Building the Medication Terminology Table

Ms S C CHIANG
Senior Pharmacist
Hospital Authority

Seminar on “Sharing Drug Records in Electronic Health Record (eHR) System – What You Need to Know”
22 & 23 Nov 2010
Today

MTT Table

Schema

Data content

Editorial rules

**MTT Table Schema**

**Data content**

**Editorial rules**

---

<table>
<thead>
<tr>
<th>HK ref</th>
<th>Actual Medicinal Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>51979</td>
<td>Atenolol (5-flucytosine) oral capsule 500 mg</td>
</tr>
<tr>
<td>41418</td>
<td>Acyclovir Stada (acyclovir) topical cream 5 %</td>
</tr>
<tr>
<td>470499</td>
<td>Zoltra (Zoltra) topical cream 5 %</td>
</tr>
<tr>
<td>17375</td>
<td>Zoltra (Zoltra) topical cream 3 %</td>
</tr>
<tr>
<td>147113</td>
<td>Cisapride (acyclovir) eye ointment 3 %</td>
</tr>
<tr>
<td>44957</td>
<td>Super-E (d-alpha-tocopherol) oral capsule 200 international unit</td>
</tr>
<tr>
<td>450883</td>
<td>Anetop (amethocaine) topical gel 4 %</td>
</tr>
<tr>
<td>396546</td>
<td>amoxycillin (Bronkus) oral capsule 250 mg</td>
</tr>
<tr>
<td>41439</td>
<td>APT Amoxicillin (amoxycillin) oral capsule 250 mg</td>
</tr>
<tr>
<td>596660</td>
<td>Blackmores Vit D3 (cholecalciferol) oral capsule 1000 international unit</td>
</tr>
<tr>
<td>53341</td>
<td>Novoepiprep (insulin human) subcutaneous injection, cart</td>
</tr>
<tr>
<td>150569</td>
<td>Tizanovin (tizanidine hcl) oral controlled release tablet 400 mg</td>
</tr>
<tr>
<td>334270</td>
<td>Predol (prednisolone) (as sodium metasulphobenzoate) tab</td>
</tr>
<tr>
<td>52336</td>
<td>Infibrom (lactobacillus acidophilus + bifidobacterium bifidum) cap</td>
</tr>
<tr>
<td>52336</td>
<td>Infibrom (lactobacillus acidophilus + bifidobacterium bifidum) cap</td>
</tr>
<tr>
<td>473840</td>
<td>Infibrom (lactobacillus acidophilus + bifidobacterium bifidum) cap</td>
</tr>
</tbody>
</table>

---

**Appendix – Route**

The HKMVT routes will be referencing, and with their definitions standard terminologies:

- UK NHS dm+d "Virtual Medicinal Product Route (List D) – tl"
- Directorate for the Quality of Medicines & Healthcare (EDC)
- Australian TGA Approved Terminology for Medicines – Chaj
Why do we need a **Medication Terminology Table**?
Different terms for the same concept
Different terms for the same concept
Why standard drug terminology?

“There is a lack of standardisation in the UK in describing medicines, appliances and medical devices, in how such descriptions are organised, and in linking knowledge required for decision support to these descriptions…”

NHS Connecting for Health

Terminologies and classifications form the foundations of information content in the electronic health record (eHR)...

American Medical Informatics Association
American Health Information Management Association Terminology and Classification Policy Task Force

“providing the foundation for EHR... making the healthcare knowledge more usable and accessible on national and international level... ensuring systems interoperability... improving patient safety...”

R Rudowski et al.
International Society of Telemedicine & eHealth

“(terminology standard) is part of the EHR solution... and not the total solution

American Medical Informatics Association
American Health Information Management Association Terminology and Classification Policy Task Force
What do we want to achieve?

Standard Drug Terminologies

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Standardisation of drug terminologies</td>
</tr>
<tr>
<td>2</td>
<td>Inter-operability</td>
</tr>
<tr>
<td>3</td>
<td>Support electronic health record</td>
</tr>
<tr>
<td>4</td>
<td>Pave way for future decision-support</td>
</tr>
<tr>
<td>5</td>
<td>Improved quality of care and patient safety</td>
</tr>
</tbody>
</table>
Which standard drug terminology shall we use?

- SNOMED-CT core, ICD-10 etc
- SNOMED-CT core, ICD-10 etc
- SNOMED-CT core, ICD-10 etc
- RxNorm, SNOMED-CT, FDA, FDB, Micromedex, etc
Which Standard Drug Terminology?
Both have similar hierarchical structure for concepts relevant to clinical systems

Members states include:
Australia, Canada, Cyprus, Denmark, Lithuania, New Zealand, Singapore, Spain, Sweden, The Netherlands, United Kingdom, United States.

Developed and maintained by:
IHTSDO (formerly SNOMED RT and UK CTV)
SNOMED CT: the basics

CONCEPTS
• A concept is a clinical meaning, identified by a unique identifier (ConceptID)
• Every concept has a description (fully specified name) as well as many synonymous descriptions (ie the preferred names)

HIERARCHY
• SNOMED-CT is comprised of 19 top hierarchies
• Each has a whole series of inter-related concepts
• Concept in SNOMED CT is placed in a hierarchy and has tree-like relationships (“IS_A”)

RELATIONSHIPS
• e.g. “Diazepam 5mg Tablet” IS_A “Diazepam” IS_A “Benzodiazepine” IS_A “Hypnotic” IS_A “……….etc
• Intra- and inter-relationships exist between concepts, at various levels

For more information: “SNOMED CT - the language of the NHS Care Records Service (A guide for NHS staff in England)”
Virtual therapeutic moiety (VTM) 
Diazepam 
ID=48546005

Virtual medicinal product (VMP) 
Diazepam 5mg Oral Tablet 
ID=321197008

How are AMPs linked to VMPs at our local extension?
How to kick start the process of building the HK MTT?
Kick start process for the Local Hong Kong Scene

• At the Hong Kong Government
  – Drug Compendium maintained by the DoH
  – Contains all pharmaceutical products in HK (about 20,000 – 30,000 drug items)
  – Each pharmaceutical product has a Hong Kong Product Registration number

• At Hospital Authority Hong Kong
  – Maintains a Centralised ‘HA’ drug database
  – Contains all drugs used in HA (about 6,000)
How’s:

the MTT Table Schema

Building the Medication Terminology Table
Ingredient

Route

Form

Therap Class

Therap Class

RIF

REF

VMP

Amp

VTM

TN

INH

IH

Select Inheritance

Direct Inherited From Parents

D H's DC

HK-Reg

XXX

EDIT

TAGGING

NEW

L copy (non-portable)

L define Cat.

+ New Attribute

= Top-down

= Bottom-up
Participating organisations will need to map to the MTT tables according to their drug data table structure. This mapping allows communication with eHR.
International Interoperability:

A mechanism (e.g. “IS_equiv_to_SCT”) by which the relationships with targeted generic concept tables and SNOMED can be defined.

These tables and the relationships are in compliance with the SNOMED model and allows future mapping from HKMTT to SNOMED concepts.
Building the Medication Terminology Table

How’s: the data content

Building the Medication Terminology Table

<table>
<thead>
<tr>
<th>HK reg</th>
<th>Actual Medicinal Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>51979</td>
<td>Ancobon (5-flucytosine) oral capsule 500 mg</td>
</tr>
<tr>
<td>41418</td>
<td>Acyclovir Stada (acyclovir) topical cream 5%</td>
</tr>
<tr>
<td>47049</td>
<td>Zovirax Cold Sore Cream (acyclovir) topical cream 5%</td>
</tr>
<tr>
<td>17375</td>
<td>Zovirax (acyclovir) eye ointment 3%</td>
</tr>
<tr>
<td>44713</td>
<td>Cusiviral (acyclovir) eye ointment 3%</td>
</tr>
<tr>
<td>44957</td>
<td>Super E (8-alpha-tocopheryl) oral capsule 200 international unit</td>
</tr>
<tr>
<td>45083</td>
<td>Ametop (amethocaine) topical gel 4%</td>
</tr>
<tr>
<td>39546</td>
<td>amoxicillin (Bright Future) oral capsule 250 mg</td>
</tr>
<tr>
<td>41459</td>
<td>APT-Amoxicillin (amoxicillin (as trihydrate)) oral capsule 250 mg</td>
</tr>
<tr>
<td>59660</td>
<td>Blackmores Vit D3 (cholecalciferol) oral capsule 1000 international unit</td>
</tr>
<tr>
<td>55341</td>
<td>Novorapid (insulin aspart human) subcutaneous injection, cart</td>
</tr>
<tr>
<td>05569</td>
<td>Trenal (exponentilone) oral controlled-release tablet 400 mg</td>
</tr>
<tr>
<td>33470</td>
<td>Predfoam (prednisolone (as sodium metasulphonate)) rec</td>
</tr>
<tr>
<td>52336</td>
<td>Inforan (lactobacillus acidophilus + bifidobacterium bifidum) c</td>
</tr>
<tr>
<td>52336</td>
<td>Inforan (lactobacillus acidophilus + bifidobacterium bifidum) c</td>
</tr>
<tr>
<td>47980</td>
<td>Nicotinell (nicotin) bucal chewing gum (nicotin) 2 mg (ini)</td>
</tr>
</tbody>
</table>
The concept tables should support the co-production mechanism from DH’s Drug Compendium.

**DH-eHR’s Co-Production Model**

- **HK MTT Generic product concept tables**
- **HK MTT Trade product concept tables**

**Diagram:****

- **Ingredient**
- **HAS_ACTIVE_INGREDIENT**
- **Therapeutic Moiety**
  - **VTM + Route**
  - **VTM + Route + form**
- **Generic Product**
- **TradeName**
  - **TradeName + Route**
  - **TradeName + Route + form**
- **Trade Product**

**Links:**
- **eHR ISO to complete the data content for each concept and stitch up the hierarchies**
- **DH-DC contributes data to defined fields of MVT concept(s)**

**Data Structures:**
- **HK-Reg product**
  - **HK-Reg no.**
  - **Trade name**
  - **Manufacturer**
  - **Ingredients**
  - **others**

**Notes:**
- **Trade equiv of**
Phase 1

DH-DC to collect essential data elements from Certificate holders

Agreed set of critical data elements

Phase 1 of MTT data preparation – we will be importing the entire Drug Compendium “Product Name” as its current state into AMP (no structural element yet); DH will start inviting certificate holders to review their trade names; also that DH-HA will work out an agreed set of critical data elements.
Phase 1 of MVT data preparation – we will be importing the entire Drug Compendium “Product Name” as its current state into AMP (no structural element yet); DH will start inviting certificate holders to review their trade names; also that DH-HA will work out an agreed set of critical data elements.

Extracted from “Update on HK Drug standards – 7th DH-HA Liaison Meeting”
Phase 1 of MTT data preparation – we will be importing the entire Drug Compendium “Product Name” as its current state into AMP (no structural element yet); DH will start inviting certificate holders to review their trade names; also that DH-HA has worked out an agreed set of critical data elements.
By 2013, DH-DC and eHR-MVT ready for co-production mechanism (Year 2013 onwards).

DH Drug Compendium data structure and content will be ready by 2013 – all future MTT concept should be initiated by a newly registered product on the Drug Compendium.
How’s: editorial rules

Building the Medication Terminology Table

Appendix – Route

The HKMTT routes will be referencing, and with their definitions standard terminologies:

- UK NHS dm+d “Virtual Medicinal Product Route (List D) – tI
  Directorate for the Quality of Medicines & Healthcare (EDC
- Australian TGA Approved Terminology for Medicines – Chaj
Basic principles

- Compliant with standard
- Descriptive enough to allow identification and classification
- **Unambiguous**
- Concise
- **Clinically relevant**
Editorial rules - aims

• **Consistent** identification of branded and generically equivalent medicines

• **Consistent** naming conventions / term expressions

• Provide clinically relevant drug product information for [eHR record sharing](#), [prescribing](#) and [drug checking](#) systems

• Sufficient information to support [linkage with SNOMED-CT](#)
We recommend...

NHS Dictionary of Medicines and Devices (dm+d) Editorial Policy
August 2010

nehta Australian Medicines Terminology (AMT) Editorial Rules
June 2009

SNOMED CT Editorial Guidelines
May 2008
 Editorial rules are documented expressively

<table>
<thead>
<tr>
<th>RuleID</th>
<th>Concept</th>
<th>Attribute</th>
<th>Section title on Draft</th>
</tr>
</thead>
<tbody>
<tr>
<td>MVT-VTM-PT-1</td>
<td>VTM</td>
<td>Preferred Term</td>
<td>Virtual Therapeutic Moiety &quot;Preferred Terms&quot; Rules</td>
</tr>
<tr>
<td>MVT-VTM-PT-2</td>
<td>VTM</td>
<td>Preferred Term</td>
<td>Virtual Therapeutic Moiety &quot;Preferred Terms&quot; Rules</td>
</tr>
<tr>
<td>MVT-VTM-PT-3</td>
<td>VTM</td>
<td>Preferred Term</td>
<td>Virtual Therapeutic Moiety &quot;Preferred Terms&quot; Rules</td>
</tr>
<tr>
<td>MVT-VTM-PT-5</td>
<td>VTM</td>
<td>Preferred Term</td>
<td>Virtual Therapeutic Moiety &quot;Preferred Terms&quot; Rules</td>
</tr>
<tr>
<td>MVT-VTM-AN-1</td>
<td>VTM</td>
<td>Aliasname</td>
<td>Virtual Therapeutic Moiety &quot;Aliasname&quot; Rules</td>
</tr>
<tr>
<td>MVT-VTM-AN-2</td>
<td>VTM</td>
<td>Aliasname</td>
<td>Virtual Therapeutic Moiety &quot;Aliasname&quot; Rules</td>
</tr>
<tr>
<td>AMT-MP-PT-2</td>
<td></td>
<td>Draft</td>
<td>AMT-MP-PT-2 Draft</td>
</tr>
<tr>
<td>AMT-MP-PT-3</td>
<td></td>
<td>Draft</td>
<td>AMT-MP-PT-3 Draft</td>
</tr>
</tbody>
</table>

Each rule documented is organised and categorised in a similar way as our reference terminology standard.

Current status of the rules:

- Document rules that we do not follow or differ from our reference standard.
VTM Rule 1: capitalisation rules

“The first character of a description should be in lower case or an integer, applicable to all concept types including the Fully Specified Names, Preferred Terms, Synonyms or other descriptions, unless otherwise specified…”

Reference: AMT Appendix I – Capitalisation (AMT-APP-CAP-1)

“Full proper nouns will be expressed (e.g. Bacillus Calmeete and Guerin)
Abbreviated descriptions such as "BCG" would be maintained as the aliasname in MVT, where applicable…”

Reference: AMT Appendix I – Capitalisation (AMT-APP-CAP-14)

“Single letters following a substance name will be expressed in upper case (e.g. vitamin C, amphotericin B, hepatitis B)”

Reference: AMT Appendix I – Capitalisation (AMT-APP-CAP-7)

“Scientific names used to describe an organism will be expressed in full names and upper or lower case according to convention (e.g. Haemophilus influenzae, Streptococcus aureus)”

Reference: AMT Appendix I – Capitalisation (AMT-APP-CAP-8)
MVT Route List

This list supports the representation of the place in, or on the body where a medicinal product may be introduced or applied in order that it achieves its intended therapeutic effect.

At draft stage

Subject to reviews and refinements

Ongoing update

<table>
<thead>
<tr>
<th>Route</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>buccal</td>
<td>Buccal pertaining to the cheek cavity</td>
</tr>
<tr>
<td>dental</td>
<td>Dental pertaining to the teeth or a tooth</td>
</tr>
<tr>
<td>ear</td>
<td>Administered into the ear</td>
</tr>
<tr>
<td>epidural</td>
<td>Administered to the outside, upon, or over the dura mater</td>
</tr>
<tr>
<td>extracorporeal</td>
<td>Extracorporeal circulation, haemodialysis</td>
</tr>
<tr>
<td>infiltration</td>
<td>The diffusion or accumulation in a tissue or cell</td>
</tr>
<tr>
<td>inhalation</td>
<td>Taking into the lungs by breathing through the nasal or oral respiratory route for local or systemic effect</td>
</tr>
<tr>
<td>intra-arterial</td>
<td>Within an artery or arteries</td>
</tr>
<tr>
<td>intra-articular</td>
<td>Within a joint or inside the cavity of a joint</td>
</tr>
<tr>
<td>intracardial</td>
<td>Within the heart</td>
</tr>
<tr>
<td>intracavernosal</td>
<td>Within the tissues of the corpus cavernosum penis, but not including urethral administration or application to the skin</td>
</tr>
<tr>
<td>intracavitary</td>
<td>Within the cavity of a hollow organ, as that of the cervix</td>
</tr>
<tr>
<td>intradiscal</td>
<td>Within or into a cistern</td>
</tr>
<tr>
<td>intracutaneous</td>
<td>Within the structure of the skin</td>
</tr>
<tr>
<td>intradermal</td>
<td>Within the dermis</td>
</tr>
<tr>
<td>intradiscal</td>
<td>Into or within the fibrocartilage plates separating the articulating surfaces of bone</td>
</tr>
<tr>
<td>intraepidermal</td>
<td>Administration within the epidermis</td>
</tr>
<tr>
<td>intraligamental</td>
<td>Introduced directly into a localised lesion</td>
</tr>
<tr>
<td>intramammary</td>
<td>Within the breast</td>
</tr>
<tr>
<td>intramural</td>
<td>Within the substance of the wall of an organ</td>
</tr>
<tr>
<td>intramuscular</td>
<td>Within or into the substance of a muscle</td>
</tr>
</tbody>
</table>

Reference:
- Australia NEHTA AMT Editorial Rules (Jun 2009)
- US FDA CDER Data Standard Manual (downloaded as of September 2010)
This is a list of valid qualifier value concepts to describe the dose formulation, such as capsules, tablets, injections. These dose forms are used to support the representation of the orderable physical formulations of medicinal products held in HKMVT.

Referenced and consolidated from reference standard terminologies

At draft stage

Subject to reviews and refinements

Ongoing update

Reference:
• UK NHS dm+d Editorial Policy (Aug 2010)
• Australia NEHTA AMT Editorial Rules (Jun 2009)
• US FDA CDER Data Standard Manual (downloaded as of September 2010)
Usage of MTT

Medication Terminology Table

Virtual Therapeutic Moiety
diazepam
diazepam oral
diazepam oral tablet

Virtual Medicinal Product
diazepam oral tablet 5 mg

Product
Dispensing record

Actual Medicinal Product
Diazer 5 (diazepam) oral tablet 5 mg

eHR recording sharing

Product Safety

<table>
<thead>
<tr>
<th>HK Registration no.</th>
<th>Trade Name</th>
<th>Virtual Therapeutic Moiety (preferred term)</th>
<th>Route</th>
<th>Dose Form</th>
<th>Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>HK-50904</td>
<td>Diazer 5</td>
<td>diazepam</td>
<td>oral</td>
<td>tablet</td>
<td>5 mg</td>
</tr>
</tbody>
</table>
Usage of MTT

Data elements for Clinical Systems

- Virtual Therapeutic Moiety: diazepam
- VTM + Route: diazepam oral
- VMT + Route + Dose Form: diazepam oral tablet
- Virtual Medicinal Product: diazepam oral tablet 5 mg

Provides a logical hierarchies for prescribing drug search and other structural elements (e.g. drug-based prescribing unit)

- Trade Name: Diazer 5 (diazepam)
- TN + Route: Diazer 5 (diazepam) oral
- TN + Route + Dose Form: Diazer 5 (diazepam) oral tablet
- Actual Medicinal Product: Diazer 5 (diazepam) oral tablet 5 mg

Product Safety

<table>
<thead>
<tr>
<th>HK Registration no.</th>
<th>Trade Name</th>
<th>Virtual Therapeutic Moiety (preferred term)</th>
<th>Route</th>
<th>Dose Form</th>
<th>Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>50904</td>
<td>Diazer 5</td>
<td>diazepam</td>
<td>oral</td>
<td>tablet</td>
<td>5 mg</td>
</tr>
</tbody>
</table>
Usage of MTT

Medication Decision Support

Virtual Therapeutic Moiety
diazepam

VTM + Route
diazepam oral

VMT + Route + Dose Form
diazepam oral tablet

Virtual Medicinal Product
diazepam oral tablet 5 mg

Allergy documentation and Checking

Drug-Drug Interaction
G6PD / Pregnancy checking
Drug Duplication Checking

Dosage Range Checking

Actual Medicinal Product
Diazer 5 (diazepam) oral tablet 5 mg

Trade Name
Diazer 5 (diazepam)

TN + Route
Diazer 5 (diazepam) oral

TN + Route + Dose Form
Diazer 5 (diazepam) oral tablet

Trade Name Table

<table>
<thead>
<tr>
<th>HK Registration no.</th>
<th>Trade Name</th>
<th>Virtual Therapeutic Moiety (preferred term)</th>
<th>Route</th>
<th>Dose Form</th>
<th>Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>50904</td>
<td>Diazer 5</td>
<td>diazepam</td>
<td>oral</td>
<td>tablet</td>
<td>5 mg</td>
</tr>
</tbody>
</table>
Usage of MTT

Pharmaco-epidemiology studies

Virtual Therapeutic Moiety
diazepam

VTM + Route
diazepam oral

VMT + Route + Dose Form
diazepam oral tablet

Pharmaco-epidemiological studies

No. of patient on benzodiazepines?

No. of patient on diazepam orally?

No. of patient taken diazepam oral tablet?

Trade Name
Diazer 5 (diazepam)

TN + Route
Diazer 5 (diazepam) oral

TN + Route + Dose Form
Diazer 5 (diazepam) oral tablet

Actual Medicinal Product
Diazer 5 (diazepam) oral tablet 5 mg

Virtual Medicinal Product
diazepam oral tablet 5 mg

Medication Terminology Table

<table>
<thead>
<tr>
<th>HK Registration no.</th>
<th>Trade Name</th>
<th>Virtual Therapeutic Moiety (preferred term)</th>
<th>Route</th>
<th>Dose Form</th>
<th>Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>HK-50904</td>
<td>Diazer 5</td>
<td>diazepam</td>
<td>oral</td>
<td>tablet</td>
<td>5 mg</td>
</tr>
</tbody>
</table>
The Plan

develop
Co-Production Mechanisms

prepare
MTT Data Content

compile
Editorial Policies