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# USP Patient Safety CAPSLink™

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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

Radiological procedures provide a valuable and life-saving tool to health care providers in the diagnosis and treatment of medical conditions. Historically, some products used in these procedures (e.g., contrast media and radioisotopes) have not been routinely examined under the scrutiny of the healthcare organization's medication safety program.

JCAHO's new 2004 Medication Management Standards include contrast and diagnostic agents among a list of items defined as "medications"<sup>1</sup>. Reports submitted to USP and reported in the literature<sup>2-3</sup> illustrate the serious neurotoxic effects that can result from errors involving ionic contrast media. Also reported to USP and seen in the literature are a number of adverse events that occur in radiology including allergic reactions and unintended complications of intravenous infiltrations.

However, not all errors that originate in the radiology department are the result of the inappropriate use of a radiographic product. Errors in the radiology department also include the inappropriate preparation of the patient prior to the procedure, incorrect

interruption and/or resumption of an existing IV infusion, and administering the diagnostic medication to the wrong patient. Therefore, it is essential that hospitals and health systems include clinical diagnostic departments, such as radiology, in their strategic medication safety initiatives.

Based on a five-year review of data submitted to USP's MEDMARX<sup>sm</sup> program, there were 912 error reports identified where radiology was listed as the location of the error. Of these, 16.3% (n=149) were categorized as harmful (Categories E-I) with two fatalities (Category I). See Table 1. This harm threshold is eight times higher than the historical MEDMARX overall average harm threshold of 2% .

Table 1<sup>a</sup>

<b>Error Category</b>	<b>Count</b>	<b>Percent</b>
A	23	2.5
B	50	5.5
C	433	47.5
D	257	28.2
E	123	13.5
F	21	2.3
G	1	0.1
H	2	0.2
I	2	0.2
Total	912	100%

a) See [www.nccmerp.org](http://www.nccmerp.org) for complete A-I Category definitions.

The top three most frequently reported **Types of Error** were *Improper dose/quantity*, *Unauthorized/wrong drug*, and *Omission* error.

Table 2. Type of Error<sup>a</sup>

<b>Error Type</b>	<b>Count</b>	<b>Percent</b>
Improper dose/quantity	166	27
Unauthorized/wrong drug	135	22
Omission error	96	15
Wrong administration technique	82	13
Prescribing error	52	8
Wrong drug preparation	33	5
Wrong patient	33	5
Extra dose	20	3
Wrong route	19	3
Wrong time	17	3
Wrong dosage form	1	-

a) Type of Error is a multi-select field. Not all records documented a specific *Type of Error*. Data is based on 622 records representing a total of 654 *Type of Error* selections.

**Selected Cases Reported to USP's MEDMARX and Medication Errors Reporting (MER) Programs:**

**Case #1:** During a code situation in the cardiac catheterization lab, the physician ordered amiodarone 300mg IV push. The catheterization lab technician went to the automated drug dispensing device and typed in “amino” and accepted the first default value (“aminophylline”) that appeared on the automated cabinet’s screen. Unfortunately, a syringe labeled “Aminophylline 50mg” was then retrieved from the automated cabinet. The syringe was passed from the technician to a second technician who then passed it to a registered nurse, none of whom caught the error. The patient received 400mg of aminophylline IV push before the error was discovered.

**Case #2:** A renal patient who was undergoing a cardiac catheterization was ordered the platelet aggregation inhibitor eptifibatide. Dosages for this drug must be decreased for patients with compromised renal function. The product was removed from the automated dispensing device located in the radiology department and, therefore, the physician’s order bypassed an initial review by pharmacy. The patient was administered a dosage used for normal renal function and incurred a massive lower gastro-intestinal bleed. The patient later expired.

**Case #3:** A nephrologist ordered a radiological study to identify a suspected occlusion of an external central venous dialysis catheter that was inserted into a renal patient. An arrangement had been made by a radiologist to provide **IV** contrast to the nephrologist in his office practice where it would be injected under the supervision of the nephrologist. The patient's wife was sent to pick up the **IV** contrast from the radiology department. The wife went to the radiology department and announced she was there to pick up a bottle of x-ray prep for her husband. The radiology staff did not check the schedule to verify the patient's test and handed the wife a bottle of barium sulfate **oral** suspension contrast. The wife returned to the nephrologist's office with the oral contrast. A nurse prepared a syringe containing the oral contrast and injected it into the dialysis catheter. The bottle did not contain any warning that it was for oral or enteral use only. The patient suffered extravasation of the material into the abdomen and prolonged hospitalization. A root cause analysis identified that the labeling on the manufacturer packages of Barium Sulfate suspension did not provide sufficient warnings. Actions taken to prevent future problems included a sign out sheet by radiology staff for both IV and enteral contrasts and the use of auxiliary labels indicating "not for injection" and "for oral use only" placed in two different locations on the container.

**Case #4:** A physician wrote an order for a virtual abdominal scan as "CT Angio Abdom". Both the pharmacist and nurse interpreted the order as “CT of the abdomen”. The patient was given Barium Sulfate, but contrast media was not required for this particular procedure. The administration of the unauthorized drug caused a delay in the CT scan for 2 days. The physician who wrote the order later discovered the error when he reviewed the MAR. A review of this event cited the physician’s abbreviation and the pharmacist’s and nurse’s unfamiliarity with the procedure as possible error cause(s) and contributing factor(s).

**Case #5:** Standard orders for a computed tomography (CT) scan with contrast with certain lab tests (i.e., serum creatinine) were initiated on a patient with no documented history of renal insufficiency. Labs were drawn, but the results had not yet been returned by the time the patient was taken to radiology for the scan. Absent the lab results, the CT technician asked the patient if he had any kidney problems, upon which the patient responded, “no”. Shortly after the test was completed, the lab results arrived and the patient’s creatinine level was 3mg/dl. The patient began to experience low abdominal pain and acetylcysteine was administered to improve renal function and minimize possible adverse effects.

**Case #6:** A patient who was on a heparin drip at 1,000 units per hour via an IV pump was sent to radiology for a MRI. The nurse in radiology discontinued the pump and regulated the heparin infusion with a manual flow device but inadvertently altered the heparin drip rate such that the patient received 20,000 units (8,000 units per hour). A stat aPPT was performed and the heparin infusion held for a period of time. Fortunately, the patient did not experience any significant sequelae.

**Case #7:** A patient who was on an insulin drip and metronidazole IV was sent to radiology for an ultrasound test. When the patient returned to the floor, the IV pump infusing the insulin drip had been switched to “standby” and the metronidazole IV was turned off. A stat blood glucose was ordered and revealed a blood glucose level of 449mg/dl. The insulin drip was re-started and adjusted to address the patient’s altered condition.

### **Recommendations to Improve Safety:**

1. Include radiology and other clinical diagnostic departments within the purview of the organization’s medication safety program.
2. Convene a multi-disciplinary team that includes representation from radiology to conduct a failure mode and effects analysis (FMEA) on the various ways in which potentially serious medication errors might occur when patients undergo radiological procedures.
3. Review boxed warnings such as “Not for Intrathecal Use” or “Not for myelography” placed on product packaging and labeling and assess if additional warning labels, or signs in storage areas, are needed to make such warnings more prominent.
4. Examine where radiographic products are stored throughout the facility, the ease with which they can be accessed, ordering procedures, and the manner in which they are distributed. Pharmacists should play a key role in the ordering, stocking, and dispensing of these products.
5. Review override procedures for retrieving medications from automated drug dispensing cabinets located in ancillary departments and build in additional safety checks to prevent the inadvertent withdrawal and administration of an unintended product. Ensure that all automated dispensing cabinets are electronically linked to the pharmacy computer system so drug withdrawals can be evaluated.
6. Where policies and procedures dictate, ensure that all appropriate lab test results (e.g., serum creatinine) are available to radiology staff prior to initiating any radiological test.
7. Create standardized order forms for radiographic procedures to reduce the use of abbreviations and the incidence of dosage miscalculations. Order forms and policies should be clear that a contrast product will not be dispensed unless the order specifically requests that a contrast agent is to be used.
8. Examine the policies and procedures for interrupting and resuming IV infusions for patients present in the radiology department for a diagnostic procedure. Establish a protocol that will clarify when and how IV infusions should be stopped and resumed in order to eliminate serious patient harm that results from the interruption or mis-programming of IV infusions.
9. Provide routine and on-going staff education for pharmacy, radiology, and nursing personnel regarding the medications associated with radiologic tests and treatments especially when new procedures or tests involving new equipment (e.g., virtual computed tomography [CT] scans) are introduced. Clinical staff also need to readily recognize the signs of an adverse event and have the skills to promptly treat the patient to reduce the risk of a serious outcome.

10. The American College of Radiology (ACR) provides guidelines and standards for a variety of diagnostic, interventional and therapeutic procedures that are available to assist radiologists in their practices.

<http://www.acr.org/dyna/?doc=publications/mnp/standards.html>

The ACR also has a manual that addresses the issues related to contrast media. Radiology departments should monitor and document contrast media reactions and have qualified personnel and equipment available to provide routine and emergency care to patients who experience contrast media reactions.

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(1) A Guide to JCAHO's Medication Management Standards. Joint Commission Resources; 2004  
[www.jcrinc.com](http://www.jcrinc.com)

(2) Bohn HP, Reich L, Suljaga-Petchel K. Inadvertent intrathecal use of ionic contrast media for myelography. *Am J Neuroradiology* 1992;3:1515-19.

(3) Killeffer JA, Kaufman HH. Inadvertent intraoperative myelography with Hypaque: case report and discussion. *Surg Neurol* 1997;48:70-73.



## 1. JCAHO Updates

2005 National Patient Safety Goals Released: The Joint Commission recently posted its 2005 Goals for hospitals which include five of the 2004 goals as well as two new sets of requirements aimed at improving medication reconciliation across the continuum of care and reducing the risk of patient falls. As part of the goal on improving the safety of using medications, accredited organizations must work to prevent errors stemming from look-alike and sound-alike drug names. A recent USP *Quality Review* newsletter can serve as a resource for organizations in meeting this Joint Commission Goal.

<http://www.usp.org/pdf/patientSafety/qr792004-04-01.pdf>

USP has also created a 38 inch by 50 inch wall poster displaying the 800 plus look-alike/sound-alike drug name pairs listed in the above newsletter and may be purchased by calling 1-800-227-8772. Quantities of 1 poster, 10 posters, and 50 posters are available.

The National Patient Safety Goals are reviewed and revised annually by the Sentinel Event Advisory Group. Details about the Goals can be found at:

<http://www.jcaho.org/accredited+organizations/patient+safety/npsg.htm>

Quality performance reports made public: On July 15, 2004 organization-specific performance information was released to the public on the JCAHO web site. It is recommended that all JCAHO-accredited organizations check their data and information on the JCAHO web site for accuracy. The Quality Report includes organization accreditation status, compliance with the National Patient Safety Goals (for organizations surveyed in 2003 and 2004), and, for hospitals, data referencing the National Quality Improvement Goals. Data and information in the Quality Report will be updated quarterly. Access the JCAHO Quality Check tool at: <http://www.qualitycheck.org>

Perinatal areas require further scrutiny: The JCAHO Sentinel Alert issued July 21 discusses the need for organizations to assess perinatal areas to ensure that appropriate neonatal resuscitation areas are fully equipped and functioning. Evaluators recommend standardizing drug availability as a mechanism to help reduce the risk of infant death and injury during delivery.

[http://www.jcaho.org/about+us/news+letters/sentinel+event+alert/sea\\_30.htm](http://www.jcaho.org/about+us/news+letters/sentinel+event+alert/sea_30.htm)

Joint Commission Resources and USP Offer Workshops on Medication Errors: Back by Popular Demand - There are only three remaining, one-day workshops titled - "Transforming Medication Error Data into Meaningful Information". This interactive program will be offered on the following dates in 2004:

- [September 22 in Rockville, MD \(at USP Headquarters\)](#)
- [November 1 in Oakbrook Terrace, IL \(at JCAHO Headquarters\)](#)
- [December 4 in Orlando, FL \(Preceding the ASHP meeting\)](#)

The program is designed for nurses, pharmacists, risk managers, medication/patient safety officers, physicians, and quality improvement staff and will teach participants methods to categorize error events by severity, determine thresholds to signal performance problems, and evaluate the impact of actions taken. For more information and to register call- JCR Customer Service toll free at 877-223-6866 or go on-line at <http://www.jcrinc.com/education.asp?durki=7032&site=5&return=5933>

## **2. Senate Passes Bill for Confidential Error Reporting**

This month the U.S. Senate approved legislation to create a voluntary and confidential reporting system for reporting medical errors. Bill [S. 720](#), would allow physicians, pharmacists, nurses and other health care providers to disclose medical errors without fear of legal action, thereby providing needed information to prevent future medical errors. Under the bill, health care providers can report information on errors to groups called Patient Safety Organizations, which would collect and analyze the data and offer feedback on how to improve care. The bill must now be reconciled with a similar piece of legislation passed by the House (H.R. 663) last March [http://news.yahoo.com/news?tmpl=story&u=/ap/20040723/ap\\_on\\_go\\_co/patient\\_safety\\_2](http://news.yahoo.com/news?tmpl=story&u=/ap/20040723/ap_on_go_co/patient_safety_2)

## **3. FDA Updates:**

Burns in MRI Patients Wearing Transdermal Patches: Certain transdermal patches, like those that deliver nicotine, testosterone and nitroglycerin, can cause burns if a patient wears one during an MRI procedure because some transdermal patches have an aluminized backing <http://www.accessdata.fda.gov/psn/transcript.cfm?show=29#8>

More About Hazards in Patient-Controlled Analgesia: Dangerous overdoses continue to occur with patient-controlled analgesia (PCA) when the PCA pump, designed to prevent overmedication, is manipulated by people other than the patient. <http://www.accessdata.fda.gov/psn/transcript.cfm?show=29#7>

## **4. Deadly Medical Errors are More Widespread Than Previously Reported**

A study released this month by the health care consulting firm HealthGrades estimates that approximately 600,000 fatal medical errors have occurred over the past three years. The number of deaths that result from medical errors is more than double the Institute of Medicine's earlier findings, and technology such as computerized physician order entry and electronic medical records will not prevent a majority of these errors. [http://www.healthgrades.com/media/english/pdf/HG\\_Patient\\_Safety\\_Study\\_Final.pdf](http://www.healthgrades.com/media/english/pdf/HG_Patient_Safety_Study_Final.pdf)

## **5. ASHP Foundation Launches New Medication-Use Safety Award**

The ASHP Research and Education Foundation and the Cardinal Health Foundation recently announced a new award program that will honor a pharmacist-led

multidisciplinary team making significant, institution-wide system improvements relating to medication use. Applications for the inaugural *Award for Excellence in Medication-Use Safety* are due by August. 2. <http://www.excellenceinmeduse.org>

## 6. Applications Due for AHA McKesson Quest for Quality Prize

Applications are now available for the 2005 American Hospital Association McKesson Quest for Quality Prize<sup>SM</sup>: Honoring Leadership and Innovation in Patient Care Quality, Safety, and Commitment. The award is supported by grants from McKesson and the McKesson Foundation. The award winner will receive \$75,000 and two finalists will receive \$12,500 each. Other hospitals may be recognized with Citations of Merit.

In 2005, the AHA McKesson Quest for Quality Prize<sup>SM</sup> will honor organizations that: 1) have committed in a systematic manner to achieving the Institute of Medicine's six quality aims—safety, patient-centeredness, effectiveness, efficiency, timeliness, and equity; 2) can document progress in achievement of multiple aims; and 3) provide replicable models and systems for the hospital field. Applications and information on the prize are available at [www.aha.org/questforquality](http://www.aha.org/questforquality) by calling 312/422-2700, or by writing the Office of the Secretary, American Hospital Association, One North Franklin, Chicago, IL 60606. Applications are due October 15th 2004.

## 7. Annual Study of “Most Wired” Hospitals Released

According to the 2004 Most Wired Survey and Benchmarking Study, the nation's hospitals are making significant headway in building the electronic medical records that health experts believe will improve quality and patient safety. According to the latest survey, of the 101 “Most Wired” hospitals, 90% provide clinicians with access to online medical records, 87% to online medical histories, 88% to online patient demographics and 69% to online nurses' notes. [www.hhnmag.com/](http://www.hhnmag.com/)

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USP operates two complementary error reporting programs; the Medication Errors Reporting Program presented in cooperation with the Institute for Safe Medication Practices and MEDMARX. MEDMARX<sup>SM</sup> is an Internet-accessible, anonymous medication error reporting program and quality improvement tool used to track and trend medication errors.

For more information, visit [www.usp.org](http://www.usp.org)

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