



Patient Safety Advisory

Produced by ECRI & ISMP under contract to the Pennsylvania Patient Safety Authority

Drug Name Suffix Confusion is a Common Source of Errors

Medications with delayed- or extended-release formulations can play a vital role in improving adherence to drug therapy. These unique dosage formulations avoid the need for multiple daily doses of a medication due to their delayed or sustained delivery of a total daily dose steadily throughout the day. This is convenient for patients, may reduce certain side effects, and, on occasion, even allows use for different indications. However, the nomenclature used for long-acting dosage forms is often confusing, and errors may occur when the same drug has several oral dosage forms with different release rates.

The nomenclature used to distinguish different drug formulations often fails to provide “cues” regarding proper use of a dosage form.

The practice of adding “suffixes” or “modifiers” (e.g., Depakote ER or Cardizem CD) to medica-

tion names is used by manufacturers to maintain brand awareness while signifying that the formulation is different from the immediate-release version of the product. However, there is no standardization of the terms for the many different kinds of long-acting formulations. As a result, there are many inconsistencies, allowing different suffixes to be used for an identical formulation by two different manufacturers or even similar suffixes for dissimilar formulations. In short, the nomenclature used for these formulations often fails to provide appropriate “cues” regarding proper use of a dosage form.¹

In addition to lack of standards, another problem is that health professionals have been known to communicate drug names that have suffixes, but omit the suffix. This occasionally results in patients getting the immediate-release version and thus, an entire day’s dose at one time, sometimes with adverse effects. Practitioners have also been known to include suffixes that do not exist for the specified product.² Additional contributing factors reported to PA-PSRS include similar packaging, overlapping dosages, and storage of the products next to each other. These factors combine to allow confusion, inefficiencies, and medication errors at various stages in the medication use system.

In an analysis of 402 prescribing errors, Lesar³ found that the most common type of error was failure to specify the controlled-release formulation (280 cases, 69.7%). The Institute for Safe Medication Practices (ISMP) has received reports of confusion between Abbott’s DEPAKOTE ER (divalproex sodium *extended* release) and DEPAKOTE (divalproex sodium *delayed* release).⁴ Additional examples include GLUCOTROL and GLUCOTROL XL as well as GLUCOPHAGE and GLUCOPHAGE XR.

The most common examples of this type of error reported to PA-PSRS include mix-ups between products such as:

- ADDERALL and ADDERALL XR
- EFFEXOR and EFFEXOR XR
- VICODIN and VICODIN ES

Additional examples include:

- AUGMENTIN and AUGMENTIN XR
- CARDIZEM and CARDIZEM CD
- CIPRO and CIPRO XR
- DEPAKOTE and DEPAKOTE ER
- DETROL and DETROL LA
- LOPRESSOR and LOPRESSOR XL (the XL formulation is Toprol XL)
- RYTHMOL and RYTHMOL SR
- SENOKOT and SENOKOT S
- SINEMENT and SINEMENT CR
- verapamil and verapamil SR

The confusion multiplies when there are two or more “extended” release formulations for the same products, which are not therapeutically equivalent or “substitutable.” Some products have numerous

This article is reprinted from the *PA-PSRS Patient Safety Advisory*, Vol. 1, No. 4—December 2004. The Advisory is a publication of the Pennsylvania Patient Safety Authority, produced by ECRI & ISMP under contract to the Authority as part of the Pennsylvania Patient Safety Reporting System (PA-PSRS).

Copyright 2004 by the Patient Safety Authority. This publication may be reprinted and distributed without restriction, provided it is printed or distributed in its entirety and without alteration. Individual articles may be reprinted in their entirety and without alteration provided the source is clearly attributed.

To see other articles or issues of the Advisory, visit our web site at www.psa.state.pa.us. Click on “Advisories” in the left-hand menu bar.

Drug Name Suffix Confusion is a Common Source of Errors

suffixes to differentiate formulations of the same drug. For example, suffixes for various diltiazem products include SR, CD, XR, XT, and LA. ISMP also has received reports where pharmacists dispensed METADATE ER instead of METADATE CD. Similarly, ISMP has received a report where a prescription for METADATE CD 20 mg was dispensed as METADATE ER 20 mg. The pharmacists involved in these errors weren't aware that the METADATE CD product existed.⁵ PA-PSRS has received reports noting confusion between medications such as the once-a-day formulation WELLBUTRIN XL (bupropion extended-release) and WELLBUTRIN SR (bupropion sustained-release), which is indicated for twice-daily dosing. Wellbutrin mix-ups are especially likely since both the SR and XL formulations are available in 150 mg tablet strengths, and it's not unusual for the SR formulation to be prescribed once daily.

Drug name suffixes are confusing enough without coining them on our own. One report to ISMP involved a physician assistant that wrote a prescription for a patient, which was misread by both the pharmacist and technician as VICODIN ES (hydrocodone 7.5 mg/ acetaminophen 750 mg). However, on closer inspection, the suffix looked more like RS. The pharmacist called the physician assistant and learned that he had used "RS" to mean "regular strength." VICODIN (hydrocodone 5 mg/acetaminophen 500 mg) was then dispensed.⁶

In order to improve the landscape when suffixes are used and reduce the risk of errors, nomenclature standards would help to diminish confusion between various formulations of the same drug.⁷ Standard suffixes or descriptive phrases might be incorporated directly into the drug name, or a unique brand name might be needed to designate a different formulation property, as was done with NEORAL (cyclosporine modified) and SANDIMMUNE (cyclosporine). FDA is aware of these problems and will be examining ways to improve trademark nomenclature.

Being mindful of the potential for this type of confusion when prescribing, storing, dispensing, and administering such medications is just the first step in prevention. Other preventive strategies to consider include:

- Selectively building flags into computer systems and marking drug containers to warn

staff about the differences where a high risk of error exists or when a mix-up might be very serious.

- Designing computer mnemonics to separate the different formulations on computer screens used during order entry.
- Storing similarly named drugs separately and using auxiliary labels to differentiate the products in medication storage areas.
- Verifying new prescriptions for any of these medications where prescriber confusion among suffixes has been reported.
- When communicating orders orally, using the full words "extended release" or "sustained release," not abbreviations, especially for those medications that are available as an immediate release formulation.
- Involving patients also may help. When prescribing and dispensing one of these medications, practitioners may want to inform patients of the potential for confusion between the various formulations and suffixes.

Notes

1. Cohen MR, ed. *Medication Errors. Causes, Preventions and Risk Management*. Sudbury (MA): Jones and Bartlett Publishers; 2000.
2. ISMP Medication Safety Alert! Community Pharmacy/Ambulatory Edition. 15 Jul 2004;(9)14.
3. Lesar TS. Medication errors related to dosage formulation issues. *Medscape Pharmacists* 2001. Available on Internet: http://www.medscape.com/viewarticle/408579_print
4. ISMP Medication Safety Alert! 7 Feb 2001;(6)3.
5. ISMP Medication Safety Alert!. 28 Nov 2001;(6)24.
6. ISMP Medication Safety Alert! [online]. 15 Nov 2004;(9)14.
7. Cohen MR. Medication error reports. *Hosp Pharm*. 1990;25:747-8.



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.



ECRI is an independent, nonprofit health services research agency dedicated to improving the safety, efficacy and cost-effectiveness of healthcare. ECRI’s focus is healthcare technology, healthcare risk and quality management and healthcare environmental management. ECRI provides information services and technical assistance to more than 5,000 hospitals, healthcare organizations, ministries of health, government and planning agencies, and other organizations worldwide.



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.