Specializations	364741000	Finding of Apgar score at 1 minute
2	Exclude	Code and Specializations	364742007	Finding of Apgar score at 5 minutes
2	Exclude	Code and Specializations	364743002	Finding of Apgar score at 10 minutes
1	Include	Specializations of Code	365870005	Finding of resuscitation status
1	Include	Code and Specializations	165478007	Red blood cell shape - normal
1	Include	Specializations of Code	365621008	Finding of red blood cell shape

Value Set Challenge: Definition Vague CommonCodedClinicalObservationType

Description	Issues
Identifies the type for a clinical observation whose value is expressed as a code. E.g. Home support level.	<p>Definition is vague, "Home support level" is not an SCT code so couldn't look at as an example. Definition does not disallow lab or imaging.</p> <p>Filter; current filter will produce lab and imaging observations</p>

Level	Operation	Filter Type	Code/Property	Description
0	Include	With Property	Human	
0	Intersect	With Property	Status=Current	
0	Intersect	Content Below		
1	Include	Code	397747003	Assertion
1	Include	Content Below		
2	Include	Specializations of Code	386053000	Evaluation procedure
2	Exclude	Code and Specializations	15220000	Laboratory test
2	Exclude	Code and Specializations	363679005	Imaging
1	Include	Specializations of Code	363787002	Observable entity
1	Include	Specializations of Code	254291000	Staging and scales
1	Include	Code	32750006	Inspection

Challenge: SNOMED/LOINC Code/Value Pair CommonCodedClinicalObservation

Current Structure includes:

Code = CommonCodedClinicalObservationType (SNOMED CT)

Value = CommonClinicalObservationValue (SNOMED CT)

- CommonClinicalObservationAssertionValue – single concept (SNOMED CT)
- CommonClinicalObservationResultValue – post coordinated “complex” concept (SNOMED CT)

- **Recommend revisiting this to simplify and or provide guidance for how to use this.**

Conclusion

- Improve precision in description
 - A scope with clear requirements
 - Description of how the value set is going to be implemented and used
 - Use cases would be very helpful
- SNOMED CT high level of hierarchies is difficult to use for value set rule creation
- Clear value set guidance needs to be in place in order to support interoperability on both ends
- Intensional value sets may be used as “foundation” subsets for implementers

Questions/Discussion