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USP Patient Safety CAPSLink™

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USP Patient Safety CAPSLink™

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CAPSLink™

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USP Medication Error Analysis

Stop, Look and Listen: Highlights of USP's 8th Annual MEDMARX Data Report Related to Look-Alike, Sound-Alike Drug Errors¹

The release of the 8th Annual MEDMARX Data Report in February 2008 focused on the correlation between drug names and medication errors and was issued in response to the Institute of Medicine's (IOM) call to action. Among the key findings in this year's report was the role of the pharmacy staff (pharmacy technicians and pharmacists) in look-alike/sound-alike (LASA) errors. In addition, the confusion caused by look-alike/sound-alike names was identified as a Cause of error in the design and operation of computerized prescriber order entry (CPOE) systems.

A significant portion of the report is a list of 1,470 unique drug names identified from the review of 26,092 LASA records submitted to USP during the period January 1, 2003 - December 31, 2006, with drugs implicated in errors. The preponderance of these records, 26,092, came from more than 670 health care facilities that participate in USP's MEDMARX Program. An additional 512 records originated from the Medication Errors Reporting (MER) Program that USP operates in cooperation with the Institute for Safe Medication Practices (ISMP).

The Data Report contained 3,170 drug name pairs, which is nearly double the number of drug name pairs in the 2004 listing issued by USP. For those LASA drug errors reviewed, 1.4% (384) resulted in harmful patient outcomes, of which 7 errors may have caused or contributed to a patient's death. As the baby boomer generation moves into its senior years, the utilization of pharmaceuticals will play an increased role in not only treating disease, but also in prevention and wellness. Therefore, as the FDA approves more new drugs each year, the chances increase for this problem to play an even greater role in adverse medication events. The problem is further compounded by the fact that elderly adults frequently take multiple medications for the treatment of multiple chronic diseases and other symptoms. Finally, all of the top ten drugs by volume sold in the U.S. appear in this year's listing of confusing names underscoring the importance of solutions that aim at preventing similarity in drug names rather than at fixing the problem after the product is in the marketplace.

This problem is not unique to the U.S., thus the unsuspecting patient who travels abroad can return to the U.S. with a product that has the same brand name as a drug in the U.S., but in fact contains a completely different active ingredient. In one case an unsuspecting pharmacist looked up a brand name in an online reference and did not realize that the generic name that was listed referred to a non-U.S. product. In fact, what the pharmacist inquired about was a prenatal vitamin, Optinate[®], that was available under the same brand name in other countries containing Risedronate (for osteoporosis). Following are some examples of look-alike, sound-alike drugs:

mellaril	elavil
paxil	taxol
prilosec	prozac
cerebyx	celebrex
oxycontin	oxycodone
hydroxyzine	hydralazine

alprostadiil**alprazolam**

Table 1 documents the severity of LASA errors based on data reported to MEDMARX for the period January 1, 2003 – December 31, 2006. Category B errors, where an error occurred but did not reach the patient constituted the largest portion (n=12,503, 47%) of LASA errors reported. This was followed closely in numbers by Categories C&D (combined total of 12,463 or 46.9%) that did reach the patient, but caused no harm. Categories E-I errors (n=384), which caused patient harm accounted for 1.42% of the total.

Table 1. Severity of LASA Medication Errors

Error Category ^a	n	% ^b
Potential Errors		
A	1,254	4.7
Intercepted Errors		
B	12,503	47.0
Nonharmful Errors		
C-D	12,463	46.9
Harmful / Fatal Errors		
E-I	384	1.42
Total	26,604	

a. For complete definition of error categories see <http://www.nccmerp.org/>

b. Based on LASA records reported to MEDMARX for the period 01/03-12/06.

Case Example^a

A physician's office staff member telephoned a prescription in to a community pharmacy. The prescription was understood and repeated back to the physician staff member by the pharmacist as Celebrex[®] (celecoxib) 200 mg. Celebrex 200 mg was subsequently dispensed to an elderly patient diagnosed with depression. The patient noticed the drug was different than his previous medication and called the pharmacist, who then contacted the physician's office. The doctor clarified that the correct medication should have been Celexa[®] (catalpa) 20 mg. The patient did not take any of the wrong medication. This error points to the need for all telephonic medication orders to be re-read and spelled out (over the phone) by both the individuals (physician staff member and pharmacist) and then repeated back and spelled out "I understand the order to be for Celexa 20 mg. Is that correct?" This error documents the importance of the patient taking a proactive role in monitoring his/her medications by contacting the pharmacist upon discovering a difference in the medication from that previously received.

How then do LASA drug errors occur?

Drugs can have both a generic name and a proprietary or brand name. There can be strong similarities between generic/generic names, generic/brand names, and brand/brand names. Some examples include generic/generic: Clonidine and Colchicine, generic/ brand: Clonidine and Klonopin, and brand/brand: Lipitor[®] and Zocor[®]. Each of these examples look alike when written or printed and sound

alike when spoken; and they can be mispronounced, or pronounced differently depending on a wide variety of dialects and accents. All of these have the potential to contribute to confusion that can lead to errors. This year's report also documented LASA error reports that were further compounded by same/similar packaging, dosing, strength, dosage form, and clinical indication.

Additionally, issues such as poor penmanship with hand written medication orders can be confused with a similar look-alike drug. Handwriting styles, such as cursive or print or mixed cursive and print are, obviously, not uniform and can prove difficult to decipher. Also, lines drawn through numbers such as 7 or 0 with handwritten prescriptions can be confusing and contribute to errors because the line can be interpreted to mean a strikethrough of a mistake thereby directing the reader to disregard the number. Lastly, in today's high tech healthcare environment, a multitude of technology impacts look-alike errors through electronic/ automated medium to include, but not limited to phones, faxes and computers.

Case Example^a

A handwritten prescription for "Bleph 10" was filled by a pharmacy as Blephamide[®] ophthalmic suspension. The patient then refilled the prescription six times without the error being detected. It was during a follow-up appointment some nine months later that the physician identified the error and subsequently diagnosed the patient as having steroid induced glaucoma. The patient incurred permanent harm as a result of the error.

Medication Use Node (Phase) Where LASA Errors Occurred

A majority of the errors reported with LASA drugs occurred during the dispensing node (phase) of the medication-use process (64.4%, Table 2). It is during this phase when the greatest opportunity for error occurs due to the large volume of many different dosage forms and strengths of medications routinely distributed from the pharmacy or other patient care area within a facility. Examples of proactive strategies to prevent LASA errors during the dispensing and administration of medications might include the implementation of storage processes in the pharmacy and other facility medication storage areas that physically separate or differentiate products with similar names and the deployment of proven technologies like Robotic Fills and Bar Code Medication Administration (BCMA).

Table 2. Medication Use Node where LASA Errors Originated ^a

Total	25,349
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a.
Based on

LASA records reported to MEDMARX during the period 01/03-12//06
 b. Node (phase) is not applicable to Category A records

Triple Mix-Ups

As previously mentioned, the 8th Annual MEDMARX Data Report included 512 error records that originated from the medication-errors reporting (MER) program that USP operates in cooperation with the Institute for Safe Medication Practices (ISMP). Contained among those were seven (7) that involved three different drug products (Table 3). Although there was no harmful outcome for any of these patients, this finding highlights the important fact that one drug has the potential to be confused with multiple other drugs, thus increasing the opportunity for error. In the case of one drug, cefazolin, there were as many as 15 other drugs paired with it and reported as LASA errors. This finding further supports the case for the inclusion of the indication or purpose for use (not diagnosis) on all prescriptions to facilitate differentiation between look-alike/sound-alike drugs and serve to reduce the potential for error.

Table 3. Look-Alike and/or Sound-Alike Errors Involving Three Drugs

Drug Names	Error Category Index
Aripiprazole, Lansoprazole, Omeprazole	A
Oxytrol, Roxanol, Uroaxtral	A
Pamelor, PanlorDC, Panlor SS	B
Prevpac, Propac, Propecia	C
Vioxx, Ziox, Zyvox	A
Zestril, Zetia Zyrtec	B
Zestril, Zetia, Zyrtec	C

Case Example^a

An order for Actonel[®] (risedronate) 30 mg was entered into the hospital pharmacy computer system and the automated dispensing device (ADD) interface link as Actos[®] (pioglitazone) 30 mg. Drug names and computer codes for both drugs were similar (Actos computer short code = ACTO30 and Actonel computer short code= ACTO 30 02). The error was not detected by nursing staff who profiled and gave the drug to the patient. The following day, the error was detected by the patient's physician when he noticed the wrong drug was recorded on the medication administration record (MAR). The patient received one dose of the wrong drug (Actos vs Actonel). The patient was not diabetic and was further observed without any harm or subsequent problems. The facility continues to analyze the error and is considering changes to the pharmacy computer short coding for both Actos and Actonel, along with other drugs with similar names.

Key Recommendations from the 8th Annual MEDMARX Data Report to Reduce the Risk of and Prevent LASA-related Medication Errors:

- When making formulary additions, always consider potential for mix-ups. Evaluate the facility's formulary or inventory and identify which medications appear on USP's list of drug-name pairs that look or sound alike (most recent list is available from¹:[Click here](#))
- Physically separate or differentiate products with similar names as they are stored on the shelf.¹
- Disseminate facility specific information about products that have been confused to improve awareness.¹
- Implement TALL-man lettering in pharmacy software, labeling, and order writing. For example, acetaZOLamide (glaucoma) and acetoHEXamide (diabetes.)¹
- Implement read backs and spell-backs.¹
- Track medication errors caused by look-alike or sound-alike drug names and identify the medications most frequently involved.¹
- Implement proven technological solutions: CPOE , Robotic Fills, Bar code medication administration technologies and Electronic medical records.¹
- Include the indication for the drug on all prescriptions (regardless of the setting in which written), whether manual or computer generated.¹
 - **Use simple words:** For sinus; For heart; For high blood pressure
 - **Include** a line for "indication for use" on prescription pads and in computer entry systems
 - **Check** indication against the drug and include the indication for use on the prescription label (pharmacy systems)
 - **Talk:** If the indication does not match what the patient expects to see, the patient should consult with his/her physician or pharmacist
- Ambulatory patients should exercise their right to counseling by a pharmacist at the point of initial medication dispensing or refilling.¹
 - Particularly for **NEW** prescriptions to **obtain the precise pronunciation** and understand the potential for confusion with other drug names

a. Case reports reflect actual error descriptions but may have been modified for clarity.

References:

1. Hicks RW, Becker SC, Cousins DD, eds. (2008). MEDMARX data report. A report on the relationship of drug names and medication errors in response to the Institute of Medicine's call to action. Rockville, MD: Center for the Advancement of Patient Safety, U.S. Pharmacopoeia.



In the News...

1. USP-ISMP Workshop: Using Data Effectively to Manage the Risks to Medication Safety

This one-day interactive program is designed for pharmacy directors, risk managers, patient safety officers, medication safety officers, and other healthcare professionals seeking to enhance their ability to collect, analyze, and prioritize medication error and other adverse drug event data. Participants will learn how to select effective risk reduction strategies based on proven medication safety principles, instead of relying on human vigilance alone. They also will learn the best way to report findings in an actionable format that will help drive medication safety efforts and show results from system improvements. The workshops include home study materials and will include breakout sessions with an opportunity to gain hands-on practice working with data. Pharmacy and Nursing CE credit will be available.

AGENDA TOPICS include:

- Risk identification: Data collection methods
- Risk analysis: Analysis of aggregate data for trending
- Risk control: Choosing effective error reduction strategies
- Case studies: Examining data, priority setting, and interventions

FEES AND REGISTRATION:

Early registration: \$400.00 (up to 21 days before program date)
Regular registration: \$450.00
Group discounts: \$350.00

For group discounts, you must first call 301-230-6304 to obtain a group code number that can be used during the online registration process.

To register for the workshops, go to:
www.usp.org/goto/uspismpworkshop

WORKSHOP DATES

June 7, 2008

8:00 a.m.– 4:30 p.m.

Before the ASHP Annual Meeting

Seattle, WA

July 24, 2008

8:00 a.m. - 4:30 p.m.

Princeton, NJ

September 12, 2008

8:00 a.m.– 4:30 p.m.

USP Headquarters

Rockville, MD

October 1, 2008

8:00 a.m. – 4:30 p.m.

Before the ASHRM Annual Meeting

Boston, MA

November 7, 2008

8:00 a.m.– 4:30 p.m.

Houston, TX

December 6, 2008

8:00 a.m.– 4:30 p.m.

Before the ASHP MidYear Meeting

Orlando, FL

2. NCC MERP Issues Recommendations to Avoid Errors with Drug Samples

The National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP) recently issued recommendations related to drug samples with the primary goal of highlighting the risk of medication errors with the use of these products and to provide guidance for a standardized approach to distribution of drug samples in all practice settings. For specific recommendations, see:

<http://www.nccmerp.org/council/council2008-01.html>

3. FIP Global Conference on the Future of Hospital Pharmacy

The International Pharmaceutical Federation (FIP), which is the international organization representing 2 million pharmacists worldwide, will hold a conference to address issues that will shape the future of hospital pharmacy practice on

August 30-31, 2008, as part of the 68th FIP Congress in Basel, Switzerland.

Hosted by the FIP Hospital Pharmacy Section, the conference is open to any hospital pharmacist or other individuals interested in hospital pharmacy practice.

A primary goal of the conference is to identify opportunities for improving all aspects of the medication-use process, including the procurement, preparation, distribution, prescribing and administration of medicines in hospitals. For additional information about this conference, please visit the conference website

at www.fip.org/globalhosp

4. FDA Releases 2nd Issue of Drug Safety Newsletter

The FDA recently released the second issue (Volume 1, Winter 2008) of the Drug Safety Newsletter. An *electronic version* of the newsletter is available at:

http://www.fda.gov/cder/dsn/2008_winter/2008_winter.pdf

5. California Fines Hospitals for Violations that Caused Medication Errors

The California Department of Public Health recently fined several California hospitals for potentially life-threatening violations. Among those cited by the state were several San Francisco and Bay Area medical centers, where one facility was fined \$25,000 for medication errors involving three patients in September 2007. Another hospital in Los Angeles was fined \$25,000 for an event that corresponds with the date and circumstances involving a large overdose of heparin, a blood thinner, similar to what was given to actor Dennis Quaid's newborn twins last fall. These penalties were only the second time the state has fined hospitals as part of a law that went into effect January 1, 2007, which allows the state to assess penalties against hospitals in cases of "immediate jeopardy," or for violations likely to cause death or serious injury. Specific details on the hospital violations are available from the [California Department of Public Health's website](#)

6. "Smart Pill Box" Improves Patient Medication Safety and Compliance

Patients are turning to the use of high tech-devices, drug-tracking tools, including interactive, consumer-friendly websites, to help keep track of their medication regimens and to reduce errors. One such device is the Med-eMonitor[®], which is among the first “smart pillbox“ devices that is designed to improve patient medication compliance and decrease the risk of medication errors. The device is connected to a drug database through a patient’s phone line and is programmed remotely via the Internet. It beeps and includes a large-print message screen in addition to a voice that announces when the medication is to be taken, reminds when doses are missed, and alerts patients to potentially dangerous medication interactions. Compartments for the five most crucial drugs a patient takes have sensors with time/date stamps that track when a pill is removed. For full text of article, [Read here](#)

7. FDA Safety Communication on Initial Singulair[®] Review Information

The FDA continues to investigate the possible association between the use of Singulair and behavior/mood changes, suicidality (suicidal thinking and behavior), and suicide. Over the past year, the maker of Singulair, Merck & Co, Inc., has updated the prescribing and patient information for Singulair to include post-marketing reports of previously mentioned adverse events. The FDA is working with Merck to further evaluate a possible link between the use of Singulair and behavior/mood changes, suicidality, and suicide in response to inquiries received by FDA. Complete FDA communication available at: http://www.fda.gov/cder/drug/early_comm/montelukast.htm

8. Heart Test Guidelines Issued for ADHD Drug Use in Children

The American Heart Association recently issued guidelines strongly encouraging a thorough heart check-up to include an electrocardiogram before prescribing stimulants like Ritalin and Adderall to children for the treatment of attention deficit and hyperactivity disorder (ADHD). The goal of the recommended guidelines is to safely treat children with ADHD while minimizing the risk of cardiac arrest, which has been linked to the use of these drugs. Additional information: [Click here](#)

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USP Medication Error Reporting Programs:



MEDMARX[®]—USP’s comprehensive, Internet-accessible, anonymous medication errors reporting program, and quality improvement tool. The program facilitates productive and efficient documentation, tracking, trending, and prevention of medication errors.



Medication Errors Reporting (MER) Program—presented in cooperation with the Institute for Safe Medication Practices, this nationwide program makes it possible for health professionals to report medication errors confidentially and anonymously to USP.

Other USP patient safety resources:

- [MEDMARX Annual Data Summary reports](#)—provides readers with a wealth of information on reported error events including patterns in the types, causes, and level of harm associated with medication errors.
- [Understanding and Preventing Medication Errors: A Resource for Healthcare Practitioners](#)—a CD toolkit with practical guidelines, forms, and templates to help healthcare facilities improve error-reduction initiatives.
- [Advancing Patient Safety in U.S. Hospitals: Basic Strategies for Success](#)—a book in which hospitals share stories about how they reduced medication errors and promoted safer patient care.
- Medication Safety Pocket Reference—a pocket-sized reference booklet containing listings of similar drug names and dangerous abbreviations that could cause medication errors. Contact custsvc@usp.org and ask for item #3227702.
- Similar Drug Names Poster—a wall poster for easy reference listing look-alike and sound-alike drug names known to cause confusion and potential medication errors when handwritten or communicated verbally. Posters are packaged in quantities of 1 (item # 3728251) 10 (item # 3728252) and 50 (item # 3728253). Contact custsvc@usp.org and ask for the appropriate item number.

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