Stemming drug errors from abbreviations

Problem: Abbreviations and acronyms save time; they can also lead to medication errors. Not all practitioners interpret abbreviations uniformly, and, therefore, the intended meaning is not always conveyed.

Historically, medication errors have resulted from incorrect interpretation of poorly written, ambiguous, or unfamiliar abbreviations and acronyms—with poor penmanship the primary cause of these errors. Healthcare practitioners are discovering, however, that typed abbreviations are prone to misinterpretation as well. On different occasions, an Rx with the abbreviation *MTX* has been interpreted as *methotrexate* or *mitoxantrone*. The Food & Drug Administration received one medication error report in August 2000 involving the misinterpretation of the abbreviation *DTO* for a 13-day-old infant. The abbreviation *DTO*, or Deodorized Tincture of Opium, has been incorrectly referred to as *diluted tincture of opium*, which contains 1/25 the amount of opium. Although the error was corrected before the drug reached the patient, this inadvertent mistake could have cost the patient her two-week-old life. Table 1 illustrates some drug abbreviations that have been incorrectly interpreted.

Abbreviations and acronyms are routinely used to describe chemotherapy protocols. This practice often leads to confusion, as some protocols differ by only one or two letters. For example, the abbreviation *MIME* refers to a chemotherapy regimen comprised of mitoguazone, ifosfamide, methotrexate, and etoposide. This is similar to the *MINE* protocol, which consists of mesna, ifosfamide, mitoxantrone, and etoposide. The abbreviation for the investigational drug CPX, being tested in cystic fibrosis, sounds similar to *CTX*, which is the abbreviation used for the chemotherapy drug Cytoxan.

Latin apothecary abbreviations are also prone to misinterpretation resulting from either a poorly scripted Rx or an unfamiliar abbreviation. Tenfold insulin overdoses have resulted from the misinterpretation of the abbreviation *U* (for "units") as a zero when closely followed by a number in written orders. In 1993, the FDA received a medication error report about a patient who died because "20 U" of insulin was misinterpreted as *200 U*. Another fatal accident occurred in 1995 when a prescription for "furosemide 40 mg Q.D." was misinterpreted as

Table 1

Typed and written abbreviations for drugs

Abbreviation/acronym	Intended meaning	Misinterpretation
AZT	zidovudine	azathioprine
CPZ	Compazine	chlorpromazine
DPT	diphtheria-pertussis-tetanus	Demerol-Phenergan-Thorazine
HCT	hydrocortisone	hydrochlorothiazide
HCTZ	hydrochlorothiazide	hydrocortisone
$MgSO_4$	magnesium sulfate	morphine sulfate
MSO_4	morphine sulfate	magnesium sulfate
TAC	triamcinolone	tetracaine, Adrenalin, cocaine
5-ASA	5-aminosalicylic acid	five tablets of aspirin

Table 2

Latin apothecary abbreviations

Abbreviation/acronym	Intended meaning	Misinterpretation
o.d. or OD	once daily	right eye
TIW or tiw	three times a week	three times daily
SC	subcutaneous	sublingual
q.d. or QD	every day	q.i.d. or four times daily
Qhs	at bedtime	every hour
IU	International units	IV or intravenously
U	Units	misread as 0 (zero)
Per os	orally	os taken to mean "left eye"
mcg	microgram	"mg" or milligram

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furosemide 40 mg QID. Other examples of misinterpreted Latin apothecary abbreviations are listed in Table 2.

Recommendations: The National Coordinating Council for Medication Error Reporting & Prevention (NCCMERP) encourages the avoidance of abbreviations in the prescribing of medications. Although it is more time-consuming, drug names, dosage units, and directions for use should be written clearly to minimize confusion. For example, doses in micrograms should always have the unit written out, because the abbreviation *µg* can easily be misread as *mg*, creating a 1000-fold overdose.

If abbreviations are unavoidable, either healthcare practitioners should attempt to write neatly or institutions should implement measures to minimize misinterpretation of handwriting with the use of computerized physician order entry systems. Practitioners should also familiarize themselves with Latin apothecary abbreviations and most widely used acronyms so that only one meaning is understood. A handy reference book for practitioners is entitled *15,000 Conveniences at the Expense of Communications and Safety*, which is authored by Neil Davis. This book lists 15,000 acronyms, symbols, and other medical abbreviations and 22,000 of their possible meanings to assist individuals in interpreting medically related communications.

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