

Theater-Style Demonstration
S45 – Expressing Terminologies for Practical Use
November 13, 2006



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



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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)

RXCUI	STR	SAB

161	Acetaminophen	RxNorm
161	APAP	MMSL
161	Paracetamol	SNOMEDCT
...		



Normalized forms

Strength

4mg/ml

Ingredient

Fluoxetine

Dose form

Oral Solution

Strength

Semantic clinical drug component

Ingredient

Ingredient

Dose form

Semantic clinical drug form

Strength

Ingredient

Dose form

Semantic clinical drug



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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

Prozac

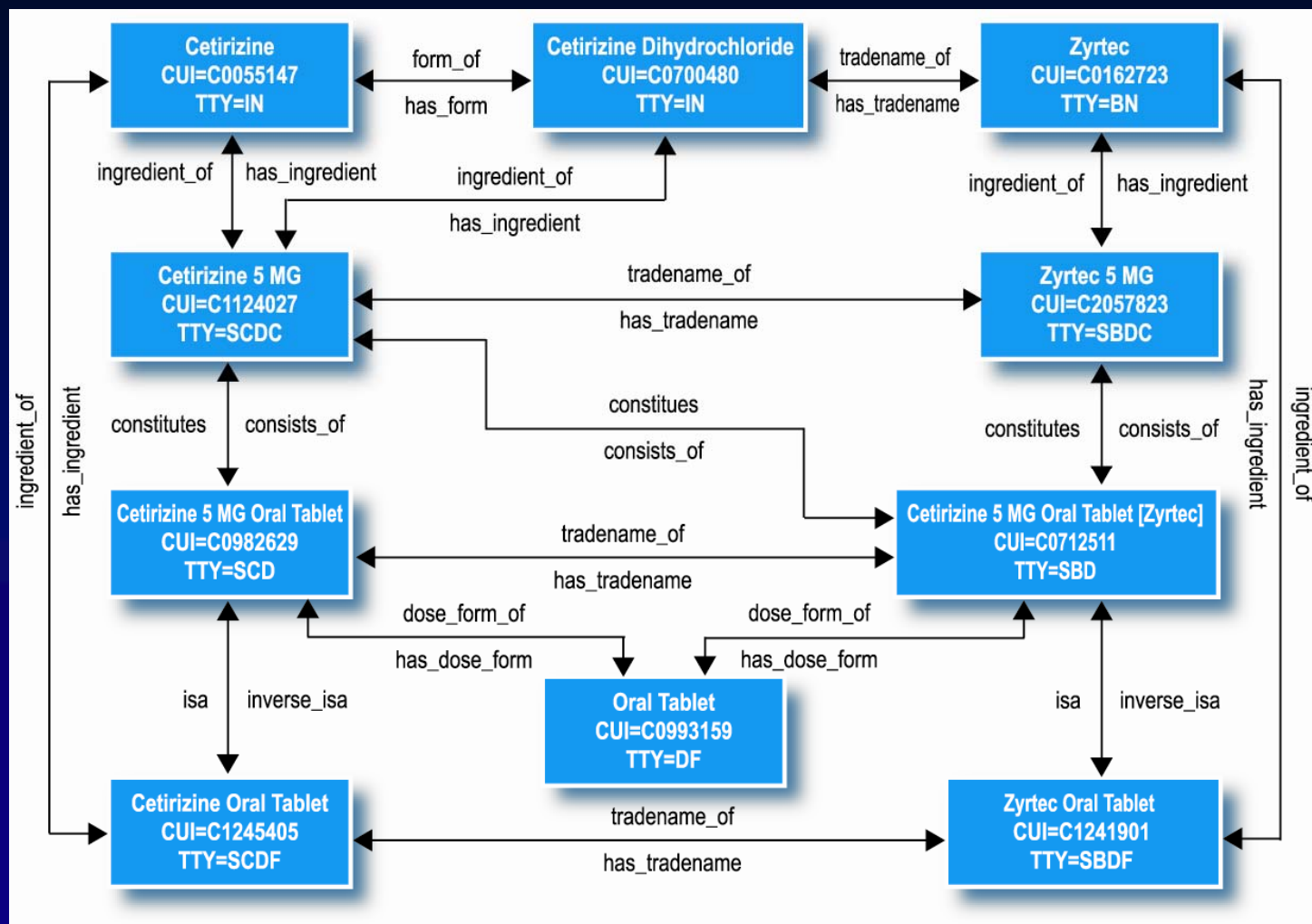
Fluoxetine 4 mg/ml oral solution [Prozac]



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Relations among drug entities



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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)



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Visualization and processing of drug information



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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

<http://mor.nlm.nih.gov/download/rxnav/>



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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



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Future work

Integrated drug information



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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

Ticlid

STR	SAB	Code
-----	-----	------

Ticlid	RxNorm	227257
--------	--------	--------

Ticlid	MMSL	2177
--------	------	------

Equivalent codes

- RXCUI:227257
- BRAND_CODE:2177

Acetaminophen

STR	SAB	CODE
-----	-----	------

Acetaminophen	RxNorm	161
---------------	--------	-----

APAP	MMSL	4992
------	------	------

Paracetamol	SNOMEDCT	3875170004
-------------	----------	------------

...

Equivalent strings

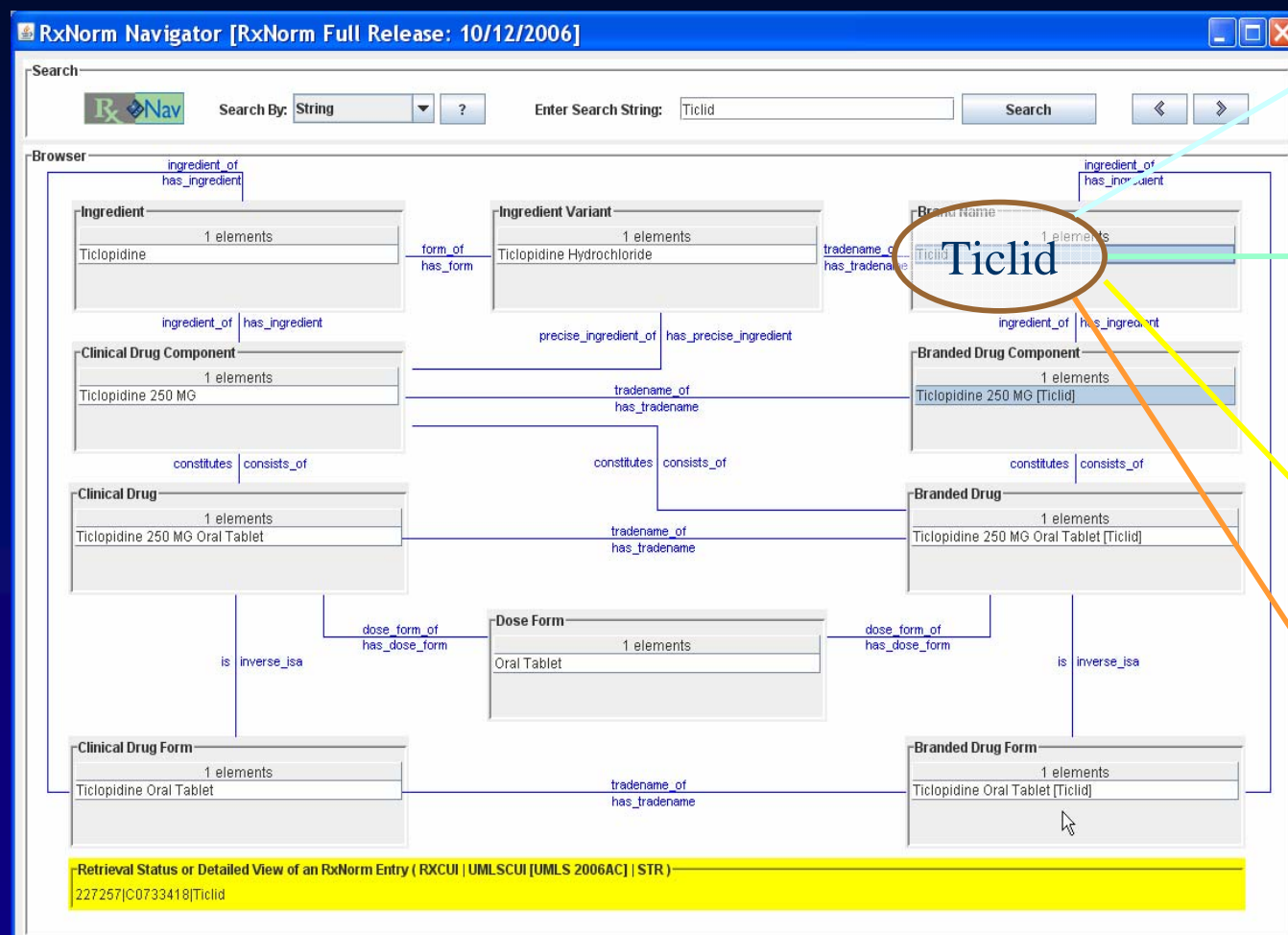
- Acetaminophen
- Paracetamol
- ...



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Links to applications or vocabularies



MeSH

DailyMed

Equivalent strings
and codes
(authenticated users)

MyMedicationList



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MeSH: Pharmacologic actions

Ticlid

Ticlopidine - Microsoft Internet Explorer

Address http://www.nlm.nih.gov/cgi/mesh/2006/MB_cgi

National Library of Medicine - Medical Subject Headings

2006 MeSH

MeSH Descriptor Data

[Return to Entry Page](#)

MeSH Heading	Ticlopidine
Tree Number	D02.886.778.834
Tree Number	D03.383.903.834
Scope Note	Ticlopidine is an effective inhibitor of platelet aggregation. The drug has been found to significantly reduce infarction size in acute myocardial infarction. It is an effective antithrombotic agent in arterial disease, atherosclerosis, aorto-coronary bypass grafts, ischaemic heart disease, venous thrombosis, and arteriosclerosis.
Entry Term	53-32C
Entry Term	Ticlid
Entry Term	Ticlodix
Entry Term	Ticlodone
Entry Term	Ticlopidine Hydrochloride
Allowable Qualifiers	AA AD AE AG AI AN BL CF CH CJ CT DU EC HI IM IP ME PD PK PO RE SD ST TO TU UR
Pharm. Action	Fibrinolytic Agents
Pharm. Action	Platelet Aggregation Inhibitors
CAS Type 1 Name	Thieno (3,2-c)pyridine, 5-((2-chlorophenyl)methyl)-4,5,6,7-tetrahydro-

Pharmacologic action

- Fibrinolytic Agents
- Platelet Aggregation Inhibitors



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DailyMed: Drug label information

Ticlid

Adverse reactions

- Agranulocytosis
- Thrombotic thrombocytopenic purpura
- ...

DailyMed: About DailyMed - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address <http://dailymed.nlm.nih.gov/dailymed/druginfo.cfm?id=936>

Google [Go](#) [RS](#) [Bookmarks](#) [Search Web](#) [Get IE7 n](#)

DailyMed: About DailyMed [Add Tab](#)

Options

- Home
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Additional Resources

- Report Adverse Event
- MedlinePlus Information
- Find Clinical Trials
- Biochemical Data Summary
- Search PubMed Articles
- Presence in Breast Milk

Merriam-Webster Turn Dictionary On

For a FDA View of this Label, click here

DrugLabel Sections

- Description
- Clinical Pharmacology
- Indications & Usage
- Contraindications
- Precautions
- Adverse Reactions
- Overdosage
- Dosage & Administration
- Patient Counseling Information
- Supplemental Patient Material
- Other information

Revision Date: 12/14/2005

TICLID®

(ticlopidine hydrochloride)

TABLETS

WARNING:

TICLID can cause life-threatening hematological adverse reactions, including neutropenia/agranulocytosis, thrombotic thrombocytopenic purpura (TTP) and aplastic anemia.

Neutropenia/Agranulocytosis:

Among 2048 patients in clinical trials in stroke patients, there were 50 cases (2.4%) of neutropenia (less than 1200 neutrophils/mm³), and the neutrophil count was below 450/mm³ in 17 of these patients (0.8% of the total population).

DailyMed



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MyMedicationList

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



More information



- <http://mor.nlm.nih.gov/download/rxnav/>

RxNorm

- <http://www.nlm.nih.gov/research/umls/rxnorm/index.html>

DailyMed

- <http://dailymed.nlm.nih.gov/>

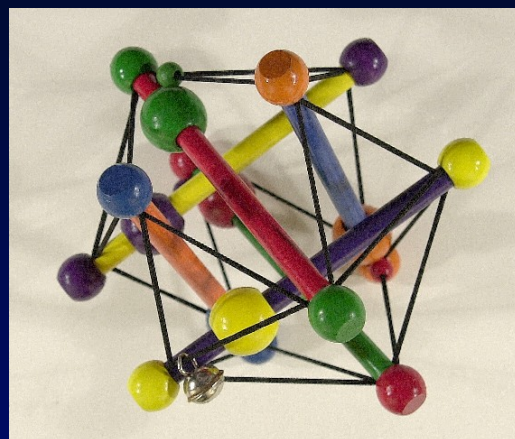


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MeSH Section

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



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