

## Abbreviations: A Shortcut to Medication Errors

Throughout healthcare, “shortcuts” such as abbreviations and symbols are often used to save time when communicating medication orders, especially in handwritten communication. However, some of these shortcuts can be very time-consuming for the person on the receiving end and can be dangerous to the patient. Abbreviations and nonstandard dose designations are frequently misinterpreted, and they often lead to errors resulting in patient harm.

PA-PSRS has received over 200 reports describing situations in which the use of abbreviations has led to medication errors. Some of the common error-prone abbreviations involved in errors in PA-PSRS include:

- “U” for unit
- “QD” for daily
- “QID” for four times daily
- “QOD” for every other day
- “<” for less than
- “>” for greater than
- “cc” for cubic centimeter
- “D/C” for discontinue
- “AU” for both ears
- “OU” for both eyes
- Drug name abbreviations
  - MSO4 for morphine sulfate
  - MgSO4 for magnesium sulfate
  - HCTZ for hydrochlorothiazide

One of the error-prone abbreviations most commonly reported to PA-PSRS is the abbreviation “U” used to indicate “units.” This abbreviation contributes to errors when it is misread as a zero (0) or as the number 4. These errors often result in potential 10-fold or greater overdoses. In one example, an older male patient was ordered 5 units of Humalog (insulin lispro recombinant) but received 50 units of Humalog on two occasions. The order on the medication record was written as “5U” instead of “5 units.” A contributing factor to the insulin overdose identified by the institution was the use of “U” for units.

Through the USP-ISMP Medication Errors Reporting Program (MERP), ISMP has also received a number of reports where patients have received overdoses of insulin or heparin when “U” for unit has been used. In one report, a nurse who was taking a patient’s medication history recorded his insulin dose using the ab-

breivation “U” instead of writing the word “unit” (see Figure 1). The physician then misread the “U” as a “4” and wrote for “Humalog 44 U/24 U/64 U.” The patient received a single overdose of insulin but was not harmed. Further overdoses were averted because the nurse said to the patient “Here’s your insulin, 44 units.” The patient responded “44 units? I take 4 units!”<sup>1</sup>

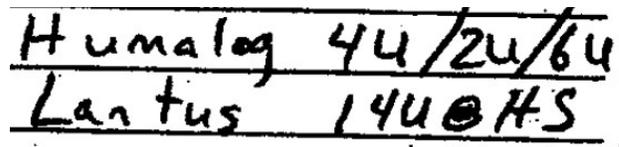


Figure 1. “4U” Mistaken for “44.” Image provided courtesy of ISMP.

Some abbreviations used to indicate the frequency of drug administration (e.g., QD and QOD) can be problematic as well. In one report received through the MERP, an order (see Figure 2) for Flomax (tamsulosin) 0.4 mg QD was misinterpreted as Flomax 0.4 mg QID. Fortunately, the error was caught prior to the patient’s being harmed.<sup>2</sup>

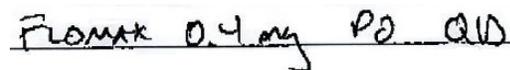


Figure 2. “QD” Mistaken for “QID.” Image provided courtesy of ISMP.

Several instances of this abbreviation causing errors have also been reported to PA-PSRS. In one case, an order for Zithromax (azithromycin) 500 mg written as QD was misinterpreted as QID. Luckily, there was no harm despite the patient’s receiving the medication four times daily. In another report, an order was written for Digoxin 0.125 mg po QOD (every other day),

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but the medication was given QD (every day). The patient received two extra doses before the error was discovered.

Other examples of reports including the use of error-prone abbreviations submitted to PA-PSRS include:

- An elderly female patient received a Coumadin (warfarin) dose that should have been held because her INR was 2.8. The original order stated to give Coumadin if INR < 2.5 (less than 2.5). However, the “<” (less than) symbol was misinterpreted as “greater than,” and the patient was administered Coumadin, despite the lack of sense in such an interpretation of the order.
- An elderly female patient received Vasotec (enalaprilat) 1.25 mg IV with a systolic blood pressure less than 180 mmHg. The prescriber’s order included a parameter to hold the medication if the patient’s “SBP<180.” However, the nurse confused the “<” and “>” signs and administered the medication when the patient’s systolic blood pressure measured only 140 mmHg.
- A physician wrote an illegible and confusing order to increase Diovan to 80 mg BID. An up arrow (↑) symbol was used to indicate “increase” but was read as the numeral 1. The pharmacy interpreted the order to be Diovan 160 mg BID (since no 180 mg form is available), and one dose of Diovan 160 mg was administered to the patient. Luckily she suffered no harm from this overdose.
- A prescriber used an abbreviation for magnesium sulfate and wrote “MgSo4 2g IV x 1 dose” for a 45-year-old female patient. However, the unit clerk and nurse misinterpreted the order as morphine sulfate (MSO4) 2 mg IV x 1 dose, and the patient received a 2 mg dose of morphine sulfate. MSO4 is an error-prone abbreviation commonly used in place of writing out morphine sulfate. Contributing to this error was the fact that the patient was having pain, so morphine seemed reasonable. The prescriber was notified, and magnesium was administered to the patient.
- An elderly patient was ordered Dilaudid (HYDROmorphone); however, the order was written without the use of leading zeroes (.2-.4 mg). As a result, the order was misread as 2-4 mg instead of the intended 0.2-0.4 mg. The nurse recognized the error after giving the initial dose. The patient experienced no ill effects.

The use of error-prone abbreviations and dose designations has become a concern of the Joint Commission on Accreditation of Healthcare Organizations (JCAHO). A National Patient Safety Goal (NPSG) in 2004,<sup>3</sup> the elimination of dangerous abbreviations has been carried over into the 2005 NPSG with two changes: (1) pre-printed forms are now included in the scope of the goal, and (2) the goal now applies only to orders (all orders) and other medication-related documentation, not all patient-specific documentation.<sup>4,5</sup>

To address the difficulty of achieving compliance with this NPSG, JCAHO offers several helpful tips.<sup>6</sup> Most focus on educating, advocating, and reminding staff. One tip seems to be directly related to enforcement: “Direct pharmacy not to accept any of the prohibited abbreviations. Orders with dangerous abbreviations or illegible handwriting must be corrected before being dispensed.” A corollary to that—enlisting nurses to help notify physicians—may also be employed. Unfortunately, following this advice has spurred numerous reports of burdensome workloads for those making the calls and strained relationships between the medical staff and nurses and pharmacists who are being forced to police the issue.

The real issue is that enforcement of prohibited abbreviations requires more than asking pharmacists or nurses to alert prescribers to lapses in compliance. This is an organizational problem that requires peer-to-peer interaction along with full support from hospital and medical staff leadership. Hospitals that have been working on this initiative relentlessly for years report that the most effective way to enforce physician compliance is to make it a physician-owned process.<sup>7,8</sup> When educational efforts failed to produce significant change, these hospitals pursued operational changes such as preprinted orders, targeted pages, and email reminders, to initially improve compliance. Then, after enacting a zero tolerance policy, medical staff leaders interacted with physicians who were noncompliant. Pharmacists and nurses still played a role in collecting data about noncompliance, and even notifying individuals when there was a lapse in policy. But the medical staff took responsibility and addressed all issues of repeated physician non-compliance.

In an effort to help increase compliance, JCAHO surveyors in January were instructed to score prescribers’ use of any abbreviation on the National Patient Safety Goal “dangerous - do not use” list as noncompliance once the abbreviation is written on the chart.<sup>9</sup> Facilities are no longer considered compliant if phar-

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macists or nurses call a prescriber for clarification and document the intended meaning. The goal is to place responsibility for prescriber compliance on the medical and administrative staff instead of nurses and pharmacists.

While it seems likely that this latest move will improve compliance, there are other strategies that facilities can employ to help eliminate the use of dangerous abbreviations, such as:

- Encouraging all hospital personnel including medical staff, pharmacists, and nurses to avoid using error-prone abbreviations in all written and electronic communication.
- Identifying and promoting “Physician Champions” who support accreditation-related activities and advocate for full compliance with the NPSGs.
- Providing educational seminars and updates to all staff including the medical staff and administrators, and providing instruction to new staff and residents before or at the beginning of their employment period.
- Disseminating posters and laminated cards with dangerous abbreviations and dose designations throughout the hospital and staff.
- Removing any error-prone abbreviations from computerized prescriber order entry and other computer systems.
- Avoiding use of abbreviations on computer-generated labels, labels for drug storage bins/shelves, and in guidelines, charts, and protocols.

Such steps are already being taken in many Pennsylvania facilities.

### Resources for Facilities

ISMP List of Error-Prone Abbreviations, Symbols and Dose Designation—[www.ismp.org/PDF/ErrorProne.pdf](http://www.ismp.org/PDF/ErrorProne.pdf)

JCAHO “Do not use” List—[www.jcaho.org/accredited+organizations/patient+safety/04+npsg/index.htm#abbreviations](http://www.jcaho.org/accredited+organizations/patient+safety/04+npsg/index.htm#abbreviations))

JCAHO Implementation Tips for Eliminating Dangerous Abbreviations—[www.jcaho.org/accredited+ organizations/patient+safety/05+npsg/tips.htm](http://www.jcaho.org/accredited+organizations/patient+safety/05+npsg/tips.htm)

### Notes

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An Independent Agency of the Commonwealth of Pennsylvania

The Patient Safety Authority is an independent state agency created by Act 13 of 2002, the Medical Care Availability and Reduction of Error (“Mcare”) Act. Consistent with Act 13, ECRI, as contractor for the PA-PSRS program, is issuing this newsletter to advise medical facilities of immediate changes that can be instituted to reduce serious events and incidents. For more information about the PA-PSRS program or the Patient Safety Authority, see the Authority’s website at [www.psa.state.pa.us](http://www.psa.state.pa.us).



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The Institute for Safe Medication Practices (ISMP) is an independent, nonprofit organization dedicated solely to medication error prevention and safe medication use. ISMP provides recommendations for the safe use of medications to the healthcare community including healthcare professionals, government agencies, accrediting organizations, and consumers. ISMP’s efforts are built on a non-punitive approach and systems-based solutions.