

The Evaluation of the Japanese Similar Names Searching System for the Future Development of the System in the U.S.

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BACKGROUND

Sound-alike drug names including look-alike names can result in potentially harmful medication errors. The Medication Error Reporting Program administered by the Institute for Safe Medication Practice has devoted to medication error prevention and safe medication use.¹

The voluntary practitioner error-reporting program has helped healthcare professionals to learn about errors happening across this country. In addition, various organizations strive to prevent confusing new names from releasing to the market, which include the International Non-property Name Committee of the World Health Organization, the United States Adopted Names Council, the US Pharmacopeia, Inc., and the US Food and Drug Administration.²

Proposed drug names are screened by those institutions during their pre-approval processes. Despite these efforts, medication errors due to confusion resulting from sound-alike drug names still have occurred.² The Joint Commission on Accreditation of Healthcare Organizations requires hospitals to examine errors caused by confusion over drug names.

An online searching system was implemented in Japan in 2008, which no other countries have ever developed. In addition, the Japan Council for Quality Healthcare (JCQHC) has been conducting a unique incident reporting system nationwide.³ Japan is improving their systems in order to avoid medication errors.

OBJECTIVES

Primary Objective:

To evaluate the indices that are used in the Japanese Similar Names Searching System (JSNSS) for the future development of the system in the U.S.

Secondary Objective:

To make suggestions to improve our systems in the U.S. to avoid medication errors due to sound-alike drug name confusion.

METHODS

- A prospective survey was conducted in St. Francis Health Center pharmacy from 2/11/08 to 4/30/08. Drug names and their strengths were recorded. The sound-alike drug pairs from the survey were evaluated by the method used in the JSNSS.
- A PubMed and an Ichushi Web (Ver. 4), which is the largest medical database for articles published in the Japanese language, searches were performed. The search period for both databases was 1995 through July 2009. A Google search was also performed for any government websites and the official proceedings related to medication errors in Japan.

RESULTS

- During the prospective survey, 22 sound-alike drug pairs were counted.
 - According to the Medicine Similar Name Search Engine⁴, the following indices were accepted which show the tendency toward sound-alike medication errors occur between two existing drug names or between the name of a drug candidate and other existing drug names.
 - >Edit: Number of edit operations (e.g., substitutions, deletions, or insertions) needed to transform one drug name into another; identical to Levenshtein distance
 - >Head: Number of common letters from the head
 - >Dlen: Difference in stem letter length
 - >Tail: Number of common letters from the tail
 - >Cos1
 - >Htco
 - >Cos2
 - >Ehcos1
 - >H3cos1
 - >T3cos1
- Similarity Indices: the formulas for these indices have not been released on the website.

Table 1 Similarity Indices for 22 Error Pairs

Drug Pairs	Edit	Head	Dlen	Tail
Olanzapine Ondansetron	8	1	1	0
Multivitamin Mirtazapine	8	1	1	0
Escitalopram Ezetimibe	12	1	3	0
Amlodipine Amiloride	5	2	1	1
Atenolol Amitriptyline	11	1	5	0
Cephalexin Cefuroxime	7	2	0	0
Citalopram Cinacalcet	7	2	0	0
Citrucel Cholestyramine	11	1	6	0
Clonidine Clopidogrel	5	3	2	0
Entacapone Etidronate	8	1	0	1
Fluconazole Flecainide	7	2	1	1
Glyburide Glipizide	4	2	0	3
Hydralazine Hydrochlorothiazide	10	4	8	1
Labetalol Lamotrigine	8	2	2	0
Loratadine Lisinopril	9	1	0	0
Metformin Metronidazole	9	3	4	0
Methimazole Memantine	7	2	2	1
Metoprolol Metronidazole	8	3	3	0
Ropinirole Risperidone	8	1	1	1
Simvastatin Simethicone	8	3	0	0
Tolterodine Tamsulosin	9	1	1	0
Trazodone Tramadol	4	3	1	0

- The JSNSS provides the necessary changes classified into three categories: "needed," "consider," and "unnecessary." The category of "name change needed" includes:
 - >Edit=1 AND Head>0
 - >Edit=1 AND Head=0 AND the letters on the top look-alike (e.g. d and b) when hand-writing
 - >Edit=2 AND Head>3
- Since the formulas for six indices used in the JSNSS have not been released, the rest of the four indices were evaluated for the 22 sound-alike drug pairs: edit, head, dlen, and tail.
- As a result, none of the error pairs drawn from our survey met the category of "needed." These results suggested a gap in the similarity indices between Japanese drug names and those in the U.S. The difference in phonology of Japanese and English possibly affected the results.

CONCLUSION

- The JSNSS is a novel system that provides a tool to avoid potential sound-alike medication errors.
- However, the details of the ten similarity indices including their formulas have not been released, so it was impossible to track any scientific evidence of the system.
- The differences between languages need to be considered when applying this system in the U.S., Specifically, this research suggested that the major differences in phonetics between Japanese and English affect the similarity indices and possibly the characteristics of medication errors caused by sound-alike confusion.

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DISCLOSURE

Authors of this presentation have nothing to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation.