

vMR: the HL7 virtual Medical Record Standard

May 16, 2013

Health eDecisions All Hands Call

Claude Nanjo

David Shields



UNIVERSITY OF UTAH
HEALTH CARE

Background

- A “holy grail” of clinical informatics is scalable, interoperable CDS
- Key requirement for interoperable CDS and re-use of CDS knowledge resources = use of a common patient data model
 - Referred to as a “Virtual Medical Record” or vMR
(Johnson *et al.*, *AMIA Annu Symp Proc*, 2001)
- Lack of a common vMR has been a major barrier to sharing knowledge and scaling CDS



Example Challenge without VMR

Observation

Code = BP

Value = 120/80 mmHg

Blood Pressure

Systolic = 120 mmHg

Diastolic = 80 mmHg

Observation

Code = BP

Observation

Code = SBP

Value = 120 mmHg

Observation

Code = DBP

Value = 80 mmHg

Vital Sign

Type = BP

Value = 120/80

Units = mmHg



vMR Goal

- Provide common information model upon which interoperable clinical decision support resources (e.g., rules) can be developed



Project History

- Analysis of data required by 20 CDS systems from 4 countries (*Kawamoto et al., AMIA 2010*)
- Refinement of vMR via implementation within OpenCDS
- Adopted in September 2011 as Informative Specification



Why Not Just Use the CCDA as the vMR?

- CCDA does not include all needed information
 - E.g., Family history model suitable for CDS
- CCDA is not sufficiently intuitive for direct use by CDS knowledge authors
- CCDA is deeply nested and verbose, which adds performance penalties in volume production

HOWEVER:

- CCDA can be mapped into the vMR, which has a simpler structure that is more conducive to evaluation



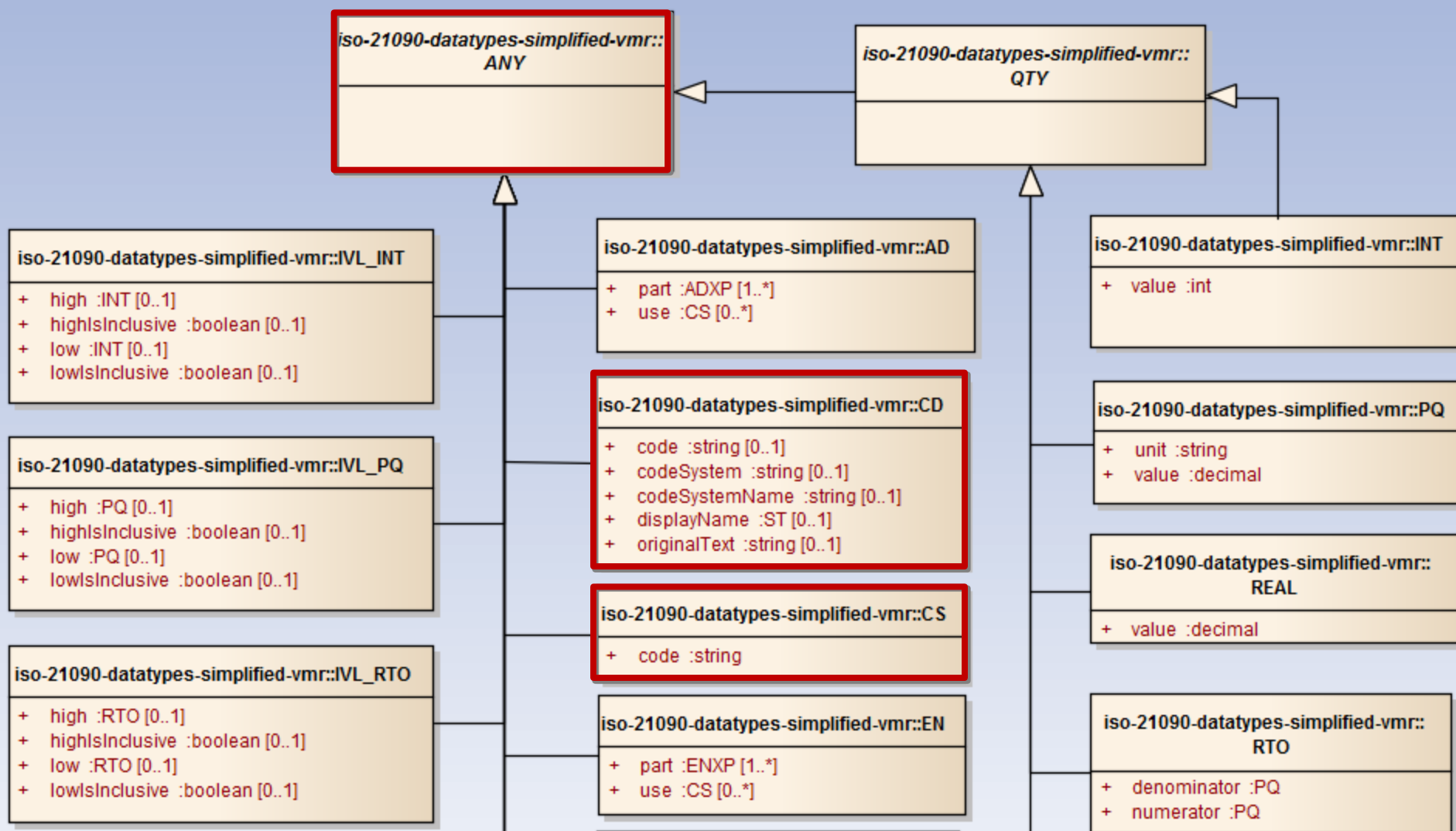
Problem Model – CCD vs. VMR

```

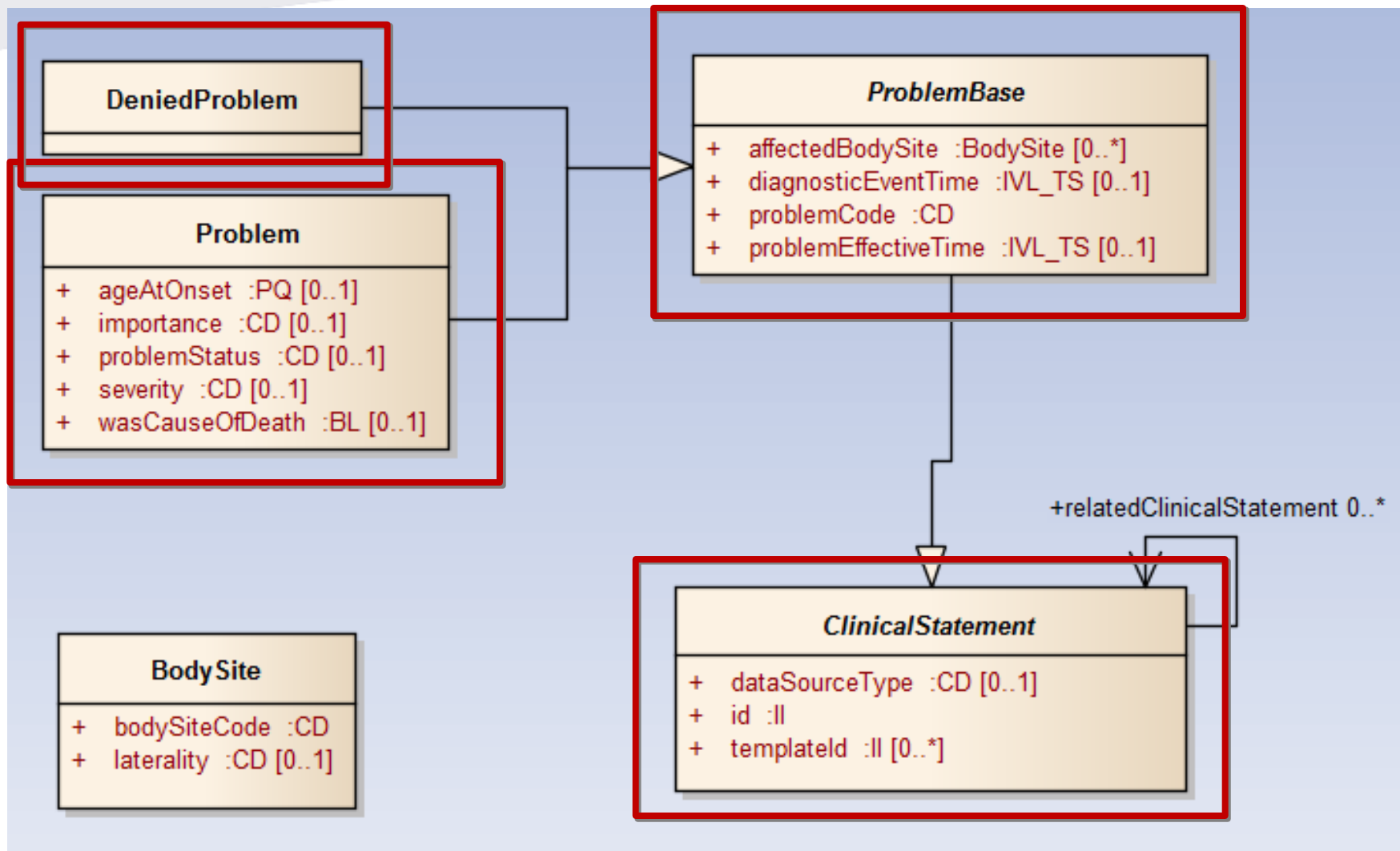
<entry typeCode="DRIV">
  <act classCode="ACT" moodCode="EVN">
    <templateId root="2.16.840.1.113883.10.20.1.27"/>
    <!-- Problem act template -->
    <id root="6a2fa88d-4174-4909-aece-db44b60a3abb"/>
    <code nullFlavor="NA"/>
    <entryRelationship typeCode="SUBJ">
      <observation classCode="OBS" moodCode="EVN">
        <templateId root="2.16.840.1.113883.10.20.1.28"/>
        <!-- Problem observation template -->
        <id root="6a2fa88d-4174-4909-aece-db44b60a3abb"/>
        <code code="195967001" codeSystem="2.16.840.1.113883.6.96" displayName="Asthma"/>
        <problemEffectiveTime low="1950"/>
        <diagnosticEventTime low="20110825" high="20110825"/>
        <problemStatus codeSystem="2.16.840.1.113883.6.96" code="55561003" displayName="Active"/>
        </problem>
        <value xsi:type="CD" code="195967001" codeSystem="2.16.840.1.113883.6.96" displayName="Asthma"/>
        <entryRelationship typeCode="REFR">
          <observation classCode="OBS" moodCode="EVN">
            <templateId root="2.16.840.1.113883.10.20.1.50"/>
            <!-- Problem status observation template -->
            <code code="33999-4" codeSystem="2.16.840.1.113883.6.1" displayName="Status"/>
            <statusCode code="completed"/>
            <value xsi:type="CE" code="55561003" codeSystem="2.16.840.1.113883.6.96" displayName="Active"/>
            </observation>
          </entryRelationship>
        </observation>
      </entryRelationship>
    </act>
  </entry>

```

Simplified ISO 21090 Data Types



Example Clinical Statement



vMR: decoded payload

```
<cdsInput>
  <templateId root="2.16.840.1.113883.3.1829.11.1.1.1"/>
  <vmrInput>
    <templateId root="2.16.840.1.113883.3.1829.11.1.2.2"/>
    <patient>
      <templateId root="2.16.840.1.113883.3.1829.11.2.1.1"/>
      <id extension="1234567890" root="2.16.840.1.113883.3.795.5.2.1.1"/>
      <demographics>
        <birthTime value="19920713"/>
        <gender code="F" codeSystem="2.16.840.1.113883.1.11.1"/>
      </demographics>
      <clinicalStatements>
        <encounterEvents>
          <encounterEvent>
            <templateId root="2.16.840.1.113883.3.1829.11.4.3.2"/>
            <id extension="testVMRoneLowHct" root="2.16.840.1.113883.3.795.5.2"/>
            <dataSourceType code="Administrative"
              codeSystem="2.16.840.1.113883.3.795.12.2.5.1"/>
            <encounterType code="I" codeSystem="2.16.840.1.113883.3.795.12.2.6.1"
              displayName="Inpatient"/>
            <encounterEventTime high="" low="20130301"/>
            <relatedClinicalStatement>
              <targetRelationshipToSource code="COMP"
                codeSystem="2.16.840.1.113883.3.795.12.1.2"/>
            <observationResult>
              <templateId root="2.16.840.1.113883.3.1829.11.6.3.6"/>
              <id extension="test1" root="2.16.840.1.113883.3.795.5.2.3.4"/>
              <dataSourceType code="Clinical"
                codeSystem="2.16.840.1.113883.3.795.12.2.5.1"/>
              <observationFocus code="20570-8" codeSystem="2.16.840.1.113883.6.1"
                displayName="Hematocrit"/>
              <observationEventTime high="20130329" low="20130329"/>
              <observationValue><physicalQuantity unit="%" value="45.7"/>
              </observationValue>
            </observationResult>
          </encounterEvent>
        </encounterEvents>
      </clinicalStatements>
    </patient>
  </vmrInput>
</cdsInput>
```



Further Information

vMR:

[http://wiki.hl7.org/index.php?title=Virtual_Medical_Record_\(vMR\)](http://wiki.hl7.org/index.php?title=Virtual_Medical_Record_(vMR))



UNIVERSITY OF UTAH
HEALTH CARE