



Nurse Advise-ERR®

Educating the healthcare community about safe medication practices

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Various release formulations of oral opioids cause confusion

Errors with oral opioids have led to serious adverse events, including over-sedation, respiratory depression, seizures, and death. According to error reports submitted to the ISMP Medication Error Reporting Program and various other programs, opioids rank among the top 10 drugs involved in errors that have led to patient harm. Specifically, we have received many reports of mix-ups among the generic products morphine, oxy**CODONE**, and oxymorphone, as well as their associated brand name products such as **OXYCONTIN** (oxy**CODONE**), **MS CONTIN** (morphine), **ROXANOL** (morphine), and **ROXICODONE** (oxy**CODONE**).

Sound-alike/look-alike name similarities are key contributing factors to errors. For example, mix-ups between **OxyCONTIN** and oxy**CODONE** are common as practitioners often use the names interchangeably. Some hospitals have reported confusion between **Oxy-**

CONTIN and **MS Contin** because practitioners believe they are different brand names for the same drug. Frequent mix-ups have occurred between **Roxanol** and **Roxicodone**. Handwritten orders for **MS Contin** have been mistaken as **OxyCONTIN**. Not only are there multiple “oxys,” “roxys,” “morphs,” and “contins” to keep straight, some of the products come in varying strengths and release formulations (see Table 1).

Long-acting, controlled-, extended-, or sustained-release formulations are indicated when chronic pain treatment is required. These formulations release their active ingredients over 8 hours or more. Higher doses of these opioids should only be used in opioid-tolerant patients. Short-acting, immediate-release formulations are best for acute pain management and break-through pain since they are absorbed into the body quicker. Examples of errors with these opioids follow.

continued on page 2

Table 1. Commonly Confused Oral Opioids

Generic Name	Brand Names	Dosage Forms and Strength(s)	Immediate Release Directions	Extended/Controlled /Sustained Release Directions
morphine	Avinza	Capsule, various strengths from 30-120 mg		Daily (every 24 hours)
	Kadian	Capsule, various strengths from 10-200 mg		Every 12 hours
	MS Contin	Tablet, various strengths from 15-200 mg		Every 8-12 hours
oxy CODONE	Oramorph SR	Tablet, various strengths from 10-100 mg		Every 8-12 hours
	Roxanol (concentrate)	Liquid, 20 mg/mL, 100 mg/ 5 mL	Every 4 hours	
	OxyIR	Capsule, 5 mg	Every 6 hours	
oxymorphone	Roxicodone	Liquid, 20 mg/mL	Every 6 hours	
	OxyCONTIN	Tablet, various strengths from 10-160 mg		Every 12 hours
	Opana	Tablet, 5 mg, 10 mg	Every 4-6 hours	
	Opana ER	Tablet, various strengths from 5-40 mg		Every 12 hours

checkitout! ✓✓✓✓

Take these steps to reduce the risk of errors with various formulations and brands of oral morphine, oxy**CODONE**, and oxymorphone.

- ✓ **Limit access.** Avoid stocking concentrated opioid solutions in patient units, as these strengths are used primarily to treat chronic pain.
- ✓ **Segregate.** Separate immediate-release and long-acting formulations of oral opioids. Have the pharmacy dispense any concentrated liquid opioids in unit-dose oral syringes for individual patient use. If concentrated solutions must be available in patient units, affix an auxiliary label to the bottle and segregate it from other concentrations. Return unused supplies to the pharmacy immediately after patient discharge.
- ✓ **Differentiate.** Use tall man lettering to differentiate similar drug names on pharmacy labels, auxiliary labels, medication administration records (MARs), and computer screens.

continued on page 2



Recalled infusion pump.

On March 11, 2009, the Food and Drug Administration (FDA) classified the recent recall of Baxter Healthcare Corporation's **COLLEAGUE Single Channel and Triple Channel Volumetric Infusion Pumps** as a Class 1 recall. This is the most serious type of recall because there is a high probability that serious injury or death can occur. The company issued an urgent device correction letter on January 23, 2009, sending it to all nursing vice presidents informing them of the recall. There are three main issues: failure codes leading to interruption of therapy; damaged battery messages; and a smoke and fire hazard possibility related to improper cleaning. The company advised organizations to develop

continued on page 3

Various release formulations continued from page 1

A physician prescribed oxyCODONE IR (immediate-release) 10 mg every 6 hours for a patient recently discharged from the hospital. The community pharmacy accidentally dispensed 10 mg tablets of OxyCONTIN, an extended-release formulation of oxyCODONE intended to be taken every 12 hours. Taking it every 6 hours could lead to over-sedation and serious respiratory depression. Fortunately, the error was detected before serious harm occurred because the patient called the pharmacist when he became nauseated.

A physician prescribed AVINZA 30 mg TID PRN for a patient. Avinza is an extended-release form of morphine intended to be administered once every 24 hours, not three times a day, and not on a PRN basis. The patient died within a few days of receiving multiple doses of Avinza, although it is unclear if the error contributed to her death.

A physician prescribed OPANA (oxymorphone) IR 10 mg every 4 to 6 hours. The pharmacy dispensed Opana ER 10 mg tablets with directions to take 1 tablet every 4 to 6 hours. Using the modifier "IR" contributed to the error. "IR" is not part of the official name for Opana immediate-release tablets, so the "IR" looked more like "ER" to the pharmacist. Fortunately, the patient was familiar with the pink 10 mg Opana tablets and pointed out that the erroneous tablets

were not the same color as previously taken. The error was corrected before the patient received any doses.


An order for 60 mg of ROXANOL (morphine) liquid every 4 hours for pain was mistakenly dispensed as ROXCODONE (oxyCODONE). At least four nurses administered the wrong medication, oxyCODONE instead of the ordered morphine to the patient for 7 doses in a row. Since the oxyCODONE dose/day is about half the morphine dose/day, the patient received a 2-fold overdose. Other than sedation, the patient had no adverse effects. The error was caught by a nurse who had made the same mistake three weeks earlier.

A 91-year-old man being treated for a mild heart attack was mistakenly given a 100 mg dose (20-fold overdose) of morphine oral solution instead of 5 mg as prescribed. A concentrated form of morphine oral solution, Roxanol (20 mg/mL), was accidentally dispensed instead of a standard concentration of morphine oral solution (10 mg/5 mL), and the dose was expressed by volume, not mg (i.e., 5 mL instead of 5 mg). The patient received 5 mL of Roxanol (100 mg), which may have contributed to his death the next day.

For suggestions on how to prevent mix-ups between oral opioids, see the **check!out!** column starting on page 1.

HazardAlert

Reuse of insulin pens for multiple patients risks the transmission of blood-borne disease

 A US Army hospital publicly announced last month that 2,114 insulin-dependent diabetic patients admitted between August 2007 and January 2009 may be at risk for developing a blood-borne disease because of incorrect procedures used during the administration of insulin using pen devices (www.wbamc.amedd.army.mil/documents/PressReleases/02062009.html). Insulin pens are intended to be used for one patient. According to the announcement, although staff changed the pen's needle between patients, they reused

the pen for more than one patient. An Army-wide investigation found pens may have been used incorrectly at a second US facility, affecting 15 patients or less. A recent follow-up announcement identified that 16 patients exposed to the reused insulin pens have tested positive for hepatitis C, although a link to the injections has not been confirmed.

At least two studies have shown that biological contamination of insulin occurred in up to half of all reused insulin pen cartridges, even when the

continued on page 3

check!out! continued from page 1

✓ Determine appropriateness.

Assess the patient for opioid tolerance and pain attributes (e.g., acute or chronic pain, type of pain, intensity, duration) to confirm that an appropriate oral opioid has been prescribed. Follow-up with prescribers if a question arises.

✓ **Drug information.** Post charts for opioid-to-opioid dose conversions (e.g., morphine mg/day oral dose \times 0.5 = oxyCODONE mg/day dose) on all patient care areas as a reference.

✓ **Modifiers.** Avoid modifiers such as IR and ER when prescribing and transcribing opioids. If modifiers are part of the official drug name, write out the abbreviation's intent (e.g., immediate-release, extended-release).

✓ **Use mg not mL.** Never express doses of liquid medications in mL alone; the dose should always be expressed in mg.

✓ **Brand names.** Use brand names to help communicate the desired drug formulation. If the generic name is used, the dosage form (extended- or immediate-release) must be specified.

✓ **Use prompts.** Design screen prompts for automated dispensing cabinets, which require nurses to indicate whether they want an immediate- or extended-release product, or a standard or concentrated dose.

✓ **Patient monitoring.** Develop guidelines and a checklist for monitoring patients receiving opioids, symptoms of opioid toxicity, and the appropriate response if toxicity is suspected.

✓ **Staff education.** Educate staff about confusion between oral opioids.

✓ **Recovery from error.** Ensure that opioid reversal agents (e.g., naloxone) are available in areas where oral opioids are administered.

✓ **Patient education.** Teach the patient about the use of opioids.



*nice*catch Nurse captures a levetiracetam and levofloxacin mix-up



A hospitalized patient with a seizure disorder had been receiving levetiracetam (**KEPPRA**) 750 mg IV every 12 hours. Each dose was prepared in the pharmacy. The patient's nurse did not have the next scheduled dose, so she notified the pharmacy of the missing medication by electronically initiating a reprint of the label in the pharmacy. The label printed in the central part of the pharmacy, not in the IV room where infusions were prepared. A pharmacy technician misread the reprinted label as levofloxacin 750 mg IV. The technician selected a premixed bag of levofloxacin 750 mg and placed the reprinted label on the bag for the pharmacist to check. The pharmacist checked the product without catching the mistake, and the drug was sent to the patient care unit. Fortunately, the nurse noticed the mistake before administering the wrong drug to the patient.

The error was clearly related to name similarity of the two products—levetiracetam and levofloxacin—and overlapping dosages of 750 mg. The error happened because the drug name on the label was misread as a similarly named product.

The hospital where the error occurred now uses tall man lettering for both products (leve**TIR**acetam and levo**FLOX**acin) in the pharmacy computer to highlight the main differences in each drug name. This helps to minimize the risk of misreading an order entry screen or a drug label printed from the pharmacy computer. The hospital also rerouted the pharmacy printers to ensure that a label for any product that requires preparation is printed in the IV room where it is made, not the central pharmacy. If nurses have the ability to print labels in the pharmacy for missing doses, the labels should be clearly identified (e.g., distinct color) as a missing medication request from nurses, not a label generated by pharmacy staff. Without clear differentiation between labels, pharmacists will not know to check the patient's profile to ensure that a mistake has not been made before dispensing a dose.

HazardAlert Reuse of insulin pens continued from page 2

needle is changed. Air bubbles and pathogenic contaminants can enter the cartridge after injection while the needle is still attached to the pen. Thus, pens are not suitable for multiple patients without risking cross-contamination. The FDA also warned about this risk in its **Patient Safety News** segment on the topic (www.accessdata.fda.gov/scripts/cdrh/cfdocs/psn/transcript.cfm?show=78#5).

Facilities using insulin pens should provide education and continuously monitor pen use to guard against situations where one patient's pen could be used for another patient. Please don't assume that everyone knows not to do this. In one report, a nurse told us that, rather than waiting for pharmacy to dispense a patient's insulin pen, nurses

at her hospital often borrowed a pen from another patient, put on a new disposable needle, and injected a dose of insulin into a second patient using the first patient's pen. The practice was undertaken to meet patients' needs for timely insulin administration and the nursing staff did not perceive the risks associated with this practice.

Labeling each dispensed pen with the patient's name may help to reinforce that the product is intended for that patient alone. If institutional safety with pen devices can't be assured, they shouldn't be used. The FDA also published an alert on March 19, 2009 (www.fda.gov/cder/drug/InfoSheets/HCP/insulin_pensHCP.htm), reminding practitioners about the risk of sharing insulin pens between patients.

Recalled pumps continued from page 1
a contingency plan so that back-up pumps are available; they provided clear instructions for addressing the failure codes and damaged battery messages, and instructions on how to properly clean the pumps (www.baxter.com/about_baxter/news_room/downloads/1-23-09_Final_US_Letter_2.pdf). For more information about the recall, go to: www.baxter.com/about_baxter/news_room/news_releases/2009/03_11_09_colleague.html.

► **Special Announcements**

Smart pump guidelines. ISMP recently held a national forum with pharmacists, nurses, physicians, biomedical staff, and vendors to develop safety guidelines for smart infusion pumps. Funding for this project came from Baxter, B Braun, Cardinal Health, Hospira, and Smiths Medical. Three areas in which facilities consistently need direction were identified: implementation, drug library development, and maintenance and data analysis to guide clinical practice. The guidelines, which center on these topics, are available for public comment (www.ismp.org/tools/guidelines/smart_pumps/comments/) until **May 11, 2009**.

ISMP teleconference. Join us on **April 16, 2009**, for the second session of our teleconference series on high-alert medications, **Reducing the Risk of Patient Harm from Anticoagulation Therapy**, and learn what you need to know to prevent life-threatening adverse events associated with anticoagulant therapy. For details, visit: www.ismp.org/educational/teleconferences.asp.

Unique 2-day program. Attend ISMP's **Medication Safety INTENSIVE** workshop, a one-of-a-kind program that will teach you how to approach medication safety "through the eyes of ISMP." The workshop will be held in three locations during 2009. For details, please visit: www.ismp.org/educational/MSI.

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10-Minute ISMP Survey on Look-Alike and Sound-Alike (LASA) Drug Names

Please take a few minutes to complete our short survey on look-alike and sound-alike (LASA) drug names, and submit your responses by **April 17, 2009**, via our website at: www.ismp.org/survey/Survey200902.asp (or fax to 215-914-1492 if Internet access is unavailable). **We are very interested in the opinions of all staff involved in the medication use process**, including *unit secretaries* who transcribe medication orders and *pharmacy technicians* who help dispense medications. Even if you know little about the topic, ISMP would sincerely appreciate your response to the survey. The survey is longer than usual only because the table for question 10 is detailed to make it easy for you to pick your responses. Completing the survey should take about 10 minutes or less. Thank you for participating in our survey!

1) Does your organization maintain a targeted list of look-alike and sound-alike (LASA) drug name pairs that could be confused with each other?

Yes No Don't know (If you answered "No" or "Don't Know," skip to question 13)

2) Without looking at your organization's LASA drug name pairs list, how many of the name pairs can you cite from memory?

None A few Half Most All

3) After checking your organization's LASA drug name pairs list, how many drug name pairs are on it?

1-5 6-9 10 11-15 Greater than 15

4) How did your organization select the LASA drug name pairs on the list? (Check all that apply)

The Joint Commission LASA list FDA list of drug name pairs with recommended tall man letters
 ISMP LASA list ISMP list of drug name pairs with recommended tall man letters
 USP LASA list Staff reports of mix-ups or potential mix-ups between drugs with LASA names
 Professional or trade literature Don't know
 Other: _____

5) Have you added any new drug name pairs to the LASA drug name pairs list since compiling the initial list in your organization?

Yes No Don't know

6) Has your organization identified risk-reduction steps to reduce confusion between the drug name pairs on the list?

Yes No Don't know (If you answered "No" or "Don't Know," skip to question 13)

7) Has your organization implemented all or some of the risk-reduction steps identified for your organization?

Implemented all Implemented some Implemented none Don't know

8) How did your organization establish the risk-reduction steps for the list of LASA drug name pairs? (Check all that apply)

Analysis of your medication use system ISMP website/resources Don't know
 Best practices/recommendations in the literature Staff suggestions
 The Joint Commission website/resources Safety-focused committee deliberations
 Other: _____

9) Do the risk-reduction steps taken in your organization address the following phases of the medication use process?

Procurement: Yes No Don't know **Drug Storage:** Yes No Don't know
Prescribing: Yes No Don't know **Transcribing:** Yes No Don't know
Dispensing: Yes No Don't know **Administration:** Yes No Don't know

10) Please tell us whether your organization has employed the risk-reduction steps listed in column A.

A. Risk-reduction Steps		B. Are the steps taken in your organization?			
		Yes Fully	Yes Partly	No	Don't Know
1 Limit Access	a. Avoid unit stock of certain concentrations, strengths, forms				
	b. Dispense the targeted drugs in unit doses				
	c. Limit use to a single product/strength				
	d. Limit variety of stock in patient units				
2 Separate Storage	a. Separate LASA drugs in pharmacy				
	b. Separate LASA drugs in patient units				
	c. Separate storage of different strengths, forms, and releases (e.g., immediate/sustained)				
3 Differentiate	a. Stock potentially confused drugs in different strengths (e.g., morphine/HYDROmorphine)				
	b. Change appearance of LASA names on computer screens (e.g., bold font/color/tall man letters)				
	c. Change appearance of LASA names on shelves/bins (e.g., bold font/color/tall man letters)				
	d. Change appearance of LASA names on pharmacy labels (e.g., bold font/color/tall man letters)				
	e. Use auxiliary labels				
	f. Affix "name alert" stickers to areas where look- or sound-alike products are stored				
4 Add Redundancy	a. Prescribe by brand and generic names				
	b. Include brand and generic names on MARs				
	c. Employ double-checks (manual)				
	d. Employ double-checks (technology—bar coding, electronic prescribing)				
	e. Print daily medications from the pharmacy computer system for physician review				
5 Improve Access to Information	a. Specify the drugs' indication when prescribing medications				
	b. Display entire drug names on screen when stems are used as a mnemonic (e.g., "Met")				
	c. Specify the dosage form, drug strength, and complete directions on prescriptions				
	d. Consider the possibility of name confusion when adding a drug to the formulary				
	e. Utilize computer alerts to remind providers about potential problems				
6 Include the Patient	a. Advise patients taking LASA drugs about the risk of mix-ups and how to avoid them				
	b. Encourage patients to question medications that look different than expected				
	c. Investigate patient concerns about drug appearance				
7 Ensure Staff Awareness	a. Periodically educate staff involved in handling LASA drugs about risks and risk-reduction strategies				
	b. Ensure knowledge of differences among LASA drug name pairs (e.g., lipid vs. conventional products, morphine vs. HYDROmorphine)				
8 Others	Please list:				

11) Do you believe the risk-reduction strategies taken in your organization to guard against confusion with LASA drug name pairs have been effective?
 Yes No Don't know

12) Do you believe the risk-reduction strategies taken in your organization to guard against confusion have prevented **you** from making a mistake?
 Yes No Don't know

13) Please check the category that best describes you.

- Staff Pharmacist Clinical Pharmacist Pharmacy Director/Manager Pharmacy Technician Unit Secretary
 Staff RN Staff LPN/VPN Nurse Clinical Specialist Nurse Manager
 Nurse Educator Quality/Risk Physician Other: _____