

Automated screening of look-alike, sound-alike medicine names for safety

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Introduction

In Australia look-alike sound-alike (LASA) medicines present significant risk in clinical settings. A 2016 international review¹ revealed lists of LASA medicines were compiled manually from error and near-miss reports and opinion surveys. This represents a *reactive* approach. A *proactive* approach would involve screening for medicine name similarity. In the United States, the FDA uses Phonetic Orthographic Computer Analysis (POCA) software for approval of medicine names (Figure 1).²

Objectives

This collaborative project aimed to design and test software, based on POCA, to compute similarity of Australian medicine names. *Computed similarity scores* were analysed against *manually-calculated similarity scores* underpinning the National Tall Man Lettering List.³ *Computed risk categories* were compared against risk categories determined by *expert consensus*.

Methods

Review of international literature re LASA medicines and Tall Man lettering

Exploration of FDA 'POCA' software² for screening of medicine name similarity

Replication of POCA² to screen entire Australian Register of Therapeutic Goods (ARTG) (Figure 2)

Computation of composite name similarity scores (0.0000-1.0000) for all pairs

Retention and review of medicine name pairs with a similarity score threshold ≥ 0.6600 , i.e. 'moderate', 'high' and 'extreme' (Box 1)

Analysis of computed scores vs manually-calculated scores (from original Tall Man list³)

Analysis of computed risk category vs expert consensus risk (from original Tall Man list³)

Recommendations re computation of medicine name similarity in Australia

Results

- Approved and brand name medicines were included, but required transformations to remove non-alpha characters.
- Screening of the ARTG took >15 hours and identified 7,750 medicine pairs with at least 'moderate' (≥ 0.6600) similarity scores.
- Commonly implicated medicines had the prefix 'pro-' and/or suffixes '-eine', 'ine' or 'en'.
- There was significant correlation ($p < 0.05$) of computed scores with both the manually-calculated scores and the expert-consensus risk categories.
- However, expert consensus tended to amplify the consequence and significance of confusion between LASA medicines.

'Moderate' similarity: 0.6600-0.6899 (3,521 pairs)
e.g. mepolizumab vs palivizumab (0.6839)

'High' similarity: 0.6900-0.8999 (4,195 pairs)
e.g. propine vs prozine (0.8583)

'Extreme' similarity: ≥ 0.9000 (34 pairs)
e.g. primacin vs primaxin (0.9034)

Box 1. Examples of similarity scores for medicine names

Discussion

- The Australian software, named **LASA v2: Look-alike sound-alike Automated Screening Application** (Figure 2), demonstrated high sensitivity in identification of potentially confusable LASA medicines.
- Due to its high sensitivity, **LASA v2** can proactively identify potential errors of medicine name confusion. The cost of high sensitivity is 'noise' in the data.
- LASA v2** software is hence recommended to:
 - Perform one-against-all screening of medicines in error reports. This would identify other related, potentially more significant, risks
 - Confirm and update the current National Tall Man Lettering List⁴
 - Screen proposed medicine names for risk of confusion with existing medicines.
- Other risks for erroneous selection of medicines in clinical practice arise from similar dosage forms, similar packaging (Figure 3), proximity in software lists, and proximity in storage.
- This automation to identify medicine name similarity, addresses one angle of a multi-factorial problem.

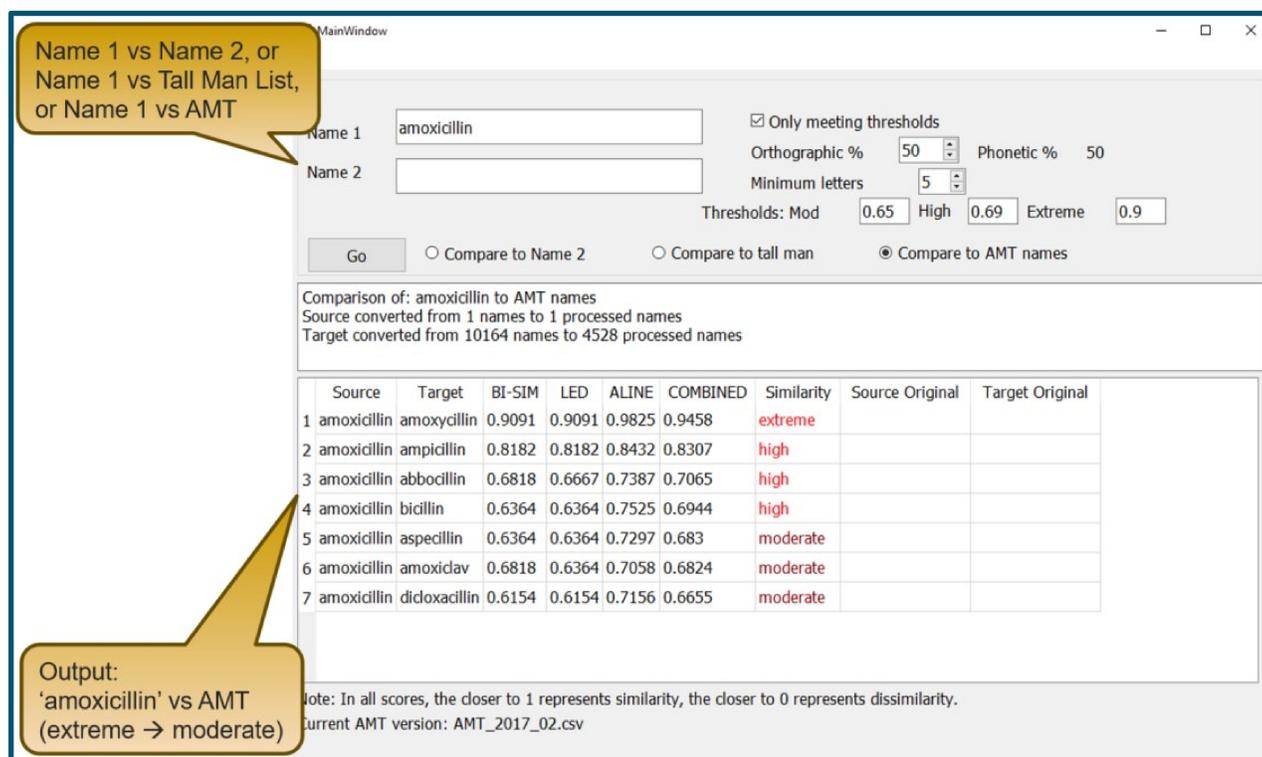


Figure 2. Australian replication of POCA ('LASA v2') AMT = Australian medicines terminology

Take-Away Points

- Successfully produced and tested software to screen Australian medicine names for similarity.
- The software produces a similarity score for name pairs, based on their look-alike and sound-alike similarity.
- Interpretation of the scores should be supplemented with clinical considerations.

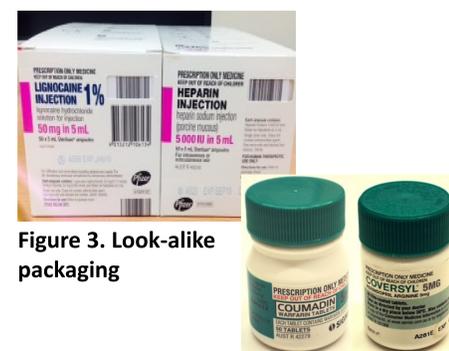


Figure 3. Look-alike packaging

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Figure 1. Principles of FDA's POCA software

