



Medication Errors Linked to Drug Name Confusion

Approximately 25% of medication errors reported to national medication error reporting programs result from confusion with drug names that look or sound alike.¹ A list of easily confused drug name pairs reported over the years to the Institute for Safe Medication Practices (ISMP) and U.S. Pharmacopeia (USP) is available online.²

A similarity of characters in brand drug names, generic names, and brand-to-generic names can lead to confusion. Similar-sounding drug names present additional problems. These similarities are compounded by practitioners attempting to keep up with the vast array of new products introduced to the marketplace, illegible handwriting, orally communicated prescriptions, similar labeling or packaging of medications, and incorrect selection of a drug names that may appear in close proximity (e.g., ZYPREXA/ZYRTEC) when entering orders into electronic order entry systems.

For example, ISMP recently wrote about a handwritten order for the bronchodilator FORADIL (formoterol) that was misinterpreted as TORADOL (ketorolac). In another report, a hospitalized patient reported taking "Plaxil" at home, but she was actually taking PLAVIX (clopidogrel). The admitting physician misinterpreted "Plaxil" as PAXIL (paroxetine) and prescribed this medication for the patient, which caused several days of severe disorientation.³

Eleven percent (11%) of the medication error reports submitted to PA-PSRS were classified as wrong drug errors, where one drug was prescribed, dispensed, or administered in place of another drug. Of those reports, 34% were due to confusion between similar medication names.

The most serious errors reported due to similar names involve high alert medications. Insulin products were involved in 9% of the reports, and 21% involved opiate narcotics. Errors involving opiate narcotics include name confusion between morphine and meperidine (DEMEROL) as well as name confusion between immediate release and sustained released opiate products such as morphine immediate release products and morphine sustained release products (MS CONTIN); and oxycodone and sustained release oxycodone (OXYCONTIN).

One of the most commonly confused name pairs reported to PA-PSRS has been morphine and hydromorphone. Thirty-two percent (32%) of the opiate/narcotic look-alike name reports include these two drugs. A number of events reported to national systems involving this combination have been fatal. In fact, mix-ups between these drugs are among the most common and most serious errors that occur involving two high-alert drugs, based on reports to national reporting programs. Contributing factors include the mistaken belief that hydromorphone is the generic name for morphine, as well as both drugs being available in 1 mg/mL, 2 mg/mL and 4 mg/mL prefilled syringes.⁴ We have also received reports involving mix-ups between the pegylated liposomal form of doxorubicin (DOXIL), instead of the conventional form, doxorubicin hydrochloride, as well as confusion between cephalosporin antibiotics.

Examples of error reports submitted to PA-PSRS include:

- Six percent (6%) of all reports of name confusion occurred between alprazolam (XANAX) and lorazepam (ATIVAN).
- Mix-ups between similar names of insulin products such as:

HUMALOG and HUMALOG 75/25
 HUMALOG and HUMULIN R
 HUMULIN N and HUMULIN R
 HUMALOG 75/25 and HUMULIN 70/30
 NOVOLOG and HUMALOG
 NOVOLOG and NOVOLIN R
 NOVOLOG 70/30 and NOVOLIN 70/30

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- Mix-ups between AVANDIA and COUMADIN, including one report where AVANDIA 4 mg was ordered but COUMADIN 4 mg was removed from floor stock and reports where COUMADIN was ordered but dispensed as AVANDIA. Similar errors have been reported outside of PA-PSRS, some with serious consequences.⁵
- A prescriber incorrectly choosing nitropruside sodium injection from an electronic order entry system, instead of nitroglycerin injection.
- Reports of mix-ups between DEPO-PROVERA and DEPO-MEDROL.

The issue of confusing drug names has become a concern with the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) as well. A new national patient safety goal for 2005 states that organizations, in order to improve the safety of using medications, “[i]dentify and, at a minimum, annually review a list of look-alike/sound-alike drugs used in the organization, and take action to prevent errors involving the interchange of these drugs.”⁶ JCAHO expects facilities to develop a list of look-alike/sound-alike drugs that contains a minimum of 10 drug combinations from a JCAHO-provided list.⁷

Following is a list of JCAHO-identified name pairs that have been reported to PA-PSRS:

- Hydromorphone and morphine
- Insulin products
- Lipid-based doxorubicin (DOXIL) and conventional doxorubicin (ADRIAMYCIN)
- TAXOL (paclitaxel) and TAXOTERE (docetaxel)
- AMARYL (glimepiride) and REMINYL (galantamine)
- AVANDIA (rosiglitazone) and COUMADIN (warfarin)
- KLONOPIN (clonazepam) and clonidine (CATAPRES)
- LAMISIL (terbinafine) and LAMICTAL (lamotrigine)
- HESPAN (hetastarch) and heparin

There are many strategies organizations can implement that may help prevent medication errors due to confusion between drug names. Identifying look-alike and sound-alike drug pairs used in your facility that are most often involved in errors can be a helpful first step. Then, consider incorporating the following strategies to reduce the risk of errors with those medications:

- Separating products with look-alike names on storage shelves, computer screens, and on any printed prescriber or stock order forms.
- Building computer alerts notifying the prescriber, pharmacy, and nursing and affixing warning labels to products or storage areas as appropriate.
- Advising staff and patients about the potential for confusion.
- Using bold print to clearly distinguish letters which differ on product and storage bins labels with look-alike drug names. This strategy is commonly referred to as “tall man lettering,” (e.g., chlorPROMAZINE and chlorPROPAMIDE).⁸
- Whenever possible, having prescribers indicate the purpose of the medication on the order form or electronic transmission. Pharmacy and nursing could determine the indication or purpose of the medication if not noted by the prescriber prior to dispensing or drug administration. Most products with look-alike/sound-alike names do not have similar indications for use.
- Considering the possibility of name confusion and instituting safeguards to avoid confusion when adding a new product to your organization’s formulary.
- Encouraging the reporting of errors and potentially hazardous conditions within your organization to help focus your error prevention activities on those drug names that are commonly involved in errors.

PA-PSRS users can track medication errors associated with look-alike/sound-alike names. When entering medication error reports, Question 22, “System Factors Contributing to Medication Errors” allows you to indicate if drug name confusion played a role in medication

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errors during prescribing, preparation/dispensing, or administration.

Notes

1. ISMP Medication Safety Alert! 19 Apr 2000;(5)8.
2. United States Pharmacopeia. USP Quality Review [online]. [cited 4 Nov 2004]. Available from Internet: <http://www.usp.org/pdf/patientSafety/qr792004-04-01.pdf>.
3. ISMP Medication Safety Alert! [online] 12 Jun 2002;(7)12. Available from Internet: <http://www.ismp.org/MSAarticles/name.htm>.
4. ISMP Medication Safety Alert! [online] 1 Jul 2004;(9)12. Available from Internet: <http://www.ismp.org/MSAarticles/morphine.htm>.
5. ISMP Medication Safety Alert! 26 Jul 2000;(5)15.
6. Joint Commission on Accreditation of Healthcare Organizations. Facts about the 2005 national patient safety goals [online]. [cited 2004 Nov 1] Available from Internet: http://www.jcaho.org/accred-ited+organizations/patient+safety/05+npsg/npsg_facts.htm.
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8. U.S. Food and Drug Administration, Center for Drug Evaluation and Research. Name Differentiation Project [online]. [cited 2004 Nov 5] Available from Internet: <http://www.fda.gov/cder/drug/mederrors/namediff.htm>.



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.



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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.