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 review 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 list)

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

Recommendations re computation of medicine name similarity in Australia

Results

Approved and brand name medicine names 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 ‘-ine’, ‘-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:
  1. Perform one-against-all screening of medicines in error reports. This would identify other related, potentially more significant, risks
  2. Confirm and update the current National Tall Man Lettering List
  3. 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.

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.

REFERENCES

1. Emmerton L. Revision of the Tall Man lettering methodology. ACSQHC; 2014.


Figure 1. Principles of FDA’s POCA software

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

Figure 3. Look-alike packaging

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