

Mapping NDC to ATC classification

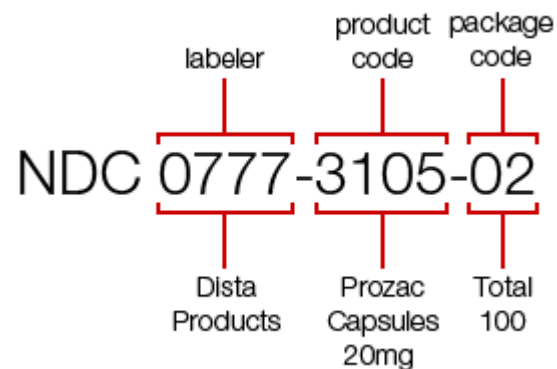
Ximena Oyarzun

Medication classification

NDC

National Drug Code

Product code for identification



VA

Department of Veterans Affairs Drug Classification

Free

2 levels

Product code

- Classifies NDCs/RxCUI

HS500 Blood Glucose Regulation Agents

HS502 Hypoglycemic Agents, Oral

Metformin

ATC

Anatomical Therapeutic Chemical code-WHO

Free

5 levels

Active ingredient classes

A **ALIMENTARY TRACT AND METABOLISM**

A10 **DRUGS USED IN DIABETES**

A10B **BLOOD GLUCOSE LOWERING DRUGS, EXCL. INSULINS**

A10BA **Biguanides**

ATC code	Name	DDD	U	Adm.R	Note
A10BA02	<u>metformin</u>	2	g	O	

The Problem -Disambiguation

RxNorm

RxCUI: 1923428

timolol 2.5 MG/ML Ophthalmic Solution

ATC

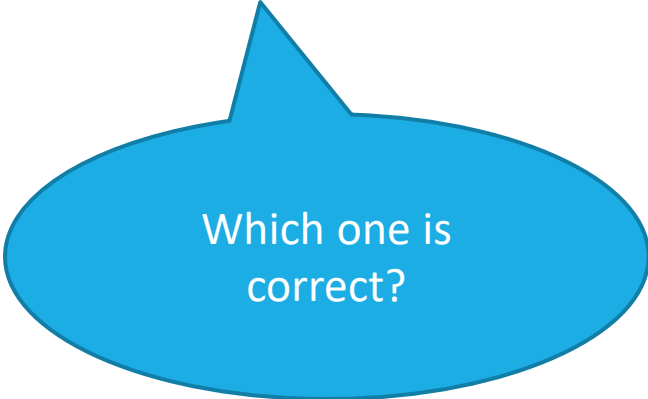
C07AA06 timolol

S01ED01 timolol

C07BA06 timolol and thiazides

S01ED51 timolol, combinations

C07DA06 timolol, thiazides and other diuretics



Which one is
correct?

The Problem -Disambiguation

RxNorm

RxCUI: 1923428

timolol 2.5 MG/ML Ophthalmic Solution

Only 1 Ingredient

ATC

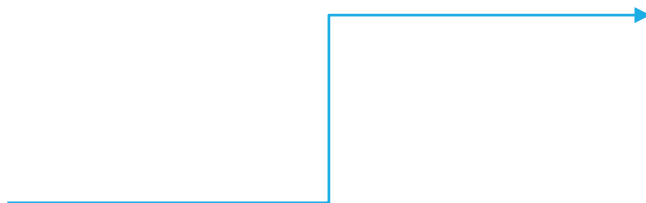
C07AA06 timolol

S01ED01 timolol

~~C07BA06 timolol and thiazides~~

~~S01ED51 timolol, combinations~~

~~C07DA06 timolol, thiazides and other diuretics~~



The Problem -Disambiguation

RxNORM

RxCUI: 1923428

timolol 2.5 MG/ML Ophthalmic Solution



VA classification

OP000 Ophthalmic agents

OP101 BETA-BLOCKERS, TOPICAL OPHTHALMIC



ATC

~~C07AA06 timolol (systemic use)~~

S01ED01 timolol (ophthalmic use)

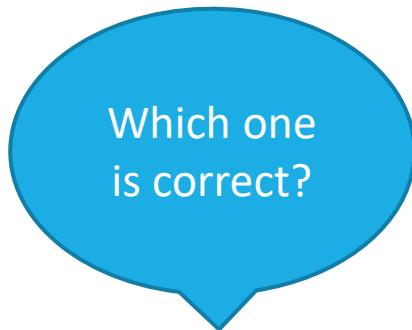
The Problem –multi-ingredients

RxNORM

RxCUI: 858824

enalapril maleate 5 MG /

hydrochlorothiazide 12.5 MG Oral Tablet



ATC

C09AA02 enalapril

C09BA02 enalapril and diuretics

C09BB02 enalapril and lercanidipine

C09BB06 enalapril and nitrendipine

C09XA52 aliskiren and hydrochlorothiazide

C09XA54 aliskiren, amlodipine and hydrochlorothiazide

C09DX06 candesartan, amlodipine and hydrochlorothiazide

C03AA03 hydrochlorothiazide

C03AB03 hydrochlorothiazide and potassium

C03EA01 hydrochlorothiazide and potassium-sparing agents

C03AX01 hydrochlorothiazide, combinations

C09DX07 irbesartan, amlodipine and hydrochlorothiazide

C09DX03 olmesartan medoxomil, amlodipine and hydrochlorothiazide

C09BX03 ramipril, amlodipine and hydrochlorothiazide

C09DX01 valsartan, amlodipine and hydrochlorothiazide

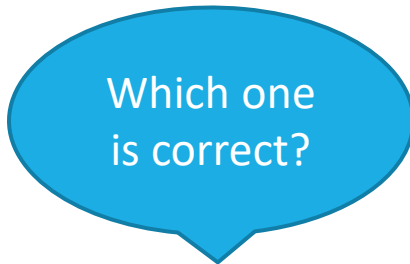
The Problem –multi-ingredients

RxNORM

RxCUI: 858824

enalapril maleate 5 MG /

hydrochlorothiazide 12.5 MG Oral Tablet



ATC

~~C09AA02 enalapril~~

~~C09BA02 enalapril and diuretics~~

~~C09BB02 enalapril and lercanidipine~~

~~C09BB06 enalapril and nitrendipine~~

~~C09XA52 aliskiren and hydrochlorothiazide~~

~~C09XA54 aliskiren, amlodipine and hydrochlorothiazide~~

~~C09DX06 candesartan, amlodipine and hydrochlorothiazide~~

~~C03AA03 hydrochlorothiazide~~

~~C03AB03 hydrochlorothiazide and potassium~~

~~C03EA01 hydrochlorothiazide and potassium-sparing agents~~

~~C03AX01 hydrochlorothiazide, combinations~~

~~C09DX07 irbesartan, amlodipine and hydrochlorothiazide~~

~~C09DX03 olmesartan medoxomil, amlodipine and hydrochlorothiazide~~

~~C09BX03 ramipril, amlodipine and hydrochlorothiazide~~

~~C09DX01 valsartan, amlodipine and hydrochlorothiazide~~

1. Multi-ingredient → discard single ingredient
2. Discard combinations that are not the one in the RxCUI

The Problem –multi-ingredients

RxNORM

RxCUI: 858824

enalapril maleate 5 MG /

hydrochlorothiazide 12.5 MG Oral Tablet

Which one
is correct?

Is HCTZ a
diuretic?

Is Enalapril
a K-Sparing
agent?

Is the
combinations
right?

ATC

C09BA02 enalapril and diuretics

C03EA01 hydrochlorothiazide and potassium-sparing agents

C03AX01 hydrochlorothiazide, combinations

The Problem –multi-ingredients

ATC

C09BA02 enalapril and diuretics

C03EA01 hydrochlorothiazide and potassium-sparing agents

C03AX01 hydrochlorothiazide, combinations

Is HCTZ a diuretic?

Expansion Dataset

Is Enalapril a K-Sparing agent?

Rules List

Is the combinations right?

C CARDIOVASCULAR SYSTEM

C03 DIURETICS

C03A LOW-CEILING DIURETICS, THIAZIDES

C03AA Thiazides, plain

ATC code	Name	DDD	U	Adm.R
C03AA03	<u>hydrochlorothiazide</u>	25	mg	O

C CARDIOVASCULAR SYSTEM

C09 AGENTS ACTING ON THE RENIN-ANGIOTENSIN SYSTEM

C09A ACE INHIBITORS, PLAIN

C09AA ACE inhibitors, plain

ATC code	Name	DDD	U	Adm.R	Note
C09AA02	<u>enalapril</u>	10	mg	O	
		10	mg	P	

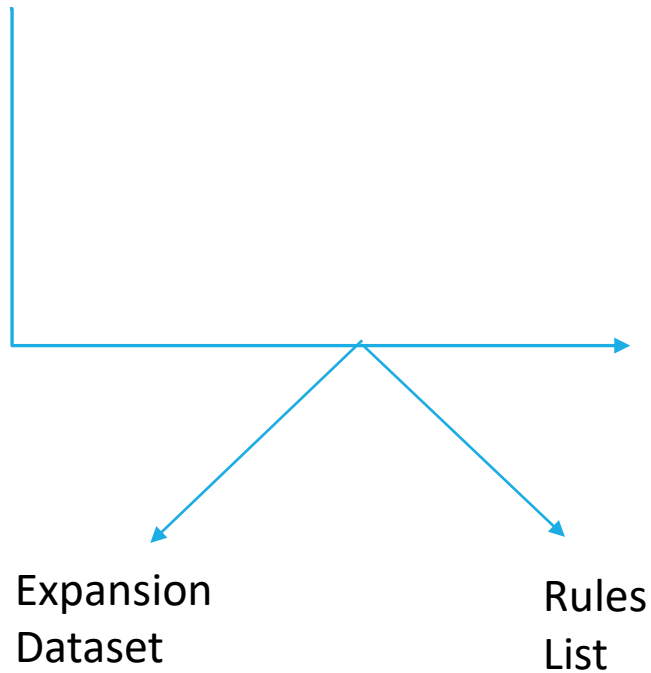
The Problem –multi-ingredients

RxNorm

RxCUI: 858824

enalapril maleate 5 MG /

hydrochlorothiazide 12.5 MG Oral Tablet



ATC

C09BA02 enalapril and diuretics

~~C03EA01 hydrochlorothiazide and potassium-sparing agents~~

~~C03AX01 hydrochlorothiazide, combinations~~

From expansión dataset Enalapril is not a K-Sparing agent; and HCTZ is a diuretic

From Rules list, HcTZD, combinations is broader than enalapril and diuretics

Expansion Dataset

Diuretics  C03 **DIURETICS**

ATC class cited	Example		search in ATC
combinations excl. Psycholeptics	A02BX51-carbenoxolone, combinations excl. psycholeptics	N05	PSYCHOLEPTICS
other non-opioid analgesics	N02AJ03-dihydrocodeine and other non-opioid analgesics	N02B	OTHER ANALGESICS AND ANTIPYRETICS
ACE-Inhibitors	C09BB-ACE inhibitors and calcium channel blockers	C09A	ACE INHIBITORS, PLAIN
acid preparations	A09AC02-multienzymes and acid preparations	A09AB	Acid preparations
Analgesics	A03DA06-trospium and analgesics	N02	ANALGESICS
analgesics	A03DC-Other antispasmodics in combination with analgesics	N02A	Analgesics
analgesics	C03AH Thiazides, combinations with psycholeptics and/or analgesics C03AH01-chlorothiazide, combinations	N02	ANALGESICS
analgesics	C03AH Thiazides, combinations with psycholeptics and/or analgesics C03AH02-hydroflumethiazide, combinations	N02	ANALGESICS
adrenergics	R03DB01-diprophylline and adrenergics	R03C	ADRENERGICS FOR SYSTEMIC USE
antibiotics	D07CA01-hydrocortisone and antibiotics	D06A	ANTIBIOTICS FOR TOPICAL USE
antispasmodics	N02AG01-morphine and antispasmodics		
diuretics	C02LA50-combination of rauwolfia alkaloids and diuretics incl. other combinations	C03	DIURETICS
and diuretics	C02LC01-clonidine and diuretics	C03	DIURETICS
and diuretics in combination	C02LB-Methyldopa and diuretics in combination	C03	DIURETICS
and other drugs for obstructive	R03AK01-epinephrine and other drugs for obstructive airway diseases	R03	DRUGS FOR OBSTRUCTIVE AIRWAY DISEASES
and psycholeptics	A03CA01-isopropamide and psycholeptics	N05	PSYCHOLEPTICS

Rules List

chlorphenamine (Antihistamine) + Acetaminophen (Analgesic) + pseudoephedrine (descongestant)

Which one is correct?

Analgesics > descongestants > antihistamine

N02BE51 paracetamol, combinations excl. psycholeptics

R06AB54 chlorphenamine, combinations

R01BA52 pseudoephedrine, combinations

Final products

- “Ground truth” dataset
 - Basic rules spreadsheet for coding → “If VA_ID=CV050 then search in ATC4_ID=C01AA”
 - Validation of rules
- Expansion dataset
- Rules list