Using RxNorm in VistA

Use of RxNorm to encode medications in CCR/CCD
VistA/RPMS Project

What is RxNorm?

- http://www.nlm.nih.gov/research/umls/rxnorm/overview.html

- Standardized nomenclature for clinical drugs

- Produced by the NLM...

- To facilitate interchange of drug data

What does RxNorm Look Like?

- A set of tables

- Four main ones

    - RXNCONSO, Concept and Source Information

    - RXNREL, Relationships

    - RXNSAT, Attributes

    - RXNSTY, Semantic Type

Examples of Tables

- 727359|ENG|P||PF||N|2656259||||GS|BD|28336|Hyalgan 20mg/2ml Solution for Injection||N||

- 727362|ENG|P||PF||N|2719627||||GS|MTH_RXN_BD|28336|Hyalgan 20mg/2ml Solution for Injection_#2||N||

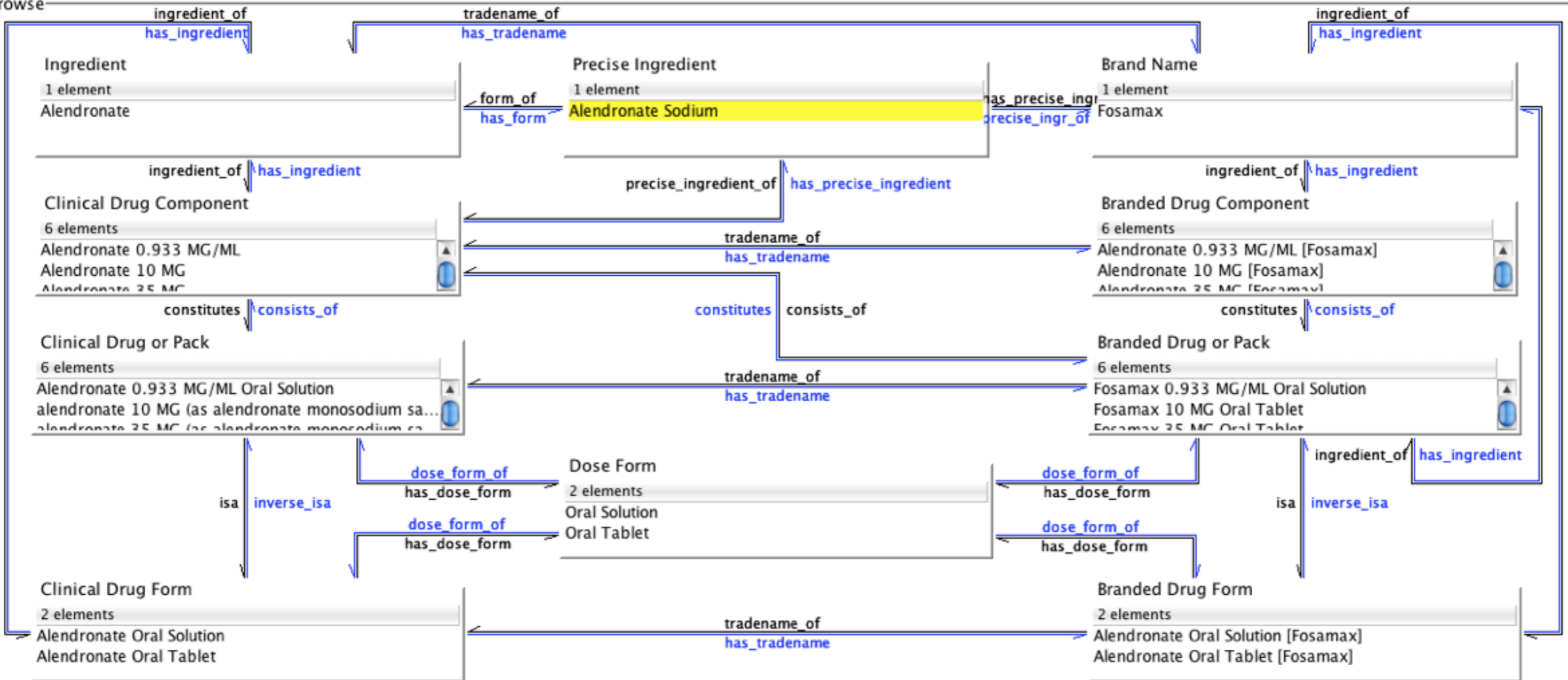- 727308|ENG|P||PF||N|2719626||||GS|MTH_RXN_BD|28336|Hyalgan 20mg/2ml Solution for Injection_#1||N||

RxNorm Navigator

Terminology | NDCs

Search

℞ ◈Nav   Search By: [String ▼]   ❓ Help   Enter Search String: [alendronate sodium ▼]   (Search)   ◀ ▶

Browse

ingredient_of   tradename_of   ingredient_of
has_ingredient   has_tradename   has_ingredient

Ingredient	Precise Ingredient	Brand Name
1 element	1 element	1 element
Alendronate	**Alendronate Sodium**	Fosamax

form_of   has_precise_ingr
has_form   precise_ingr_of

ingredient_of has_ingredient   precise_ingredient_of has_precise_ingredient   ingredient_of has_ingredient

Clinical Drug Component	Branded Drug Component
6 elements	6 elements
Alendronate 0.933 MG/ML	Alendronate 0.933 MG/ML [Fosamax]
Alendronate 10 MG	Alendronate 10 MG [Fosamax]
Alendronate 35 MG	Alendronate 35 MG [Fosamax]

tradename_of
has_tradename

constitutes consists_of   constitutes consists_of   constitutes consists_of

Clinical Drug or Pack	Branded Drug or Pack
6 elements	6 elements
Alendronate 0.933 MG/ML Oral Solution	Fosamax 0.933 MG/ML Oral Solution
alendronate 10 MG (as alendronate monosodium sa...	Fosamax 10 MG Oral Tablet
alendronate 35 MG (as alendronate monosodium sa...	Fosamax 35 MG Oral Tablet

tradename_of
has_tradename

ingredient_of has_ingredient

dose_form_of   dose_form_of
has_dose_form   has_dose_form

Dose Form
2 elements
Oral Solution
Oral Tablet

isa inverse_isa   isa inverse_isa

dose_form_of   dose_form_of
has_dose_form   has_dose_form

Clinical Drug Form	Branded Drug Form
2 elements	2 elements
Alendronate Oral Solution	Alendronate Oral Solution [Fosamax]
Alendronate Oral Tablet	Alendronate Oral Tablet [Fosamax]

tradename_of
has_tradename

Status or RxCUI| UMLSCUI: 2009AB | RxNorm Synonym | RxNorm Normalized String
Retrieved "Alendronate Sodium".

Why use RxNorm?

- Provides a standardized vocabulary to interchange drug data between different systems

What is a CCR?

- Clinical Care Record

- An XML-based standard to facilitate health information exchange

- ASTM E2369-05

- Relatively easy to implement

```xml
<Medication>
<CCRDataObjectID>MED_OUTSIDE1</CCRDataObjectID>
<DateTime>
<Type>
<Text>Documented Date</Text>
</Type>
<ExactDateTime>2007-04-11T16:14:59-05:00</ExactDateTime>
</DateTime>
<Type>
<Text>Medication</Text>
</Type>
<Status>
<Text>ACTIVE</Text>
</Status>
<Source>
<Actor>
<ActorID>ACTORPROVIDER_1000000031</ActorID>
</Actor>
</Source>
<Product>
<ProductName>
<Text>ASPIRIN</Text>
<Code>
<Value>308416</Value>
<CodingSystem>RXNORM</CodingSystem>
<Version>08AB_081201F</Version>
</Code>
</ProductName>
<Strength>
<Value>81</Value>
<Units>
<Unit>MG</Unit>
</Units>
</Strength>
<Form>
<Text>TAB,EC</Text>
</Form>
<Concentration>
<Value>81</Value>
<Units>
<Unit>MG</Unit>
</Units>
</Concentration>
</Product>
<Quantity>
<Units>
<Unit>TAB</Unit>
</Units>
</Quantity>
<PatientInstructions>
<Instruction>Non-VA medication recommended by VA provider.  </Instruction>
</PatientInstructions>
<Directions>
<Direction>
<Description>
<Text>81MG MOUTH EVERY MORNING</Text>
</Description>
<DoseIndicator>
<Text>4</Text>
</DoseIndicator>
</Direction>
</Directions>
</Medication>
```

What is a CCD?

- Continuity of Care Document

- The result of an (totally ineffectual) amalgamation of the CDA (an HL7 standard) and the CCR.

- This project does not directly create CCD documents

  - Difficult to implement

  - Very very poor documentation for implementation

- We rely on conversion tools

```xml
<component>
	<section>
		<code code="10160-0" codeSystem="2.16.840.1.113883.6.1" codeSystemName="LOINC"/>
		<title>Medications</title>
		<text>
			<list>
				<item>Theodur 200mg BID</item>
			</list>
		</text>
		<entry>
			<substanceAdministration classCode="SBADM" moodCode="EVN">
				<text>Theodur 200mg BID</text>
				<effectiveTime xsi:type="PIVL_TS" institutionSpecified="true">
					<period value="12" unit="h"/>
				</effectiveTime>
				<routeCode code="PO" codeSystem="2.16.840.1.113883.5.112" codeSystemName="RouteOfAdministration"/>
				<doseQuantity value="200" unit="mg"/>
				<consumable>
					<manufacturedProduct>
						<manufacturedLabeledDrug>
							<code code="66493003" codeSystem="2.16.840.1.113883.6.96" codeSystemName="SNOMED CT" displayName="Theophylline"/>
						</manufacturedLabeledDrug>
					</manufacturedProduct>
				</consumable>
			</substanceAdministration>
		</entry>
```

Export of Meds from VistA

- Using Pharmacy Re-engineering APIs

  - Except for Non-VA/Outside meds

- Data is assembled into a ^TMP global, then exported as XML

- Only Outpatient meds at this point

APIs Used

- RX^PSO52API (Meds Dispensed)

- PEN^PSO5241 (Meds Pending)

- No API for Non-VA meds

  - GETS^DIQ(55,DFN,"52.2*","IE","NVA")

- For RPMS, GETRXS^BEHORXFN

Other PRE APIs used

- NDF^PSS50 (for VUID)

- DOSE^PSS50 (for strength and Unit)

- CPRS^PSNAPIS (for form, concentration)

- DATA^PSS50 (for dispense unit)

- AP^PSS51P1 (convert free text schedule to interval in minutes)

Example Code

- C0CMED1 routine

RxNorm VistA Files

- Three Files

  - 176.001 - RxNorm Concepts

  - 176.002 - RxNorm NDC translation

  - 176.003 - RxNorm Sources

176.001: RxNorm Concepts

- Result of importing RXNCONSO.RRF

  - Fields:

    - RXNCUI - RxNorm Concept ID

    - RXNAUI - Atom ID

    - SAB - Source Abbreviation

    - TTY - Term Type

    - CODE - hmm... what could that mean?

    - STR - String

Data from Concepts File

RXCUI: 1091
  SAB: MTHSPL
   CODE: 94ZLA3W45F
 STR: Arginine

RXAUI: 2596460
 TTY: SU

RXCUI: 1091
  SAB: MMSL
   CODE: 7609
 STR: Arginine

RXAUI: 35041
TTY: BN

RXCUI: 1091
  SAB: RXNORM
 CODE: 1091
 STR: Arginine

RXAUI: 35043
 TTY: IN

← RXCUI

RXCUI: 1091
  SAB:VANDF
  CODE: 4018668
 STR: ARGININE

RXAUI: 2067913
 TTY: IN

← VUID

176.002: RxNorm NDC translation

- Only used for RPMS

- Translates NDCs to RxNorm

- (RPMS does not have VUIDs)

176.003: RxNorm Sources

- Only used to retrieve the RxNorm version currently in use.

Matching a VistA drug to RxNorm

- Drug must be matched to the National Drug File

- VA Product File entry is obtained using the following code:

  (MEDIEN is the internal entry number of the Drug in file 50)

  ```
  D NDF^PSS50(MEDIEN,,,,,"NDF")

  N NDFDATA M NDFDATA=^TMP($J,"NDF",MEDIEN)

  N NDFIEN S NDFIEN=$P(NDFDATA(20),U)

  N VAPROD S VAPROD=$P(NDFDATA(22),U)
  ```

Matching a VistA drug to RxNorm, cont.

- RxNorm Concepts file has an index for searching VUIDs

  Set Logic: S ^C0CRXN(176.001,"VUID",X(1),DA)=""

  Set Cond: S X=X(2)="VANDF"&(X(3)="CD")

  Kill Logic: K ^C0CRXN(176.001,"VUID",X(1),DA)

  Kill Cond: S X=X(2)="VANDF"&(X(3)="CD")

  Whole Kill: K ^C0CRXN(176.001,"VUID")

  X(1): CODE (176.001,4) (Subscr 1) (forwards)

  X(2): SAB (176.001,2) (forwards)

  X(3): TTY (176.001,3) (forwards)

Matching a VistA drug to RxNorm, cont.

- Code that gets the RxNorm info is as follows:

.1 NDFIEN,$D(^C0CRXN) D ; $Data is for Systems that don't have our RxNorm file yet.

. . S VUID=$$GET1^DIQ(50.68,VAPROD,99.99)

. . S RXNIEN=$$FIND1^DIC(176.001,,,VUID,"VUID")

. . S RXNORM=$$GET1^DIQ(176.001,RXNIEN,.01)

. . S SRCIEN=$$FIND1^DIC(176.003,,"B","RXNORM")

. . S RXNNAME=$$GET1^DIQ(176.003,SRCIEN,6)

. . S RXNVER=$$GET1^DIQ(176.003,SRCIEN,7)

Matching a VistA drug to RxNorm, cont.

Eventual Result (e.g. for Aspirin)

<Code>

<Value>308416</Value>

<CodingSystem>RXNORM</CodingSystem>

<Version>08AB_081201F</Version>

</Code>

Questions?

Contact Inforamtion:

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Hub of VistA discussion outside of the VHA:

http://groups.google.com/group/Hardhats

hardhats.org

medsphere.org

Code (svn): https://trac.opensourcevista.net/