
Report of the review of the

**NEHTA Australian Medicines Terminology
Editorial Rules**

conducted by
Australian Medicines Handbook Pty Ltd

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Table of contents

Executive summary.....	4
Review of Australian Medicines Terminology editorial rules.....	5
Purpose of review	5
Scope of review.....	5
Review recommendations.....	7
General principles	7
Always display ingredients in trade PTs.....	7
Ingredient displayed is the Medicinal Product.....	9
Medicinal and trade sides identical.....	10
Editorial recommendations	11
Expressing concentrations/strengths.....	11
Strength expressions for oral liquids.....	11
Display of numbers	12
Ingredients or Trade Names with numbers	12
Other pack information (e.g. product codes)	13
Units.....	13
Alternative strength expressions	16
Adrenaline.....	16
Local anaesthetics	17
Patches	17
Eye/ear drops and other topical skin preparations	18
‘Conventional’ inhalations.....	19
Dosage forms	20
Inverted syntax for dosage forms.....	20
Include only clinically meaningful descriptions of dosage forms	20
Modified-release properties for injections	22
Proprietary forms as part of trade name.....	23
Alternatives to TGA forms	23
Ingredient and trade naming conventions.....	24
Ingredients ending in -ate.....	24
Display of more than 3 ingredients.....	25
Waters of hydration.....	27
Use of suffix in trade product concepts	28
Expressing generics	29
Clinically relevant modifications.....	31
Physiological salts.....	31
<i>Potassium</i>	32
<i>Calcium</i>	33
<i>Magnesium</i>	33
<i>Iron</i>	34
Representing salts with discernible therapeutic differences to base.....	34
Prodrugs	38
Enantiomers	39

Micronised formulations	39
How products are represented or viewed.....	40
Order of ingredients in PTs of multi-ingredient preparations.....	40
Order of items presented in pick lists	42
Rules for using short names at MPUU, MPP, TPUU and TPP levels	44
Miscellaneous issues	46
Ability to capture separate administration of multi-component products at TPUU .	46
Tall Man typography.....	46
Modified-release formulations of morphine and other opioids	47
Amphotericin	48
Influenza vaccine	48
Terminology for bases and salts	49
AMT editorial rules themselves.....	49
Anomalies found with records when searching	50
References.....	52

Executive summary

- AMH acknowledges the detail in the Fully Specified Name (FSN) within the model provides the depth required to flexibly and accurately describe and differentiate medicinal entities. It is not intended for general use but sits in the model background to create a common terminology for international use.
- The Preferred Term (PT) is the concept that will be ‘viewed’ by health professionals in the respective use cases. Therefore, the terms used in the PT to represent medicine names, strengths and forms should be familiar and recognisable; these terms will be influenced by environmental representations such as packaging and product information/consumer medicine information.
- The active ingredient(s) in certain medicines should be included in trade concepts to aid recognition and to promote quality use of medicines. Use cases where this might be applied include product pick lists in software and pharmacy dispensing labels.
- AMH has taken the perspective that the Australian Medicines Terminology (AMT) is a style standard for describing medicinal products to ensure they can be adequately *identified*. We believe the clinical application of the product cannot be described adequately in all instances and should, therefore, not be part of the possible use cases.
- In implementing certain recommendations, user testing has been suggested as a means of ensuring the final output achieves the intended goal without sacrificing understanding or creating ambiguity. User testing should be considered for the short names (restricted to 60 characters) used on dispensing labels and for the order in which ingredients are represented in multi-ingredient preparations.
- A number of editorial recommendations have been suggested to improve readability and reduce the risk of misinterpretation, while simultaneously remaining mindful of the needs around succinct labelling and character restrictions.
- We believe that evaluation around Tall Man typography is insufficient presently to be confident it will have the desired impact. Furthermore, the decision to adopt Tall Man needs to be a systemic approach because selecting an incorrect medicine can occur at a number of places in the chain from prescribing to medicine administration. Tall Man should be included as a PT synonym only to allow for future use.
- If the future application of the model includes being able to record unit-of-use administration, we believe continued development work will be required as the model does not currently distinguish components separately in multi-component products.
- A user-friendly version of the AMT editorial rules will be needed if the expectation is they will be applied by third parties (e.g. vendors) in naming new medicines.

Review of Australian Medicines Terminology editorial rules

Purpose of review

To assess the Australian Medicines Terminology editorial rules by testing the product concept outputs generated by the rules from a dataset of products listed on the PBS. Concept outputs include representations of active ingredients, pharmaceutical strength or concentration, pharmaceutical form and proprietary/trade descriptions.

Scope of review

This review was conducted by staff at the Australian Medicines Handbook (Adelaide) and Dr John Bennett of the University of Queensland, between 18 October and 19 November. The review used the AMT viewer (Release 1.0.0-Beta, dated 28 September 2007) and AMT Editorial Rules v2.0 (dated 15 October 2007). A document relating to representing strengths on medicines was provided by NEHTA on 9 November and was considered as part of this review.

The review looked at editorial conventions for expressing pharmaceutical information, the clinical relevance of the concepts at various levels in the model, and the risk of interpreting the concepts ambiguously at various levels in the model (in the context of user-friendliness and patient safety). While some recommendations relate to readability, these are not necessarily the result of a comprehensive search of the evidence base for typography and visual communication design, nor formal expertise in this area; they are based on the editorial experience of the *Australian Medicines Handbook*.

‘Screen shots’ are from Genie prescribing software (Version 7.5.1, 26 October 2007).

In interpreting this review, you should understand that we have made the following assumptions:

- AMH supports the approach taken to generate the Fully Specified Name (FSN) and recognises that the detail in the FSN provides the depth required to flexibly and accurately describe and differentiate medicinal entities. It is not intended for general use but sits in the background of the model to create a common terminology for international use.
- The recommendations that follow relate to the presentation of the Preferred Term (PT) within the AMT unless otherwise stated.
- The PT is the concept that will be ‘viewed’ by health professionals in the respective use cases.
- The labelling of a dispensed product will probably use the Trade Product Pack (TPP) PT unless the short name is used in preference.
- The intention is that the editorial rules are creating a syntax generated in an automated fashion and that, while the output of that first-pass transform may have to

be manually edited subsequently, the volume that needs such editing is to be kept to a minimum.

- AMH has taken the perspective that the AMT is a style standard for describing medicinal products to ensure they can be adequately *identified*. We believe the clinical application of the product cannot be adequately described in all instances and should, therefore, not be part of the possible use cases. For example, in the *Australian Medicines Handbook*, clinical content is delivered within the body of the monograph; it is **not** part of the section dedicated to product descriptions.

The recommendations that follow have been grouped under broad headings:

- general principles;
- editorial features;
- alternative strength expressions;
- dosage forms;
- naming conventions for ingredients and trade names;
- clinically significant modifications;
- how products are viewed; and
- miscellaneous issues.

Review recommendations

General principles

In thinking how the editorial rules are applied by the model, we considered three overarching philosophies were important for identifying medicines in the proposed use cases:

- that drug names be included in trade descriptions parenthetically to trade name.
- that the drug name displayed will be the Medicinal Product (MP) unless otherwise stated.
- that representations on the medicinal and trade sides be identical structurally.

The ability to implement some of the recommendations that follow may be predicated on accepting the context established by these assumptions.

As a general observation, we also advise that NEHTA work with the TGA and industry to standardise the minimum requirements and format of information supplied to register medicinal products in Australia so that the integrity of the data upon which the AMT is based is improved.

Always display ingredients in trade PTs

RECOMMENDATION 1: Ingredients of medicines should be included as part of the description of all trade PTs.

RATIONALE: It is an important principle of quality use of medicines that prescribers and medicine users understand the active ingredient. It is known that prescribers are not always aware of the ingredients in combination medicines. With respect to empowering consumers to be involved in their health care, many initiatives focus on improving their understanding of the two names on their medicines — the active ingredient and the brand/trade name.

Deciding to include generic drug names in the trade concepts also resolves some problems that the editorial rules and model generate, particularly for multi-component and composite packs which are occasionally ambiguously and poorly defined (see examples below).

How this is applied within the model is a question for NEHTA. What we are suggesting is that for the use cases of prescribing and dispensing, the users are able to identify the constituents of medicines (whether single or multi-ingredient) **on screen (e.g. as part of pick lists)** and that these are then represented on a dispensing label.

EXAMPLES:

- 1) The TPUU for Estalis Sequi displays the ingredients of the patch which contains the combined hormones but not for the patch containing oestradiol alone. Indeed, the oestradiol-only patch is labelled Estalis Sequi 50/140, the suffix of which implies it is a multi-ingredient combination. A clearer description would be

Estalis Sequi 50/140 (norethisterone 140 micrograms + oestradiol
50 micrograms/24 hours)
Estalis Sequi 50/140 (oestradiol 50 micrograms/24 hours)

- 2) Amoxicillin + clavulanic acid combinations can have trade descriptions without any indication of strength; this occurs with generics and where the trade suffix is without numbers (e.g. Augmentin Duo and Augmentin Duo Forte). Including the ingredients and strength as part of the trade description assists with this issue.
- 3) The TPP for Emend states the pack has 3 capsules: that this is a mix of two different strengths (80 mg and 125 mg) is obfuscated.
- 4) TPP and CTPP for different strengths of composite packs are indistinguishable at present. Including MPs with strength resolves this in many instances.

Taxotere (docetaxel) 80 mg/2 mL, 1 pack
Taxotere (docetaxel) 20 mg/0.5 mL, 1 pack

- 5) TPUU for some multi-component packs makes no distinction between the various components: identical trade descriptions appear to have different strengths. Including the MP clarifies this.

Actonel Combi (risedronate) 35 mg, 1 pack
Actonel Combi (calcium) 500 mg, 1 pack

Didrocal (etidronate) 200 mg, 1 pack
Didrocal (calcium) 500 mg, 1 pack

- 6) Including MP can help clarify dual representations of strength.

Timoptol 0.5% (timolol 5 mg/mL) eye drops, 5 mL

Ingredient displayed is the Medicinal Product

RECOMMENDATION 2: The ingredient or drug name represented in the trade PT is the Medicinal Product concept exactly (that is, base without salt if that is how the Medicinal Product has been described). This applies to all BOSS relationships, including medicines where BOSS equals salt.

RATIONALE: Decisions have been made on the medicinal side regarding the clinically significant component of the medicine. Therefore, there is little need for salts to be represented in the trade PTs, in terms of recognition of the active ingredient, unless they are deemed to be clinically distinct. Different salts of the same MP may raise questions of clinical differences that do not exist. Additionally, not representing the salts assists in meeting character thresholds for labelling use cases.

While we acknowledge that, where the salt is the basis of strength substance (BOSS), representing some medicines without the salt strictly means the description is inaccurate, we believe that this will not affect users' understanding because they are largely familiar with the base, irrespective of whether the salt is BOSS. Furthermore, this is an area where the quality of the TGA data, when used for the purposes of AMT, yields inconsistent results (e.g. look at the different representation of 'hemihydrate' for oestradiol in Kliogest and Kliovance). By avoiding the salt, it creates an opportunity to normalise the TGA data such that its inconsistencies are not duplicated by the model.

The FSN descriptions would be as they are currently modelled. In this way, the accuracy of the product description is maintained as is international use and interchangeability.

EXAMPLE: The TPUU for Kaluril tablets — Kaluril (amiloride hydrochloride) 5 mg tablet — could be expressed as Kaluril (amiloride) 5 mg tablet without sacrificing understanding.

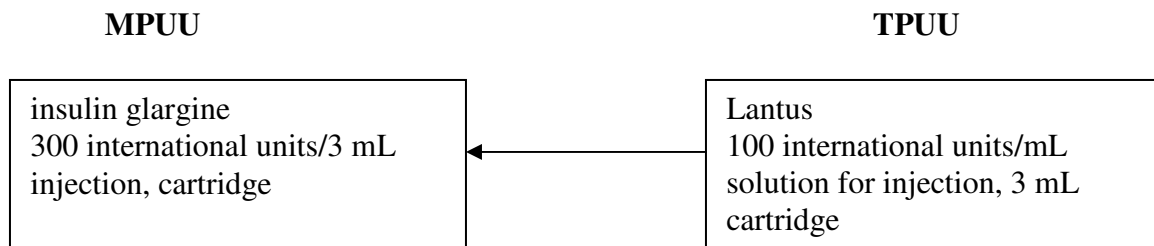
There are inconsistencies in how the model represents some of these salts. For example, the FSN for Caltrate displays 'calcium (as carbonate) 600 mg' (despite the MP being calcium carbonate) whereas the Fawns & McAllan generic of codeine phosphate displays the salt 'codeine phosphate 30 mg'.

Medicinal and trade sides identical

RECOMMENDATION 3: Product representations should be structurally identical on both the medicinal and trade sides of the model at any given level of concepts.

RATIONALE: The motivation for this recommendation is to create a familiar structure and format at any given level of the model. The medicinal and trade sides act as parallel streams of the same information. As we progress through the different levels of the model, new information is introduced in a consistent format (e.g. dose/strength and form is added to the MP/TP at MPUU/TPUU).

EXAMPLE: The strength of insulins appears differently on the two sides of the model:



It would be preferable that both sides of the model show the strength of insulin as 100 international units/mL so that recognition and familiarity are enhanced. Because insulin dosing varies, the per mL concentration should be used as this expression lends itself to dosing calculations.

Editorial recommendations

Expressing concentrations/strengths

RECOMMENDATION 4: Express concentrations by

- using the solidus
- removing the spaces either side of the solidus
- avoid using '1' to qualify single denominator units.

RATIONALE: We consider the most succinct, recognisable (on packaging, product and consumer information) and least ambiguous form for expressing concentration should be used. The Commonwealth Style Manual notes that the solidus is used when measurements are abbreviated but not when prose is used (i.e. 25 mg/hr but 25 mg per hour). However, the solidus is used widely to express scientific concentrations and appears on packaging and product information.

We acknowledge there is an opportunity to misread the solidus as '1'.

EXAMPLES: Liquid concentrations with a unitary denominator would take the form 25 mg/mL (without a denominator number); otherwise the concentration takes the form 25 mg/5 mL. For inhalations, the dose would be represented as 125 micrograms/actuation rather than 125 microgram / 1 actuation as is currently the case.

Strength expressions for oral liquids

RECOMMENDATION 5: The AMT display for strengths of oral liquids, or powders to be reconstituted as oral liquids, should be consistent with the representation on product packaging/labelling.

RATIONALE: TGA general requirements are flexible in that they merely state 'the quantity of the active ingredient contained in the stated volume of a suitable dose of the liquid'. As an aid to recognition, we believe the AMT representation of strength for oral liquids should reflect that which appears on product packaging/labelling.

The AMH modifies all strength/concentration representations to per mL (e.g. gentamicin 80 mg/2 mL becomes 40 mg/mL). However, the use case of information in the AMH is different as the knowledge base and product descriptions reside in the same monograph. Thus the strength representation is used in conjunction with the dose information to allow calculations to be made.

The use case of AMT is to identify medicines. Keeping strength representations consistent with product packaging and product information will assist in the selection process. We appreciate that how the strength is expressed is different in the context of unit-of-use administration.

EXAMPLES: amoxicillin 250 mg/5 mL; cyclosporin 100 mg/mL.

Display of numbers

RECOMMENDATION 6: Thin, non-breaking spaces should be used for values that exceed 9999. Additionally, the thin, non-breaking space should be used between strength values and strength units.

RATIONALE: As the editorial rules are intended to have international application, it should be noted that the symbol ‘,’ is used as a decimal point in most European countries. Additionally, this symbol is being used as a delimiter within concept definitions. Avoiding its use should diminish confusion.

In its place, the thin space can be used as per the Commonwealth Style Manual. This is an editorial convention used by both AMH and the BNF.

EXAMPLE: Eprex 10 000 international units/mL not 10,000 international units/mL.

Ingredients or Trade Names with numbers

RECOMMENDATION 7: Where ingredients or trade names include a tailing number such that these potentially juxtapose with dose/strength representations, separate the tailing number from its object with a thin space; the tailing number can then be followed by a normal space.

RATIONALE: This, together with the suggested amendments to expressing concentration, should help to visually group the separate elements within a concept (e.g. trade name and dose/strength or medicinal product and dose/strength). Manual manipulation to remove tailing numbers from official trade names should be avoided (see Rani 2 examples in *Anomalies* section).

EXAMPLES: Dimethicone 350; Rani 2.

Other pack information (e.g. product codes)

RECOMMENDATION 8: Non-essential information (such as product codes) should be removed from recognition-sensitive areas, such as the medicinal product and strength, to a less critical area.

RATIONALE: We agree with placing such additional information after the pack description. Presumably equivalent products in different sized packs have different codes. Furthermore, placing it at the end allows it to be easily scanned by those using this code to identify the product (e.g. those in supply).

EXAMPLE: Metronidazole (Baxter) 500 mg/100 mL (0.5%) intravenous infusion, 1 x 100 mL bag AHB 3399, bag.

Units

RECOMMENDATION 9: Any form of abbreviation of micrograms or nanograms should be avoided.

RATIONALE: Abbreviations for microgram (e.g. μg , mcg or ug) can be mistaken as 'mg'. Equally, abbreviating nanogram to its technically correct SI abbreviation, 'ng', can result in the same mistake.

The NSW TAG *Recommendations for terminology, abbreviations and symbols used in the prescribing and administration of medicines* (Oct 2006) state that 'microg' is an acceptable abbreviation but appear to position this as a secondary option to stating microgram in full. Therefore, it is possible that this abbreviation may be employed when contracting the unit term is required (e.g. short names for labelling purposes).

We also note that the abbreviation for nanomole is listed as nmol in Appendix VI of the editorial rules. For the reasons outlined above, we would suggest it be nanomol.

EXAMPLE: Risperdal (risperidone) 500 micrograms, tablet, 20

RECOMMENDATION 10: The plural form of units should be employed when associated with numbers greater than unity. For numbers less than or equal to unity, the singular is used. When a measurement is used adjectivally, the unit remains singular (e.g. 100-microgram patch).

RATIONALE: The editorial rules state

Strength units of measure will be expressed as singular to maintain consistency between abbreviations and full terms.

It is not apparent what consistency is being achieved given abbreviations are, by definition, a contraction of the complete form. Furthermore, plural forms that would be used when writing units out in full (e.g. 5 grams) do not apply to abbreviations: that is, 5 mg not 5 mgs. The recommendation is based on the Commonwealth Style Manual and editorial convention used in AMH, BNF and Martindale. The AMT rules allow for the plural form on some measures of pack units (e.g. actuations, ampoules) which, if plurals are to be used, seems a less important area of description than is the dose.

EXAMPLE: Risperdal (risperidone) 500 micrograms, tablet, 20

RECOMMENDATION 11: Consider deleting 'international' from descriptions of international units within PT displays.

RATIONALE: While it is not strictly accurate to substitute 'units' for 'international units', the latter can be used in the FSN where international conformity and interchangeability resides. For the PT, 'units' are probably understood implicitly in all the medicinal products where it will be used. Additionally, removing 'international' will assist in meeting character thresholds for labelling use cases while not sacrificing understanding.

EXAMPLES: heparin 5000 units, epoetin beta 1000 units, insulin aspart 100 units

RECOMMENDATION 12: Consider applying the rule about figures less than unity being expressed at the next unit level down on a case-by-case basis when moving from micrograms to nanograms.

RATIONALE: The editorial rules state

In general, the strength of an active ingredient should be expressed by a number between 1 and 999 metric units. That is, if the number of units is less than 1 (for example 0.5), the next lower unit level should be used (e.g. 500 micrograms should be used in preference to 0.5 mg).

While the move toward whole integers is sound, there may be instances where the change introduces the less used (and less familiar) nanogram unit. Furthermore, as in the example of calcitriol, micrograms are quoted in dosing regimens and on the packaging.

EXAMPLE: Rocaltrol 0.25 microgram capsule rather than Rocaltrol 250 nanograms capsule.

RECOMMENDATION 13: Clarify the editorial rule regarding expressing volumes of 1000 mL and more as it is unclear when it would be implemented given the current exceptions.

RATIONALE: The editorial rules state

*If the value is > 999.9 millilitre (“mL”), convert to and display as litre (“L”).
Note: for large volume parenterals injections, irrigation solutions, haemodialysis and peritoneal dialysis solutions display as millilitres (“mL”).*

It is unclear to which products this rule refers given the stated exceptions are the most likely to exceed 1000 mL. A review of containers of liquid forms for oral administration found volumes of 500 mL and less. Potentially larger pack units may be available for specific users to repackage in smaller volumes (e.g. hospital pharmacy), but this is the only exception that we can think of (and these were not used by the Royal Adelaide Hospital pharmacy department whom we consulted on this matter).

Alternative strength expressions

The editorial rules state that

For safety reasons, some items will have an alternate representation of the strength or dual representation of strength. This will be used for preparations such as lignocaines, adrenalines, and other preparations. In these cases strength can be expressed as biological activity, in units, or as ratios/percentages as well as in terms of milligrams or micrograms...Dual representation of strength will be considered to meet clinical requirements.

We agree that there are clinically significant implications associated with how strength is presented. The model should allow for a preference of which strength appears or which should have precedence when both are to be displayed.

For topical preparations and eye drops, percentage strengths are commonly used to differentiate between products and should hold precedence. Including a mass/g or mass/mL alternative expression helps to define the relative strengths and, in some cases (such as adrenaline injection, lignocaine or salbutamol nebuliser solution) aids in dose calculations.

The recommendations that follow are provided in light of the document 'Preferred strength representations 251007' provided during the review process.

Adrenaline

RECOMMENDATION 14: Express both the alternative (ratio) and concentration strength for adrenaline, giving precedence to the ratio, in accordance with trade product packaging.

RATIONALE: Most trade products of adrenaline injection (including local anaesthetics with adrenaline) include the ratio strength, that is either 1:1000 or 1:10 000. However, because there have been errors where the higher strength has been intravenously administered, it is considered good practice to include the concentration (mg/mL) as well. Note the editorial rules suggest the opposite format to that which appears currently in the AMT viewer.

For the 1:10 000 strength, the editorial rules would suggest converting 0.1 mg/mL to 100 micrograms/mL. This should not be followed as it could cause confusion and appear as if it is a higher strength than 1 mg/mL.

EXAMPLE: Adrenaline (AstraZeneca) 1:1000 (1 mg/mL) injection, 5 x 1 mL ampoules

EXCEPTIONS: Consideration needs to be given as to whether this convention is applied to EpiPen auto-injectors. These preparations describe their dosing in terms of micrograms/mL without reference to the ratio. It may not be an improvement to include the ratio, particularly as EpiPen Jr is at a different strength (1:2000) than is typically seen.

Local anaesthetics

RECOMMENDATION 15: Express both the alternative (%) and concentration strength for local anaesthetics, giving precedence to the percentage, unless the trade product name does not specify a percentage strength.

RATIONALE: Most trade names include a strength expressed as a percent (e.g. Citanest 2%). For these products, following the format % (mg/mL) is probably clearest and recognisable.

EXAMPLE: Xylocaine 2% (lignocaine 20 mg/mL) injection, 50 x 5 mL ampoules

EXCEPTIONS: Some local anaesthetics do not include percentage strength as part of the trade name; we recommend these do not have them included artificially.

Chirocaine (levobupivacaine 25 mg/10 mL) injection, 1 x 10 mL ampoule
Chirocaine (levobupivacaine 125 mg/200 mL) injection, 1 x 200 mL bag
Xylocard 500 (lignocaine 500 mg/5 mL) injection concentrated, 10 x 5 mL ampoule

Patches

RECOMMENDATION 16: Express patch release characteristics as amount of active ingredient over a stated time (i.e. units per measure of time). This allows variations in the time period to be accommodated.

RATIONALE: The context of use of the various forms of patch is important in deciding how the dose is presented. Expressing the release characteristics as units/time consistently describes the dose in an overarching sense that allows the different contextual uses of the patches, together with the various proprietary representations of this concept, to be accommodated.

The total content of the patch should not be included as a dual representation because it is unnecessarily confusing. If this description is needed by the model for other reasons, we suggest it resides in the FSN only.

EXAMPLES:

Analgesic patches (buprenorphine, fentanyl) — micrograms/hour
Glyceryl trinitrate patches — mg/24 hours
Hormone patches (oestrogen +/- progestogen; testosterone) — mg/24 hours
NRT patches according to product labelling — mg/16 hours or mg/24 hours

Eye/ear drops and other topical skin preparations

RECOMMENDATION 17: Express both the alternative (%) and concentration strength for eye drops and topical preparations, giving precedence to the percentage as currently in the editorial rules.

RATIONALE: Currently the presentation of eye drops in the CTPP view ‘pick list’ varies dramatically. The representations of strength are typically more often displayed as percentage concentration with concentration as mg/mL following in parentheses, although there are a considerable number showing only the latter.

Genoptic 3 mg / 1 mL eye drop solution, 5 mL, bottle
Chloromycetin 5 mg / 1 mL eye drop solution, 10 mL, bottle
Betoptic 5 mg / mL eye drop solution, 5 mL, bottle

Betoptic S 0.25% (2.5 mg / mL) eye drop suspension, 5 mL, bottle
Soframycin 0.5 % (5 mg / mL) eye/ear drops, 8 mL, bottle
Chlorsig 0.5 % (5 mg / mL) eye drop solution, 10 mL, bottle

For products with a number of strengths, the percentage concentration is a convenient means of distinguishing between strengths using the product labelling/packaging and is often incorporated as a trade suffix. We agree percentage should be incorporated as a dual strength display for eye drops in the model, whether the proprietary name has it or not. It is information that aids identification rather than adding confusion.

For multi-ingredient eye drops (which tend not to state percentage strengths as any trade suffix), the current model representation seems sufficient:

Xalacom (latanoprost 0.005 % (50 micrograms/mL) + timolol 0.5% (5 mg/mL))
eye drops

EXCEPTIONS: The above rules apply equally to topical creams and ointments. There are some corticosteroid preparations that use a fractional trade suffix as an indication of strength (e.g. Betnovate 1/5 and Betnovate cream). The preferred strength document suggests that these not have an alternative strength because they would then have, essentially, 3 representations of strength.

We believe these trade suffixes are unqualified relative strengths — that is, 1/5 or 1/2 of what? As there are literally only a few of these products, it seems reasonable not to make exceptions of these products, allowing the rule to create consistency across the dosage form.

‘Conventional’ inhalations

RECOMMENDATION 18: Use only mass/mL concentrations for these preparations. Dual representation with a percentage concentration is not recommended.

RATIONALE: Many preparations used for nebulising do not include percentage strengths on product packaging/labelling (although one exception was located — generic salbutamol produced by Pfizer). The dose of these medicines is usually expressed as mg or micrograms (depending on the agent). Displaying the strength as a mass/mL assists dosing calculations; percentage strengths do not add value here and distinguishing between strengths should be by the dose required.

See also comments about the term ‘conventional inhalation’ in *Dosage Forms* section.

EXAMPLES:

Pulmicort Respule (budesonide) 500 micrograms/2 mL, conventional inhalation
Salbutamol (Terry White Chemists) 2.5 mg/2.5 mL, conventional inhalation

Dosage forms

Following are recommendations for expressing dosage forms in PTs. For the FSN, the utility of representing dosage forms using full TGA descriptions is acknowledged.

Inverted syntax for dosage forms

RECOMMENDATION 19: Retain inverted syntax format of dosage form for Child Name PT as it is for Child Name FSN.

RATIONALE: The order of display for the product in pick lists is simpler for the user if similar forms are grouped. Thus, selection progresses through medicinal or trade name, strength, form (e.g. tablet, capsule, oral liquid, etc.) then form qualifier (e.g. modified release, chewable, dispersible, etc.).

EXAMPLES:

- tablet,
- tablet, chewable
- tablet, dispersible
- tablet, enteric coated
- tablet, modified release

Include only clinically meaningful descriptions of dosage forms

RECOMMENDATION 20: Collapse the available TGA dosage forms in the PTs of the medicinal and trade sides of the model to only those forms that impart a clinically meaningful modification.

RATIONALE: Expanded forms (other than those listed as examples below), cause unnecessarily complicated pick lists with no decision-making advantage. For example, the relevant selection would be between tablet and tablet, dispersible; other distinctions (e.g. film-coated, uncoated tablet) do not add value. Compare these two representations:

TPP list for aciclovir 800 mg tablet, 35

- Aciclovir (GenRx) 800 mg tablet, 35
- Aciclovir (Pharmacor) 800 mg tablet, 35
- Acihexal 800 mg uncoated tablet, 35
- Acyclo-V 800 mg film-coated tablet, 35
- Lovir 800 mg uncoated tablet, 35
- Zovirax 800 mg dispersible tablet, 35

Aciclovir (GenRx) 800 mg tablet, 35
Aciclovir (Pharmacor) 800 mg tablet, 35
Acihexal 800 mg tablet, 35
Acyclo-V 800 mg tablet, 35
Lovir 800 mg tablet, 35
Zovirax 800 mg tablet, dispersible, 35

It is suggested that distinctions such as ‘Capsule: fast release’ and ‘Capsule: slow release’ are collapsed beneath ‘Capsule: modified release’ as the classifications are unqualified: faster than what? There may be more than one type of fast release with different rates of release and this cannot be conveyed by this terminology.

With respect to injections specifically, AMH uses the term ‘injection’ to imply a solution for injection and has suggested that the latter term could be collapsed; it is suggested ‘powder for injection’ be retained to distinguish those products that require reconstitution.

Intravenous infusion seems to convey route and mode of administration rather than necessarily be needed to describe the product. The term ‘intravenous infusion’ is included in the full name of parenteral solutions in the *British Pharmacopoeia* monograph title (hence Sodium Chloride 0.9% Intravenous Infusion BP). It typically pertains to large volumes but interestingly is also the part of the name of the 50% Glucose 50-mL injection. Therefore, it appears in product titles because they follow BP specifications rather than being required as part of the product description. Furthermore, intravenous infusion is inconsistently used in the model (see Sodium Chloride (Baxter) 3% 1000 mL). For this reason, we feel the medicinal side description of ‘injection’ is adequate for the trade side.

Note that while AMH makes a distinction between solvents (used to dissolve powder forms) and diluents (used to dilute liquid forms [e.g. Taxotere]), for simplicity we agree with the use of the single term, diluent, as used in the model.

With respect to ‘conventional inhalation’ as a dosage form, we believe this is not an intuitive description for the nebulised forms of these drugs. It could be argued that pressurised metered dose inhalers are the ‘conventional’ form of inhaled therapy. Furthermore, it is not applied consistently across similar products — compare Aeron and Apoven with Atrovent. Suggestions include ‘Inhalation, Solution’ or ‘Inhalation, Nebuliser’.

EXAMPLES:

- capsule, enteric-coated capsule, modified-release capsule
- ear drops
- eye drops
- granules, effervescent granules, enteric-coated granules, modified-release granules
- inhalation, powder for inhalation, pressurised inhalation, [note this group requires a term for nebuliser solutions as stated above]
- injection, concentrated injection, diluent for injection, modified-release injection, powder for injection
- lotion
- nasal drops
- oral liquid, powder for oral liquid
- paint
- pessary
- suppository
- tablet, chewable tablet, dispersible tablet, effervescent tablet, enteric-coated tablet, modified release tablet, orally disintegrating tablet, soluble tablet

Other child PTs relative to the parent in the Form Hierarchy spreadsheet are retained.

Modified-release properties for injections

RECOMMENDATION 21: Modified-release properties for injections should take precedence over other descriptions for parenteral products as this is usually the most important clinical feature.

RATIONALE: It is more descriptive and differentiating to reflect modified-release characteristics of depot parenterals. We believe the list below would benefit from being more akin to ‘Risperdal Consta 25 mg modified release injection’ as it emphasises the ‘depot’ nature of these products, with less chance of error in prescribing, dispensing and administration

EXAMPLES:

- Haldol decanoate 150 mg/3 mL solution for injection
- Fluanxol Depot 20 mg/1 mL solution for injection
- Fluanxol Depot 40 mg/2 mL solution for injection
- Fluanxol Concentrated Depot 100 mg/1 mL concentrated injection
- Modecate 12.5 mg/0.5 mL, solution for injection
- Modecate 25 mg/1 mL, solution for injection
- Modecate 50 mg/1 mL, solution for injection
- Clopixol Depot 200 mg/1 mL solution for injection

Proprietary forms as part of trade name

RECOMMENDATION 22: Proprietary forms should be associated with their respective proprietary trade name and should not be used as a *de facto* approved dosage form.

RATIONALE: The editorial rules state that

Some manufacturers have dosage forms with a name that is specific to their product(s). This Appendix lists these so called Proprietary Forms and links them to actual TGA Dosage Forms.

Using proprietary dosage forms (e.g. nebule) to describe a dosage form creates inconsistency across similarly used products (particularly in the area of nebuliser solutions). Furthermore, the model occasionally generates a description where the proprietary form substitutes for a more intuitively meaningful form.

By associating the proprietary form with its proprietary trade name, and then linking these proprietary forms to TGA dosage forms, the model generates a meaningful dosage form while maintaining the potentially recognisable marketing ‘form’.

EXAMPLES: The TPUU for Risperdal 4 mg Quicklet is technically without form; Avanza 15 mg SolTab is similar. Proprietary forms should be associated with their proprietary names as occurs with Zyprexa Zydis. Using this rule, the risperidone example above would become Risperdal Quicklet 4 mg tablet orally disintegrating.

Note there is no distinction between Imigran and Imigran FDT on the medicinal side at MPUU; the FDT in the trade name is all that distinguishes it from the other sumatriptan 50 mg tablet. However, this is probably of no consequence given the Imigran PI states that the variations in T_{max} and AUC ‘are not considered to be of clinical significance’.

Alternatives to TGA forms

RECOMMENDATION 23: Consider using ‘patch’ in preference to transdermal drug delivery system.

RECOMMENDATION 24: Consider ‘oral gel’ as an additional form beneath gel.

RATIONALE: Patch is the colloquially used and understood term for transdermal delivery systems. Using patch preferentially will aid recognition and character thresholds for labelling.

There are a number of gel formulations intended for use in the oral cavity (e.g. Bonjela, miconazole oral gel). Adding this form will help distinguish these gel products from other topical preparations.

Ingredient and trade naming conventions

Ingredients ending in -ate

RECOMMENDATION 25: The Medicinal Product Preferred Term should be the name recognisable and familiar to users in the Australian context. Sources used to determine this would include the TGA Australian Approved Name, the product information, the consumer medicine information (CMI), and pharmaceutical sponsor marketing material. This should be the preferred term on both the medicinal and trade sides, irrespective of issues such as accurately representing the basis of substance strength.

RATIONALE: The editorial rules state that

Ingredients that end in “ate” when available as a salt, shall be changed so that the base is represented by ending in “ic acid” where appropriate. The current edition of Martindale: The Complete Drug Reference will be the reference source.

While this is chemically accurate and, in many cases, corresponds with recommended International Non-proprietary Names, there is a distinct danger that Australian users will not recognise the concept in this form. In some cases, applying the rule generates a concept that is completely unfamiliar, if indeed it is ever used (e.g. cromoglycic acid – see screenshot below.).

Press 'Return' to prescribe the selected medication.

Drug Interaction Checking is set at Level 2 - CAUTION

MIMS 01/09/2007 - 30/09/2007

sodium

Medication	Strength	Form	Qty	Rpts	Code	Sched	Script
Sodium cromoglycate	20mg	Powder for	[100]	5	PBS/RPBS		
Sodium cromoglycate	1mg/dose	Inhaler	200 doses[1	5	PBS/RPBS		
Sodium cromoglycate	5.2mg/dose	Nasal Spray	13 mL[1]	Nil	Private		
Sodium cromoglycate	20mg/2mL	Nebulising S	[120]	Nil	Private		
Sodium cromoglycate	2%	Eye Drops	10 mL[1]	5	Restricted - PBS/RPBS		

Script:

Dose:

Frequency:

Instructions:

Repeats:

Reason:

Category:

S: Single use, C: Core medication, R: PRN Frequent, I: Intermittent, P: PRN Infrequent, T: Trial, H: Hidden

Authority Indication:

Memorise dose:

Add New Drug

User Added Drugs

Cancel

Add to QuickScript

MIMS 1/4

Annual

Select

Alternative names generated by the editorial rule should be included in the model as a synonym in the PTs. The name can be used as the MP in the FSN.

EXAMPLES:

- (1) PT for alendronic acid should be alendronate as the base form does not exist in pharmaceutical formulations. Representing the salt (alendronate sodium) does not confer any additional clinically significant information.
- (2) Notwithstanding the above recommendation, the PT for zoledronic acid should remain as such because it is the base form that exists in pharmaceutical formulations and in health professional and consumer information. If in the future, language usage develops such that it becomes known as zoledronate, then this can be accommodated and the bisphosphonate group will be consistent.
- (3) While we agree with the suggestion to invert the order of ingredient name to place the clinically significant part of the salt name first, the change from sodium valproate, through valproate sodium, to valproic acid could result in lack of recognition. Given that valproic acid is available internationally, using that name as the MP in the FSN should permit harmonisation and the appropriate linking.
- (4) The model does not appear to apply the rule to ‘docusate’ — is it considered an exception to the rule?

Display of more than 3 ingredients

The editorial rules state that

Items that may use more than 3 active ingredients in the creation of the name include:

- *Vaccines; and*
- *Large Volume Parenteral injections.*

We agree that multi-ingredient vaccines need to be treated as an exception. The exception around ‘large volume parenteral injections’ needs clarifying: what is a large volume? Nonetheless, the molar content of these fluid products is often important and they should be considered an exception.

Vitamin A or vitamin D in OTC multi-ingredient preparations could be considered vitamins of interest given they can be associated with toxicity. However, the *Standard for the Uniform Scheduling of Drugs and Poisons* (SUSDP) describes at what content of vitamin A or vitamin D these preparations change from OTC to prescription-only medicines (S4) based on their benefit–harm profile. Therefore, we would not include these vitamins as exceptions and would rely on the scheduling process.

Additional exceptions to consider follow.

RECOMMENDATION 26: All ingredients of prescription-only products should be displayed in the preferred term.

RATIONALE: Under the SUSDP conventions, the benefit-harm profile of certain medicines is such that they are considered to require medical supervision and are designated prescription-only status. Given this philosophy, quality use of medicines principles would indicate that the component ingredients of these medicines should be readily identified by both health professionals and medicine users. Looking into the future and the emergence of the polypill, it will be important that the constituents are declared.

RECOMMENDATION 27: All ingredients of products containing paracetamol should be displayed in the preferred term.

RATIONALE: Multi-ingredient products containing paracetamol (e.g. many cough/cold preparations contain 3 or 4 ingredients) should also be considered an exception in order to ensure therapeutic duplication (with resultant toxicity) is minimised. Medicine users are frequently asked in messages around the safe use of paracetamol to identify other products which may contain the drug.

RECOMMENDATION 28: All ingredients of products containing pseudoephedrine should be displayed in the preferred term.

RATIONALE: As with paracetamol above, pseudoephedrine is frequently a component of cough/cold preparations containing 3 or 4 ingredients. In at least two states (NSW and South Australia), a sale of any pseudoephedrine-containing product must be recorded as a prescription. The ability to identify pseudoephedrine as an ingredient is therefore important to dispensing pharmacists.

RECOMMENDATION 29: Consideration needs to be given to defining what an extemporaneous preparation is and including this as an exception to the three ingredient rule.

RATIONALE: Extemporaneous preparations will be produced by units aligned to certain medical specialties (e.g. dermatology clinics). There will be a need to display the ingredients and their strengths in such instances.

Waters of hydration

RECOMMENDATION 30: The editorial rule regarding hydration status should be applied in FSNs only. Waters of hydration should not appear in PTs unless they are part of the proprietary name of a generic medicine.

RATIONALE: The editorial rules state that

Waters of hydration shall be expressed for each ingredient where hydration is present. Where an ingredient is found to be anhydrous, this shall not be expressed. Lack of an expression of hydration assumes the ingredient to be anhydrous.

There is no added clinical significance in knowing the hydration status. However, representing waters of hydration in the PT potentially generates questions regarding alternative forms and adds unnecessary characters to labelling. The assumption that, where there is a lack of explicit expression, the ingredient is in the anhydrous form, allows a more succinct description of the hydrated status in the FSN (see Atrovent example below).

EXAMPLES:

- (1) While the two brands of alendronate have different hydration status — Fosamax is alendronate sodium trihydrate and Alendro is alendronate sodium monohydrate — this is immaterial to the use. Note that in the model, the monohydrate is stipulated in the FSN but the trihydrate is not for Fosamax.
- (2) The current TPUU FSN display for Atrovent metered dose inhaler — Atrovent (ipratropium bromide anhydrous (as bromide monohydrate) — becomes Atrovent (ipratropium bromide (as monohydrate)).

EXCEPTIONS: For generic formulations without a brand name (other than house brand), the trade PTs should be consistent with the trade name and retain the hydration status, if relevant.

Indapamide Hemihydrate (Chemmart)
Ipratropium Bromide Anhydrous (Chemmart)

Use of suffix in trade product concepts

RECOMMENDATION 31: The Trade Family concept should be used to group trade products in preference to Trade Product concept.

RATIONALE: The editorial rules state that

TF_Product_Term will be populated with the product brand name with any suffixes that define the product, strength, form or presentation excluded. Each Trade Product will consist of products with the same active ingredients.

EXCEPTION

Where Trade Products exist with the same Brand Family name but different active ingredients, a suffix will be included to create a unique unambiguous name, e.g. Canesten Clotrimazole and Canesten Bifonazole will be created as two trade families.

The editorial rules are correct in ignoring suffixes when considering if products belong to the same TP. However, sometimes they do not outline sufficiently what constitutes a suffix and consequently how trade products are grouped. This has resulted in a wide variation of presentations. For example, hyphens are sometimes recognised and other times ignored in describing the Trade Product (see example 1). A standardised approach is required.

Furthermore, occasionally the TPs are incorrect as they group products with different MP concepts (see examples 2 and 3).

Perhaps this has occurred as TP was being asked to make such family groupings in the 7-concept model. The new 'Trade Family' overarching concept has the ability to group at the level that the previous model was asking of the TP.

EXAMPLES:

- 1) Brevinor and Brevinor-1 have separate TPs (and could be grouped at a TF concept) but Toprol-XL and Cortic-DS are labelled as Toprol and Cortic, respectively, at TP; the hyphenated extension appears at other concept levels.
- 2) Some insulin products with different MPs have the same TP (see Hypurin and Humalog preparations). Conversely, Humulin preparations are correctly allocated with separate TPs where relevant; these could be grouped in a TF concept.
- 3) Panamax and Panamax Co are grouped at TP but the former has an MP of 'paracetamol' and the latter an MP of 'paracetamol + codeine'; the same applies to Codalgin and Codalgin Forte. By comparison, Dymadon P and Dymadon Forte, with separate MPs, are presented correctly with separate TPs.

Interestingly, Panadeine Forte and Codapane Forte (which are identical to Dymadon Forte) have TPs of Panadeine and Codapane without any such trade product existing in the model (but would when data other than PBS is incorporated).

EXCEPTIONS: Dilaudid and Dilaudid-HP are aggregated appropriately under the same TP (Dilaudid). A hyphenation rule would potentially override this grouping. However, this could be rectified either by manual editing after transformation or by using the TF concept.

Expressing generics

RECOMMENDATION 32: The current syntax for expressing generics is adequate. Ideally, generics in pick lists should be ordered according to ascending strength.

RECOMMENDATION 33: There is no need to duplicate the medicinal product in the trade concepts when the Trade Product is a generic.

RATIONALE: We agree with the current syntax for expressing generics in the Trade Product concept; that is, medicinal product followed by manufacturer/sponsor in parentheses. We note the need for representing salt and, where relevant, hydration status in this proprietary name (see example 1 below).

Ideally, the order of generics in pick lists should be grouped in ascending order of strength followed by sponsor as opposed to the current situation where they are grouped alphabetically by sponsor (see example 2).

Where a Trade Product is a generic product, the recommendation that all ingredients be displayed should be ignored. There is no need to duplicate the medicinal product in parentheses when the trade product name contains that term as it unduly complicates the syntax (see example 3).

EXAMPLES:

- 1) Amiodarone hydrochloride (Chemmart)
Ipratropium Bromide Anhydrous (Chemmart)

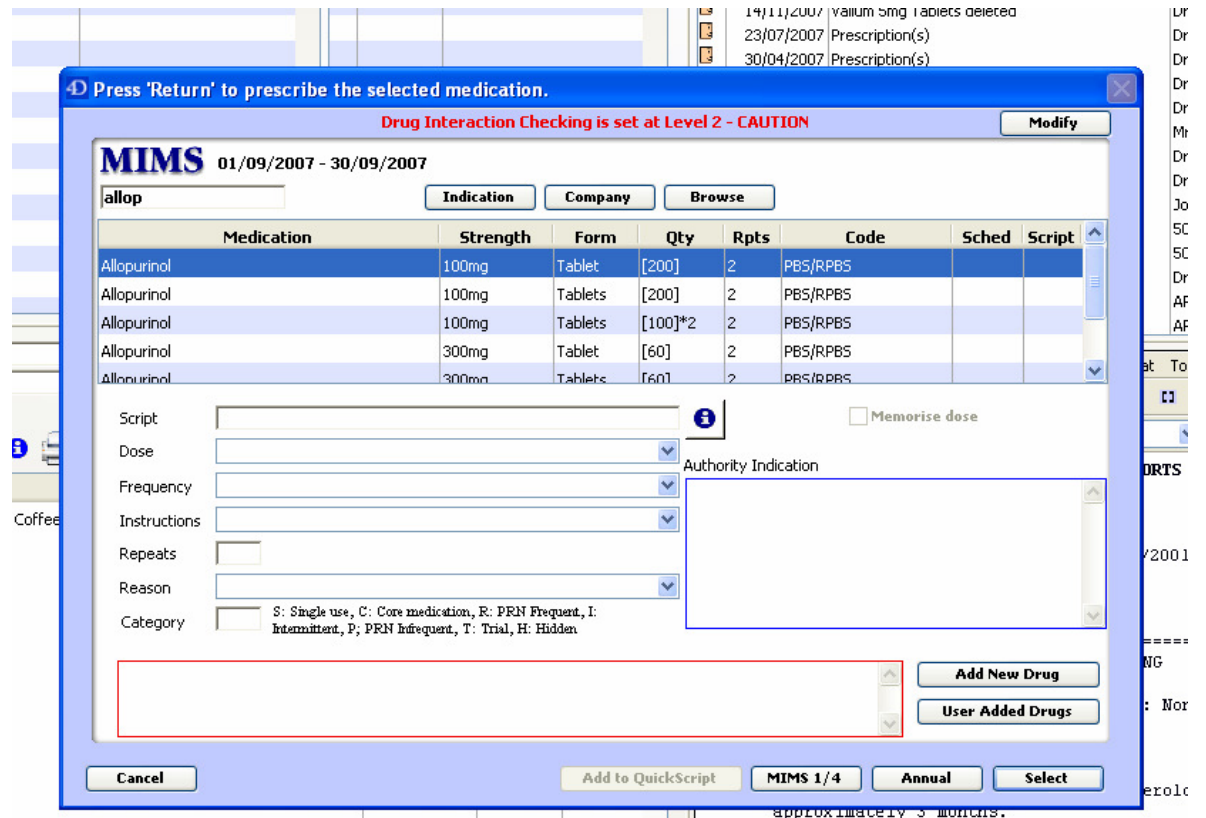
2) Currently the TPP list for alprazolam generics appears as follows:

- Alprazolam (Chemmart) 1 mg tablet, 50
- Alprazolam (Chemmart) 2 mg tablet, 50
- Alprazolam (GenRx) 1 mg tablet, 50
- Alprazolam (GenRx) 2 mg tablet, 50
- Alprazolam (Terry White Chemists) 1 mg tablet, 50
- Alprazolam (Terry White Chemists) 2 mg tablet, 50
- Alprazolam-DP 1 mg tablet, 50
- Alprazolam-DP 2 mg tablet, 50

Recommend that it appears as:

- Alprazolam (Chemmart) 1 mg tablet, 50
- Alprazolam-DP 1 mg tablet, 50
- Alprazolam (GenRx) 1 mg tablet, 50
- Alprazolam (Terry White Chemists) 1 mg tablet, 50
- Alprazolam (Chemmart) 2 mg tablet, 50
- Alprazolam-DP 2 mg tablet, 50
- Alprazolam (GenRx) 2 mg tablet, 50
- Alprazolam (Terry White Chemists) 2 mg tablet, 50

The screenshot indicates how it would appear in a prescribing software pick list.



- 3) Ciprofloxacin (GenRx) 250 mg tablet, 14 **not** Ciprofloxacin (GenRx)
(ciprofloxacin) 250 mg tablet, 14

Clinically relevant modifications

Physiological salts

RECOMMENDATION 34: Where physiological salts are being employed for their elemental content to redress a deficiency state, the MP should reflect the element without salt as this is the therapeutic substance of intent. This includes, but may not be limited to, calcium, magnesium, potassium, sodium and the trace metal elements in the list. Total molar content of an element should be described in the related concepts.

RATIONALE: The editorial rules state that

A physiological salt is defined as “a salt where one or more of its constituent base entities is normally present in the human body in order to perform a biochemical function”. A clinically significant physiological salt is defined when “the salt representation of the base materially changes the therapeutic potency of the base, the duration of action of the base, the onset of action of the base, the pharmacological target of the base or the adverse reaction profile of the base, such that prescribing and administration decisions should, in the opinion of an appropriate expert body, be made at the level of the salt representation of the base”. The Medicinal Product name will consist of the full name for the salt where clinically significant.

Physiological salts may include salts of the following elements:

<i>aluminium</i>	<i>calcium</i>	<i>chromium</i>	<i>cobalt</i>
<i>copper</i>	<i>fluoride</i>	<i>iodine</i>	<i>iron</i>
<i>manganese</i>	<i>magnesium</i>	<i>molybdenum</i>	<i>nickel</i>
<i>phosphate</i>	<i>potassium</i>	<i>selenium</i>	<i>tin</i> <i>zinc</i>

It is understood this rule has been sourced from UK definitions used in the NHS *dm+d* terminology. However, no background is provided in the document as to why they have adopted this position.

Often these elements are being used to treat a deficiency state such as hypokalaemia or hypocalcaemia; this is especially true of parenteral solutions. We believe that, clinically, the important feature is how much of the element the product is supplying rather than the respective amounts of the salts used. Thus it is the element itself that is the intended therapy; the respective salts are merely sources of that element. With respect to measurement, mmol should be used in preference to mEq (which are occasionally represented in product information).

Where physiological salts are being used for purposes other than electrolyte and/or trace element supplementation, the salts should be represented at MP to differentiate them; these are typically in products such as antacids where calcium carbonate, aluminium hydroxide and magnesium hydroxide, for example, are combined.

EXAMPLES: Below are recommendations with greater detail about specific physiological elements known to be of particular clinical consequence.

Potassium

RECOMMENDATION 35: Potassium should be the overarching MP for its salt presentations where providing elemental potassium is the therapeutic goal. Total molar content of potassium in mmol in products should be expressed.

RATIONALE: For parenteral fluids that contain potassium (as chloride or acetate or any other source of a significant amount of potassium), which when ingredients of a product contribute a **significant amount of potassium**, it is more important to display the amount of potassium in millimoles than the weight of the salt(s) used. This is probably true for oral preparations (e.g. tablets, oral rehydration solutions) also.

It is suggested that a **significant amount of potassium** be defined as a daily amount providing at least 15 mmol of elemental potassium. This is based on an RDI of 60 mmol in adults. As a comparison, the Slow K dose range is 2–6 tablets per day up to 12 per day (16–48 mmol up to 96 mmol); the Chlorvescent dose range is 2–6 tablets per day (28–84 mmol).

There is nothing intrinsic about the chloride salt, *per se*, that requires it to be separately designated at the MP concept (although it is acknowledged that chloride content is relevant to acid/base homeostasis). It is the potassium content (in mmol) that is most relevant and is the major concern of initiatives focusing on the safe use of parenteral potassium chloride.

The ‘3 ingredient rule’ means that once a product has more than 3 ingredients then the user is unable to glean how many mmol of any electrolyte is provided in parenteral fluids in any of the concepts. Presumably the rule’s exception around large volume parenteral solutions takes this into account. However, the aggregated molar content of any single element should be displayed preferably.

EXAMPLES: Potassium acetate, potassium chloride, potassium citrate.

EXCEPTIONS: Potassium dihydrogen phosphate (monobasic) and dipotassium hydrogen phosphate (dibasic) salts are used for their phosphate content as supplements to redress hypophosphataemia. These products should relate to the MP for phosphorous.

Calcium

RECOMMENDATION 36: Calcium should be the overarching MP for its salt presentations where providing elemental calcium is the therapeutic goal. Total molar content of calcium in mmol in products should be expressed.

RATIONALE: The intent of this recommendation is reflected by how the model is forced to represent calcium supplements as amounts of elemental calcium (as the carbonate salt); this would not be the case if calcium carbonate were the clinically important component. The understanding seems clear that the oral dose indicated in the picking list (if TPP or CTPP is to be used for this purpose) is referring to elemental calcium. As with potassium above, it is the calcium content that is generally relevant and this should be displayed in mmol as well as mg.

EXAMPLES: Calcium carbonate, calcium citrate, calcium gluconate.

EXCEPTIONS: Calcium carbonate is used as an antacid and as a phosphate binder. These uses employ the carbonate component and it seems reasonable to use an MP of 'calcium carbonate' in those cases where providing elemental calcium is not the therapeutic goal.

Magnesium

RECOMMENDATION 37: Magnesium should be the overarching MP for its salt presentations where providing elemental magnesium is the therapeutic goal. Total molar content of magnesium in mmol in products should be expressed.

RATIONALE: As with potassium and calcium above, it is the magnesium content that is generally relevant and this should be displayed in mmol as well as mg.

EXAMPLES: Magnesium aspartate, magnesium chloride, magnesium sulfate (injection).

EXCEPTIONS: Magnesium carbonate, hydroxide, sulfate or trisilicate salts are used in antacid and laxative formulations. For these it seems reasonable to use an MP of 'magnesium [salt]' where providing elemental magnesium is not the therapeutic goal.

Iron

RECOMMENDATION 38: Iron should be the overarching MP for its salt presentations as providing elemental iron (whether in the ferric or ferrous state) is the therapeutic goal. Total molar content of iron in mmol in products should be expressed.

RATIONALE: The current exceptions include ferric pyrophosphate, ferrous fumarate, ferrous sulfate, iron polymaltose and iron sucrose; other forms not included were ferric ammonium citrate, ferric pyrophosphate, ferrous gluconate and ferrous phosphate. No matter the form, providing elemental iron is the therapeutic goal. The PT should reflect content as iron x mg (as salt). Indeed, as with calcium above, that iron content is described in the FSN shows that this is the constituent of clinical interest.

Representing salts with discernible therapeutic differences to base

RECOMMENDATION 39: The aim of representing only truly therapeutically different bases and salts in separate MP concepts should be upheld and evidence compiled to support distinctions.

RATIONALE: The editorial rules state that

A discernable therapeutic difference is defined as “a modification to the base that materially changes the therapeutic potency of the base, the duration of action of the base, the onset of action of the base, the pharmacological target of the base or the adverse reaction profile of the base, such that prescribing and administration decisions should, in the opinion of an appropriate expert body, be made at the level of the modification to the base”. The Medicinal Product name will consist of the base name with modification, where it is deemed to be discernably therapeutically different from the base.

We believe the AMT must be wary that it does not get embroiled in discussions about modifications that are more about differentiating products from a marketing perspective than because there are true clinical therapeutic differences. Perhaps there is an opportunity to review the definition above of clinically significant salts as it is currently broad and difficult to apply.

An opportunity exists also to review the robustness of the evidence around some of the alleged differences (e.g. different potencies of ocular fluorometholone and its acetate salt; relative potencies of the various esters of topical corticosteroids) in a more comprehensive fashion.

We acknowledge these recommendations vary considerably from the list in the editorial rules and would be happy to discuss in greater detail the relative merits of particular examples.

EXAMPLES:

Suggested salt	Recommendation	Reason
adefovir dipivoxil	adefovir	See <i>Prodrugs</i> section.
aluminium hydroxide	aluminium hydroxide	Salt used for purposes other than supplementation.
aluminium hydroxide – dried	aluminium hydroxide	Chemical differences do not manifestly change clinical use.
atropine sulphate	atropine	Salt is BOSS but does not modify use. Quaternary compounds (methonitrate and methylbromide) available internationally and differences in absorption/adverse effects means they could have separate MPs.
betamethasone acetate	betamethasone	Salt is BOSS but does not modify use.
betamethasone sodium phosphate	betamethasone	
betamethasone dipropionate	betamethasone dipropionate	Esters appear to modify potency but the extent to which this is true could be verified.
betamethasone valerate	betamethasone valerate	
calcium carbonate	calcium; calcium carbonate	Separate 2 MPs to reflect distinct uses of products (see Calcium in <i>Physiological salts</i> section).
calcium chloride	calcium	Generally used for calcium content.
calcium citrate	calcium	
cocoamphodiacetate disodium	cocoamphodiacetate disodium	Used as a foaming agent in shampoos, body washes, lotions. Recommend treat as an excipient, not an ingredient. Note prior recommendation regarding changing the name of this to its base.
clodronate sodium	clodronate	See <i>Ingredient and trade naming conventions</i> section.
erythromycin ethylsuccinate	erythromycin	Difference purported to be in ability to give with/without food which is a patient counselling issue rather than selection issue. Does not alter clinical use. While the PBS includes the salt, the price is equivalent for the base and salt which means they do not consider there is a therapeutic advantage. (See also PBS entry for metronidazole and the benzoate ester for a similar example).
erythromycin lactobionate	erythromycin	Salt merely for solubility and is BOSS but does not modify use.
etidronate disodium	etidronate	See <i>Ingredient and trade naming</i>

		<i>conventions</i> section.
ferric pyrophosphate	iron	Generally used for iron content.
ferrous fumarate	iron	
ferrous sulphate	iron	
fludrocortisone acetate	fludrocortisone	Only one salt available. Salt is BOSS but does not modify use. Medroxyprogesterone acetate similar which AMT MP does not represent as salt.
fluorometholone acetate	fluorometholone acetate	Appears to have better ocular penetration but this could be verified.
flupenthixol decanoate	flupenthixol	See explanation below in <i>Other issues</i> .
fluphenazine decanoate	fluphenazine	
haloperidol decanoate	haloperidol	
hexamine hippurate	hexamine hippurate	Hippuric acid possibly contributes to effect although mechanism unknown. Second salt (mandelamine) available internationally.
hyoscine butylbromide	hyoscine butylbromide	Quaternary modification leads to differences in absorption/adverse effects. Separate MPs but MP for hyoscine hydrobromide probably could be hyoscine (not the salt).
hydrocortisone acetate	hydrocortisone	Salt is BOSS but does not modify use. Medroxyprogesterone acetate similar which AMT MP does not represent as salt.
hydrocortisone sodium succinate	hydrocortisone	
iron polymaltose	iron	Generally used for iron content.
iron sucrose	iron	
lignocaine hydrochloride anhydrous	lignocaine	See <i>Waters of hydration</i> section.
lignocaine hydrochloride monohydrate	lignocaine	
lithium carbonate	lithium carbonate	See explanation below in <i>Other issues</i> .
magnesium aspartate	magnesium	Generally used for magnesium content.
magnesium chloride	magnesium	
magnesium hydroxide	magnesium hydroxide	Salt used for purposes other than supplementation.
nandrolone decanoate	nandrolone	See explanation below in <i>Other issues</i> .
norethisterone acetate	norethisterone	Salt is BOSS but does not modify use.
oestrone sulfate sodium	oestrone	Salt is BOSS but does not modify use. See <i>Anomalies</i> section.
olmesartan medoxomil	olmesartan	See <i>Prodrugs</i> section.
potassium chloride	potassium	Generally used for potassium content.
prednisolone acetate	prednisolone acetate	Appears to have differences in ocular penetration but this could be verified.
prednisolone sodium phosphate	prednisolone sodium phosphate	
selenium sulphide	selenium sulphide	Topical use only. Separate MP for selenium as supplement.

sodium chloride	sodium	Generally used for sodium content.
sodium gluconate	sodium	
testosterone decanoate	testosterone	Used for testosterone supplementation despite different esters and variety of products. Similar logic to that applied in <i>Physiological salts</i> section.
testosterone isocaproate	testosterone	
testosterone phenylpropionate	testosterone	
testosterone propionate	testosterone	
testosterone undecanoate	testosterone	
zinc oxide	zinc oxide	Topical use only. Separate MP for zinc as supplement.
zuclopenthixol decanoate	zuclopenthixol	See explanation below in <i>Other issues</i> . Three salts exist – acetate, dihydrochloride and decanoate. If the recommendation is accepted around modified release injection, a single MP could be used.

Other issues and examples not included in list

1) Decanoate esters of antipsychotics, etc.

While these formulations fit the current criteria for separate MPs for the salt, this on its own does not convey the difference adequately such that their safe use is supported. The most important difference — the modified release properties — are not overtly apparent. As stated previously, we recommend all depot injections should be called injection, modified release. This can be done either in addition to the salt (as a ‘belts and braces’ approach) or instead of the salt. Evidence for the latter (i.e. only one MP) can be found in Martindale where the description of the decanoate ester of haloperidol is that it ‘is slowly absorbed from the site of injection...suitable for depot injection...gradually released into the bloodstream where it is rapidly hydrolysed to haloperidol’. Thus the ester is probably more about reducing the aqueous solubility of the base, making it suitable for an oily depot formulation, than it is about modifying the pharmacokinetics once absorbed.

2) Critical drugs where the dose is calculated on the base

For some drugs, dosage regimens are calculated and presented as base. Where differences in the amount of base between available salts are considerable, and the clinical consequences of miscalculating the dose based on these differences are serious, then the salts should be represented at the MP concept.

Quinine is used to treat malaria. The amount of quinine base varies in the two available oral salts — quinine sulfate 300 mg (quinine 248 mg) and quinine bisulfate 300 mg (quinine 177.5 mg). Inadvertently using the wrong salt can result in significant underdosing or toxicity. Currently the AMT has a single MP of quinine. We recommend separate MPs for quinine sulfate and quinine bisulfate.

Lithium is used to treat bipolar disorder and as an adjunct to antidepressant therapy. While only one salt of lithium (carbonate) is available in Australia currently, internationally a citrate salt is also available. Lithium carbonate 200 mg is equivalent to lithium citrate 509 mg. Inadvertent use of the wrong salt could result in treatment failure

or toxicity. Currently the AMT has lithium carbonate as the MP; we agree with this position.

Caffeine is used as a respiratory stimulant in premature infants. Currently only caffeine citrate is commercially available and dosage is expressed in terms of caffeine citrate. However, other formulations may be available (e.g. from hospital pharmacies) that contain caffeine base. Caffeine base 1 mg is equivalent to caffeine citrate 2 mg. Given the clinical context, it is important that the dose be accurate. Caffeine does not appear in the dataset for this version of the AMT. However, it is a component of some preparations not included in this PBS dataset (e.g. Cafergot, Travacalm). We recommend separate MPs for caffeine (base) and caffeine citrate.

3) Other issues

Glatiramer acetate — does this need to be the salt? The Component Formulation Details spreadsheet suggests that BOSS = base.

Three **pancreatic enzyme** supplement products — Cotazym-S Forte, Creon, and Panzytrat — have 3 separate MPs: lipase + protease + alpha amylase, pancreatic extract and pancrelipase, respectively. This is undesirable. Furthermore, dosing recommendations are based on the lipase content. We recommend that the lipase + protease + alpha amylase be used as the MP for this group and that consideration be given to the name ‘amylase’.

Prodrugs

RECOMMENDATION 40: The salt should not be represented in the medicinal concept for prodrugs.

RATIONALE: It does not seem relevant to the editorial rules for the MP name of a drug to factor in what happens to that drug once in the body. This seems removed from the function of terminology. Additionally, this has not been applied consistently by the model: candesartan cilexetil and tenofovir disoproxil fumarate are ester hydrolyzed prodrugs but the MPs are simply candesartan and tenofovir, respectively.

EXAMPLES: At the MP concept, display adefovir dipivoxil as adefovir; olmesartan medoxomil as olmesartan.

Enantiomers

RECOMMENDATION 41: Clarify the wording around when enantiomers will be represented in the Medicinal Product concept.

RATIONALE: The editorial rules state that

Enantiomers will be represented only if the enantiomers of a racemic mixture have proven significantly different therapeutic potencies, duration of action, onset of action, pharmacological targets or adverse reaction profiles. If, in the opinion of an appropriate expert body, prescribing and administration decisions should be made at the level of the modification to enantiomer, the Medicinal Product will represent the active enantiomer of a racemic mixture.

The rule can be interpreted such that enantiomers of a racemic mixture will be represented separately if they have different activity. Thus, warfarin could potentially be represented at MP as ‘eswarfarin’ because there is greater activity in that enantiomer. However, prescribing decisions cannot be made at the level of an entity that does not exist (at present) and would cause confusion.

Enantiomers are recognised as new chemical entities in the registration process and there are numerous examples of the commercialisation of active enantiomers (e.g. esomeprazole from omeprazole and levobupivacaine from bupivacaine). Prematurely creating MPs for active enantiomers within a racemic mixture will cause complications in the future should that enantiomer become commercially available.

Micronised formulations

RECOMMENDATION 42: Suppress this rule until such times as its utility can be assessed.

RATIONALE: The editorial rules state that

The Medicinal Product will be represented as such if it has been formulated in a micronised form which has been proven to increase the bioavailability of the active ingredient.

For items that include clinically significant micronised formulations, the modification will follow the name of the substance. Where multiple modifications are present, the order will be determined on a case by case basis. For example: griseofulvin, micronised.

There is a concern that ‘micronised’ may not be readily interpreted by prescribers or those that have not been exposed to pharmaceutical principles. Furthermore, the drug development process has progressed such that a number of mechanisms are available to

improve the pharmacokinetic profile of a molecule; this research is called lead optimisation and includes microemulsions, solid solutions and nanoparticles, as well as the familiar micronising. To single out this form may not be addressing the complex ways in which pharmacokinetic profiles are altered and is analogous to the various means by which modified-release characteristics are achieved — which are not described in the terminology. Similarly, the issue of particle size is relevant to the effects of inhaled beclomethasone when comparing Qvar to the older CFC-containing products. Would the AMT have tried to reflect this difference in the concepts?

In order to assess how this might be used, two examples were considered where micronised forms were known to exist: griseofulvin and fenofibrate. There is only one form of griseofulvin now available. Both the capsule and tablet forms of fenofibrate (Lipidil) were micronised. It would seem superfluous to include the micronised qualifier in these instances where there is no alternative form.

How products are represented or viewed

Order of ingredients in PTs of multi-ingredient preparations

RECOMMENDATION 43: There are two potential methods of ordering the medicinal products available in multi-ingredient products. Each method should be tested with relevant end users (e.g. health professionals, vendors) in order to make an informed decision.

RATIONALE: The editorial rules state that

The sequence of ingredients in the Medicinal Product Preferred Term will, by default, be based on the alphabetic order of the ingredient names. However, if every MPUU associated with one of the components of the MP (either through the ‘MPUU is a MP’ relationship, or through the two relationships ‘MPP is a MP’ and ‘MPP has MPUU’) has the same ‘PreferredTermOrder’ for the corresponding ingredients, then this order is used instead. The components are then listed alphabetically.

EXCEPTION

The order sequence for multi-ingredient products will be alphabetic, unless clinical practice determines an altered sequence. This will be developed on a case by case basis, for example:

- *The MP FSN is Codeine + Paracetamol, while the MP Preferred Term is Paracetamol + Codeine.*

There is probably no ideal answer to this question. Two methods are possible: alphabetical listings (which lends itself to automated generation) and the case-by-case basis outlined in the rules.

FSNs are alphabetical. This seems a clear rule that can be applied to PTs also without need of subjective argument about the relative clinical merits of the medicine's constituents. Whether paracetamol is the principal ingredient in combination with codeine is arguable: it is true that codeine is often added to paracetamol in a stepwise approach to treating pain; but to say codeine 30 mg, with both its desired and unwanted opioid effects, is secondary to paracetamol is a subjective position. This scenario may occur multiple times with various combinations (e.g. antiretrovirals). Furthermore, the order of many multi-ingredient preparations is inextricably entwined with the pharmaceutical sponsor bringing it to market; this is apparent with the antihypertensive combinations available. Finally, what is the most significant clinical component is context specific: the 'most important' component of the amlodipine/atorvastatin combination, Caduet, may be different in a person with hypertension and normal cholesterol than in a person with high cholesterol.

How the future polypill would be handled by the rules is a case in point. With a pill that attempts to treat a number of cardiovascular risk factors simultaneously, any order other than alphabetical seems destined to be subject to the various permutations of order possible.

The attraction of an alphabetical rule is that it is clear, objective, able to be applied, and puts the decision making within the AMT rather than the terminology reacting to the marketplace and having to continually make clinical evaluations.

Alternatively, the rules could apply a hierarchy of exceptions to the ingredients being listed alphabetically. Exceptions could be:

- when a trade suffix implies an order (e.g. Karvezide 150/12.5).
- when one ingredient is more clinically relevant (e.g. levodopa combinations — see exceptions below); there are very few of these.
- establishing conventions for certain combinations (e.g. HRT and oral contraceptive formulations where the AMT currently orders these as progestogen/oestrogen as per ATC convention; corticosteroid then LABA for inhaled anti-asthmatic combinations).

We accept that having the ingredients in an order different to that suggested by the trade suffix may cause confusion. We believe it would be beneficial to test both presentations with relevant users (e.g. prescribers, pharmacists, vendors) so that the implementation can be confident that the ultimate order of ingredient listing is the least ambiguous to identify products effectively and safely.

EXAMPLE:

Accuretic 20/12.5 (hydrochlorothiazide 12.5 mg + quinapril 20 mg) tablet, 30

EXCEPTIONS: These exceptions apply to both the alphabetical option and as part of the hierarchy of exceptions in the alternative option.

Where it is accepted that ingredients have been included for purposes that are not directly therapeutic, the alphabetical rule will not apply and these ‘ancillary’ ingredients will be placed secondary to the principal ingredient(s). Examples of this may be ingredients that act as enzyme inhibitors to alter the activity of the principal agent (e.g. clavulanic acid with ticarcillin or benserazide with levodopa) or ingredients added to deter medicinal abuse (e.g. atropine with diphenoxylate or naloxone with buprenorphine).

Amoxicillin and clavulanic acid
Bupivacaine and adrenaline
Buprenorphine and naloxone
Diphenoxylate and atropine
Imipenem and cilastatin
Levodopa and benserazide
Levodopa and carbidopa
Lignocaine and adrenaline
Piperacillin and tazobactam
Ropivacaine and adrenaline
Ticarcillin and clavulanic acid

Order of items presented in pick lists

RECOMMENDATION 44: Ideally, products should be in ascending order of strength to assist in selection.

RATIONALE: The order of items presented in AMT is affected by an alphanumeric hierarchy. This can conceivably create confusion as the strengths are not presented in an intuitive, ascending order. Furthermore, there are examples where this hierarchy places the highest and lowest strengths adjacent to each other which have safety implications when selecting from a pick list.

Pick lists ordering by alphanumeric may be a vendor implementation issue rather than the remit of the AMT. We highlight it as something that should be addressed somewhere in the process.

EXAMPLES:

CTPP view:

- Atacand 16 mg
- Atacand 32 mg
- Atacand 4 mg
- Atacand 8 mg

- Aciclovir (GenRx) 200 mg
- Aciclovir (GenRx) 800 mg
- Aciclovir (Pharmacor) 200 mg
- Aciclovir (Pharmacor) 800 mg
- Aciclovir (Terry White) 200 mg

- Durogesic 100 microgram / 1 hour
- Durogesic 12.5 microgram / 1 hour
- Durogesic 25 microgram / 1 hour
- Durogesic 50 microgram / 1 hour
- Durogesic 75 microgram / 1 hour

EXCEPTIONS: The ability to order items as suggested may not always be possible in the various vendor systems. For example, Genie allows users to create their own 'User Added Drugs' such as the Erythromycin 3% lotion in the screenshot below. The information stored in this record is not recognised in the same way as an entry taken from the MIMS database. This causes it to be placed first in this ordered list.

The screenshot shows the MIMS (Medication Information Management System) interface. At the top, there is a status bar with the text "Drug Interaction Checking is set at Level 2 - CAUTION" and a "Modify" button. Below this, the date range "01/09/2007 - 30/09/2007" is displayed. The search term "erythromycin" is entered in the search field, with buttons for "Indication", "Company", and "Browse".

Medication	Strength	Form	Qty	Rpts	Code	Sched	Script
Erythromycin	3%	lotion	[100mls]	5	Private	(54)	
Erythromycin	175mg	Capsules	[25]	Nil	Private		
Erythromycin	20mg/g	Gel	30 g[1]	Nil	Private		
Erythromycin	250mg	Capsules	[25]	1	PBS/RPBS		
Erythromycin	250mg	Capsules	[125]	1	Authority - PBS/RPBS		

Below the table, there is a form for adding a new drug. The form includes fields for "Script", "Dose", "Frequency", "Instructions", "Repeats", "Reason", and "Category". There is also a "Memorise dose" checkbox and an "Authority Indication" field. At the bottom of the form, there are buttons for "Add New Drug" and "User Added Drugs".

At the bottom of the interface, there are buttons for "Cancel", "Add to QuickScript", "MIMS 1/4", "Annual", and "Select".

Rules for using short names at MPUU, MPP, TPUU and TPP levels

RECOMMENDATION 45: Set rules for abbreviating the description of a medicine are difficult to formulate. It is likely the short names will need to be created on a case-by-case basis manually. These short names should be tested with vendor and health professional users.

RATIONALE: The editorial rules state that.

The abbreviated name at MPUU, TPUU, MPP and TPP levels is to satisfy the use case requirement from system suppliers for a short name of no more than 60 characters. A pragmatic ‘clinically intuitive’ approach will be taken in the abbreviating of a product name.

The use case for short names is at the end of the prescribing and dispensing process when a product label is being generated. We approached this task intending to create a hierarchy of rules which systematically pruned the complete PT to the minimum considered necessary that retained clinical meaning. In a loose order, we focused on abbreviating packsize, form, proprietary form and the syntax of MP and strength. However, it proved too difficult to craft a formulaic approach that satisfied all examples.

It is likely that short names will need to be customised for many products. It would be best practice to test the short names with vendors (from an implementation perspective) and with health professional and consumer users (from an understanding perspective). Experience from the Medicines Reference Group feedback suggests that a number of the abbreviations outlined in the UK document list were not endorsed as ‘intuitive’ and would probably benefit from testing.

General principles that may be considered reasonable include:

- the drug name and strength are highly important and sensitive to alterations of meaning if manipulated;
- MP concepts should **never** be abbreviated;
- strength should always appear with MP unless there is a trade suffix that acts as a *de facto* strength;
- when no further abbreviation is possible (but characters still exceed 60), it is preferable to omit the MPs in the trade description altogether rather than abbreviate the MP.

Potential rules that can be applied in different cases:

- if salts are to be retained, they can be removed (in contrast to what is suggested in the UK document regarding abbreviations);
- international units can be replaced with units;
- the forms for inhalations could be rationalised as inhaler (for metered dose ‘pressurised’ and dry powder inhalers) and inhalation solution or inhalation nebulised;

- if parenteral dose forms come in prefilled units where the entire volume is given, the dose can be expressed by the mass (i.e. mg or micrograms) units alone.

EXAMPLES: The following are suggested short names at TPP for labelling purposes.

- 1) Seretide Accuhaler 100/50 (fluticasone propionate 100 microgram / 1 actuation + salmeterol (as xinafoate) 50 microgram / 1 actuation) powder for inhalation, 60 actuations [170 characters]

Actions – removed salts; amended form; pack/number of actuations replaced by the notion of one inhaler; proprietary form abbreviated; amended MP syntax to represent combination; mcg abbreviation only for short name.

Seretide Acc 100/50 (fluticasone/salmeterol 100/50 mcg/act) inh [63 characters]

- 2) Salbutamol (Terry White Chemists) 0.1% (2.5 mg/2.5 mL) conventional inhalation, 30 x 2.5 mL ampoules [100 characters]

Actions – amended form; amended pack; amended proprietary name.

Salbutamol (Terry White) 0.1% (2.5 mg/2.5 mL) neb, 30 [53 characters]

- 3) Mixtard 30/70 Penfill (insulin neutral – human 30 international units/mL + insulin isophane – human 70 international units/mL) suspension for injection, 5 x 3 mL cartridge [171 characters]

Actions – form and pack abbreviated; amended MP syntax to represent combination; strength/units removed because trade suffix has detail.

Mixtard 30/70 (insulin neutral/insulin isophane (human)) inj, 5x3mL [67 characters]

- 4) Pegasys-RBV (peginterferon alfa-2a 180 microgram / 0.5 mL solution of injection [4 x 0.5 mL prefilled syringes] + ribavirin 200 mg [112 tablets]), 1 pack [153 characters]

Actions – form and pack abbreviated; mcg abbreviation only for short name; volume of syringe form removed because full dose administered.

Pegasys-RBV (peginterferon alfa-2a 180 mcg inj [4] + ribavirin 200 mg tab [112]), pack [86 characters]

- 5) Triphasil, 112 tablets [4 x 28 tablets] [39 characters]

Actions – added MPs for improved identification.

Triphasil (levonorgestrel + ethinyloestradiol) 4 x 28 tabs [58 characters]

Miscellaneous issues

Ability to capture separate administration of multi-component products at TPUU

RECOMMENDATION 46: The ability to log administration using TPUU should include separate administration of either concurrent or sequential multi-component medicines.

RATIONALE: Currently the model does not create a clinically appropriate representation at TPUU for multi-component medicines used concurrently or sequentially. This is because it presents the components within the one concept so it is difficult to understand how administering the separate elements can be logged.

One solution considered was that a TPUU for a multi-component medicine could be the composite of TPUUs for the separate constituents. This is analogous to MP concepts where the respective ingredients are part of the MP together with the composite (e.g. amoxicillin, esomeprazole, clarithromycin, esomeprazole (&) clarithromycin (&) amoxicillin).

EXAMPLES: Emend capsules, Triphasil tablets and Estalis Sequi patches have components that are administered sequentially. As both components are simultaneously described at TPUU, it is not apparent how individual administration can be described using the concept.

Similarly, Nexium Hp7 has three components that are taken concurrently but with different dosage regimens (once and twice daily). TPUU does not seem flexible enough to capture this administration.

Tall Man typography

RECOMMENDATION 47: Include Tall Man typography as a PT synonym only at this stage. This allows for future use but not for immediate implementation.

RATIONALE: Tall Man lettering is but one aspect (typography) of a number of design elements that contribute to the rate of medication errors; these include content, composition/layout, typography, colour and visuals. Studies evaluating the effectiveness of Tall Man have obtained varied results.

In non-health professionals shown 60 matched drug pairs known to cause confusion (including 16 that the FDA had identified as problematic), Tall Man lettering improved

recognition compared to lowercase. However, it was noted that the size of the effect was increased when people were informed about the purpose of the uppercase lettering. Moreover, it did not affect the number of false-positive identifications which the authors say are analogous to choosing the wrong medication. They concluded that ‘the tall man intervention increases attention to high-risk drug names rather than actually making them less confusable’.^{1,2}

For acute care hospital nurses (n = 11) presented with three options — Tall Man, coloured lettering or white characters on a black boxed background — the nurses felt the white on black was most helpful for differentiating similar drug names. They perceived that differentiating the name with uppercase characters did not make the names distinctive enough. The author goes on to say that ‘indiscriminate use of the basic principle of applying “tallman letters” to drugs that are not on the [FDA] list might lead to further confusion if the cueing is inconsistent...typographic principles and legibility research suggest that varying the visual attributes of a typeface, other than changing the case, would more effectively help to differentiate names’.³

If the logic of Tall Man is accepted, then a systems approach is required to maximise its utility. This would involve changes on medicine packaging by the manufacturer, on pharmacy shelf labels, on dispensing labels, in prescribing and dispensing software. Indeed, following research into reported medication errors, the FDA’s Name Differentiation Project requested that manufacturers of the 16 pairs of drugs most commonly implicated in errors voluntarily change the appearance of their packaging. University of South Australia research into errors made by pharmacists (unpublished but made available to AMH) cites brand extensions and similar product liveries as reasons why errors occurred.

Therefore, we believe that including Tall Man synonyms in the model reserves the function for when a more widespread, systemic approach can be coordinated.

Modified-release formulations of morphine and other opioids

RECOMMENDATION 48: Modified-release formulations of morphine and oxycodone are adequately described in the model at all concepts including MPUU.

RATIONALE: Discussions in previous meetings of the Medicines Reference Group have highlighted the number of morphine modified-release formulations as being potentially a clinical problem. We therefore paid special attention to these and the various forms of oxycodone.

While we acknowledge the potential for confusion given the variety of strengths and forms of these opioids, we consider the model describes these products accurately with respect to drug name, strength and form in order for a product to be correctly identified. With respect to clinical interchangeability, the AMT should not be used in isolation but

should integrate with a knowledge system to support such clinical decisions. We do not believe the AMT can define the difference between a modified-release formulation given once a day and another given twice daily.

Amphotericin

RECOMMENDATION 49: Modify the MP for amphotericin B to amphotericin.

RATIONALE: We were asked to consider the likelihood of the ‘B’ in amphotericin B being misread as an ‘8’. While we agree this is possible for those not paying sufficient attention, we believe this has a low risk because the resulting misread becomes nonsensical and does not enable dosing. Furthermore, the greatest implications for a dosing error occur with the parenteral forms and these are administered within hospital where there are additional checking points in the system. Notwithstanding this, we believe that an MP of amphotericin could be used without affecting understanding.

The greater risk of confusion with amphotericin is in its various parenteral forms and doses. The editorial rules already make provision to distinguish between these parenteral forms and this does not depend on the presence of the ‘B’.

Influenza vaccine

RECOMMENDATION 50: The MP for influenza vaccine could be ‘influenza vaccine’ and the MPUU ‘influenza vaccine [year]’ to differentiate the year of composition.

RATIONALE: We were also asked to consider how influenza vaccine could be represented in the model given its constituents/strains change annually.

It is seldom clinically required to know what strains are included in the vaccine in any given year. Thus we feel it is adequate to label the vaccine with the year of issue (e.g. influenza vaccine 2007). This should be sufficient for the purposes of health record keeping and for identifying the product. Should it be necessary to know what strains were included in a particular year’s vaccine, this information can be found in other knowledge systems. In considering this recommendation, we feel denoting the year need only occur at MPUU/TPUU level and below. The MP or TP concepts can be simply influenza vaccine and the various trade names, respectively. The logic for this is analogous to the arguments that appear above for discernibly, clinically significant salts. The year is the ‘salt’ but, as it does not change the medicinal product/drug or its intended use, it need not have a separate concept at MP.

There are a couple of other issues regarding the representation of influenza vaccine products. Currently, the unit-of-use is described as 15 microgram of viral haemagglutinin.

This is not strictly correct as there is this amount of each of the viral strains comprising the product. Also, the TPP/CTPP for Fluvax have ‘Thiomersal free’ added to the descriptor: this is not part of the usual proprietary name. While we presume this has been added to help identify the product as thiomersal-free because of concerns of toxicity, this seems to be a content issue which is more about influencing choice than product identification; the trade names of the various vaccines available are probably the ultimate discriminator. Similar trace constituents of products that also have potential adverse effects (allergic reactions), such as neomycin, gentamicin or polymyxin, are not mentioned in the respective descriptions of those vaccines.

Terminology for bases and salts

RECOMMENDATION 51: Bases could be called active ingredient and salts remain as salts.

RATIONALE: Base/salt terminology has the feel of ‘chemistry-speak’. Additionally, this creates ambiguity sometimes when the base is actually an acid (e.g. alendronic acid).

AMT uses the term ‘base’ to represent the active moiety of the chemical compound(s) in medicines. ‘Active ingredient’ is a term increasingly being promoted in consumer circles to school that group of medicines users about the generic drug name. It is a term that describes exactly what it means and works for all sectors of people involved with medicines.

AMT editorial rules themselves

RECOMMENDATION 52: The editorial rules will need a user-friendly version to be produced if the expectation is that third parties will apply them in generating names for new medicines.

RATIONALE: The editorial rules themselves are quite a technical document that relies on an understanding of IT as well as understanding the principles behind the model. In parallel to this is the issue that many of the decisions that can be made have a degree of subjectivity (e.g. clinically significant salts). If it is to be the case that, when new medicines become available, the rules are to be applied by third parties (e.g. vendors) rather than by a central body, we believe the rules would need to be simplified such that they act more as a user manual. The current version, with its definitions and descriptions, could then act more as a complete specifications document.

Anomalies found with records when searching

Below is a list of individual records where there was something about the representation that you may need to amend.

EXAMPLES:

- Rani 2 – the trade PT records this as Rani whereas the FSN correctly records it as Rani 2. The trade PT may have been altered intentionally to avoid the numbered suffix juxtaposing with strength. However, it could be confusing to change the established trade name.
- Displaying the number ‘1’ with single units of use at TPUU is inconsistent. Compare Pulmicort 1 mg/2 mL Respule, ampoule with Intal 20 mg Spincap, 1 capsule.
- Representing the number of forms in a pack appears to be inconsistently displayed on the medicinal side. Compare Duride (30 tablets) or Durogesic (5 patches) with Ducene (50) or EES (25). It has relevance because there is a potential for patch to feature in the description 3 times — amount of drug, form, number in pack — and thus the desired display will help alleviate this potentially.
- Display of trade names within the model where an uppercase letter (or letters) appears other than as the initial character. Examples found were NeoRecormon, ReoPro, NovoMix, NovoRapid, the FlexPen syringe forms of various insulin preparations, and the SoloStar form of Lantus.
- Can it be correct in the Estalis Sequi 50/125 patches that the patch containing oestradiol 50 micrograms/24 hours only contains oestradiol 4.33 mg/patch when the patch containing both norethisterone and oestradiol appears to contain a magnitude less of oestradiol (0.512 mg/patch)?
- The modified-release preparations of verapamil are inconsistently described in the model. Anpec SR 240 mg is described as a film-coated tablet rather than a modified-release tablet. Amongst the Cordilox items, the 240 mg strength is called Cordilox SR whereas no suffix is applied to the 180 mg strength in bottle or blister; all strengths appear in the Cordilox SR product information.
- There are a number of incorrect percentage concentrations across the range of generic salbutamol and Ventolin solutions for inhalation: all are presented as 0.5% although the concentrations are 2.5 mg/2.5 mL, 5 mg/2.5 mL and 5 mg/mL.
- Most of the inconsistency around representing strength with eye drops relates to dual strengths using percentage concentration and mg/mL or only the latter. However, the order of dual representation is reversed for Xalatan 50 microgram/1 mL (0.005%) eye drops and Zovirax 30 mg/1 g (3% w/w) eye ointment.

- According to the Tarka product information, it is a combination of an immediate-release formulation of trandolapril with a slow-release formulation of verapamil. The model does not display this characteristic. We believe that, where a formulation contains two release properties, the modified-release aspect should take precedence in the concept description as it influences the administration of the medicine; for example, Tarka should be swallowed whole consistent with many modified-release formulations. Thus the TPP concept would appear:

Tarka 4/240, modified release tablet, 28

- The form of Crinone 8% gel is drug delivery systems. This does not seem descriptive enough. Given it is a gel formulation with intravaginal use via an applicator, there seems to be scope for a more descriptive form.
- The trade concepts for Gliadel Wafer 7.7 mg implant could be confusing because the term ‘wafer’ has a more readily understood definition for oral dosage forms. Neither the title in the product information/CMI (in eMIMS 5.0) nor the PBS entry include the term wafer.
- TPUU and TPP for Ogen and Genoral have strengths different to that which the dose is based on. This is because the amount of salt, piperazine oestrone sulfate, is represented on the trade side whereas the dose/BOSS is based on the MP base, oestrone sulfate sodium. In some respects, this display is almost like a salt of a salt. If the MP were oestrone, then the trade could be represented as:

Ogen (oestrone (as piperazine sulfate)) 1.25 mg tablet, 56 [if policy decision is that salt must be included].

- The dosage form for Pulmicort Turbuhalers, Intal Spincaps and Ventolin Rotacaps is insufflation which is inconsistent with other dry powder inhaler formulations in the model and may not be recognisable to many users. These should be described as Powder for Inhalation in line with similar products.
- Contrary to rule AMT-APP-STR-8 regarding the use of w/w as a qualifier of strength, the following products include it in FSNs or PTs: Elidel cream, Efudix cream, Zovirax eye ointment, Colifoam, various presentations of Canesten Clotrimazole and generic clotrimazole.
- The TPUU for Celestone Chronodose could display the total content of betamethasone rather than the relative amount of the two betamethasone salts (the amounts of which would never be prescribed).
- MS Contin modified-release granules are inconsistently described across the available strengths: 60 mg, 100 mg and 200 mg are simply called MS Contin whereas the 20 mg and 30 mg strengths are called MS Contin Suspension Controlled Release. As

the form describes the modified-release characteristic, perhaps MS Contin Suspension is sufficient.

- The trade concepts for Apidra omit the term ‘SoloStar’ which is included in the name in the product information. An analogous product, Lantus, has SoloStar included; this is useful to draw a distinction between the 3-mL prefilled disposable device and the plain 3-mL cartridge.
- Elocon cream and ointment is without an alternative percentage strength.
- The punctuation for products like P.V. Carpine and Q.V. Bath Oil puts them at the head of the alphabetical list. This may not be where a user would look if searching by trade name. Consider their placement as if for ‘PV’ or ‘QV’, respectively.
- Budamax essentially has no form because the form appears in the proprietary name — Budamax Aqueous Nasal Spray 64 microgram/actuation, 120 actuations.
- The position of the inert substance in the MP concept is not consistent and this does not appear to be due to any alphabetical rule. Compare the MP for Risperdal Consta, Caverject, Taxotere and Triphasil. How is the placement of the inert substance determined?
- The pack of Rivotril 1 mg/mL injection is described incorrectly on both medicinal and trade sides in both FSN and PT. The pack size states one ampoule and one diluent but the pack for this actually contains 5 ampoules of each (pack size 10 ampoules).
- Where packs contain diluent, that component is given the trade name of the product to which it belongs (e.g. Aredia diluent, ampoule). While the form helps to reduce confusion with the component containing the active ingredient, perhaps it is possible to create a format akin to Aredia, 1 pack (with diluent).

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