RxNav

Providing Standard Drug Information

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Outline

- Drug vocabulary standardization: RxNorm
- Visualization and processing of drug information: RxNav
- Future work: integrated drug information
Drug vocabulary standardization

RxNorm
Motivation

- Exchange of information requires standardized names
  - Ordering drugs
  - Checking interactions
  - Inventory management
- No standard naming conventions for drugs
Concepts

- Integrating terms from various drug vocabularies
- Unique identifiers for concepts (RXCUI)

<table>
<thead>
<tr>
<th>RXCUI</th>
<th>STR</th>
<th>SAB</th>
</tr>
</thead>
<tbody>
<tr>
<td>161</td>
<td>Acetaminophen</td>
<td>RxNorm</td>
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<tr>
<td>161</td>
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<tr>
<td>161</td>
<td>Paracetamol</td>
<td>SNOMEDCT</td>
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<td>...</td>
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</table>
Normalized forms

<table>
<thead>
<tr>
<th>Strength</th>
<th>Ingredient</th>
<th>Dose form</th>
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<tbody>
<tr>
<td>4mg/ml</td>
<td>Fluoxetine</td>
<td>Oral Solution</td>
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</tbody>
</table>

Semantic clinical drug component

Semantic clinical drug form

Semantic clinical drug
Generic vs. Brand

- **Generic**
  - Ingredient (IN)
  - Clinical drug form (SCDF)
  - Clinical drug component (SCDC)
  - Clinical drug (SCD)

- **Brand**
  - Brand name (BN)
  - Branded drug form (SBDF)
  - Branded drug component (SBDC)
  - Branded drug (SBD)

- **tradename_of**
  - Fluoxetine
  - Fluoxetine 4 mg/ml oral solution

- **Tradename**
  - Prozac
  - Fluoxetine 4 mg/ml oral solution [Prozac]
Relations among drug entities
RxNorm database

- Data sources
  - Master Drug Data Base
  - Multum MediSource Lex.
  - Micromedex DRUGDEX
  - National Drug Data File
  - Plus Source Vocabulary
  - FDA National Drug Code Directory
  - VA National Drug File
  - SNOMED Clinical Terms

- Content
  - 5,590 ingredients
  - 11,148 brand names
  - 13,756 clinical drug comp.
  - 17,703 clinical drugs
  - 13,938 branded drugs
  - 13,336 branded drug comp.
  - 8,308 clinical drug forms
  - 10,496 branded drug forms
  - 337,794 NDC code attributes

(as of 10/12/2006, excluding obsolete terms)
Visualization and processing of drug information
RxNav

- Visualization and navigation
  - RxNorm browser
  - Spelling correction
  - Search on names and codes
  - Standalone application
    - RxNorm database at NLM
    - Local RxNorm database

- Drug information processing
  - API to the RxNorm database
  - Web services
RxNav demo

RxNav: Search features

By:
- String: concept name
- GCN: Generic Code Number (First Data Bank)
- GFC: Generic Formula Code (Micromedex)
- GPPC: Generic Product Packaging Code (Medi-Span)
- LISTING_SEQ_NO: ID (FDA’s National Drug Code Directory)
- NDC: National Drug Code (FDA)
- RXCUI: unique identifier in RxNorm
- SNOMED ID: unique identifier in SNOMED CT
- UMLS CUI: unique identifier in the UMLS
- VUID Number: unique identifier in the VA National Drug File
Future work

Integrated drug information
Integration

- Equivalent strings and codes
- Links from RxNav to applications or vocabularies
  - MeSH
  - DailyMed
  - MyMedicationList
- Single entry point for a variety of information
  - One stop shopping for drug information
### Equivalent strings and codes across sources

**Equivalent strings**
- Acetaminophen
- Paracetamol

**Equivalent codes**
- RXCUI:227257
- BRAND_CODE:2177

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Links to applications or vocabularies

- MeSH
- DailyMed
- Equivalent strings and codes (authenticated users)
- MyMedicationList
MeSH: Pharmacologic actions

- Ticlid
- Pharmacologic action
  - Fibrinolytic Agents
  - Platelet Aggregation Inhibitors
Ticlid

Adverse reactions
- Agranulocytosis
- Thrombotic thrombocytopenic purpura
...
MyMedicationList

- Patient owned, personal, confidential
- Standard drug information
- Personal drug list management
  - Add
  - Delete
  - Update/Notification
- Interface with EHR (electronic health record)
More information

- **RxNav**

- **RxNorm**

- **DailyMed**
Medical Ontology Research

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MeSH Section

- UMLS Editing/Production
- RxNorm
- DailyMed
- Links at www.nlm.nih.gov/mesh