The WHO Drug Dictionary Types, Formats and Loading Considerations in TMS

Carl Huddenius, Uppsala Monitoring Centre

Sunil G. Singh, DBMS Consulting, Inc.

the UPPSALA MONITORING CENTRE

Acknowledgements and Introductions

- Many thanks to the OCUG for opportunity to present a tutorial related to the WHO Drug Dictionary Types and Formats.
- Many thanks to Carl Huddénius and Daniel von Sydow of the World Health Organization, Uppsala Monitoring Centre.
- Many thanks to the audience members for attending.

the UPPSALA MONITORING CENTRE

Assumptions/Scope/Disclaimer

- Assumption: Audience has a basic understanding of WHODrug Dictionary
- Scope: OC 4.0.x to OC 4.5.x.
- Disclaimer: The samples provided in these scripts are for demonstration purposes only. No part of the content of this presentation should construed for fitness to a particular purpose or a warranty of any kind.

the UPPSALA MONITORING CENTRE

Agenda

- Part I: Overview, Content and Usefulness of the WHO Drug Dictionary Types
  - WHODD
  - WHODDE
  - Combined Files of WHODDE and WHOHD
- Part II: Overview of the WHODrug Formats
  - B2 Format and C Format
  - Uses of C Format
  - Differences between B2 and C Format
- Part III: Loading and Updating the B2 and C Formats into TMS
  - The ATC Derivation Problem and Options in TMS
  - C Format Loading Considerations in TMS
  - Update Considerations for B2 Drug Code
  - SDQ Loading

Part I: Overview, Content of the WHODrug Dictionaries

the UPPSALA MONITORING CENTRE

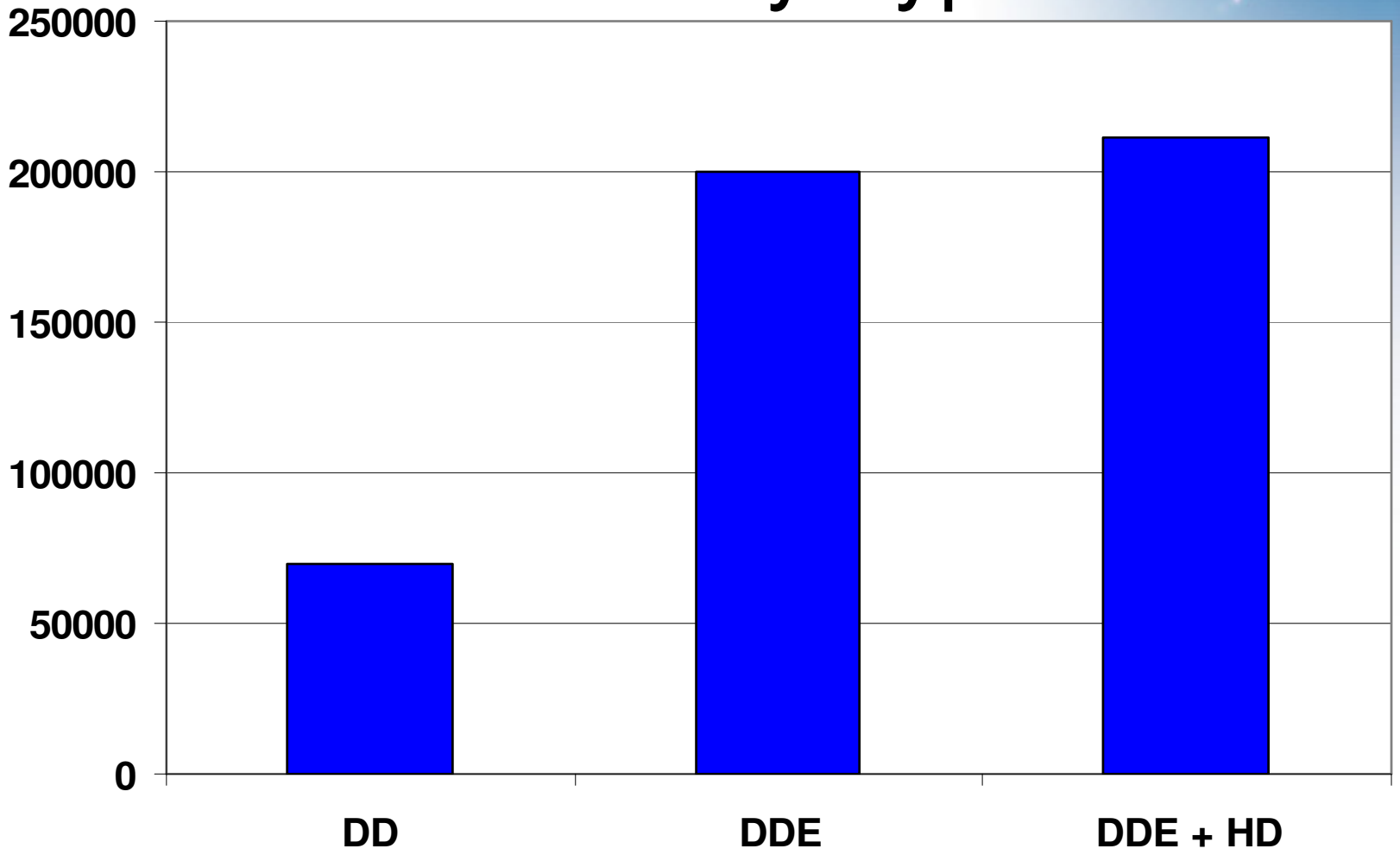
Dictionary Type/Format

- Dictionary Types
  - WHO Drug Dictionary (WHO DD)
  - WHO Drug Dictionary Enhanced (WHO DDE)
  - WHO Drug Dictionary Enhanced extended with the Herbal Dictionary (WHO DDE+HD)

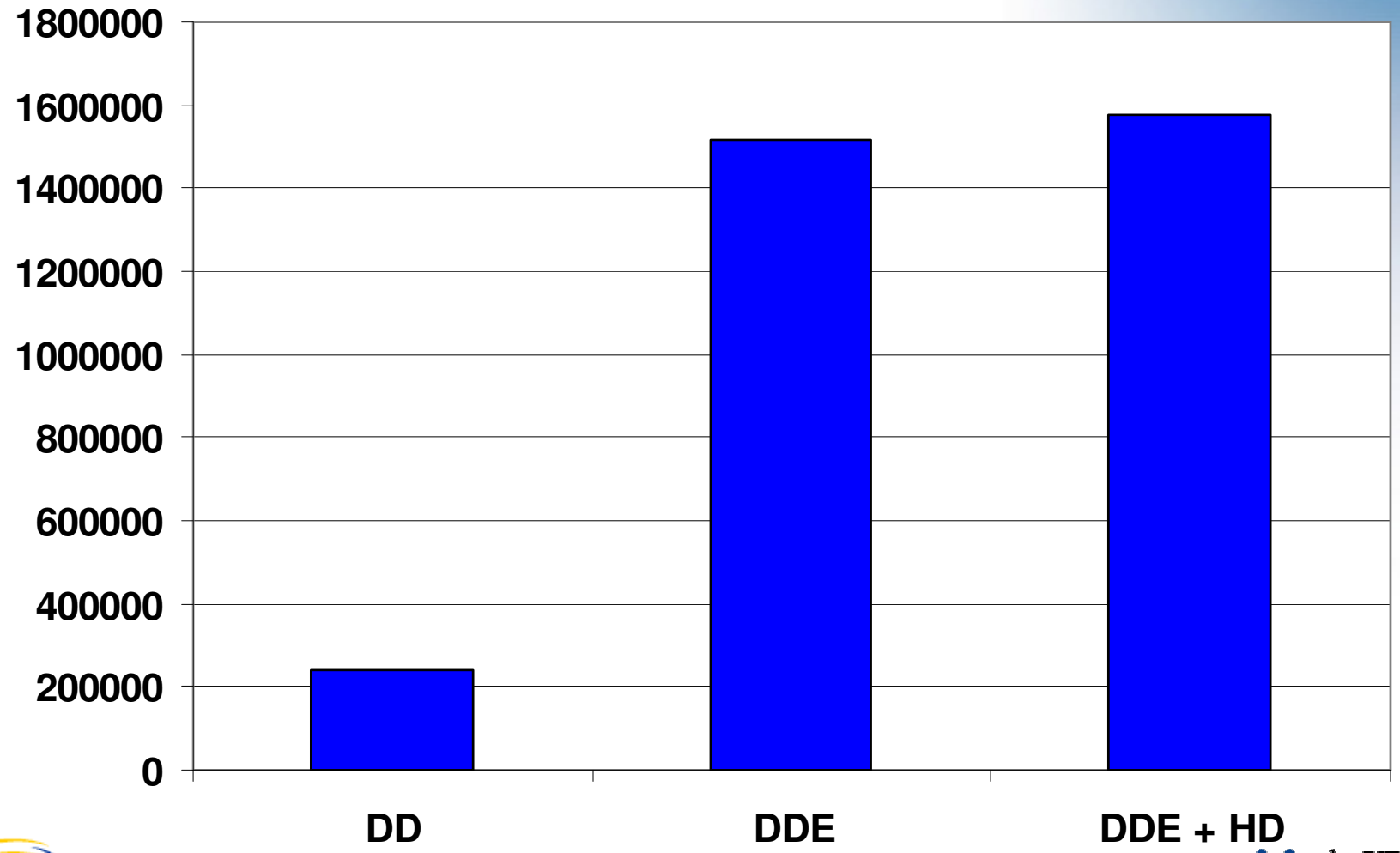
- Dictionary Formats
  - B-2 Format
  - C Format

the UPPSALA MONITORING CENTRE

No of **B** Format entries per Dictionary Type



No of **C** Format entries per Dictionary Type



Part II: Overview of the WHODrug Formats

the UPPSALA MONITORING CENTRE

Dictionary Formats

- The WHO Drug Dictionaries are available in different formats: B-2 and C
- The formats are data-files, with pre-defined data-fields and relationships between the tables
- The data-files are loaded into TMS

the UPPSALA MONITORING CENTRE

The Dictionary Formats

- The B-2 Format dictionary is a dictionary of Drug Codes (drug names and their corresponding ingredient etc.)
- Drug Code
  - Ingredient(-s)
  - Salt(-s)
  - Names
- The C Format dictionary is a dictionary of Medicinal Products
- Medicinal Product ID
  - A unique combination of
    - Drug Code
    - Name
    - Name Specifier
    - Country
    - Marketing Authorisation Holder
    - Strength
    - Dosage form

B and C Formats

- The B format is a dictionary of product names
  - Unique identifier – Drug Code (B-2)
- The C format is a dictionary of medicinal products. Each drug name can appear many times – e.g. in different forms and countries
  - Unique identifier – Medicinal Product ID
  - Drug Code is also included
  - Code with higher precision
  - Understand the difference between drugs with similar drug names

the UPPSALA MONITORING CENTRE

B-2 View

User:	Organisation:	Version:	Dictionary:	
carl.huddenius@who-umc.org	the UMC Products & Services	June 1, 2009	WHODDE, WHOHD	Fri, Aug 21, 2009 GMT: 09:24

Search | ATC | Condensed | Compare | Result | Product | Export | Request

Search: Product Name like alvedon

Number of rows: 2 (DDE, HD: 2) Filter

Product Name	Drug Code	Ingredient(s)	Generic	Preferred
Alvedon	00020001004	Paracetamol		
Alvedon dos	00020001337	Paracetamol		

C View

MP_ID	Drug Code	Product Name	Name specifier	Pharmaceutical form	Strength	Country	MAH	Generic	Preferred
1156070	00020001004	Alvedon		TABLETS	500 mg	Sweden	AstraZeneca AB		
1156071	00020001004	Alvedon		TABLETS	Unspecified	Sweden	AstraZeneca AB		
1156072	00020001004	Alvedon		Unspecified	Unspecified	Sweden	AstraZeneca AB		
1224867	00020001004	Alvedon		Unspecified	Unspecified	Sweden	Not specified		
1286550	00020001004	Alvedon		Unspecified	Unspecified	United Kingdom	Not specified		
1440892	00020001004	Alvedon		Unspecified	Unspecified	Philippines	Not specified		
188671	00020001004	Alvedon		SUPPOSITORIES, PAEDIATRIC	Unspecified	United Kingdom	Novex pharma		
188672	00020001004	Alvedon		Unspecified	Unspecified	United Kingdom	Novex pharma		
4765	00020001004	Alvedon		Unspecified	Unspecified	Sweden	Draco ab		
4967	00020001004	Alvedon	Forte	Unspecified	Unspecified	Sweden	Astra pharmaceutical products, inc.		
807830	00020001004	Alvedon		TABLETS	Unspecified	Philippines	Multicare pharm		
807831	00020001004	Alvedon		Unspecified	Unspecified	Philippines	Multicare pharm		
812839	00020001004	Alvedon		LIQUIDS	Unspecified	Philippines	Multicare pharm		
87552	00020001004	Alvedon		Unspecified	Unspecified	Unspecified	Not specified		

Non-unique Names

- Some drug names can mean many things – the names can be used in different countries or forms with different active ingredients
- In the B-2 format the Drug Record number and Sequence number 1 is added to the drug name – to make it unique
- In the C format entries have additional data fields

the UPPSALA MONITORING CENTRE

Non-unique Name, B-2 Format

ACTRON	/00020001/
ACTRON	/00109201/
ACTRON	/00321701/
ACTRON	/00391201/
ACTRON	/00727101/

the UPPSALA MONITORING CENTRE

Non-unique Name, C Format

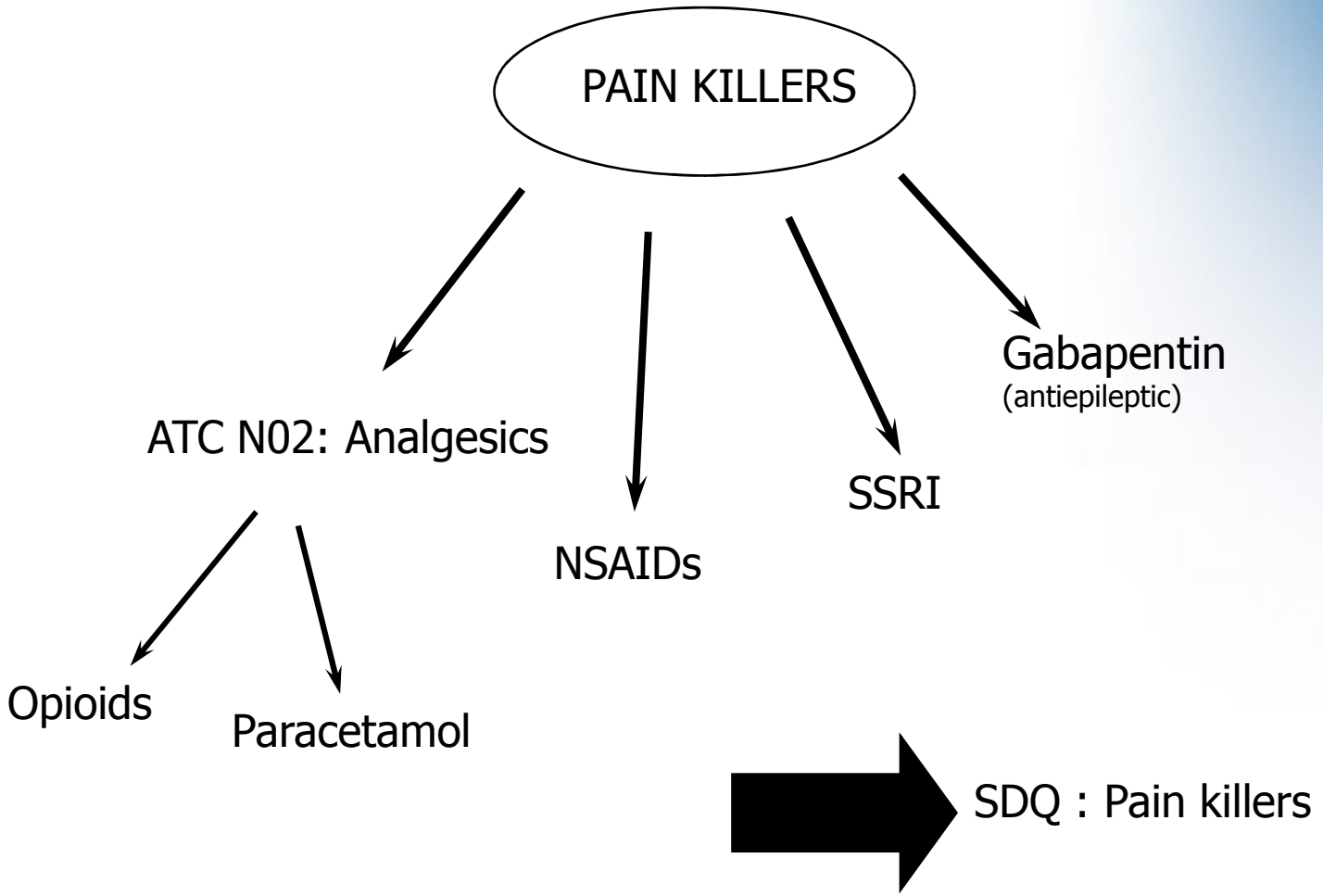
Product Name	Actron	Actron	Actron	Actron	Actron
Drug Code	00020001158	00109201461	00321701053	00391201026	00727101001
Name specifier(s)	500		old form		old form
Active Ingredient(s)	Paracetamol	Ibuprofen	Ketoprofen	Acetylsalicylic acid Caffeine Paracetamol	Acetylsalicylic acid Caffeine Citric acid Paracetamol Sodium bicarbonate
Preferred base name	Paracetamol	Ibuprofen	Ketoprofen	Thomapyrin n	Actron
Preferred salt name					
Generic					
Preferred					Yes
ATC code(s)	N02BE Anilides *official*	M01AE Propionic acid derivatives *official*	M02AA Antiinfl. prep., non-steroids for topical use *official* M02AA Antiinflammatory preparations, non-steroids for topical use *official* M01AE Propionic acid derivatives *official*	N02BE Anilides	N02BE Anilides
MAH(s)	Bayer	Bayer Bayer S.A.	Bayer Bayer consumer care	Bayer	Miles martin
Countries	Spain Venezuela	Argentina Chile Mexico Uruguay	United States	France United Kingdom	Spain
Pharmaceutical form(s)	COATED TABLETS LIQUIDS, DROPS LIQUIDS, SYRUPS TABLETS	CAPSULES LIQUIDS, SUSPENSIONS	COATED TABLETS, FILM TABLETS		
Strength(s)					
Medicinal Product ID(s)	⊞	⊞	⊞	⊞	⊞

Why SDQs/The purpose of SDQs

Standardized Drug Queries (SDQs)

- Lists of drugs of special interest
  - Facilitate analysis
  - Monitoring and assessment of Adverse events
  - Protocol compliance
  - Monitor possible drug interactions

the UPPSALA MONITORING CENTRE



SDQ structure

SDQ main table

SDQ-number	SDQ name	Descritption
1	Pain killers	

SDQ subgroup table

SDQ-number	SDQ subgroup number	Sub group name
1	01	ATC: N02
1	02	NSAIDs
1	03	SSRI
1	04	Gabapentin

SDQ drug table

SDQ subgroup number	Drecno	Base name
01	000363	Morphine
01	000200	Paracetamol

the UPPSALA MONITORING CENTRE

The pilot release March 2009

- NSAIDs
- Monoclonal antibodies
  - Antineoplastics
  - Non-antineoplastics
- C-level ATC

the UPPSALA MONITORING CENTRE

Next release March 2010

- Anti-hypertensives and diuretics
- Corticosteroids
- Analgesia producing opioids
- DMARDS (disease modifying antirheumatic drugs)
- Corticosteroids
- Anticoagulants
- Antineoplastics
- Anticonvulsants
- Biologicals
- CYP

the UPPSALA MONITORING CENTRE

Cumulative changes file

- Cumulative changes file
  - Traces all Drug Codes since 2004
  - Mapped discontinued codes (incorrect or reclassified) to replacement codes
  - Help users upgrade from old releases
  - Can also be useful in versioning of coded data

- Have you coded to any code that have been deleted?

the UPPSALA MONITORING CENTRE

Delete - Replace

Has any of the Drug Codes we have used (coded to) been deleted. If so which are the replacement codes? Should we re-code?

- Use the cumulative changes table.
- Example: *01632701005*084<u>01166101014</u>
- This means that
- Concor plus *01632701005* Bisoprolol hemifumarate/Hydrochlorothiazide

  Was deleted. It was last used 084 (December 2008) It is now pointing at Concor Plus <u>01166101014</u> Bisoprolol fumarate/Hydrochlorothiazide

- Any clinical data that uses the code *01632701005* should be re-coded to <u>01166101014</u>
- The name Concord Plus became unique.

the UPPSALA MONITORING CENTRE

Delete - Replace

Search | ATC | Condensed | Compare | Result | Product | Export | Request

Search: Product Name like concor plus

Version: December 1, 2008

Dictionary: WHODDE, WHOHD

Number of rows: 2 (DDE, HD: 2)

Filter

Product Name	Drug Code	Ingredient(s)	Generic	Preferred
Concor Plus	01166101014	Bisoprolol fumarate/Hydrochlorothiazide		
Concor plus	01632701005	Bisoprolol hemifumarate/Hydrochlorothiazide		

Search | ATC | Condensed | Compare | Result | Product | Export | Request

Search: Product Name like concor plus

Version: March 1, 2009

Dictionary: WHODDE, WHOHD

Number of rows: 1 (DDE, HD: 1)

Filter

Product Name	Drug Code	Ingredient(s)	Generic	Preferred
Concor Plus	01166101014	Bisoprolol fumarate/Hydrochlorothiazide		

the UPPSALA MONITORING CENTRE

Previously unique - Non unique?

- Has any of the products we have coded to become non-unique?
- Use the DD Changed DrugName.txt. Identify entries where /code/ has been added.
- Example:
  06235401001SEVIKAR /06235401/SEVIKAR
- Check if any of the drug codes have been used in your clinical data.
- Find the 'new' Sevikar. Use the DD_ins.txt. Find the other entry:
  06230801006 5M09 237UNS 02 093SEVIKAR /06230801/
- Decision: should the code selection be revised?

the UPPSALA MONITORING CENTRE

Previously unique - Non unique

Search | ATC | Condensed | Compare | Result | Product | Export | Request

Search: Product Name like sevikar

Version: June 1, 2009

Dictionary: WHODDE, WHOHD

Number of rows: 1 (DDE, HD: 1)

Filter

Product Name	Drug Code	Ingredient(s)	Generic	Preferred
Sevikar	06235401001	Amlodipine/Olmesartan medoxomil		Yes

Search | ATC | Condensed | Compare | Result | Product | Export | Request

Search: Product Name like sevikar

Version: September 1, 2009

Dictionary: WHODDE, WHOHD

Number of rows: 2 (DDE, HD: 2)

Filter

Product Name	Drug Code	Ingredient(s)	Generic	Preferred
Sevikar	06230801006	Amlodipine besilate/Olmesartan medoxomil		
Sevikar	06235401001	Amlodipine/Olmesartan medoxomil		Yes

the UPPSALA MONITORING CENTRE

Non-unique

- Has any additional alternative been added to a previously non-unique name?
- Use the DD_ins.txt. Indentify inserts with /code/ that do not have corresponding entries (same name minus /code/) in the DD Changed DrugName.txt.
- Example:
  025954010010M05SCH UNS 08 053CRAMPEX /02595401/
- Compare with corresponding 'old' entries in the DD.txt:
  018265010019M05 237UNS 03 051CRAMPEX /01826501/
  005142010015M77 19UNS 04 044CRAMPEX /00514201/
- Check if the 'old' entries have been used in your clinical data.
- Decision: should the code selection be revised?

the UPPSALA MONITORING CENTRE

Non-unique

Search: Product Name like Crampex

Number of rows: 2 (DDE, HD: 2)

Version: March 1, 2009 | Dictionary: WHODDE, WHOHD | Filter

Product Name	Drug Code	Ingredient(s)	Generic	Preferred
Crampex	00514201001	Calcium gluconate/Ergocalciferol/Guaifenesin/Nicotinic acid		Yes
Crampex	01826501001	Calcium gluconate/Ergocalciferol/Nicotinic acid		Yes

Search: Product Name like Crampex

Number of rows: 3 (DDE, HD: 3)

Version: September 1, 2009 | Dictionary: WHODDE, WHOHD | Filter

Product Name	Drug Code	Ingredient(s)	Generic	Preferred
Crampex	00514201001	Calcium gluconate/Ergocalciferol/Guaifenesin/Nicotinic acid		Yes
Crampex	01826501001	Calcium gluconate/Ergocalciferol/Nicotinic acid		Yes
Crampex	02595401001	Atropa belladonna/Calcium carbonate/Copper acetate/Homeopatics nos/Magnesium phosphate/Potassium bromide/Silicic acid/Zinc oxide		Yes

the UPPSALA MONITORING CENTRE

New/Changed ATC-Codes

- If you code ATC as well as Drug Code – has the yearly **ATC revision** affected any of the codes you have selected?
- Use ATC info YYYY.xls

the UPPSALA MONITORING CENTRE

New/Changed ATC-Codes

ATC 2007:4

- L ANTINEOPLASTIC AND IMMUNOMODULATING AGENTS
  - Search for entries coded with this 1st level code
  - L01 ANTINEOPLASTIC AGENTS
  - L02 ENDOCRINE THERAPY
  - L03 IMMUNOSTIMULANTS
  - L04 IMMUNOSUPPRESSIVE AGENTS
    - Search for entries coded with this 2nd level code
    - L04A IMMUNOSUPPRESSIVE AGENTS
      - Search for entries coded with this 3rd level code
      - L04AA Selective immunosuppressive agents
      - L04AX Other immunosuppressive agents

ATC 2008:1

- L ANTINEOPLASTIC AND IMMUNOMODULATING AGENTS
  - Search for entries coded with this 1st level code
  - L01 ANTINEOPLASTIC AGENTS
  - L02 ENDOCRINE THERAPY
  - L03 IMMUNOSTIMULANTS
  - L04 IMMUNOSUPPRESSANTS
    - Search for entries coded with this 2nd level code
    - L04A IMMUNOSUPPRESSANTS
      - Search for entries coded with this 3rd level code
      - L04AA Selective immunosuppressants
      - L04AB Tumor necrosis factor alpha (TNF-) inhibitors
      - L04AC Interleukin inhibitors
      - L04AD Calcineurin inhibitors
      - L04AX Other immunosuppressants

the UPPSALA MONITORING CENTRE

New/Changed ATC-Codes

Other ATC changes than the yearly ATC revision

- Deletes
- Inserts
- Updates

Decision: should the code selection be revised?

the UPPSALA MONITORING CENTRE

ATC precision

- Name level
  - What is this drug name used for?
- Substance level
  - What is the substance used for?

the UPPSALA MONITORING CENTRE

ATC precision, use

- Name level
  - To understand an individual case report
  - To produce certain reports (e.g. CDISC)
- Substance level
  - For analysis of large datasets, where the effect of the substance is more relevant than the indication

the UPPSALA MONITORING CENTRE

ATC precision, Substance level

Ketoprofen 00321701001

A01AD *Other agents for local oral treatment*
M01AE *Propionic acid derivatives*
M02AA *Antiinfl. prep., non-steroids for topical use*

Orudis 00321701002

A01AD *Other agents for local oral treatment*
M01AE *Propionic acid derivatives*
M02AA *Antiinfl. prep., non-steroids for topical use*

Orudis 00321701002
MP ID: 524611
A01AD *Other agents for local oral treatment*
M01AE *Propionic acid derivatives*
M02AA *Antiinfl. prep., non-steroids for topical use*
Pharmaceutical Form: Gels and Sols

ATC precision, Name level

Ketoprofen 00321701001

A01AD *Other agents for local oral treatment*
M01AE *Propionic acid derivatives*
M02AA *Antiinfl. prep., non-steroids for topical use*

Orudis 00321701002

M01AE *Propionic acid derivatives*
M02AA *Antiinfl. prep., non-steroids for topical use*

Orudis 00321701002
MP ID: 524611
M02AA *Antiinfl. prep., non-steroids for topical use*
Pharmaceutical Form: Gels and Sols

Orudis 00321701002
MP ID: 553239
M01AE *Propionic acid derivatives*
Pharmaceutical Form: Capsules

Additional assignments

- It is possible to use both levels of precision for both B-2 and C.
  - An additional name level assignment in B-2
  - An additional substance level assignment in C
- Available as additional tables, does not affect 'old tables'.

the UPPSALA MONITORING CENTRE

Old Form

- Composition of a product changes – but the trade name stays the same
- Previously only available in the C format
- Flaggs if a product no longer is on the market
  - Focus on non-unique names
  - Sometimes country specific
- Available as an additional table to be used by B format users

the UPPSALA MONITORING CENTRE

Old Form – Example 1

- The verbatim Topisolon – available with 2 different compositions
  - Desoximetasone
  - Desoximetasone/Salicylic acid (Old Form flag A)
- In the C format the Desoximetasone/Salicylic acid products are flagged as 'Old form' in the Name Specifier field
- A = Old Form in all countries, listed in oldform_drugcode_list.txt

the UPPSALA MONITORING CENTRE

Product Name	Topisolon	Topisolon
Drug Code	00370301002	01616201005
Name specifier(s)	Salbe	old form
Active Ingredient(s)	Desoximetasone	Desoximetasone Salicylic acid
Preferred base name	Desoximetasone	Ibaril med salicylsyre
Preferred salt name		
Generic		
Preferred		
ATC code(s)	D07AC Corticosteroids, potent (group III) *official*	D07XC Corticosteroids, potent, other combinations
MAH(s)	Abbott AG Aca mueller Aventis Pharma Beragena arzneimittel gmbh Bestphago Bonapharma Emra-med Eurim-pharm Gerke pharma Gpp pharma Hoechst pharmaceuticals, incorporated Kohlpharma Mpa Mtk pharma Opti arznei Sanofi-aventis Westen pharma	Sanofi-aventis
Countries	Austria Germany Ireland South Africa Switzerland	Germany
Pharmaceutical form(s)	CREAMS LIQUIDS LIQUIDS, LOTIONS OINTMENTS	LIQUIDS
Strength(s)	2.5 mg	
Medicinal Product ID(s)	⊞	⊞

Old Form – Example 2

- The verbatim Bradosol – available with 3 different compositions
  - Benzalkonium chloride
  - Domiphen bromide (Old Form flag- M)
  - Hexylresorcinol

- M = Old Form in some countries (not all), listed in oldform_drugcode_list.txt

Old Form – Example 2

Product Name	Bradosol	Bradosol	Bradosol
Drug Code	00088302055	00093302002	00581401007
Name specifier(s)		old form	
Active Ingredient(s)	Benzalkonium chloride	Domiphen bromide	Hexylresorcinol
Preferred base name	Benzalkonium	Domiphen	Hexylresorcinol
Preferred salt name	Benzalkonium chloride	Domiphen bromide	
Generic			
Preferred			
ATC code(s)	R02AA Antiseptics *official*	A01AB Antiinfectives and antiseptics for local oral treatment *official*	R02AA Antiseptics *official*
MAH(s)	Novartis consumer health unk	Ciba-geigy Novartis Consum.H.	Columbia lab cda i
Countries	United Kingdom	Austria United Kingdom	Canada
Pharmaceutical form(s)	SPECIAL SOLID FORMS, LOZENGES	SPECIAL SOLID FORMS, LOZENGES	SPECIAL SOLID FORMS, LOZENGES
Strength(s)			
Medicinal Product ID(s)	⊞	⊞	⊞

the UPPSALA MONITORING CENTRE

Part III: Loading and Updating the B2 and C Formats into TMS

the UPPSALA MONITORING CENTRE

Deriving ATC Codes from WHODrug in TMS to OC

- Since TMS requires a Single Derivable Path to derive dictionary terms to an External System (such as AERS or OC), Drug Names with Multiple ATCs can NOT send ALL possible ATCs to OC.
- This problem occurs regardless of WHODrug Dictionary Format. In B2 Format, it occurs for Preferred Name (Generic) Drugs only, but in C Format, it occurs for ALL Drugs.
- 4 Common options for dealing with this situation in TMS follow.

the UPPSALA MONITORING CENTRE

Loading ATC codes in Type B2 and Type C

- Option 1: Concatenating ATC codes as level detail of Preferred Name or Drug Name.
  - Since the Drug Name is always derivable, the entire set of ATC codes becomes a concatenated string, which is a Level Detail Attribute of the Drug Name or Preferred Term.
  - This requires parsing of the concatenated ATC Codes within OC by Derivation Procedures, or within SAS.

the UPPSALA MONITORING CENTRE

Loading ATC codes in Type B2 and Type C (2)

- Option 2: Create a Primary link to the ATC codes based on some programmatic rule defined by the business users or with a "MULTIPLE" flag
  - Could be based on common occurrences of ATCs, known indications, or even alphabetical order although this is not recommended
- In addition also set a "MULTIPLE" ATC or Level Detail which would indicate to an OC Data Manager that multiple ATCs were possible and therefore, High-Level Reclassification might be necessary. Without this MULTIPLE indicator, a strong knowledge of ATC classifications would be required at the OC level to know whether or not multiple ATCs were possible.

the UPPSALA MONITORING CENTRE

Loading ATC codes in Type B2 and Type C (3)

- Option 3: Load Separate Drug and ATC Dictionaries.
  - Loading Drug Names into a first dictionary and ATCs into a second dictionary
  - The 2nd ATC Dictionary would have a classification level as the concatenation of the Preferred Drug Name and ATC code
  - A derivation procedure populates the VT level of this 2nd ATC dictionary from the classified Preferred Drug name (from the first dictionary) concatenated with Indication or Route for coding in the 2nd dictionary.
  - This requiring two Batch Validations, which is sometimes called a "split" WHODrug dictionary solution.

the UPPSALA MONITORING CENTRE

Loading ATC codes in Type B2 and Type C (4)

- Option 4: Do not derive ATC codes and create a custom view for retrieving all ATC codes into SAS.

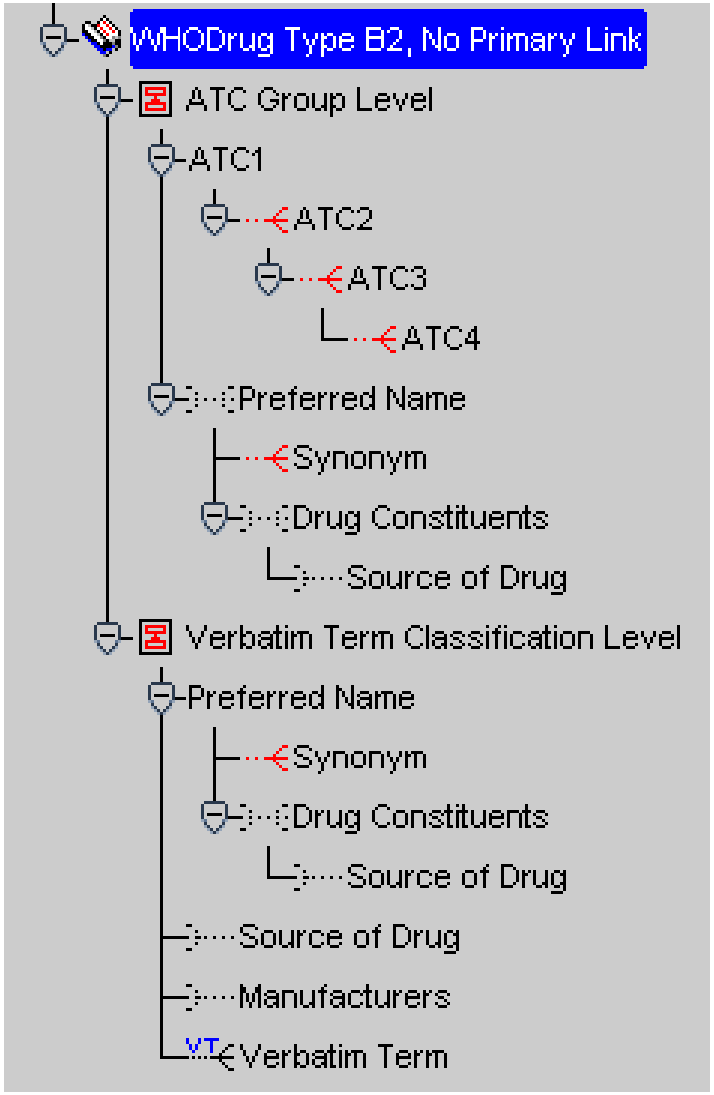
the UPPSALA MONITORING CENTRE

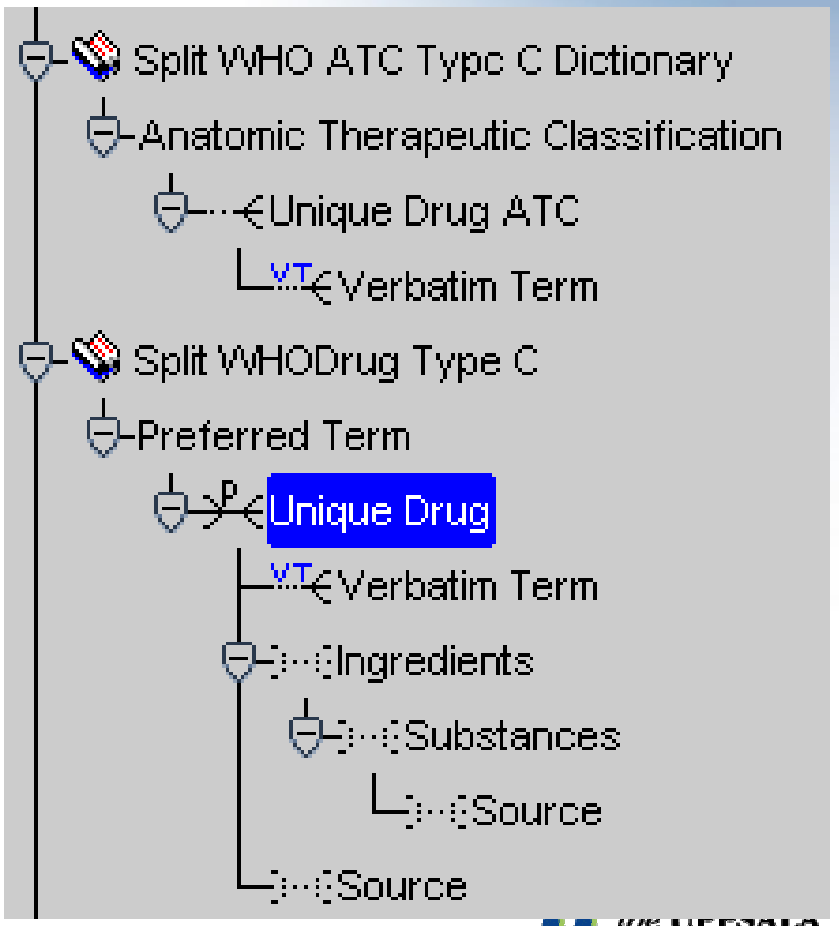
Revisions to ATC codes

- Read the ATC info 2009.xls table, and build a “delta” query for changes to ATC codes/texts. Use this in MigrateRelations API
- Also,, use High-Precision (narrow/one)/Low-Precision (broad) ATC codes.
- Both types of assignments available for B2 and C Format.
- There is an ATC tools folder with DDA_Exclusive table with only the “High Precision” mapping.
- Can be substituted in TMS loading, also a flag could also be introduced to identify High Precision and “Official” (Oslo standard) ATC mapping.
- A similar concept exists in a THG_extended file for C Format, but this file actually widens the analysis by increasing the number of ATCs per drug

Authors: Anders Hansson, Daniel von Sydow, Sunil G. Singh

View of TMS, WHODrug B2 without a PL (Opt. 1) and WHODrug Split Dictionary (Opt. 3)





Loading the C Format into TMS

- Explain challenges to loading the WHO Drug the C Format in TMS 4.5.
- Identify the key decision points that must be addressed before loading.
- Provide suggestions for possible loading and configuration options.

the UPPSALA MONITORING CENTRE

Differences in the WHODrug C Format Affecting TMS

- The Drug names themselves are **not** unique in the C Format.
- ATC codes are now associated to every Drug Name in the C Format.
- A Pharmaceutical Product level, which contains the Pharmaceutical Form (PF), was introduced in the C Format.
- All ingredients and their amounts were introduced in the C Format.
- The Medicinal Product ID (MP ID), which represents 7 drug attributes, now uniquely identifies a drug
  - (Drug Name, Name Specifier, Country, Manufacturer, All Ingredients w/ Strengths and Units, Pharmaceutical Form Drug Code (DrgRecNum+Seq1+Seq2)).

the UPPSALA MONITORING CENTRE

Loading Considerations

- Since the drug name is not unique in the C Format, the drug name alone can not be loaded as the Classification level in TMS. Therefore, the drug names must be made unique somehow.
- In making drug names unique in the C Format, the TMS built-in automatic matching would potentially be diminished. Some considerations have to be made for preserving TMS auto encoder efficiency.
    - There should be an entry with only the Name as he Classification Term and Drug Code as the DICT_CONTENT_CODE.
    - Sometimes there are two different Drug Codes (sets of ingredients) for the same Name. In these cases, the TMS coder needs to view the higher levels of the dictionary to find the difference between the entries - it could be country or pharmaceutical form.

the UPPSALA MONITORING CENTRE

Loading Considerations (2)

- Considerations to preserve TMS auto encoder efficiency
  - In the March 1 2005 version of the in B-2 Format, the /.../ was added to all names that appeared with more than one drug code including Preferred name entries XXXXXX01001. Approximately 14% of the names needed the additional /.../ code in order to make them unique. The reason why the /.../ code is added is that there is AT LEAST one more entry with the same name but different drug codes. That means that at most 7% of the names are "non-unique".
  - In the June 2005 version of the in B-2 Format, the preferred name entries are left without the /.../ code in order to make autoencoding possible.

the UPPSALA MONITORING CENTRE

Loading Choices

- Option 1: Use the Medicinal Product ID itself to make the Drug Names unique in the classification level.
- Option 2: Use the logical expansion of the Medicinal Product ID to make the Drug Names unique in the classification level and possibly populate a VTA Level with Drug Names only.
- Option 3: Add an additional level to store the Drug Names only as part of a Classification Group in the TMS WHODrug structure.

the UPPSALA MONITORING CENTRE

Option 1 : Medicinal Product ID at Classification Level

Advantages

- Easy to load.

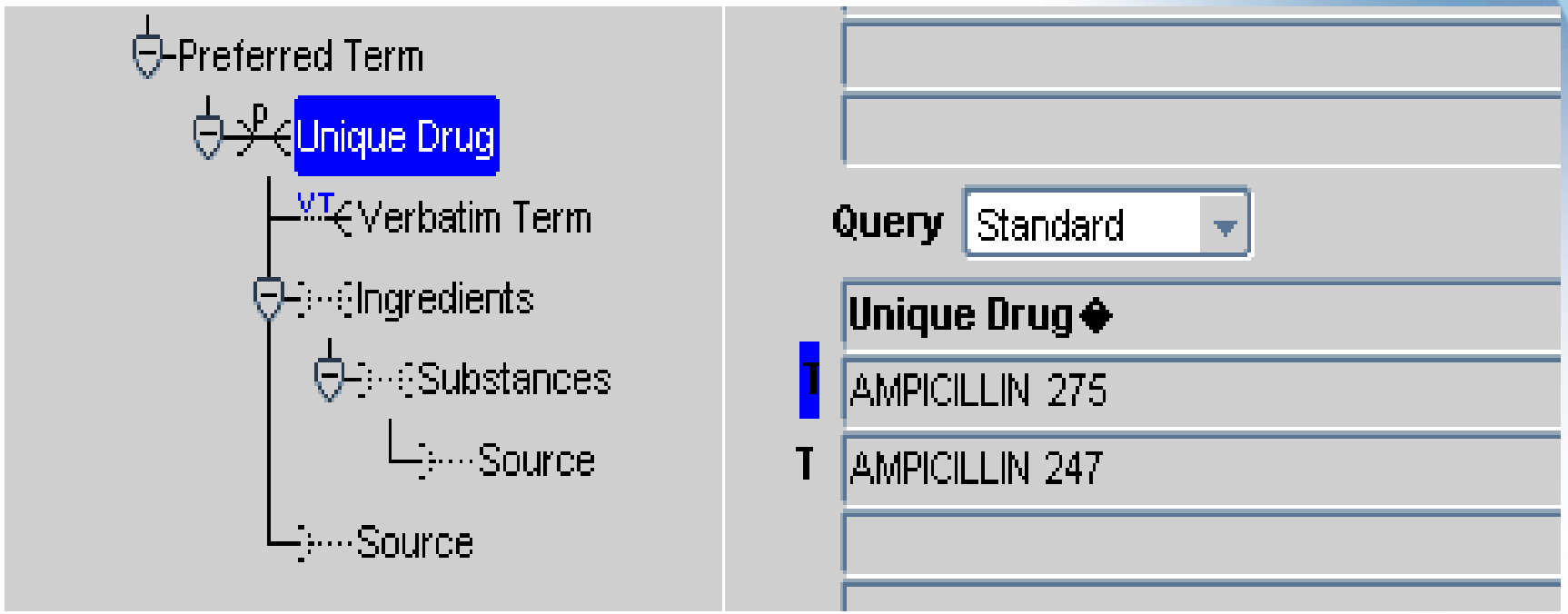
Disadvantages

- Auto encoding would not be possible.
- Coders would not have information needed to select correct VTA.

- Another suggestion is to add the MP_ID to only non-unique drug terms. However, this still leaves many terms (10,000+) which will not auto encode, and therefore, are less likely to be used.

the UPPSALA MONITORING CENTRE

Option 1 : How it Looks While Coding



DrugName MP_ID

Option 2 : Use the Logical Expansion of the MP ID

Advantages

- Information is available for coders to select appropriate VTA.

Disadvantages

- Nothing auto encodes.
- Load script is more complicated and takes longer.
- Field length may require > CHAR 300.

the UPPSALA MONITORING CENTRE

Option 2 : Auto Encoding Implications

- Load Verbatim Term Assignments (VTAs).
- This also allows coders to use the filter buttons in TMS Omission Management to choose the VTA Level and only code on the Drug Names if desired.
- Problem - Over 10,000 drug names are not unique.
- Do you have to manually code all 10,000+?
  - Yes and No !

the UPPSALA MONITORING CENTRE

Option 2 : Manually Code All Duplicate Drug Names

Advantages

- Control of the codes – you can select certain drugs from specific countries, or manufacturers, or ingredients, etc.
- You could reload same VTAs, once they are selected to new versions of the dictionary.

Disadvantages

- As each version is released, you will need to repeat this exercise.
- How long will it take your team to code 10,000+ terms?
- Some of these terms you will never see in a study, but you will spend a lot of time on them initially.

Option 2 : Or, Don't do it Manually

- Load only the Unique Drug Names as verbatim terms.
- Code the others as they are encountered as verbatim terms.

Advantages

- Over 40,000 will be able to have VTAs loaded.
- You only spend time on those you need.

Disadvantages

- You may give up consistency in decision making if this is done over time.
- Many of the most common drugs encountered are in this group.
- You need to repeat this with each new version of the dictionary.

the UPPSALA MONITORING CENTRE

Option 2 : Or, Do it Systematically

Advantages

- Same script can be used for each new version of the dictionary.
- Logic can be applied that is consistent across all term choices.
- The script will run faster than your team can do the work!

the UPPSALA MONITORING CENTRE

Option 2 : Or, Do it Systematically (cont)

Disadvantages

- Decisions still need to be made on the logic to be used.
- Some terms will not have VTAs because the same drug name by different countries/manufacturers are really different drugs.
- TMS loading Script development is complex and will take some time to run!
- Additional code must be added into the TMS loading script to take into account PF and strength.

the UPPSALA MONITORING CENTRE

Which Drugs Should Have VTAs?

- Drugs having the same DrgRecNum and Seq1 and can have a VTA selected.
- The same DrgRecNum and Seq 1 mean the drug is the same drug with the same Preferred term and the same ingredients.

- **Please Note:** WHODrug will continue to support the DrgRecNum and Seq numbers (see the document titled The New C Format: New Features that accompanies each version of the dictionary).

the UPPSALA MONITORING CENTRE

Reason for Multiple Drug Record Numbers

- A strategic decision by a manufacturer to change the active ingredients to improve the product over time, but keep the same Drug Name due to market share and brand recognition.

- The lack of availability of some active ingredients in some countries or geographies, including cases where the raw materials are not available or are banned by a country for human use or import.

the UPPSALA MONITORING CENTRE

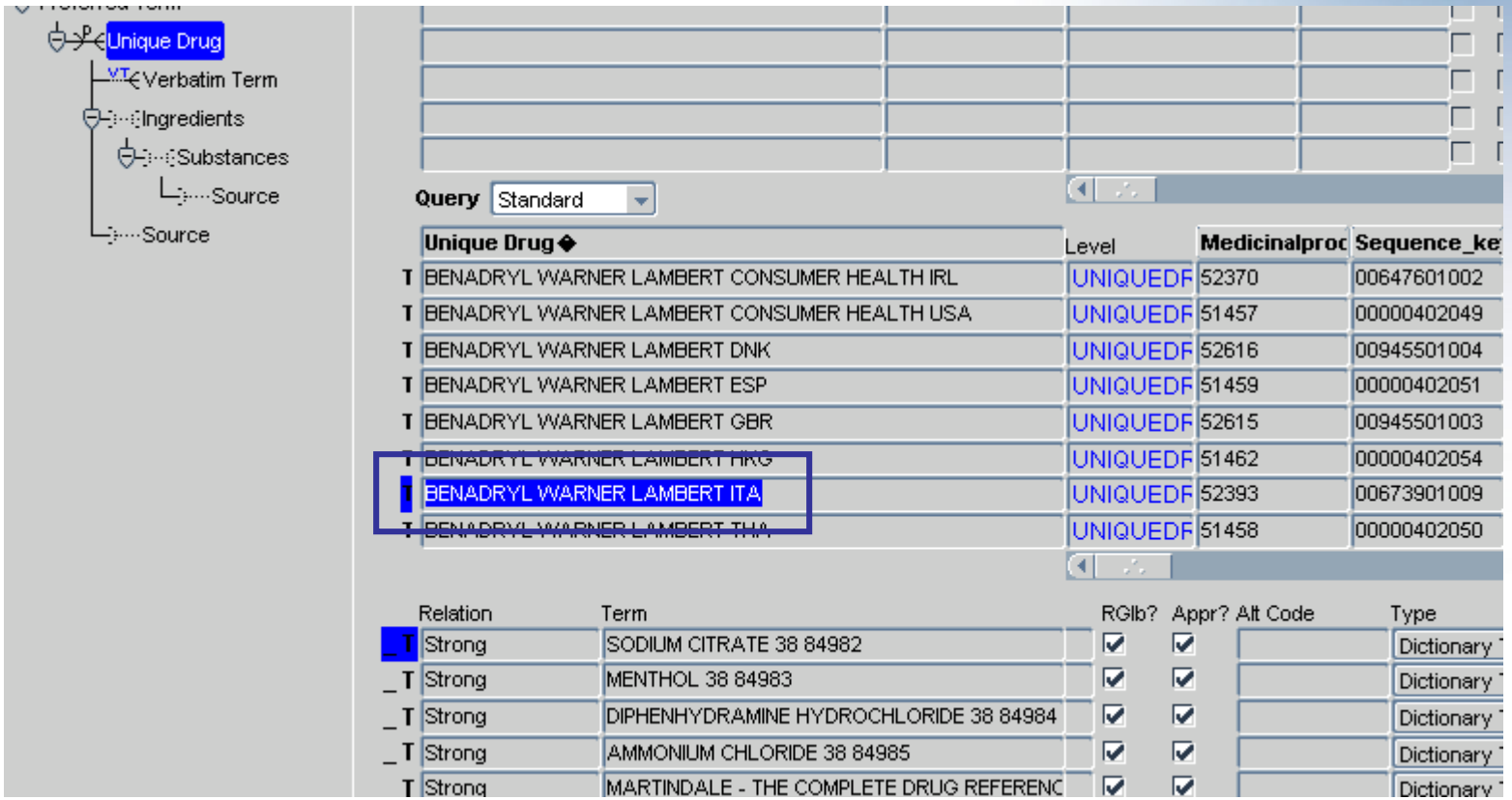
Reason for Multiple Drug Record Numbers (2)

- The purchase or acquisition of one company or brand by another combined with a strategic decision to keep the same brand recognition and market share purposes, but to also change or improve the drug which might change the active ingredients.
- The lack of enforcement of intellectual property rights or patents in some countries, where the same Drug Name is used illegally and manufactured with completely different ingredients. WHO-UMC is still obligated to report the creation and use of these drugs.

the UPPSALA MONITORING CENTRE

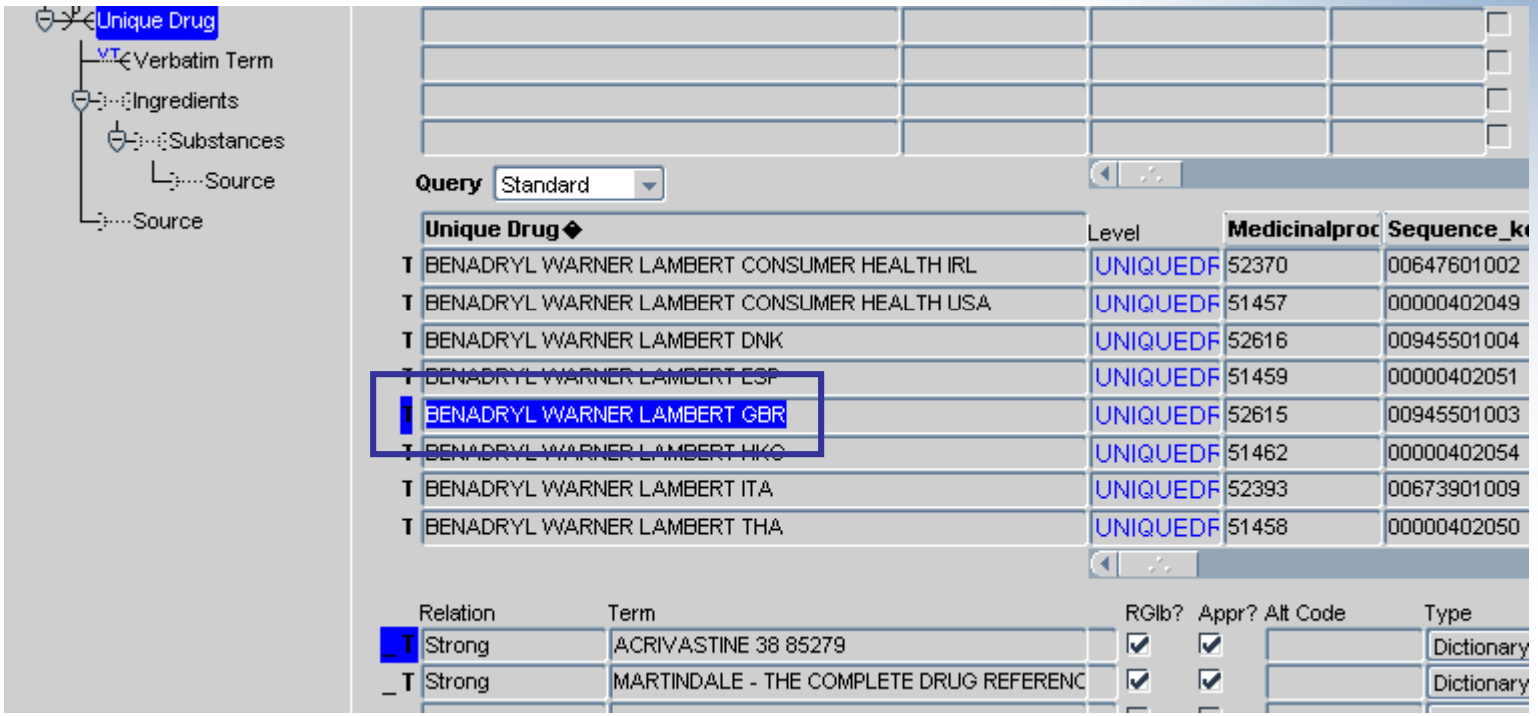
Same Drug Name in Different Countries

Benadryl in Italy



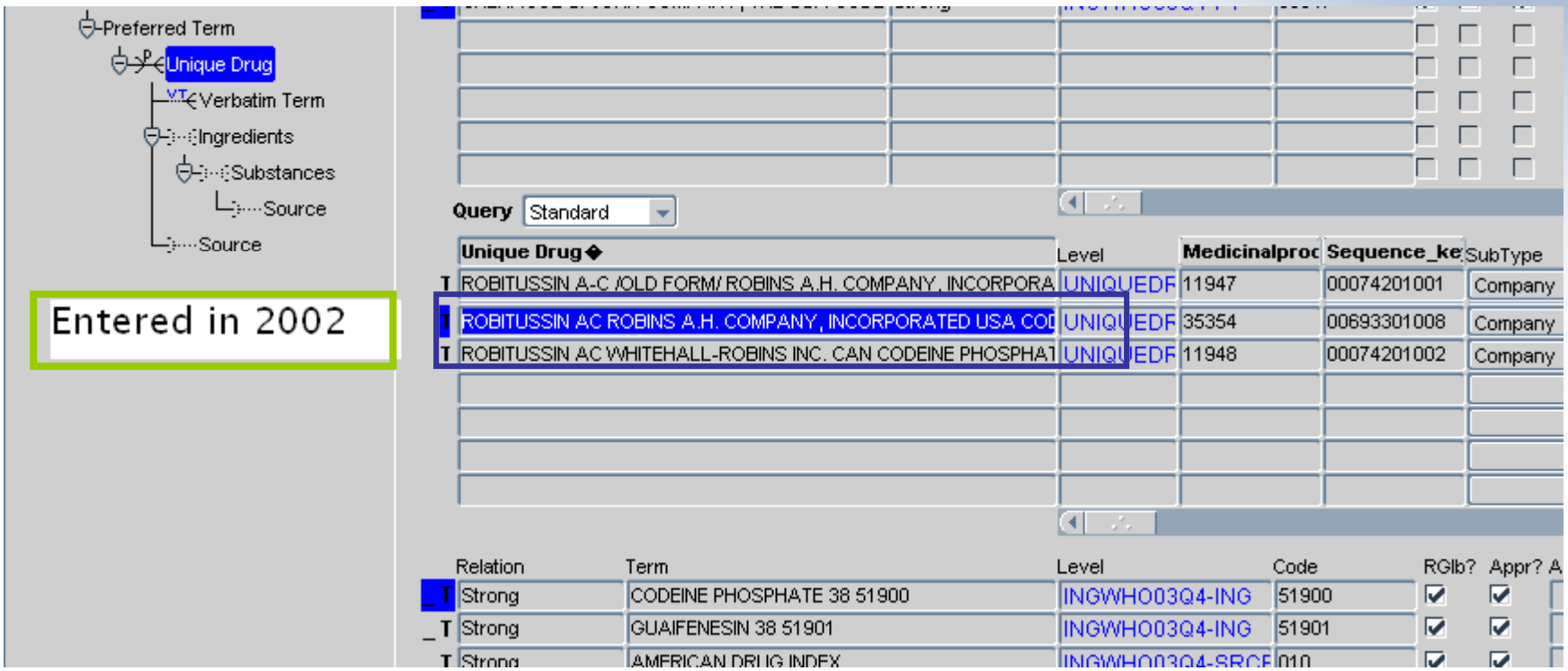
Same Drug Name in Different Countries (2)

Benadryl in the United Kingdom



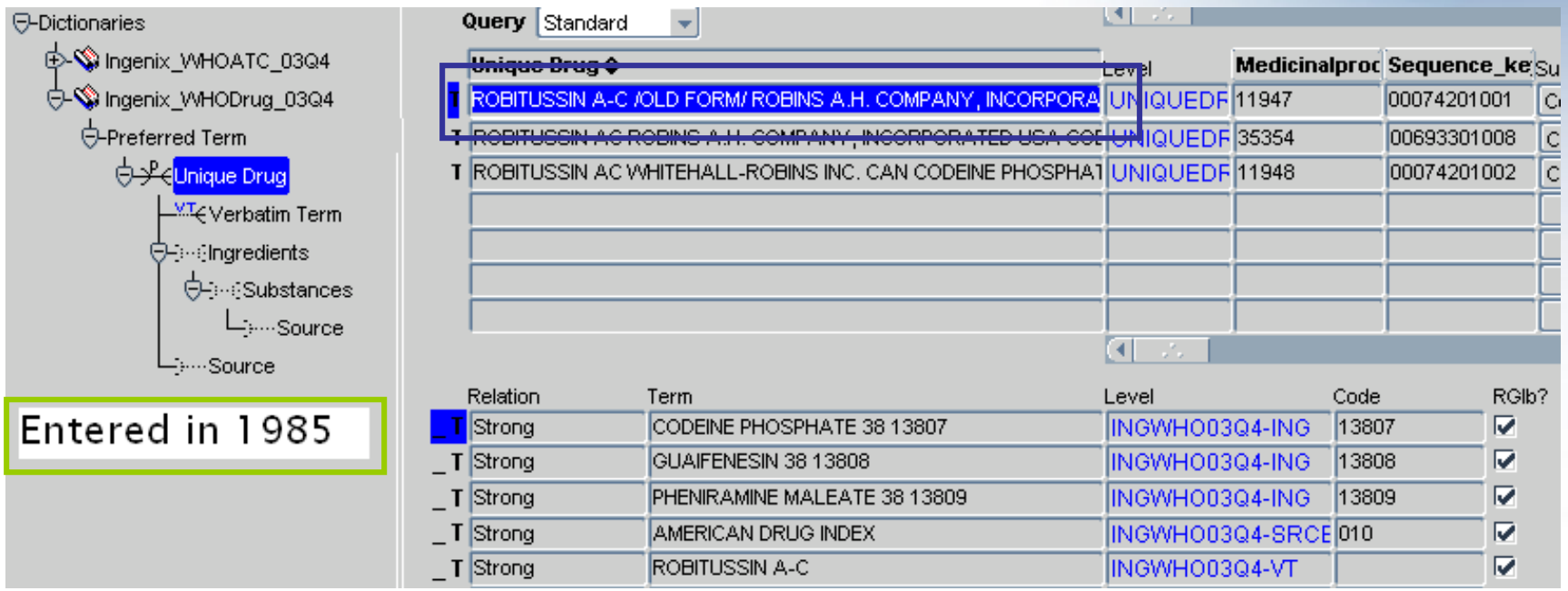
Changes in the Drug

Robitussin AC



Changes in the Drug (2)

Robitussin AC



Dictionary Updates and Reducing Data Scope

- One consideration is whether or not all of the Drug data should be loaded. Why not parse all of the Drug Names only and simply load these Drug Names?
  - Not Loading the MP_ID or loss of the MP_ID will make updating this dictionary very difficult. This is because the default TMS APIs for updating the dictionary, TMS_LOAD_DICTIONARY.MigrateRelations and TMS_LOAD_DICTIONARY.MigrateTerms expect a unique DICT_CONTENT_CODE in the dictionary which comes from the vendor which can be compared with queries against the vendor source data to determine what DICT_CONTENT_CODEs to insert/update/delete.
  - Additionally, during the dictionary load process, it is not required to specify a DICT_CONTENT_CODE nor is uniqueness enforced! But during update calls using the TMS_LOAD_DICTIONARY API, it is a de facto expectation.

the UPPSALA MONITORING CENTRE

Dictionary Updates and Reducing Data Scope (2)

- This means not having the MP_ID for all of the WHODrug source data will make updating very difficult. Calls to TMS_USER_MT_DICTIONARY for updating, inserting and deleting terms will have to be made on a separate basis, without the benefit of the TMS migration APIs.
- Additionally, if only part of the drug data is loaded (a reduction in the data scope), it may be possible to make a validation argument that the dictionary loaded in TMS was not actually a representation of the WHO-UMCs WHODrug dictionary, but a customized dictionary which is a proprietary to a single organization, which may introduce some additional validation requirements.

the UPPSALA MONITORING CENTRE

Loading and Update Considerations for B2 Format

- Since the Drug Recnum + Sequence 1 have been added to the B2 format for Drug Names which have multiple Drug Record Numbers, some Drug Names which previously autocoded do not currently autocode.
- While this represents a small percentage of Drug Names in quantitative terms, these drugs are the most commonly used and therefore occur the most frequently
- NOTE: SEQ1 will be EXPANDED TO 3 CHARACTERS IN MARCH 2010

Why does Aspirin No Longer Autocode?

- Consider the drug aspirin in the WHODD or WHODDE B2 format dictionary:
  - In the case of WHODD, the single occurrence of aspirin appears with a drug record number appended, to indicate that other drug record numbers are possible
  - In the case of WHODDE, multiple occurrences of aspirin exist with different drug record numbers

the UPPSALA MONITORING CENTRE

Possible Solutions: Use OLD Form Table

- In March 2010:
- There will be an Old Form table
  - "A" or "M" listing of drug codes
  - A=Drug Code is ALWAYS flagged as Old Form, meaning it is not currently on-market. This flag can be used to eliminate these codes.
  - M=some countries still use Old Form, or it can not be confirmed that this specific Drug is NOT in use everywhere.
- Can be used for uniqueness for loading.

the UPPSALA MONITORING CENTRE

Possible Solutions: Use Loading Rules

- Use a similar algorithm for WHODrug Type C format loading for B2.
  - Requires establishing domain VTA rules for each of the multiple sets of Drug Recnums
  - Drug Names could be defaulted based on country or Preferred Name derivation
  - Create Global VTAs where a single drug exists with a Drug Code appended if the WHODD Type is being used.

Authors: Anders Hansson, Daniel von Sydow, Sunil G. Singh

the UPPSALA MONITORING CENTRE

Possible Solutions: Derive Only Preferred Names/ Use Search Objects

- If the goal of coding is ONLY to derive Preferred Names and NOT ATCs, then it is possible to create a Global VTA if all the Preferred Names are the same, even if the Drug Recnums are different
- Possible enhancements to TMS to allow "single" VTA coding (formerly called VTI functionality), which is similar to HLC at the VT coding level instead
- Derive a specific match based on Site/Investigator/Patient location or country, and use this in a derived question or Search Object.

Up-versioning Considerations: Deletion of Drug Codes

- Read cumulative changes table and compare BOTH Drug Codes (DICT_CONTENT_CODE) and Drug Name. If Drug Names are equal, but Drug Codes have been changed, then DICT_CONTENT_CODE could be used for either a deletion or a replacement

Authors: Anders Hansson, Daniel von Sydow, Sunil G. Singh

the UPPSALA MONITORING CENTRE

Changes from Unique to Non-Unique Drugs

- Read DD Changed Drug Name.txt and compare DICT_CONTENT_CODE with Drug Codes. Use a group by to determine if there is an increase in the net count of a specific Drug Code.
- WHODD may not have the alternative case, but this may only be available in WHODDE. In the case where there is a /DRUG RECNR+SEQ1/and it is the ONLY occurrence in WHODD, then some further investigation may be required. WHODDE might be useful for reference in this case, or for the purposes of TMS loading, this can be considered a unique case.

Authors: Anders Hansson, Daniel von Sydow, Sunil G. Singh

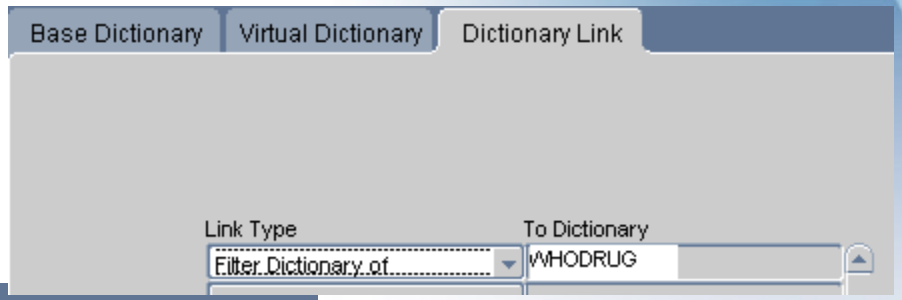
the UPPSALA MONITORING CENTRE

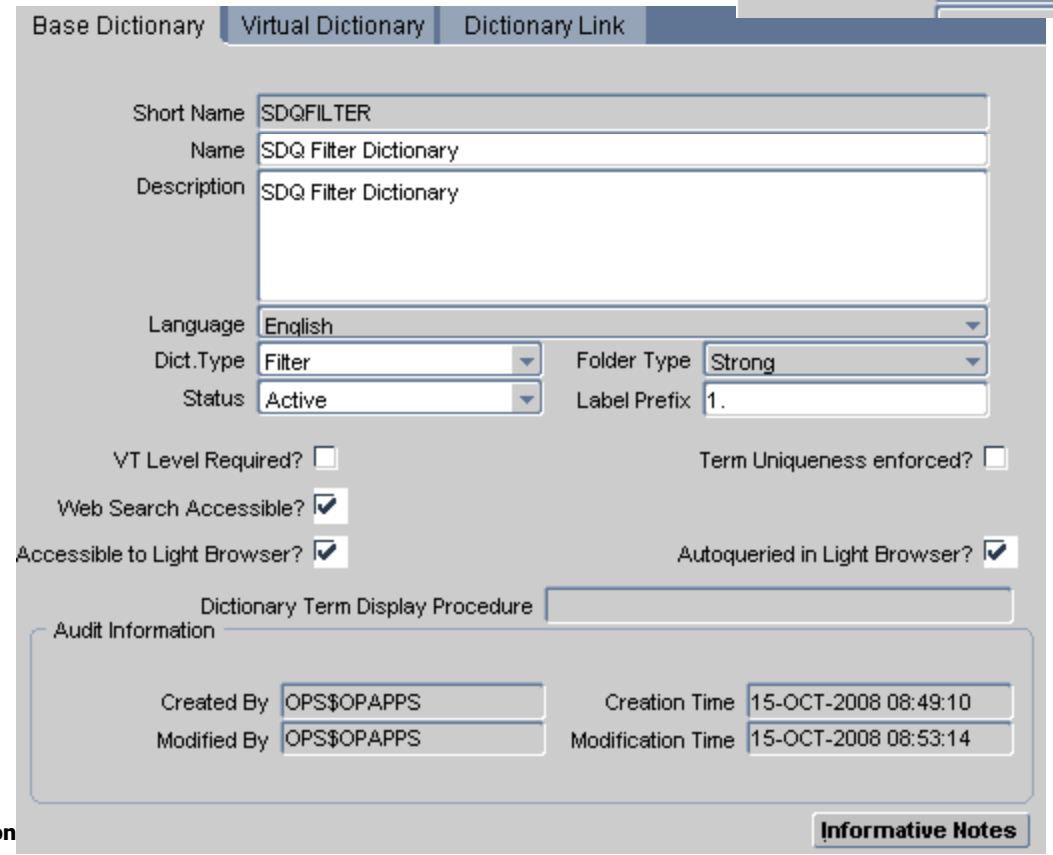
Implementing SDQs in TMS 4.6

- Current Filter dictionary approach can be used, with the same type of Informative Notes for Description and Source.
- Concept of hierarchical SMQs is also possible
- Similar Algorithm Informative notes can also be used for identifying related terms.

the UPPSALA MONITORING CENTRE

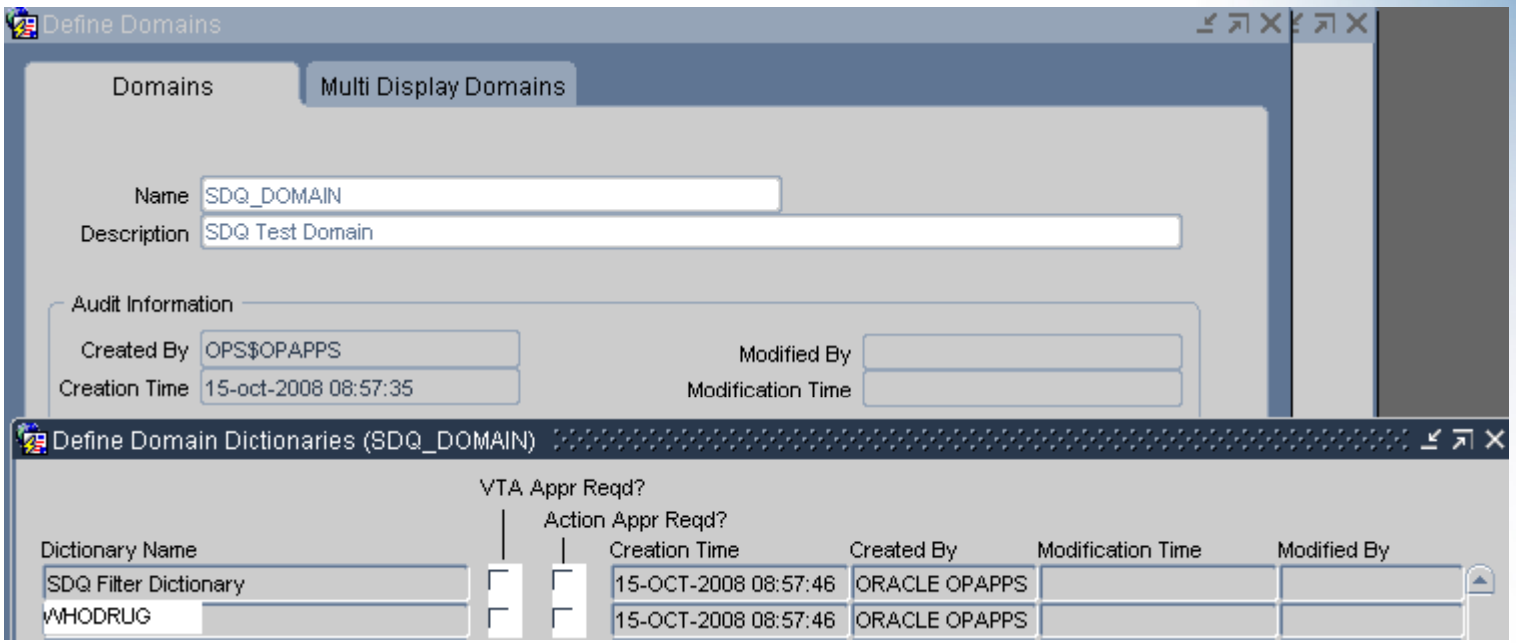
SDQ Filter Dictionary Definition





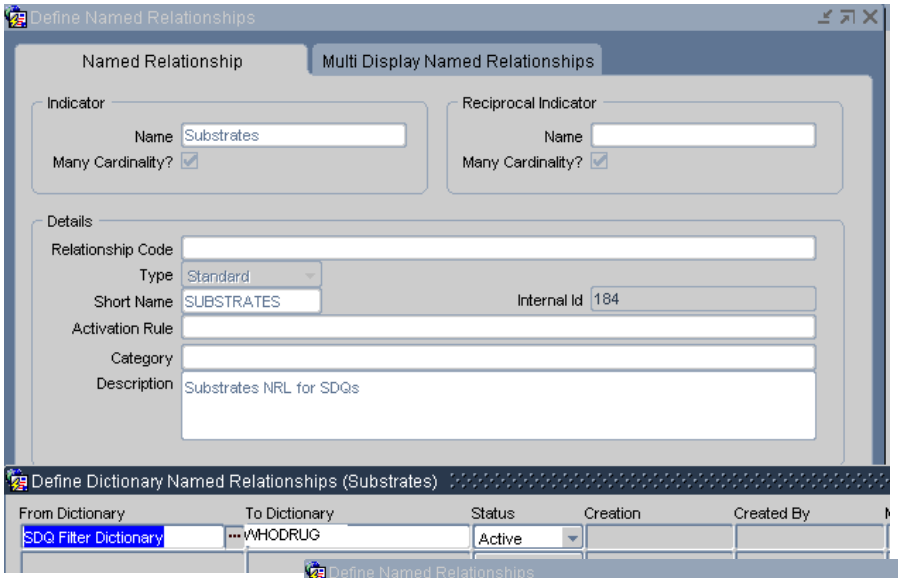
the UPPSALA MONITORING CENTRE

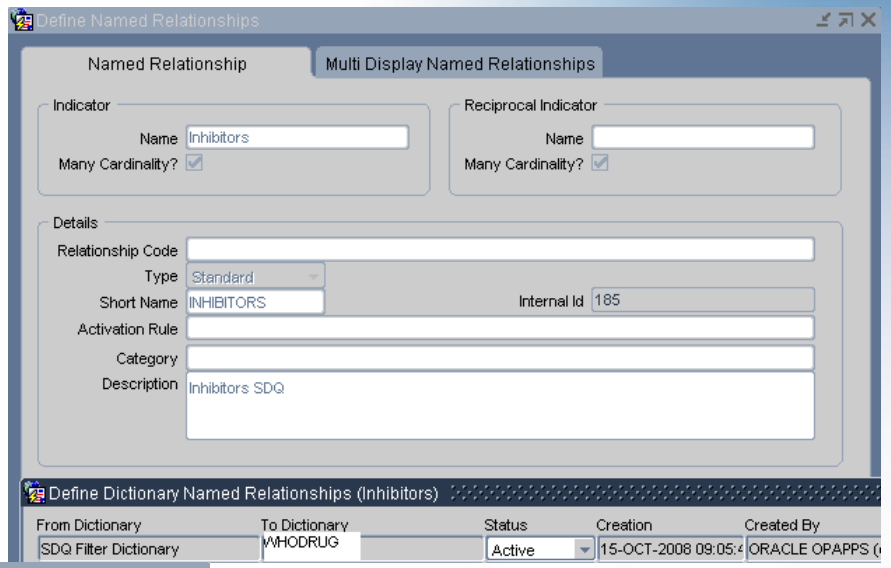
SDQ Domain Mapping

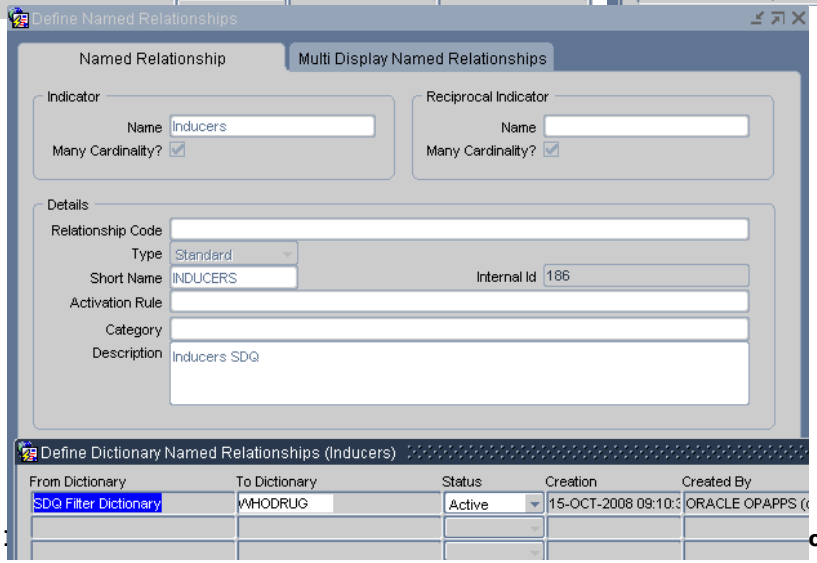


the UPPSALA MONITORING CENTRE

SDQ NRLs: Substrates, Inhibitors, Inducers

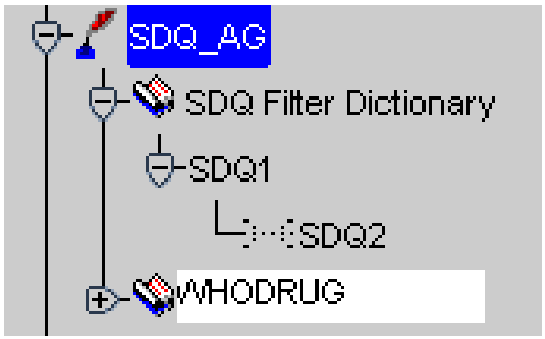






the UPPSALA MONITORING CENTRE

SDQ Activation Group



Activation Group: SDQ_AG

Description: SDQ Activation Group

Audit Information

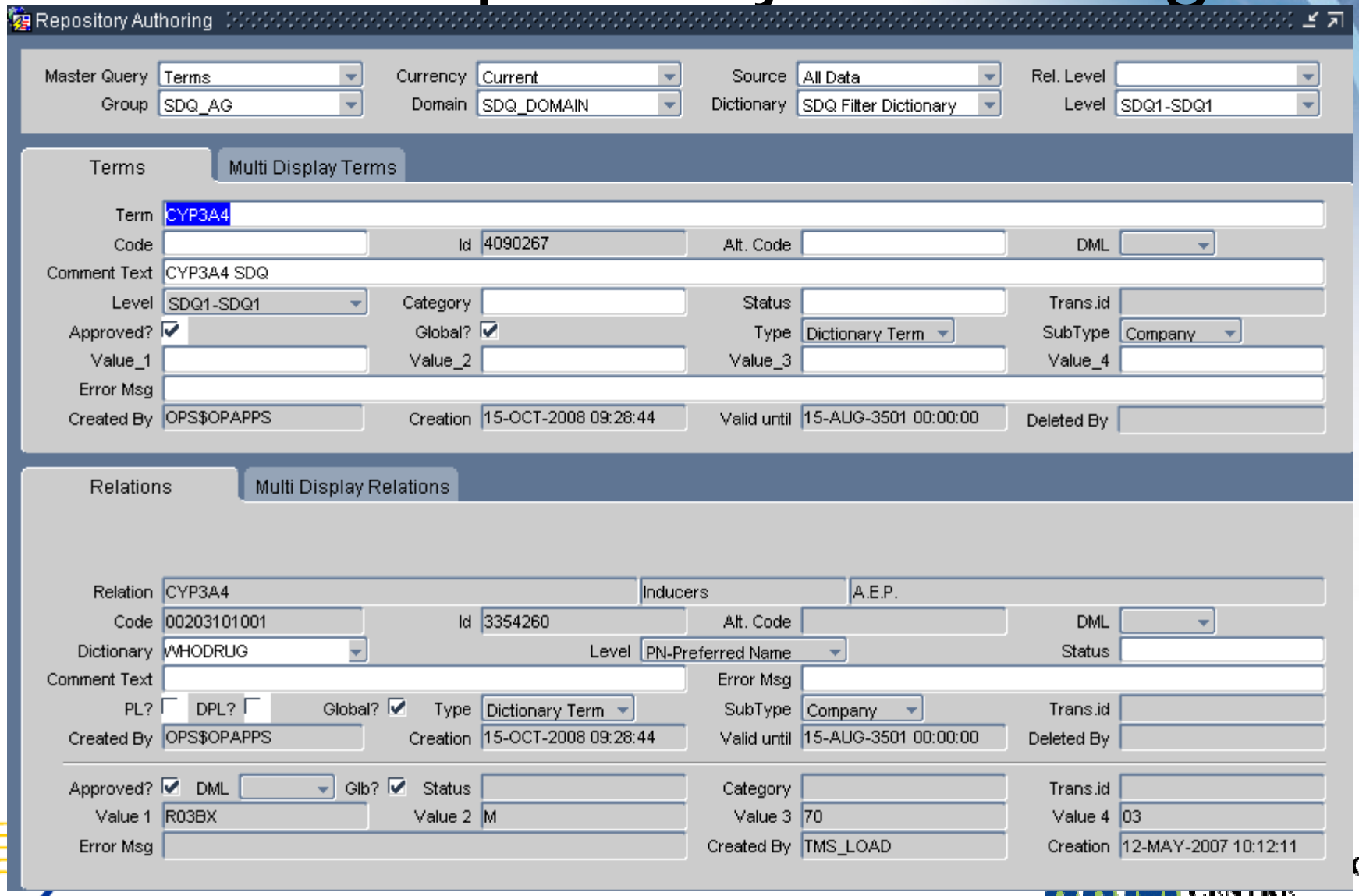
Created By	OPS$OPAPPS	Creation Time	15-OCT-2008 09:14:09
Modified By	OPS$OPAPPS	Modification Time	15-OCT-2008 09:15:05

Dictionaries within the Activation Group

Short Name	Name	In Domain?
SDQFILTER	SDQ Filter Dictionary	☑
WHODRUG	WHODRUG	☑
		☐
		☐

the UPPSALA MONITORING CENTRE

SDQ Repository Authoring



SDQ CYP3A4 Lite Browser

ORACLE Pharmaceuticals — Terminology Management System

Logout | Help

Exploration | Research | Reports

Terminologies | Verbatim Term Assignment | Verbatim Term Status | Hierarchies

Logged in as/Database ORACLE OPAPPS
Last Updated 15-Oct-2008 09:54:16

Terminologies

Simple search

Enter search criteria or click Advanced Search for additional options. Advanced search

Terminology: SDQ Filter Dictionary
Domain: SDQ_DOMAIN
Term: CYP3A4
Go

Terms Viewed

- CYP3A4

Results

Term	Approved	Level	Code	Domain	Alt.code	Id
CYP3A4	Yes	SDQ1		GLOBAL		4090267

Exploration | Research | Reports | Logout | Help

About TMS Version 4.6

the UPPSALA MONITORING CENTRE

SDQ Relations Lite Browser

Term (Today)

Term CYP3A4
Terminology SDQ Filter Dictionary
Approved Yes
Filter Verbatim Term Assignment

Level SDQ1
Term subtype Company

Terms Viewed
- CYP3A4

Term Details

Related terms

Previous Show All 26 Next

Level	Term	Relation	Domain	Related term	Level
	CYP3A4	Inducers		A.E.P.	WHOD -PN
	CYP3A4	Inhibitors		FAS-3	WHOD -PN
	CYP3A4	Inhibitors		ALZOLE-F	WHOD -PN
	CYP3A4	Inhibitors		AZOSTAT	WHOD -PN
	CYP3A4	Inhibitors		FLUCONAZOLE	WHOD -PN
	CYP3A4	Inhibitors		ORFLAZ	WHOD -PN
	CYP3A4	Inhibitors		INDINAVIR SULFATE W/RITONAVIR	WHOD -PN
	CYP3A4	Inhibitors		KALETRA /01506501/	WHOD -PN
	CYP3A4	Inhibitors		RITONAVIR	WHOD -PN
	CYP3A4	Inhibitors		TIPRANAVIR W/RITONAVIR	WHOD -PN
	CYP3A4	Substrates		TILDIAZIDE	WHOD -PN
	CYP3A4	Substrates		BELNIF	WHOD -PN
	CYP3A4	Substrates		HYNF-SANDOZ	WHOD -PN
	CYP3A4	Substrates		NIFEDIPINE	WHOD -PN
	CYP3A4	Substrates		NIF-TEN	WHOD -PN
	CYP3A4	Substrates		SALI-ADALAT	WHOD -PN
	CYP3A4	Substrates		DILTIAZEM	WHOD -PN
	CYP3A4	Substrates		TECZEM /01366001/	WHOD -PN
	CYP3A4	Inducers		ADENOVASIN	WHOD -PN
	CYP3A4	Inducers		ADOCARDIN COMP.	WHOD -PN
	CYP3A4	Inducers		AEINE	WHOD -PN
	CYP3A4	Inducers		AFPRED /00319601/	WHOD -PN
	CYP3A4	Inducers		ALEPSAL	WHOD -PN
	CYP3A4	Inducers		ALGIPAN /00165001/	WHOD -PN
	CYP3A4	Inducers		ANDIPAL /02404301/	WHOD -PN

Questions?

- Write to the UMC:
  - carl.huddenius@umc-products.com
- Write to DBMS Consulting:
  - singh@clinicalserver.com

the UPPSALA MONITORING CENTRE

Biographies

Sunil is a Global Oracle Health Sciences deployment expert for DBMS Consulting. He has been an active member of the OCUG community since 1996 and is extremely grateful for this opportunity to makes these presentations at OCUG 2009.

Carl Huddénius, MSc Pharm, Assistant Product Manager Uppsala Monitoring Centre

the UPPSALA MONITORING CENTRE

Appendix

the UPPSALA MONITORING CENTRE

Part I: Overview, Content and Usefulness of the WHODrug Dictionaries

the UPPSALA MONITORING CENTRE

WHO Drug Dictionary History

- WHO Drug is a dictionary of known medicines maintained by the World Health Organization since 1968.
- It contains lists of all known manufactured drugs in every country that was ever reported to WHO or IMS Health.
- WHO Drug identifies Generic Drugs (Preferred Terms) and non-Generic Drugs
- The dictionary also associates a drug with an Anatomical-Therapeutic Chemical (ATC) Classification; that is, the parts and systems of the human body where this drug might have an effect.
- The dictionary has changed structure (formats) three times in its history, the most recent in 2002 with the introduction of the C Format, which provides a unique MP_ID and associates EVERY Drug to an ATC code

the UPPSALA MONITORING CENTRE

WHODrug Dictionary History (2)

- Until 2002 there was only one format
- Until 2005 there was only one type

- Historical data is often coded with
  - dictionary type: WHO Drug Dictionary
  - dictionary format: B-2

the UPPSALA MONITORING CENTRE

WHODrug Dictionary Types

- The WHO Drug Dictionary, WHO Drug Dictionary Enhanced, and WHO Herbal Dictionary are different products; the difference between them are the content.
  - WHO-HD contains herbal products only (ska den stå för sig själv?)
  - WHO-DD is the same WHO Drug dictionary which has existed previously
  - WHO-DDE contains the same types of products as the WHO-DD but with the addition of a large number of new drugs from IMS Health.
  - WHO-DDE+WHO HD contains the content of WHO-DDE and WHO-HD without overlaps in data.
- All three dictionaries are provided in the three different FORMATS - C, B-1 and B-2. Therefore loading considerations for WHODD are also valid for WHODDE and WHOHD.
- There are a few minor differences in the use of a few fields between WHODD and WHOHD.

the UPPSALA MONITORING CENTRE

WHO Drug Dictionary

- The WHO Drug Dictionary contains medicinal data that has been reported from National Centers
- In order to populate the dictionary with all products in all countries the UMC entered into a collaboration with IMS Health
- Increased the number of names by ~300% (B-2 entries)
- All customers are provided both the B-2 and C format

the UPPSALA MONITORING CENTRE

WHO Drug Dictionary Enhanced

- Collaboration with IMS required a new agreement with the subscribers
- WHO Drug Dictionary Enhanced was produced as a separate dictionary type
- Subscribers that have not upgraded can still use WHO Drug Dictionary – without the IMS data
- New customers get WHO Drug Dictionary Enhanced
- All customers are provided both the B-2 and C format

the UPPSALA MONITORING CENTRE

WHO DDE - Uses

+ More names – increased chance of finding a 'direct hit'.

  Less manual work

+ Reduced need for taking chances and "googleing" – higher quality of data.

+/- Non-unique names may have "siblings" only in WHO Drug Dictionary Enhanced

+/- More non-unique trade names

WHO DDE - Maintenance

- The WHO DDE grew dramatically during 2005-6.
- It continues to grow with data from IMS – new launches and new formulations
- Modified formulations are also reported from IMS
- Other sources of data are also entered into WHO DDE

the UPPSALA MONITORING CENTRE

WHOHD Content

- The WHO Herbal Dictionary contains all products that only include ingredients of natural origin.
- Products that contain a combination of conventional substances and herbals will be included in the WHO Drug Dictionary and the WHO Drug Dictionary Enhanced.
- All entries in the WHO Herbal Dictionary are coded with the Herbal ATC classification.
- Not a separate product, it is only provided in combination with the WHO DDE

the UPPSALA MONITORING CENTRE

WHO Herbal Dictionary

- A need for special classification of herbal products – botanic instead of chemical.
- The Drug Code identifies plants and parts of plants instead of molecules and salts
- 'CAS number' (substance ID) identifies plants etc
- Herbal ATC contains additional groups

the UPPSALA MONITORING CENTRE

WHO Herbal Dictionary - Uses

The 'chemical environment' contains also the herbal remedies the patients take.

Trade names for herbal products can be found.

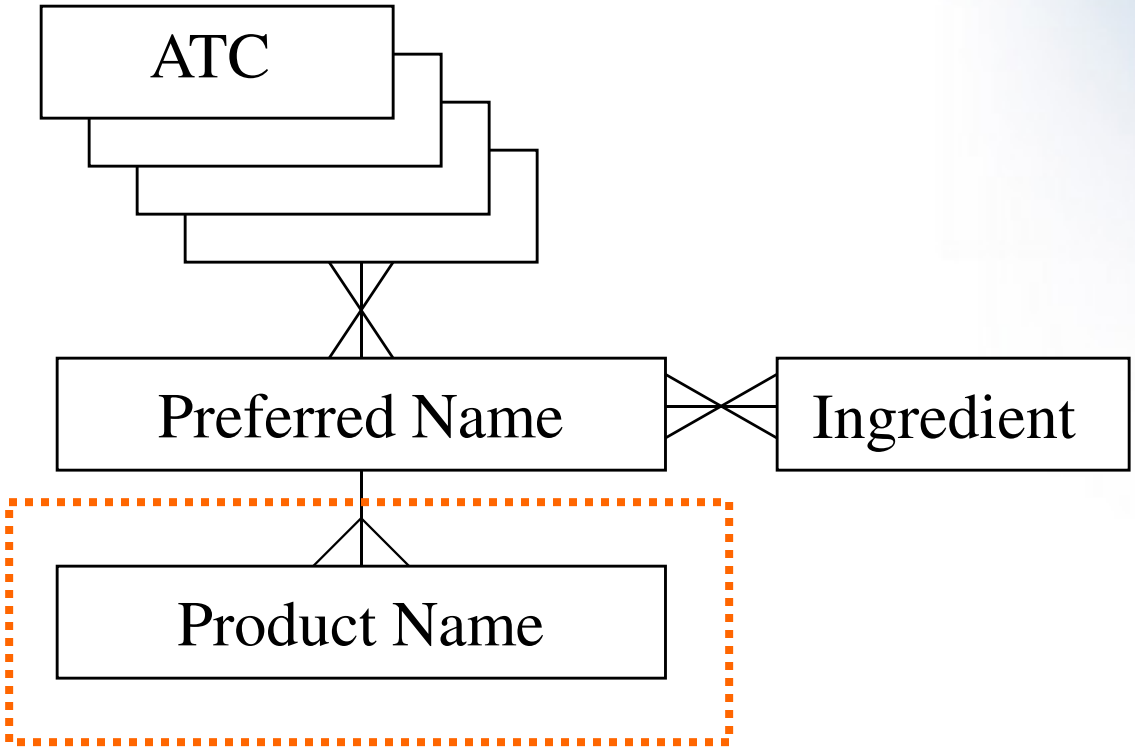
the UPPSALA MONITORING CENTRE

Combined Dictionaries

- WHO Herbal Dictionary is distributed seamlessly integrated with WHO Drug Dictionary and WHO Drug Dictionary Enhanced
- All files contain a mix of herbals and conventional products
- ATC files contain a mix of ATC and HATC
- No overlaps!

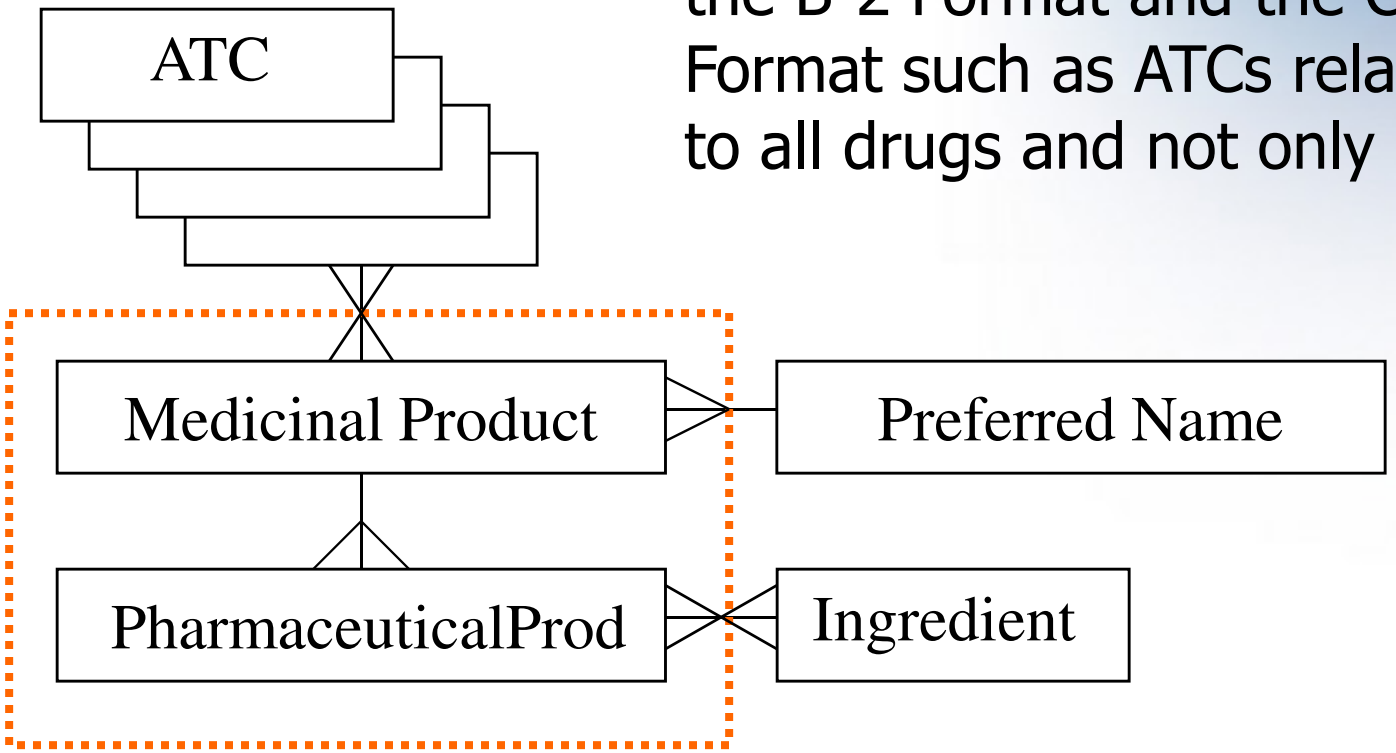
the UPPSALA MONITORING CENTRE

WHODrug Dictionary the B-2 Format



WHODrug Dictionary C Format

Structural differences between the B-2 Format and the C Format such as ATCs relating to all drugs and not only PNs.



Sequence 3 and 4

- Information about Pharmaceutical Form and Strength have been added to the Medicinal Product table
  - Sequence Number 3 – Pharmaceutical Form
  - Sequence Number 4 – Strength
- Facilitates the use of the C format, all relevant information is available in the same table

the UPPSALA MONITORING CENTRE

Use of Sequence 3 and 4

- With the additional fields all important data fields can be accessed in the Medicinal Product table – a 'one table' dictionary can be created.

MP_Id	Drug Name	Name Specifier	Drug Code	MaHolder	Country	Form	Strength	Ingredient
59142	Seresta	Forte Tabletten	000409 01 005	AHP AG	Switzerland	Tablets	50 Milligram	Oxazepam
59138	Seresta	Tabletten	000409 01 005	AHP AG	Switzerland	Tablets	15 Milligram	Oxazepam

the UPPSALA MONITORING CENTRE

Information Levels

	Drug Code	Name	Name specifier	Country	MAH	Form	Strength
1	X	X					
2	X	X	(X)				
3	X	X	(X)	X			
4	X	X	(X)	X	X		
5	X	X	(X)	X	X	X	
6	X	X	(X)	X	X	X	X

C Format – Information Levels

MP_Id	Drug Name	Name Specifier	Drug Code	MaHolder	Country	Form	Strength	Ingredient
59142	Seresta	Forte Tabletten	000409 01 005	AHP AG	Switzerland	Tablets	50 Milligram	Oxazepam
59138	Seresta	Tabletten	000409 01 005	AHP AG	Switzerland	Tablets	15 Milligram	Oxazepam
59139	Seresta	Tabletten	000409 01 005	AHP AG	Switzerland	Tablets		Oxazepam
59140	Seresta		000409 01 005	AHP AG	Switzerland			Oxazepam
405769	Seresta		000409 01 005	Biodim	France	Tablets		Oxazepam
405770	Seresta		000409 01 005	Biodim	France			Oxazepam
8477	Seresta		000409 01 005	Wyeth	Netherlands			Oxazepam
59141	Seresta		000409 01 005					Oxazepam

Content Differences Between B-2 and C: Name

WHO Drug Dictionary B-2 Format

- Distributed for over 20 years
  - It is a dictionary of drug names, where a name can be searched and translated to coded information.
  - It consists of mainly active ingredients, drug codes (which represents active ingredients and salts/esters) and Anatomical Therapeutic Chemical Classification.
- The drug name appears only once
  - A drug name is added the dictionary at the first occurrence of the name.
- **Please Note:** The B-2 Format was made completely country independent in the March 1, version 2005.

the UPPSALA MONITORING CENTRE

Content Differences Between B-2 and C: Country

WHO Drug Dictionary C Format

- The C Format allows for country specific information
  - It is possible to see which drug names appear in a specific country.
  - This information is especially relevant for certain types of products; where the same product names are marketed in different countries with different sets of ingredients.
  - In the B-2 Format the coder will not be able to determine which version of the drug is used in a certain country, but this information is available in the C Format.

the UPPSALA MONITORING CENTRE

Content Differences Between B-2 and C: Dosage Form and Strength

The C Format contains more information than the B-2 Format; dosage form and strength. The UMC has put more focus on populating the dosage form information than the strength information for two reasons:

- The dosage form information is relevant to the analysis of clinical data.
  - Types of reaction may vary depending on the type of administration; local versus systemic effects, and there could be different types of reactions to a sustained release tablet compared to a regular tablet.
  - Inadequate dosage forms may explain adverse reactions; Esophagus Ulcer caused by capsules that weren't swallowed properly.
- Sometimes the same trade name is available in different dosage forms, with different ingredients.
  - The suppository could contain additional ingredients, or different salts of the substance.

the UPPSALA MONITORING CENTRE

Content Differences Between B-2 and C: Drug Code

In the B-2 Format, the Drug Code, unique system code, describes the active ingredient(s), the salt/ester and the product name.

- The code is very useful for analysis, but it causes the following problems for data management:
  - The Drug code is affected when a product formulation is changed; one of the active ingredients is replaced by another, or a different salt of a substance is used.
  - The Drug code is affected when corrections are made; if a drug has been included in the dictionary with an incorrect salt or substance and later corrected.
  - The Drug code is affected when the name changes for various reasons. This means that the system has neither a code nor a text that is completely stable. (although these changes are exceptions and are not very common).

the UPPSALA MONITORING CENTRE

Content Differences Between B-2 and C: ATC Coding with B-2

- Both the B-2 Format and the C Format contain ATC classification.
- WHO Drug Dictionary B-2 Format
  - All products are coded with the same ATC codes as its preferred name (an active ingredient or unique combination of active ingredients).
  - For example, all products containing Acetyl Salicylic acid will be coded with the following ATC codes:

A01AD LOCAL ORAL TREATMENT
B01AC PLATELET AGGREGATION
N02BA ANALGESICS AND ANTIPYRETICS

Content Differences Between B-2 and C: ATC Coding with C

WHO Drug Dictionary C Format

- A specific product is coded with the ATC code that reflects the most common use of the product.
- For example, an Acetyl Salicylic acid product used mainly as a painkiller would be coded with the N02BA code.

the UPPSALA MONITORING CENTRE