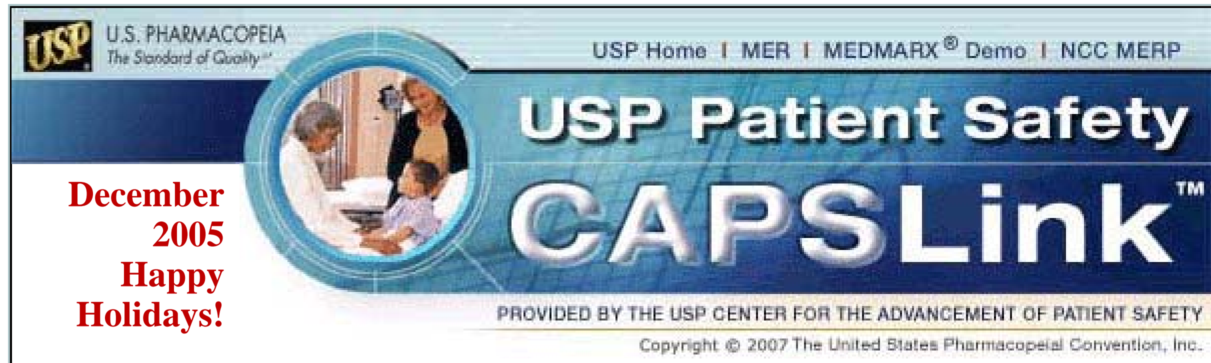

December 2005
Happy Holidays!

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USP Patient Safety CAPSLink™

This message has been sent to you as a service of the U.S. Pharmacopeia, Center for the Advancement of Patient Safety (CAPS). USP is a not-for-profit, non-governmental organization that promotes the public health by establishing state-of-the-art standards to ensure the quality of medicines and other health care technologies. CAPS is a component of USP's Patient Safety public health program. The USP Center for the Advancement of Patient Safety was created to encourage medication error reporting, conduct data analysis and research, develop educational programs, and propose standards, recommendations, and guidelines that ultimately improve the safety and quality of patient care.

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USP Medication Error Analysis

Confusion with Antiretroviral Medications[a]

Antiretrovirals are a critical tool in combating human immunodeficiency virus (HIV). Treatment with these agents has decreased the morbidity and mortality of HIV infection, but effective patient outcomes are contingent on adequate blood levels of the appropriate medications and appropriate regimen. Poor patient adherence has been the most widely studied cause of inadequate HIV medication levels. Less attention has been paid to the knowledge level of the health care providers who prescribe, dispense, or administer these medications. Medication errors with these agents, however, can lead to suboptimal drug treatment, incomplete viral suppression, and subsequent resistance.

Medication error reports submitted to USP's MEDMARX® program from January 2000 through December 2003 (48 months) were analyzed for HIV medications. The names of 15 single and three combination HIV medications that were on the market at the end of 2003 were included in the analysis.

During the 48 months, 400 medication errors were reported to USP that involved at least one single or combined HIV antiretroviral product. The errors were reported by types of facilities as described in Table 1.

Table 1. HIV Medication Errors by Type of Health Care Facility

Type of Facility	Total Errors n (%)
General community hospital	201 (50.3%)
University hospital	137 (34.2%)
Specialty, psychiatric or residential facility	16 (4.0%)
Outpatient setting	8 (2.0%)
Long term care/ Skilled nursing	2 (0.5%)
Type of Facility Not Identified	36 (9.0%)
Total	400 (100%)

Severity of errors

Of the nine possible error categories (A–I), HIV medication errors were categorized in only five—Categories A–E. This indicates that the reported errors ranged from potential errors (Category A) to temporary harm (Category E). None of the HIV medication errors reportedly resulted in serious harm (Categories G and H) or death (Category I). Of the 400 reported errors, 195 errors (49%) reached the patient (Categories C, D, or E). Based on the narratives that accompanied the records, a secondary analysis of the errors revealed the

following distribution: Category C (33%), Category D (21%), and Category E (3%) errors.

Error node

The node, or point in the medication process at which the error occurred, was identified most frequently as being the dispensing node (*n* =182, 45%) followed by prescribing node (*n* =107, 27%; Table 2). The dispensing node as the point of error in HIV medications was twice the frequency of dispensing errors in the MEDMARX database (22%) for all medications.

Table 2. Error Node: Comparison of HIV Medication Errors to All Medication Errors reported to MEDMARX in 2002

Node	HIV medications* n (%)	MEDMARX 2002 Data
Prescribing	107 (23%)	21%
Transcribing	55 (14%)	23%
Dispensing	**182 (45%)**	**22%**
Administering	51 (12%)	33%
Documenting	0 (0%)	1%
Does not apply (Category A) or not identified	28 (7%)	0%

Type of error

The most frequent type of error was wrong dose (*n* = 150, 37.5%), followed by wrong medication (*n* = 128, 32.0%; Table 3). At least 59 errors involved two or more doses, including 30 that occurred over multiple days and 16 that persisted more than a week. For the subgroup of those errors that actually reached a patient, the most frequent errors were missed doses and wrong doses, occurring 75 times each.

Table 3. HIV Medication Errors by Type of Error

Type of Error	All Errors	Errors that Reached the Patient (Categories C-E)
Wrong time	10 (2.5%)	7 (3.1%)
Wrong medication	128 (32.0%)	60 (26.3%)
Wrong patient	10 (2.5%)	8 (3.5%)
Wrong dose	150 (37.5%)	75 (32.9%)
Wrong route	4 (1.0%)	0 (0%)

Missed dose	85 (21.3%)	75 (32.9%)
Incorrect instructions	2 (0.5%)	1 (0.4%)
Drug interaction	6 (1.5%)	1 (0.4%)
Not Designated	5 (1.3%)	1 (0.4%)
Total	400	227

Medications involved

Several of the errors involved multiple medications so the total number of identified HIV medications was 500. Lamivudine (Epivir) was the medication most frequently involved in the errors (*n* = 85) (Table 4).

Table 4. HIV Medications Involved in Errors

Generic name (Trade name)	Drug Class	Number of Times Reported (% of Total)
Abacavir (Ziagen)	RT	2 (0.4%)
Agenerase (Amprenavir*)	PI	9 (1.8%)
Didanosine (ddi, Videx, Videx EC)	RT	49 (9.8%)
Dideoxycytidine (ddc, Hivid)	RT	2 (0.4%)
Delaviridine (Rescriptor)	RT	4 (0.8%)
Efavirenz (Sustiva)	RT	48 (9.6%)
Idinivir (Crixivan)	PI	20 (4.0%)
Lamivudine (3TC, Epivir)	RT	85 (17.0%)
Nelfinavir (Viracept)	PI	50 (10.0%)
Nevirapine (Viramune)	RT	28 (5.6%)
Ritonavir (Norvir)	PI	25 (5.0%)
Saquinavir (Invirase-hard gel capsule, Fortovase-soft gel capsule)	PI	27 (5.4%)
Stavudine (d4t, Zerit)	RT	49 (9.8%)
Tenofovir disoproxil fumarate, (Viread)	RT	1 (0.2%)
Zidovudine (Retrovir)	RT	75 (15.0%)
Lamivudine/ Zidovudine (Combivir)	RT	24 (4.8%)
Lopinavir/ Ritonavir (Kaletra)	PI	2 (0.4%)
Total		400

RT= reverse transcriptase inhibitors; PI= protease inhibitors
* No longer marketed; replaced by Fosamprenavir

Confusion over drug names was a common cause of many errors and

sound-alike and look-alike medication names contributed to 78 errors (19%; Table 5). Errors also occurred because of the similarity in names between certain HIV and non-HIV medications resulting in the administration of an HIV drug to a non-HIV patient. In one instance, didanosine 400mg (HIV drug) was dispensed by pharmacy staff when the medication order was for didronel 400mg (calcium regulator). The patient received the unintended HIV medication for four days. Another example was 100 units of Vitamin E ordered by the physician but dispensed as Viramune (HIV drug). No one discovered the error until the pharmacy was refilling the prescription.

Table 5. HIV Medication Errors for Which Drug Name was a Contributing Factor (*n* =78*)

Generic name (Trade name)	Number of Times Drug Name Confused for Another Drug Name (% of Total)
Abacavir (Ziagen)	1 (0.9%)
Didanosine (ddi, Videx, Videx EC)	8 (7.0%)
Efavirenz (Sustiva)	5 (4.4%)
Idinivir (Crixivan)	2 (1.8%)
Lamivudine (3TC, Epivir)	27 (23.7%)
Nelfinavir (Viracept)	14 (12.3%)
Nevirapine (Viramune)	10 (8.8%)
Ritonavir (Norvir)	10 (8.8%)
Saquinavir (Invirase, Fortovase)	5 (4.4%)
Stavudine (d4t, Zerit)	8 (7.0%)
Zidovudine (Retrovir)	15 (13.6%)
Lamivudine/ Zidovudine (Combivir)	8 (7.7%)
Lopinavir/ Ritonavir (Kaletra)	1 (0.9%)
Total	114

* Total number of drugs involved exceeds 78, because the confusion between names may have involved two HIV medications.

Recommendations

1. Given the problems associated with sound-alike, look-alike medication names, providers should write HIV medication orders/prescriptions that include the generic name, the brand name, and drug class to minimize drug name confusion and dispensing errors.
2. Avoid the use of abbreviations for medications, dosages, and instructions.
3. Current reference resources and medication charts with pictures of the medications should be available to all healthcare professionals, especially in

dispensing areas in pharmacies and in medication preparation areas on nursing units.
4. Comprehensive health histories should be obtained from all HIV patients.
5. Pharmaceutical companies, the United States Adopted Names, and the Food and Drug Administration should address the problem of sound-alike and look-alike medications.
6. Specifically related to HIV medications, health care systems must devise a timely method for order clarification. With frequent dosing of some HIV medications, if the staff members do not clarify an order quickly, a patient may miss several doses.
7. Education of patients, their families, and healthcare providers should be included in an overall improvement action plan.

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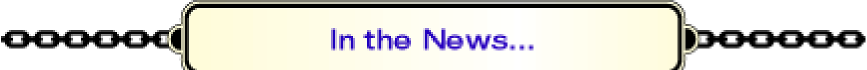
a. This is a condensed, edited version of an article titled “Antiretroviral Medication Errors” that appears in *AIDS Patient Care and STDs*; Dec. 2005, Volume 19; Number 12: pp 803-812. A publication of Mary Ann Liebert, Inc.



1. JCAHO Updates

Comment Period Open on 2007 JCAHO Patient Safety Goals: Healthcare practitioners are encouraged to review the Joint Commission’s proposed 2007 National Patient Safety Goals. The deadline for submitting comments on these for these new hospital standards is January 8, 2006. Click here to read more.

Guidelines Issued on "Surge Hospitals": A document was recently issued describing how community, state and federal health care planners can establish temporary facilities called "surge hospitals" to supplement existing hospitals in an emergency. Click here to read more.

2. Preoperative Briefings Used to Reduce Errors

California-based Kaiser Permanente Anaheim Medical Center created a preoperative safety briefing with "role-based checklists" to ensure that all clinicians are on the same page before surgery. Click here to read more.

3. CPOE Implementation Linked with Increased Patient Mortality

A study recently published in the journal *Pediatrics* finds that mortality rates among patients unexpectedly increased following implementation

of a computerized physician order entry (CPOE) system. Researchers led by a physician at the Ann Arbor-based University of Michigan Medical School evaluated mortality data from 1,942 children who were referred and admitted for specialized care at the Children's Hospital of Pittsburgh 13 months before and five months after CPOE implementation. (Abstract)

4. Hospitals Making Slow Progress Toward Patient Safety

A recent study published in *JAMA* finds that hospitals have been "slow" in adopting patient safety programs designed to improve care and prevent medical errors. Funded by the federal Agency for Healthcare Research and Quality, researchers conducted two surveys of all acute care hospitals in Utah and Missouri during 2002 and 2004 and analyzed the responses of the 107 hospitals that completed both surveys.
http://jama.ama-assn.org/cgi/content/abstract/294/22/2858

5. Call for Standardization in Color-coded Patient Wristbands

The Pennsylvania Patient Safety Authority issued a new advisory that warns of problems and medical errors caused by the lack of standardization in the use of color-coded wristbands. The Advisory states that a recent "near miss" reported to the Authority illustrates the need to create some agreement or standardization among state hospitals and ambulatory surgery centers on the meanings of various colors. Click here to read more.

6. Best Practices to Improve the Safety of Insulin Use in Hospitals

A new document titled "Recommendations for Safe Use of Insulin in Hospitals," offers a collection of best practices that experts agreed could prevent hospitalized patients from being harmed by insulin therapy. The document is the product of a joint effort by the American Society of Health-System Pharmacists and the Hospital and Health-System Association of Pennsylvania.
http://www.ashp.org/emplibrary/Safe_Use_of_Insulin.pdf

7. Imaging Agent Recalled After Serious and Fatal Adverse Drug Events

On December 19, FDA announced that Palatin Technologies agreed on the immediate suspension of sales and marketing of NeutroSpec [Technetium (99m Tc) fanolesomab] in the United States, due to reports of serious and life-threatening cardiopulmonary events following the

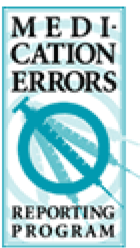
administration of the drug. NeutroSpec is used for radionuclide imaging of patients with equivocal signs and symptoms of appendicitis. Two patients died and 15 others had serious adverse drug events from receipt of the imaging agent.
http://www.fda.gov/cder/drug/infopage/technetium99/default.htm

8. New Video from AHRQ on Tips for Taking Medicines Safely

AHRQ has recently released a short Web video called "Tips for Taking Medicines Safely," which features information to help consumers take medicines safely. Some tips that are covered in the video include asking questions if you have doubts or concerns about your medicine, bringing a bag with all the medicines you take to your medical appointments, and asking about side effects and what to avoid while taking the medicine. Select to view the video.

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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