

Analysis of electronic prescribing quality related-incidents: look-alike sound-alike medications

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OBJECTIVES

1. Identify error-prone medications for electronic prescribing;
2. Compare current guidelines for electronic display of medication information to assess their scope in potentially preventing look-alike sound -alike (LASA) errors in the electronic setting.
3. Provide recommendations for a comprehensive set of standards to further reduce medication errors associated to e-prescribing

METHODS

-This study was a retrospective cross-sectional descriptive analysis of e-prescribing quality related events reported to two national web-based error reporting systems.¹⁰

-Reports from 2011 to 2015 were reviewed independently to identify incidents related to look-alike sound-alike (LASA) medications.

-The compilation of LASA pairs was compared to the existing LASA list provided in the Institute for Safe Medication Practices (ISMP) guidelines for possible inclusion of commonly erroneous medications pairs observed in practice.

-Guidelines addressing the electronic display of medication information were searched in various search engines of peer and non-peer reviewed literature.

-The information used for the comparison was directly extracted from the publications of these guidelines. The comparison focused on the content of the recommendation:

- Patient information
- Pharmacy information
- Abbreviations
- Numbers and Units of Measure
- Information display

RESULTS

Obj 1. Identify error-prone medication pairs in electronic prescribing¹⁰

Of the 1,139 events reviewed for incidents related to LASA medications, 177 events were identified to have occurred as a result of incorrect drug selection.¹⁰ There were 87 potential unique LASA drug pairs, 7 pairs were observed to occur more than on one occasion:

Table 1: Error-Prone Medications¹⁰

| Prescribed | Dispensed |
|-----------------------|----------------------------------|
| Amlodipine | Amlodipine/Benazepril *** |
| Amlodipine/Benazepril | Amlodipine/Atorvastatin ** |
| Amoxicillin | Amoxicillin/Clavulanic acid **** |
| Atorvastatin | Simvastatin * |
| Ciprofloxacin | Cephalexin * |
| Minocycline | Doxycycline * |
| Zocor | Zestril * |

• Appears in list 2 times, **Appears in list 3 times, ***Appears in list 4 times, ****Appears in list 7 times

Obj 2. Compare current ISMP LASA medication list

Of the 87 events reported as LASA medication pairs, 6 pairs were found to be currently present in the ISMP LASA list, none of the pairs occurring on multiple occasions from objective 1 were present in the ISMP LASA list.⁷ ISMP does not include errors due to combination products

Table 2: Matched LASA Drug Pairs⁷

| Prescribed | Dispensed |
|---------------------|----------------------|
| Invega | Intuniv |
| Amiloride | Amlodipine |
| Humalog | Humulin |
| Metoprolol tartrate | Metoprolol succinate |
| Chlorpropamide | Chlorpromazine |
| Hydralazine | Hydroxyzine |

*LASA: Look-alike sound-alike

Obj 3. Table 3: Comparison of electronic prescribing guidelines and recommendations for safety and error prevention from the United States^{6,7}, Australia⁸, and the United Kingdom⁹

| Item | Australia ⁸ | United Kingdom ⁹ | USA (Surescripts) ⁶ | USA (ISMP) ⁷ |
|-------------------------------------|---|---|--|--|
| Patient Information | -Not Addressed | -Not Addressed | -Use legal name -Use physical address/no PO BOX -Use contact phone number | -Not Addressed |
| Pharmacy Information | -Not Addressed | -Not Addressed | -Use full pharmacy address -Match prescriber on Rx info with SureScript directory | -Not Addressed |
| Medication Names | -Display full name -Include salt name if multiple available -Display generic and brand name -Use national Tall Man lettering for LASA | -Display full name -Include salt name if multiple available -Display generic and brand name -Use national Tall Man lettering for LASA | -Use EPN or RxNorm name -Use hyphens instead of slash or pipes -Include salt name if multiple available -Display generic and brand name | -Display full name -Include salt name if multiple available -Use national Tall Man lettering for LASA -Display generic and brand name -Use suffixes with both generic and brand |
| Abbreviations | -Avoid abbreviations | -Avoid abbreviations | -Not Addressed | -Avoid abbreviations -Avoid medical jargon |
| Numbers and Units of Measure | -Approved/consistent formatting spacing between numbers and labels -Do not use trailing zeros -Use comma to separate groups of 3 digits -Use 'million' instead of 'mega' | -Use approved/consistent formatting spacing between numbers and labels -Do not use trailing zeros -Use leading zeros -Use comma to separate groups of 3 digits | -Use comma to separate groups of 3 digits -Spacing between numbers and labels -Use 'million' instead of 'mega' -Do not use trailing zeros -Use leading zeros -Use metric units/abbreviations | -Spacing between numbers and labels -Use comma to separate groups of 3 digits -Use 'million' instead of 'mega' -Do not use trailing zeros -Use leading zeros -Use metric units/abbreviations -Use smaller font for fractions |
| Information Display | -Avoid truncation of any part of Rx -Ensure full details of multiple Rx in selection list are available | -Use separators between adjacent Rx elements -Follow CUI guidance on how to wrap Rx to avoid dissociation -Avoid truncation of any part of Rx -Avoid off-screen horizontal scroll of Rx elements -Include route of administration | -Use complete dosage form (modified release forms) -Use drug delivery mechanism -Distinction of NDC for brand and generic -Drug description must match drug identifier -Use structured and codified Sig -Include indication within Sig (recommendation) -Avoid using "take as directed" -Addition specify therapy duration -Avoid truncation of any part of Rx -Avoid splitting of directions to avoid dissociation -Appropriate use of notes -Utilize correct day supply field -Use effective date as "do not fill before" date -Include diagnosis code (ICD-9 and ICD-10) -Use DAW codes -Use integer values for refills only | -Use structured and codified Sig -Use easy to read font and size -Include indication within Sig -Appropriate use of notes -Include weight/surface area when required |

DISCUSSION/CONCLUSION

- Utilization of tall-man lettering and the addition of new pairings of LASA medications to the ISMP list would assist in safer medication practices and fewer preventable errors.
- The avoidance of abbreviations and medical jargon eliminate the possibility of information misinterpretation across the system.
- Internationally trending similarities in recommendations include the use of approved numerical formatting (Arabic and metric units), the elimination of trailing zeros, the inclusion of leading zeros, and comma use in numerical entries larger than 3 digits.
- The greatest amount of recommendation variance occurs within information display. All guideline systems identify the importance of avoiding truncation of display information within the field, but Surescripts include more descriptive recommendations for the e-prescription components.
- The combination of the recommendations from each system can create a more secure e-prescription and eliminate many of the preventable errors which are occurring during the electronic prescribing process.

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DISCLOSURE

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