Medication Safety Alerts

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This column draws on US and Canadian experience and may include, with permission, material from the *ISMP Medication Safety Alert!*, a biweekly bulletin published by the Institute for Safe Medication Practices (ISMP), Huntingdon Valley, Pennsylvania.

TAKING ACTION ON ERROR-PRONE ABBREVIATIONS

Background and Description of Project

In response to the learning that took place after an in-depth analysis of a critical incident,[1] the David Thompson Health Region (DTHR) in Alberta undertook a region-wide project to eliminate the use of error-prone abbreviations, acronyms, dose designations, symbols, and truncated drug names from all clinical documentation.

A multidisciplinary team with representatives from medicine, nursing, pharmacy, laboratory, diagnostic imaging, nutrition and food services, and the education division of human resources was assembled in January 2005 to design the plan to eliminate error-prone terms. "ISMP's List of Error Prone Abbreviations, Symbols and Dose Designations"[2] was used to develop a list of prohibited terms for implementation within the DTHR. The US list of approximately 50 terms was reduced to 30 by removing terms that were not used in medication orders written within the DTHR. (ISMP Canada has recently proposed a list of dangerous abbreviations, symbols and dose designations,[3] which is reproduced in Appendix 1.)

The primary source of error related to abbreviations, acronyms, symbols, and dose designations was thought to be handwritten medication orders; hence, this segment of clinical documentation was the first target of the initiative. Although the ultimate goal was elimination of the identified terms from all clinical documentation, the team felt that a phased-in approach would be most effective. When plans for the initiative were shared with various physician groups, it became evident that prohibited terms should be presented in small installments, with sufficient time between consecutive installments to allow the practice change to take effect. It was agreed that rolling out approximately 5 terms every 3 months would meet this criterion.

Implementation

Selection of the first set of terms was considered critical, as it would be judged as a marker of potential future success. The following criteria were used to select terms for the first phase: they had to contribute regularly to medication errors, be commonly used by practitioners, and be identified in the literature as high-priority terms for elimination. The first 7 terms selected are listed in Table 1.

Each physician received a letter signed by the vice-president of medicine advising them of the initiative, identifying the first set of prohibited terms, explaining the consequences of using the terms, and inviting their participation to make the initiative successful. All correspondence ended with the slogan "Patient Safety is in Your Hands". The same letter was distributed to pharmacists and clinical nutritionists. Posters were developed using a "traffic light" metaphor to illustrate the prohibited terms (red), the possible misinterpretation (yellow), and the required alternatives (green) (Figure 1). Nursing education about the process was accomplished primarily through the use of posters advertising the prohibited terms; nurses did not receive individual letters.

The initiative commenced on July 11, 2005. Pharmacy staff checked every handwritten order for the prohibited terms, and each time a prohibited term was used, they issued a brightly coloured reminder notice to the person who had written the order, specifying the term used and listing the other prohibited terms in this phase of the

Table 1. Phase I list of prohibited terms for David Thompson Health Region*

Error-prone abbreviation	Potential Misinterpretation	Preferred Term
U, for "unit(s)"	Mistaken as "zero", "four", or "cc"	Write "unit(s)"
IU, for "international unit(s)"	Mistaken as "IV" (intravenous) or "10" (ten)	Write "unit(s)"
q.d. or Q.D., for "daily"	Mistaken as "q.i.d." especially if the period after the "q" or the tail of the "q" is misunderstood as an "i"	Write "daily"
o.d. or O.D., for "daily"	Mistaken as "right eye" (oculus dexter), which could lead to administration of liquid medications in the eye	Write "daily"
Trailing zero after decimal point (e.g., 1.0 mg)	Mistaken as a 10-fold greater dose than intended if the decimal point is not seen (e.g., 10 mg)	Do not use trailing zeros for doses expressed in whole numbers (e.g., write "1 mg")
No leading zero before a decimal point, (e.g., .5mg)	Mistaken as a 10-fold greater dose than intended if the decimal point is not seen (e.g. 5 mg)	Use a zero before a decimal point when the dose is less than a whole unit (e.g., 0.5 mg)
µg	Mistaken as "mg"	Write "mcg" or "micrograms"

*Adapted from Institute for Safe Medication Practices.[2]

project. To ensure that the initiative was perceived as a collaborative project, the reminder notice bore the signature of the medical director for the particular prescriber.

Measurement

The success of the initiative was measured for 3 sites in the DTHR, all of which have both acute and continuing care beds. Two methods of measurement were used. Table 2 shows the number of reminder notices sent during 3 defined time periods in phase 1 of the project. Not all sites in the region began sending reminder notices at the same time, which is indicated by the large number of notices sent during the second time period (October 17, 2005, to January 16, 2006). A substantial decrease in reminder notices for both physicians and nurses was noted in the third measurement period. However, it was later learned that this decrease was probably due to reduced compliance among pharmacy staff in generating the reminder notices (because of heavy workload), rather than a decrease in physicians' use of the prohibited terms.

In addition to a count of the number of reminder notices sent, the rate of use of prohibited terms in medication orders received by the pharmacy on a single day 6 months before the project began was compared with the rate of use such terms on the same day of the week 1 year later (i.e., 6 months after completion of phase 1). The number of identified prohibited terms appearing in medication orders from 3 sites across the region (Figure 2) declined from 181 (20% of 905 orders on January 18, 2005) to 79 (9% of 867 orders on January 19, 2006.

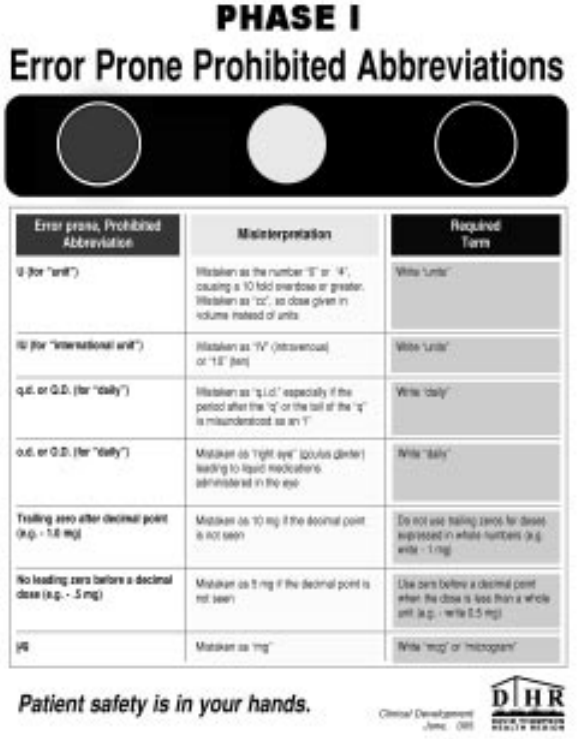

Figure 1. "Traffic light" poster, shown here in black and white and at reduced size, was printed in colour, with prohibited terms in red, the possible misinterpretation in yellow, and the required alternatives in green. See Table 1 for details of the information in the poster.

Additional Steps

The full roll-out of all prohibited terms as applied to handwritten medication orders was completed in June 2006. Simultaneously, the DTHR has been working to remove, by December 2007, prohibited

Table 2. Number of Reminder Notices Sent during Phase I (all sites)*

Time Period	To Physicians	To Nurses	To Pharmacy	To Dietitians
July 11 to October 16, 2005	1112	408	0	0
October 17, 2005, to January 16, 2006	1554	220	0	0
January 17 to March 2, 2006	479	83	0	0

*With permission from the David Thompson Health Region.

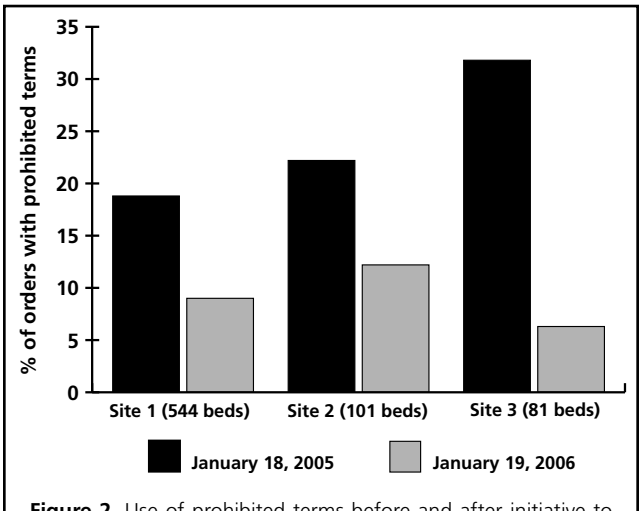

Figure 2. Use of prohibited terms before and after initiative to reduce error-prone abbreviations.

error-prone terms from the DTHR Parenteral Manual (completed in December 2005), the formulary, and all preprinted orders, protocols, guidelines, diagnostic requisitions, and result reports.

The results of this initiative have been shared with health care practitioners and allied health personnel across the DTHR. Because the workload associated with sending reminder notices was greater than anticipated, "abbreviation reminder blitzes" are planned for the future, instead of issuing reminders on a daily basis. It is hoped that repeated exposure to these reminder notices will result in decreased use of prohibited terms, and a pharmacy residency project was undertaken to test the validity of this hypothesis. The project analyzed the number of reminder notices sent, to determine if there is a difference in the use of prohibited terms by specialists and general practitioners and by urban and rural physicians. A retrospective survey was distributed to all DTHR physicians to identify their perceptions of the effectiveness of the reminder notices (and other interventions) in assisting them to eliminate the use of prohibited terms. Finally, an analysis of a random sample of handwritten medication order forms was conducted to evaluate the accuracy and consistency of Pharmacy Department staff in identifying prohibited terms and issuing appropriate reminder notices. In addition, the DTHR has implemented standardized incident reporting software, which will be used to monitor the number of medication incidents related to use of prohibited terms. The results of these analyses will inform a planned research project related to this initiative.

As part of the Alberta Medication Safety Collaborative, DTHR is working with the Health Quality Council of Alberta (HQCA) to share the DTHR model of implementation for this initiative with all other regional health authorities in Alberta. Academic institutions involved in the education of health care practitioners in Alberta (e.g., medicine, pharmacy, dentistry, and nursing) will be approached to consider including information about error-prone terms in their curricula. The provincial HQCA initiative is supported by the following organizations: ISMP Canada, the Alberta College of Pharmacists, the College and Association of Registered Nurses of Alberta, the College of Physicians and Surgeons of Alberta, Alberta Heritage Foundation for Medical Research, and the Community Research Ethics Board of Alberta.

Eliminating prohibited error-prone abbreviations, acronyms, symbols, and dose designations is an example of a medication safety initiative that can help organizations develop a culture of safety. The DTHR project demonstrates that significant change can be achieved through multidisciplinary efforts to eliminate the use of these known error-prone terms.

References

1. *Event analysis report: hydromorphone/morphine event. Red Deer Regional Hospital, Red Deer, Alberta, as conducted by the Institute for Safe Medication Practices Canada.* Red Deer (AB): Red Deer Regional Hospital; [2004 Dec 3; cited 2006 Jun 30]. Available from: http://www.dthr.ab.ca/resources/documents/RedDeerRCAReport_final12.pdf
2. *ISMP's list of error-prone abbreviations, symbols and dose designations 2003.* Huntingdon (PA): Institute for Safe Medication Practices; 2003.
3. Eliminate use of dangerous abbreviations, symbols and dose designations. *ISMP Can Saf Bull* 2006;6(4).

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Copies of the prohibited abbreviation poster (see Figure 1) and the reminder notice may be obtained by contacting Linda Poloway at DTHR (e-mail: lpoloway@dthr.ab.ca).

Appendix 1

Do Not Use

Dangerous Abbreviations, Symbols and Dose Designations

The abbreviations, symbols, and dose designations found in this table have been reported as being frequently misinterpreted and involved in harmful medication errors. They should NEVER be used when communicating medication information.

Abbreviation	Intended Meaning	Problem	Correction
U	unit	Mistaken for "0" (zero), "4" (four), or cc.	Use "unit".
IU	international unit	Mistaken for "IV" (intravenous) or "10" (ten).	Use "unit".
Abbreviations for drug names		Misinterpreted because of similar abbreviations for multiple drugs; e.g., MS, MSO_4 (morphine sulphate), $MgSO_4$ (magnesium sulphate) may be confused for one another.	Do not abbreviate drug names.
QD QOD	Every day Every other day	QD and QOD have been mistaken for each other, or as "qid". The Q has also been misinterpreted as "2" (two).	Use "daily" and "every other day".
OD	Every day	Mistaken for "right eye" (OD = oculus dexter).	Use "daily".
OS, OD, OU	Left eye, right eye, both eyes	May be confused with one another.	Use "left eye", "right eye" or "both eyes".
D/C	Discharge	Interpreted as "discontinue whatever medications follow" (typically discharge medications).	Use "discharge".
cc	cubic centimetre	Mistaken for "u" (units).	Use "mL" or "millilitre".
µg	microgram	Mistaken for "mg" (milligram) resulting in one thousand-fold overdose.	Use "mcg".
Symbol	**Intended Meaning**	**Potential Problem**	**Correction**
@	at	Mistaken for "2" (two) or "5" (five).	Use "at".
> <	Greater than Less than	Mistaken for "7"(seven) or the letter "L" . Confused with each other.	Use "greater than"/"more than" or "less than"/"lower than".
Dose Designation	**Intended Meaning**	**Potential Problem**	**Correction**
Trailing zero	X.0 mg	Decimal point is overlooked resulting in 10-fold dose error.	Never use a zero by itself after a decimal point. Use "X mg".
Lack of leading zero	.X mg	Decimal point is overlooked resulting in 10-fold dose error.	Always use a zero before a decimal point. Use "0.X mg".

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Adapted from ISMP's List of *Error-Prone Abbreviations, Symbols, and Dose Designations 2006*

Report actual and potential medication errors to ISMP Canada via the web at https://www.ismp-canada.org/err_report.htm or by calling 1-866-54-ISMPC. ISMP Canada guarantees confidentiality of information received and respects the reporter's wishes as to the level of detail included in publications.

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