



## Developing a Culture of Safety

In the field of patient safety, the phrase “culture of safety” is used to describe an environment that encourages full and open disclosure of medical errors, near-misses and other actual or potential unanticipated adverse events. In practice, a culture of safety promotes employee communications, teamwork and patient-focused care. Central to a culture of safety is: acknowledgement that an adverse event or near-miss took place; open conversation with the patient (or the patient’s family) about that event; and commitment by the facility and individual healthcare workers to investigate the event, understand how it happened, and determine what steps should be implemented to prevent a similar event from happening in the future.

Three recent articles provide insight into the issues surrounding the development of a culture of safety

within healthcare institutions. First is “The Long Road to Patient Safety: A Status Report on Patient Safety” by Daniel Longo and others, which appeared in the December 14, 2005, issue of the *Journal of the American Medical Association* (JAMA). After surveying over 100 hospitals in Missouri and Utah, the authors conclude that the pace of change in implementing patient safety protocols has been slow, and they call upon healthcare facilities, including boards of directors, medical and other staffs, and administration, to become more aggressive in promoting safe practices. In particular, they note that patients and others in the community are demanding that patient safety become a healthcare priority, while acknowledging that “the road to hospital patient safety is long and complicated.”

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## Unanticipated Care After Discharge from Ambulatory Surgical Facilities

Of the PA-PSRS reports in which patients required hospital-level care within hours or days of treatment at an ambulatory surgical facility (ASF), approximately 12% suggest that activities at discharge and during post-discharge follow-up may have contributed to the events. In a random sample of 100 of these cases, nine required hospital admission and three were treated in the emergency department.

Discharging a patient from an ASF is the culmination of services delivered but not the end of clinical responsibility. Unlike postoperative discharge from a hospital, ASF discharge occurs within hours of the surgical procedure; therefore, an abbreviated time is available to perform patient assessment and provide discharge instructions. During this observation period, heightened sensitivity on the part of the clinician helps to identify and address any physiologic changes from the patient’s preoperative state that would deem discharge unsafe. Additionally, the instructions given to the patient or caregiver—including information regarding how and when to contact the physician or when to seek emergent care—help to ensure a safe postoperative period.

### Follow-Up Care

Once discharged home, the patient is dependent on the discharge instructions to know what to expect during recovery. The patient’s decision to seek follow-up care is based on his or her understanding and tolerance of the perceived acceptable postoperative expectations. Sometimes, the patient’s tolerance is beyond what one should be expected to endure. In other situations, a change in condition may be unintentionally provoked.

*Patient called the surgeon and complained of severe pain. The office encouraged him to take his pain medication. When this did not work, he went to the ED. Patient was found*

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## Letters to the Editor

### PCA by Proxy

*We received the following letter after our article "PCA by Proxy—An Overdose of Care" appeared in the June 2005 Advisory:*

When the Sentinel Event Alert regarding PCA by proxy was issued by JCAHO in December 2004, Abington Memorial Hospital evaluated the safety measures we had in place and looked at additional opportunities to prevent a similar event from occurring within our facility. We found that we had several safety measures already established and initiated others.

As a direct reminder to the patient and his/her visitors, we applied stickers that read "Patient Use Only" to all patient administration pendants. We also incorporated the message that only the patient is to press the PCA button to administer pain medication into our PCA Patient Education tool. Throughout the education tool, it is emphasized that only the patient should press the button for administration of pain medication, and the word "you" is bolded.

The nursing policy for PCA administration clearly indicates that only the patient should press the PCA button, and there are clear guidelines for when the nurse is able to administer a "proxy" dose. Lastly, we attached an index-sized card to the pumps reinforcing the message to patients and visitors that only the patient is to use the PCA button for pain medication administration.

Cindy Koeneman, RN  
Abington Memorial Hospital  
Patient Safety Coordinator

### Automated Dispensing Cabinets

*We received the following letter from a Director of Pharmacy at a Pennsylvania Hospital:*

In reviewing the article "Problems Associated with Automated Dispensing Cabinets" [*in the September 2005 Advisory*] with several multidisciplinary healthcare workers, many came to the conclusion that these automated dispensing cabinets created the problems that were listed and that the problems were not seen prior to use of the automated cabinets. Many workers were left with the impression that the non-automated floor stock method was just as safe.

The article did lack two significant points: First, that the automated dispensing cabinets are a large improvement over the original non-

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Anita Fuhrman, RN, BS (Lebanon Outpatient Surgical Center, PSA Board Member)

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## Letters to the Editor (Continued)

automated floor stock method due to better drug security, better drug tracking, better drug reporting, and improved retrospective review capability—all of which will lead to better patient outcomes and increase patient safety. Second, automation itself allows the shortcomings to be tracked as well as they are. Without the automated cabinets, the data points that were quoted within the article would be severely limited or nearly non-existent.

The article never gave the impression of a "step-in-the-right direction" and left people with the thought that these types of errors were never seen in traditional/original non-automated floor stock scenario still used in some hospitals. The automation actually highlights the frailty of the systems used prior to their creation.

*Editor's note: We, too, believe automation, technology and automated dispensing cabinets (ADC) are a "step in the right direction" and have the potential to improve the safety of the medication use process. The writer makes a strong point that the feature of ADCs that allows tracking of medication removal provides us insight into the types of errors*

*that occur not only with ADCs but also those that likely have been occurring with traditional, non-automated floor stock systems. As the writer suggests, the intent of the original article was not to say that the types of errors described never occurred in traditional, non-automated systems - but rather that ADCs are not a panacea for the prevention of these types of errors, especially if safety upgrades have not been put in place.*

*Based on reports submitted to PA-PSRS, we feel that the implementation, design, and use of ADCs often limits the safeguards we all believe ADCs can deliver. Though upgrades to ADCs, such as warnings on interactions, drug duplications, and other safety alerts offer advancement for medication safety, many facilities still use older systems that only control access or storage. This would not be an issue except that many healthcare facilities have replaced medication exchange cassettes with ADCs without incorporating the most recent safety enhanced software upgrades. We hope facilities will use the article not to justify a step away from this technology, but rather to realize the benefit and importance of the available ADC safety features and to move forward implementing them to improve the safety of the medication-use process.*

### Upcoming Patient Safety Symposium

The Patient Safety Authority will co-sponsor this annual conference being developed by the Hospital and HealthSystem Association of Pennsylvania (HAP). With a theme of "Taking it to the Next Level: Practical Solutions for System-Level Change," the 2006 Patient Safety Symposium will bring together key stakeholders from Pennsylvania's hospital community to focus on practical strategies for promoting patient safety.

Keynote speakers will include Dr. Robert Wachter, author of the best-selling book *Internal*

*Bleeding: The Truth Behind America's Terrifying Epidemic of Medical Mistakes* and David Marx, JD, author of *Patient Safety and the 'Just Culture': A Primer for Healthcare Executives*. Breakout sessions will focus on organizational culture, effective communications, root cause analysis, and infection control protocols.

The conference is being held March 9, 2006, at the Holiday Inn Harrisburg-Hershey. Registration information is available on HAP's web site at [www.haponline.org](http://www.haponline.org).

## Developing a Culture of Safety (Continued)

(Continued from page 1)

The second article is by Lucian Leape, often described as the “father” of patient safety. In “Ethical Issues in Patient Safety” [Thoracic Surgery Clinics. 2005 Nov;15(4):493-501], Dr. Leape challenges healthcare workers, physicians in particular, to recognize the moral imperative behind full and open disclosure. While Dr. Leape distinguishes between “blame-free” and “non-punitive,” he emphasizes physician accountability. I encourage all clinicians and administrators to read, and then share, this important article, which should become required reading in all medical schools.

The third document helps bridge the gap between the above “calls to action” and an effective institutional and provider response. In a recent directive, the Veterans Health Administration of the U.S. Department of Veterans Affairs makes very clear its institutional commitment to full and open disclosure by codifying its internal protocols for acknowledging adverse events. See “Disclosure of Adverse Events to Patients” (VHA Directive 2005-049), accessible

on the website at <http://www1.va.gov/vhaethics/download/AEPolicy.pdf>.

More than six years after the release of the seminal IOM report, *To Err is Human*, the healthcare industry is still struggling with issues related to patient safety. In closing, let me quote from a JAMA editorial accompanying the Longo article cited above: “Improving the safety of patient care must be a high priority for all clinicians and administrators....To improve safety substantially, clinicians and managers must discover what policies and measurements are producing the behaviors that continue to make the system unsafe.”

That, really, is the mission of the Patient Safety Authority and the goal of the PA-PSRS system: to identify problems and recommend solutions that promote patient safety.

Alan B.K. Rabinowitz  
Administrator  
Patient Safety Authority

## Unanticipated Care After Discharge from Ambulatory Surgical Facilities (Continued)

(Continued from page 1)

*to have urinary retention; a Foley catheter was placed. Medicated for pain with IM medication and discharged to home.*

*Patient discharged to home stable. Forty-eight hours later, notified doctor of bleeding. Had resumed taking ASA. Admitted to hospital for bleeding.*

In the first case, it appears that assessment of the location of the patient’s pain may have been inadequate. In the second case, aspirin (ASA) resumption immediately after a procedure may have caused, or at least increased the risk of, bleeding. We do not know whether the patient resumed taking aspirin with or against advice given at discharge.

### Managing Care Postdischarge

Discharge instructions are given to the patient to bridge the care from the ASF to the home, to help ensure the continuation of symptom relief and patient monitoring, and to indicate when the doctor should be notified and/or when follow-up care is needed. Typically, these instructions include a list of prescribed medications, diet and activity restrictions, side effects related to surgery and anesthesia, with emphasis on symptoms of complications related to the specific surgical intervention. Treat-

ments, procedures, and follow-up tests are usually outlined in the instructions, as are postoperative appointments.<sup>1</sup>

PA-PSRS reports indicate that patients seek post-discharge medical intervention for a variety of reasons, but bleeding and pain are mentioned most frequently. A few reports also describe complaints of nausea/vomiting or urinary retention. In several reports, delays in seeking medical attention have occurred. Timely access to care may be related to patient compliance with discharge instructions; to a patient’s understanding of postoperative expectations; or to a patient’s convenient access to care.

Delays in seeking additional medical care may involve patients who experience bleeding or potential organ perforations, as the following cases indicate:

*Patient with a history of ulcerative colitis had routine colonoscopy. During the procedure, two polypectomies and several biopsies were performed. Discharge to home without problems or complaints. Patient called the doctor’s office six days later with a complaint of bloody stool; this was the first bowel movement since the procedure. Patient was admitted, received a unit of PRBCs, and was discharged in 48 hours.*

## Unanticipated Care After Discharge from Ambulatory Surgical Facilities (Continued)

*Patient reported to emergency room with complaints of abdominal pain three days post-colonoscopy with hot biopsy polypectomy. Diagnostic studies revealed free air in bowel. Perforation confirmed and colon resection performed.*

Discharge instructions can emphasize specific information on the risks related to the procedure, such as bleeding, abdominal distention without flatus, or lack of bowel movement, and can instruct patients who experience these complications to contact the physician. Consider defining the time parameters related to the specific surgical procedure so that the patient and caregiver have clear directions regarding when to contact the physician and what to communicate.

### Postoperative Bleeding

In a study at the SUNY Health Science Center at Brooklyn, bleeding was found to be the primary reason for patients to seek emergency department care after a procedure in an ASF. The study suggested that patients be better informed about when bleeding is expected and that they receive instructions outlining what to do when bleeding occurs.<sup>2</sup> Although some postoperative bleeding is to be expected, the amount of incisional bleeding can be clarified. It is important that the patient know how to apply pressure to the wound and to change or reinforce dressings, as well as when to contact the physician.<sup>3</sup> Bleeding, although high on the list of reasons for seeking follow-up care, has remained low in volume, considering the high volume of surgical interventions at ASFs.<sup>3,4</sup>

### Postoperative Pain Management

Pain after ambulatory surgery can be managed at home, but only when expectations of pain levels and anticipated relief from analgesia are clearly communicated.<sup>3</sup> Patient education often addresses what degree of pain to expect. Pain or discomfort is best discussed when an objective system of monitoring is used, similar to what is applied at the ASF postoperatively. For example, if a verbal numeric rating scale of 1 to 10 is employed to assess pain in the postanesthesia care unit, the patient can be instructed to use this scale when communicating with the physician. Additionally, when informing patients of anticipated postoperative pain and time frames for analgesia, applying the same pain scale will help to eliminate ambiguity.

Objective parameters for measuring pain postoperatively are particularly important and allow for a smooth transition when a change in pain management occurs from postanesthesia to oral analgesia

in home care.<sup>3,5</sup> A speedy discharge with timely recovery can be projected if pain is well managed.<sup>1,3</sup> In the following case, the patient initially may have had satisfactory relief postdischarge, but discomfort became unmanageable:

*Patient had right-wrist fusion done and met criteria for discharge three hours after procedure. On the afternoon of the following day the patient was admitted to the hospital for pain relief per physician's office.*

Accrediting organizations such as the Joint Commission on Accreditation of Healthcare Organizations emphasize improved management of patients' pain as the "right thing to do."<sup>6</sup> One article indicated that standardizing pain management, staff education, and standing orders improved pain management in the ambulatory setting.<sup>7</sup> Preventive analgesia is suggested using a multimodal, synergistic approach with a nonsteroidal anti-inflammatory drug (NSAID), opioid, and local anesthetic.<sup>3,8</sup> Critical to analgesia selection is the concomitant communication of side effects. Patients may choose less-than-adequate pain relief over analgesic side effects. It may be productive to explore this trade-off with the patient in an effort to identify the optimal pain-relief regimen with tolerable side effects,<sup>5</sup> with the understanding that it is better to maintain control of pain than try to regain it after it has been lost.

### Format of Discharge Instructions

Most ASFs have developed standardized forms covering the various discharge needs of the postoperative patient. These forms typically include reminders to the clinician to cover essential information, but total reliance on standardized forms can be problematic, as the following case indicates:

*Patient resumed Coumadin post-op tonsillectomy and developed bleeding requiring admission to the hospital and return to the OR for cauterizing of bleeding site. Dr. signed standard discharge instruction sheet indicating patient to resume medication unless otherwise indicated.*

A patient's presurgical medications are usually resumed postoperatively, only after physician review of each medication and any related risks associated with the surgical procedure. PA-PSRS reports indicate that when patients fail to follow instructions and continue to take coumadin and ASA/NSAIDs postoperative bleeding requiring emergent follow-up care may occur. Patient education can obviate the risk of bleeding associated with these drugs.<sup>9</sup>

## Unanticipated Care After Discharge from Ambulatory Surgical Facility (Continued)

In response to the case reported above, this facility changed its medication documentation to prevent similar events from occurring to other patients. Now, anticoagulants are flagged on routine preoperative review with a “med alert” sticker to help ensure that clinicians recognize and are attentive to the risks associated with this type of medication.

### Patient Compliance with Discharge Instructions

Traditionally, patients sign discharge instructions that indicate comprehension and represent an informal agreement that the recommendations will be followed. However, two telephone surveys of postoperative patients indicate that patients are not always compliant, especially with limitations on driving and recommendations to avoid alcohol and to have a caregiver available.<sup>10,11</sup> The best method to ensure patient compliance has not been proven.

### Sample Discharge Record

A sample comprehensive discharge record can be found in the Association of periOperative Registered Nurses (AORN) *Ambulatory Surgery Principles and Practices*. This sample form lists pertinent criteria, including the following issues mentioned in PA-PSRS reports:<sup>12</sup>

- ASA or ASA product resumption
- Doctor notification in the following instances:
  - Elevated temperature over 100°F
  - Ineffective pain management
  - Nausea/vomiting or excessive bleeding
  - Inability to urinate by [specify time]
  - No bowel movement after 24 hours

In addition, the article “Patient Care after Discharge from the Ambulatory Surgical Center” addresses the general discharge needs of the surgical patient and details various surgical complications, risks, and suggested methods of symptom management.<sup>1</sup>

### Conclusions

An *American Journal of Surgery* article states that “unplanned admission following ambulatory surgery is relatively rare but could reflect overall quality in terms of the system, physician, and patient.”<sup>9</sup> With the volume of ambulatory surgical services growing exponentially, providing safe care beyond the walls of the ASF is everyone’s goal.<sup>13</sup> Comprehensive discharge instructions include critical information for the patient and caregiver and provide for both optimal patient outcomes and staff satisfaction in delivering quality care.

Consider whether your facility’s discharge protocol addresses the following elements:

- Managing care beyond the ASF by providing well-defined, objective criteria for seeking follow-up care or physician contact.
- Discussing pain management expectations, trade-offs, and alternatives with the patient.
- Addressing incisional bleeding, dressings, pressure dressings and when to contact the physician for further intervention.
- Reviewing preoperative medications and postoperative resumption of medications, with special attention to anticoagulants.
- Reinforcing the risks related to specific instructions, such as driving within 24 hours postoperatively or lacking a supportive caregiver.
- A comprehensive discharge checklist.

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## Stress Management in Response to Practice Errors: Critical Events in Professional Practice

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*PA-PSRS invited this article from Dr. Wolf in response to reports submitted to PA-PSRS in which it was evident that healthcare workers also needed support following events involving patient harm. Those readers who have attended PA-PSRS training sessions may remember Dr. Wolf, who was featured in the video Beyond Blame, which was shown during the training sessions.*

*John R. Clarke, M.D., Editor*

Healthcare providers have been educated to believe that they must perform perfectly in clinical practice. Recent studies and initiatives are dispelling this myth and compelling providers to accept their fallibility. Many safety initiatives require nurses, physicians, and pharmacists to change entrenched behaviors and develop additional interdisciplinary skills. However, accepting human imperfections and practicing safety initiatives fail to eliminate the immediate and persistent stress that providers experience because of occurrences involving healthcare errors.

When nurses, physicians, and pharmacists make medication errors, they respond emotionally, socially, culturally, spiritually, cognitively, and physically. They are fearful and distressed by the real or imagined consequences of the mistakes. Chief among providers' concerns is that they have harmed a patient.<sup>1</sup> The personal and professional impact on them is tremendous. The stress that accompanies the error remains throughout the provider's career as situations bring the memory back.

A medication error is described below. In this passage, the nurse expresses her concern for the patient, her embarrassment, and her vow regarding how she intends to behave when colleagues make mistakes:

*I was a new R.N. in PICU. I had previously worked in NICU for several years, so that was the experience, knowledge that I was coming with. Anyway, I had received a 15-year-old boy post-op from open heart surgery. I was to start a calcium infusion, so I did. What I did wrong was I did not run the infusion through a central line, but rather through a peripheral line (this was our practice in NICU). Several hours later, I noticed a red area above his IV dressing, and when I took down the dressing, I realized that he had a calcium burn of about 3 to 4 cm long and 1 to 2 cm wide on his forearm. I immediately stopped the infusion and notified the phy-*

*sician, and told him and his parents what I had done. I was noticeably upset. The physician tried to make me feel better by saying, "At least his fingers won't fall off" which was okay; that comment did not bother me. The charge nurse said, "Don't you know we do not run calcium through peripheral lines here?" That comment upset me greatly—what a stupid thing to say—"Yes I did know but did it anyway?" That night I dreamt that when I removed the dressing from his arm, his fingers were black and fell off. I was scared to come to work the next day and see the shape of his arm. When I arrived at work, I asked the charge nurse (a different one than the previous day) how his arm was. She said, "It is horrible. Who could be so stupid as to do that?" Again, I was horrified. When I did finally get the courage to check his arm, the burn had been reduced to about 1 cm by ¼ cm and was healing wonderfully. If I am ever the one to deal with a medication error, I will never use the words "Didn't you know?" I learned that conscientious healthcare workers who make mistakes will punish themselves way more than we can or ever should. They need our support, not to be belittled and made to feel stupid.*

This critical event, similar to those in which many nurses, physicians, and pharmacists have been involved, provides a picture of hospital life. Analysis of incidents in acute care and other healthcare agencies helps healthcare professionals to evaluate safety systems in work environments.<sup>2-4</sup> The critical-incident technique<sup>5,6</sup> and root-cause analysis play a crucial role in determining the patterns and processes involved in healthcare errors and provide options for systems improvements. What is seldom examined using the critical-incident technique is the impact of healthcare errors on the providers involved in the mistakes. Their suffering is often poorly understood. When not supported, they are at risk of exhibiting lower productivity and terminating their employment. Providers may be expected to cope with the aftermath of practice errors. They often must cope alone.

Three types of approaches to healthcare-associated critical events exist, and all three are applicable to practice errors and focus on normal working environments and self-reporting. The critical-incident technique originated with the idea that to be considered critical, an event "must be performed in a situation where the purpose or intent of

## Stress Management in Response to Practice Errors: Critical Events in Professional Practice (Continued)

the act seems fairly clear to the observer.”<sup>7</sup> The technique has been used to stimulate reflection about clinical practice and develop problem-solving skills.<sup>8-11</sup> The critical-incident technique has also been used to evaluate healthcare provider performance<sup>10</sup> and has been used in research.<sup>12-15</sup> The technique provides a method of evaluating systems in work environments that plays a crucial role in interpreting systems behavior.<sup>16</sup> In this last application, the technique revolves around using procedures systematically to identify behaviors that contribute to the success or failure of individuals or organizations in specific situations and, as such, addresses task performance.

Critical-incident stress management (CISM) is a complex program intended to decrease the effects of critical-incident stress before reactions are well established. It has been used to assist healthcare providers who are involved in work-related critical incidents to reduce emotional and physical stress responses associated with serious occurrences. It is intended to promote healthy coping and high morale in organizations.<sup>17,18</sup> In the context of CISM, a critical incident is defined as a traumatic event that is shocking; a strong response occurs during or after the event and can interfere with normal coping abilities. Examples of critical incidents are serious injury, the death or homicide of a staff member at work, line-of-duty injury or death; multiple events that involve serious trauma, the unexpected death or serious injury of an infant or a child, patient suicide, care of perpetrators and survivors of domestic violence, prolonged rescue work, disasters, high-publicity events and crimes, exposure to dismemberment, and assaults directed at the staff.<sup>19-21</sup>

CISM protocols are based on a team approach; the team is composed of mental health professionals and peer-support personnel. Team members attend training programs. Many services, such as defusing, debriefing, referral, and education, are provided to personnel involved in traumatic events.<sup>22</sup> Early intervention is emphasized, using needs assessment intended to support involved personnel. Although CISM protocols are typically used to mediate the effects of traumatic experiences on personnel involved in large-scale missions related to rescue or disaster relief, some programs may be used to support individuals. The core components of CISM are pre-crisis preparation; demobilization and staff consultation (rescuers); group information briefing for stakeholders; defusing; critical incident stress debriefing; individual crisis intervention; family CISM; organization consultation; and follow-up referral.<sup>17</sup>

*Clinical practice is high-consequence work performed in high-consequence systems.*

Healthcare providers work in high-risk areas, and emergency units, operating rooms, and intensive care units are considered to be areas of higher risk than others.<sup>23</sup> Clinical practice is high-consequence work performed in high-consequence systems. Thus, the impact

of errors on patients, providers, and family members can be personally devastating. Published accounts on CISM programs do not indicate that crisis counseling has been used explicitly to support health-care providers involved in devastating and serious healthcare error events. Nonetheless, it is worthwhile to apply CISM to “offset the potentially devastating impact that exposure to trauma can have.”<sup>24</sup> The CISM model can be expanded to assist wounded providers who have made errors.

For more than 10 years, the University of Virginia Health System has included a CISM program within its Faculty and Employee Assistance Program (FEAP). The FEAP newsletter provides guidelines on critical-incident stress and its management.<sup>25</sup> The program manager stated that the FEAP program does not differentiate incidents involving healthcare errors and other abnormal stress events. He estimated that each year, the program staff meets with three healthcare providers who have been involved in healthcare errors.<sup>26</sup>

CISM programs have not been consistently used to support healthcare professionals involved in serious errors. However, interventions that support recovery are worth considering because of the high likelihood that errors will occur and that providers will suffer from such traumatic events. For example, nurses, pharmacists, and physicians experience a barrage of emotions that exhibit their distress. They feel guilty, worried, nervous, humiliated, uncomfortable, and frustrated; become hyper-vigilant; and wish to make amends. In addition to worrying about how patients suffer because of errors, providers fear facing disciplinary action, being sued, and losing the respect of coworkers, patients, and family members. Providers lose confidence in their clinical abilities and fear being judged as incompetent or careless. Aside from reprimands from colleagues and supervisors, the public disclosure of errors is very embarrassing and takes various forms, including listing of names on incident reports, involvement in root-cause analyses, notations on personnel re-

## Stress Management in Response to Practice Errors: Critical Events in Professional Practice (Continued)

cords, referrals for education and remedial action, criminal prosecution, and termination of employment.<sup>1,27,28</sup> Incidents involving healthcare errors differ from other critical incidents because providers often attribute the occurrence of the mistake to their own performance and to systems problems. The effects of serious practice errors as situational crises include personal uncertainty about performance, changes in family relationships, disruptions of work environments, and potential threats to financial stability. CISM programs support recovery and focus on caring for caregivers. They are professional social support systems staffed by well-trained full-time employees and volunteers. These programs are needed to manage and reduce the stress of healthcare providers. CISM programs augment the support given to healthcare providers by the network of friends, family members, colleagues, and managers as well as supportive patients, patients' family members, nurses, pharmacists, and physicians. They help new and experienced providers deal with the myriad stressors associated with mistakes made at work.

CISM training focuses on the value of human resources to organizations. CISM training is becoming more common and may be helpful for personnel who respond to critical incidents in the workplace. Employee assistance programs have translated the principles and strategies of CISM models, crisis intervention theory, and treatment of traumatized and bereaved individuals into work site interventions.<sup>29</sup> It is important to recognize the need to have CISM programs to assist healthcare providers who have made errors, as those programs have been created to mitigate responses so that suffering is reduced and competent professionals are retained.

Healthcare providers will continue to take personal responsibility for safe practice and to strive to prevent errors. Patient safety committees work determinedly to reduce and eliminate errors and to improve provider safety and agency safety practices, illustrating one aspect of an expanding commitment to safety. Moreover, avoiding punitive responses when providers make mistakes and ensuring that no reprisals occur when errors are reported will help to reduce the amount of additional stress on providers after they make an error. Developing a work culture in which employees communicate freely regardless of authority level will greatly assist safety efforts, as will evaluating provider competencies and supporting ongoing educational programs.

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### Brevity Is the Soul of Wit, But Not of Safety

PA-PSRS received a report of an overdose of morphine via PCA. The complete narrative read "PCA pump set incorrectly. Pt. required CPR and intubation." The cause of the problem, inferred from the narrative, was incorrect programming of the PCA pump. Information in the patient's record and the incident report provides a more complete account.

The patient was transferred from another facility to repair a complex fracture, arriving in the middle of the night. In the morning, the patient's request for medication to control the pain, exacerbated by the transfer, brought to light the absence of a pain medication order.

The patient was ordered an injectable synthetic narcotic, every 6 hours as needed. This proved inadequate. Three hours later a second dose was given, and a 75 microgram fentanyl patch was added. This combination proved inadequate. Seven hours after that, a morphine PCA was added just before change of shift with 1 mg/hr base rate and 1 mg on patient demand with 8-minute lockout. The patient complained of itching and was given benadryl.

An hour later, after change of shift, the new evening nurse observed that the patient was hard to arouse. The nurse stopped the base rate infusion, leaving the patient on demand only mode. Five hours later, the patient was observed to be more arousable, but three hours later was unresponsive.

When seen by the same nurse an hour after that, the patient was both unresponsive and briefly without a pulse. CPR was initiated, and the patient was intubated. The pupils were pinpoint and Narcan was given. The patient responded to the treatment.

The physician on the scene told the covering attending that the fentanyl patch was no longer present, but inspection showed the patch in place. It was removed. Inspection also showed large areas of urticaria. In trying to determine how much morphine the patient had received, the pump's memory revealed that no doses had been given on demand, that 14 mg of morphine had infused total and that the pump had been programmed to stop the base rate infusion at the AM hour, not the PM hour that the nurse wrote in the notes.

The complete narrative makes it obvious that more problems were present:

- The patient's pain was poorly managed by the physicians.
- A likely allergy to morphine was not managed appropriately.
- The patient's overdose was not identified in a timely fashion.
- The assessment of the patient by the physician during the resuscitation was incomplete.
- The specific programming problem was the same as many experience with their alarm clocks, setting for PM when they intend AM or visa-versa.

An understanding of the event produces more useful information than a classification of the event – an understanding that may prevent many more problems in the future – an understanding that can be conveyed in a narrative description.

## The Beers Criteria: Screening for Potentially Inappropriate Medications in the Elderly

Prescribing medications for elderly patients presents many unique challenges. As we age, our bodies undergo physiologic changes that affect how medications are absorbed, distributed, metabolized, and eliminated. These changes often make elderly patients more sensitive to the effects of medications. However, there are criteria that can help practitioners reduce the risk of patient harm by guiding more appropriate drug selection in the elderly commonly known as the Beers Criteria.

Between 1960 and 1994, the number of persons aged 65 and older doubled, and individuals aged 85 years and older increased 274%.<sup>1</sup> Today, people over age 65 account for 15% of the US population but consume more than one-third of all prescription and over-the-counter (OTC) medications.<sup>2,3</sup> In Pennsylvania, 41% of patients admitted to the hospital are 65 years or older.<sup>4</sup> It should therefore come as no surprise that patients over age 65 are involved in 41% of the adverse drug reaction reports and almost 60% of the medication-related fall reports submitted to PA-PSRS.

### Pharmacodynamics in the Elderly<sup>5</sup>

As a person ages their total body water decreases while their relative percentage of body fat increases. These changes affect how some drugs are distributed in the body. The decrease in total body water can lead to higher blood concentrations of some water-soluble drugs. The relative increase in body fat may increase the total amount of drug stored in the body for lipid-soluble drugs and may result in longer half-lives of those medications. Some drugs bind to albumin in the blood stream, but with age, serum albumin levels decrease. This may enhance a drug's effect by increasing serum concentrations of unbound (active) drug.

Many medications are metabolized by the liver. With age, decreased hepatic mass and hepatic blood flow can slow the rate of hepatic elimination. In addition, hepatic clearance of many drugs, such as diazepam, amitriptyline, and chlordiazepoxide, carried out by the cytochrome P-450 system often diminishes with age. Overall, the clearance of drugs metabolized by the liver is typically decreased 30 to 40% in the elderly.

Renal size and renal blood flow also decrease significantly with age. However, serum creatinine levels may remain within normal limits because the elderly have less lean body mass and produce less creatinine. These "normal" serum creatinine levels

may mislead practitioners to believe that drug adjustments for renally excreted drugs are not necessary. However, this is often not the case, as these physiologic changes to the kidneys decrease renal clearance of drugs necessitating a dose adjustment.

Many drugs produce active metabolites in clinically significant concentrations. Examples include some benzodiazepines (e.g., diazepam, chlordiazepoxide), tertiary amine antidepressants (e.g., amitriptyline, imipramine), antipsychotics (e.g., chlorpromazine, thioridazine, risperidone), and opioid analgesics (e.g., meperidine, propoxyphene). Age-related decreases in renal clearance, particularly in patients with any additional renal disease, can lead to increased accumulation of these metabolites, increasing the risk of toxicity unless maintenance doses are reduced.

### Adverse Drug Events and Beers Criteria

Many studies demonstrate the vulnerability of elderly patients to adverse drug events (ADEs) that may be due to the physiologic changes of aging. Problems in this population such as depression, constipation, falls, immobility, confusion, urinary retention, incontinence, anorexia, and hip fractures have been linked to *preventable* ADEs. One study showed that 30% of hospital admissions of elderly patients may be linked to drug-related problems including toxic effects.<sup>6,7</sup> A 1997 study of ADEs found that 35% of ambulatory older adults experienced an ADE and 29% required health care services (physician, emergency department, or hospitalization) for the ADE.<sup>6</sup> ADEs also affect drug regimen adherence in the elderly. A study of 20 elderly patients hospitalized due to non-adherence found that adverse effects were the most common reason (35%).<sup>8</sup> Data from PA-PSRS show that 62% of medication-related falls that result in a Serious Event affected the elderly.

In 1991, 13 nationally recognized experts in geriatrics reached a consensus on explicit criteria for certain medications that may lead to ADEs and were considered to be inappropriate for use in nursing home patients. These criteria were originally developed by Dr. Mark Beers and are commonly referred to as the "Beers Criteria." The criteria, most recently updated in 2003,<sup>9,10</sup> are based on the risk-benefit definition of appropriateness, meaning that the use of a medication is considered to be appropriate if its use has potential benefits that outweigh potential risks.<sup>11</sup>

## The Beers Criteria: Screening for Potentially Inappropriate Medications in the Elderly (Continued)

The Beers criteria define three categories of drug use or selection that are inappropriate for elderly patients. The categories, along with some examples are:

1. Inappropriate drug choice, i.e., medications generally to be avoided in the elderly population. Examples include:
  - a) Long-acting benzodiazepines, including diazepam (VALIUM), flurazepam (DALMANE), and chlorthalidone (LIBRIUM) which have long half-lives. This can lead to accumulation of the drug, leading to excessive sedation and an increase in the risk of falls and fractures.
  - b) Meperidine (DEMEROL), which can cause confusion and its metabolites can lead to seizures.
  - c) Anticholinergics and antihistamines, including diphenhydramine (BENADRYL), chlorpheniramine (CHLORTRIMETON), hydroxyzine (ATARAX, VISTARIL) and promethazine (PHENERGAN). These agents have potent anticholinergic effects and cause confusion and sedation. Diphenhydramine may be used in the lowest effective dose and only for emergency treatment of allergic reactions.
2. Excess dosage, i.e., medications at a dose or duration of therapy not to be exceeded. Examples include:
  - a) Long-term use of stimulant laxatives such as bisacodyl (DULCOLAX) and cascara sagrada, which may be appropriate in the presence of opiate analgesic use, but may exacerbate bowel dysfunction.
  - b) Doses for digoxin (LANOXIN) should not exceed 0.125 mg/day except when treating atrial arrhythmias. Diminished renal clearance of this medication increases the risk of toxicity.
3. Drug-disease interaction, i.e., medications to be avoided for patients with specific comorbid conditions. Examples include:
  - a) Patients with cognitive impairment receiving medications such as barbiturates, anticholinergics and muscle relaxants, which can worsen cognitive performance.
  - b) Patients with a history of syncope or falls receiving medications such as short or intermediate-acting benzodiazepines and tricyclic antidepressants (amitriptyline [ELAVIL], doxepin [SINEQUAN], and imipramine [NORPRAMIN]) which may produce ataxia, impair psychomotor function, and increase falls.

The Beers criteria are intended for persons older than 65 years of age, regardless of their level of frailty. The criteria also provide a rating of severity for adverse outcomes (severe vs. less severe) as well as a summary of the prescribing concerns associated with the medication. An abbreviated list of these medications can be found in Table 1. A complete list is available at <http://mqa.dhs.state.tx.us/qmweb/MedSim/MedSimTable1.htm>.

Today, the Beers criteria are the most widely used criteria for identifying drugs that potentially increase the likelihood of ADEs in elderly patients.<sup>12</sup> The criteria were adopted by the Centers for Medicare & Medicaid Services (CMS) in July 1999 for evaluation of medication therapy in nursing home patients.

Numerous studies confirm that contraindicated medication use remains a serious problem for the elderly in a variety of healthcare settings.<sup>13-15</sup> However, until recently, there was no published evidence demonstrating that the medications listed on the Beers criteria were actually associated with adverse outcomes. In Spring 2005, a study of the association between potentially contraindicated prescribing and hospitalization and death among elderly nursing home residents showed that:<sup>16</sup>

- a) The risk of hospitalization was almost 30% higher among residents who, in the preceding month, received potentially contraindicated medications that appear on the Beers criteria, and 33% higher among residents who received these medications for two consecutive months, compared with residents with no exposure.
- b) The odds of death in any month were 21% higher among residents who had exposure to these medications during the month of death or the preceding month, compared to those with no exposure.

## The Beers Criteria: Screening for Potentially Inappropriate Medications in the Elderly (Continued)

A second study published this year showed a positive association between adverse drug reactions (ADRs) and drug prescribing practices that are contrary to the Beers criteria.<sup>12</sup> Patients who experienced ADRs received a greater number of potentially inappropriate medications. In addition, there was a positive correlation between the number of ADRs and the number of prescribed drugs. The study also found a positive association between potentially inappropriate drug prescribing, as defined by the Beers criteria and ADRs, some of which were *preventable*, among elderly outpatients.

Analysis of PA-PSRS data shows that many reports of ADRs and falls involving the elderly cite a medication that appears on the Beers criteria, such as meperidine (DEMEROL), temazepam (RESTORIL), promethazine (PHENERGAN), and diphenhydramine (BENADRYL). Twenty percent (20%) of those ADR reports in patients over 65 describe patients receiving PHENERGAN (promethazine) and developing mental status changes such as agitation, "jitters," and restlessness. Also, 58% of all medication-related falls in the elderly involve medications categorized as benzodiazepines or opiates, some of which may be contraindicated according to the Beers criteria.

### Conclusion

The use of medications in the elderly population presents many challenges for all healthcare practitioners. Due to metabolic changes, the elderly are more prone to ADEs as well as ADRs. Though Beers' 1991 criteria were developed for elderly nursing home residents and the 1997 criteria for community-dwelling elderly, these criteria can also be used in the acute care setting. The latest studies suggest that many ADRs we attribute to medications in the elderly may actually be due to *preventable* ADEs. If the Beers criteria were followed, these ADRs may not have occurred.

The following practices may help to prevent ADEs and ADRs among the elderly:

- Reviewing the medication profile upon admission and discharge against the Beers criteria. Consider substituting non-drug based treatments. For example, studies have shown that non-pharmacologic sleep protocols for inpatients are an effective means of reducing the use of sedatives and the risks of ADEs.<sup>17</sup>
- Placing alerts into pharmacy order entry systems and computerized prescriber order

entry systems for those medications on the Beers list that are prescribed for patients over age 65.

- Increasing practitioner awareness of the Beers criteria through educational sessions and distributing laminated lists of the Beers criteria.
- Monitoring elderly patients for ADRs and potential ADEs who are receiving medications that appear on the Beers criteria.
- Identifying medications in your reports to PA-PSRS for those patients involved in falls to help identify those medications that are most problematic to this population.
- Analyzing reports of ADRs, falls, and medication errors in your organization's PA-PSRS reports for patients over age 65 to see if they were receiving medications that may not follow the Beers criteria.
- When it is medically necessary to prescribe a drug to an elderly patient that is on the Beers criteria, consider starting at the lowest possible dose. For example, medications like PHENERGAN (promethazine) could be prescribed at doses as low as 6.25 mg, which may reduce the likelihood of an ADE.

By paying special attention to elderly patients who are receiving medications that appear on the Beers list we may be able to *prevent* ADEs and ADRs in this vulnerable population.

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## The Beers Criteria: Screening for Potentially Inappropriate Medications in the Elderly (Continued)

Table 1. Abbreviated Beers List of Medications with Increased Risk of Adverse Drug Events in Patients Over 65

Medications	Reason that Use is a Problem
<b>Pain Relievers</b>	
propoxyphene and combination products (Darvon®, Darvocet N-100®)	Used to control pain. Propoxyphene offers little pain-relieving advantage over acetaminophen (Tylenol®), yet has the side effects of other narcotics.
Meperidine (Demerol®)	Used to treat pain. Meperidine is not an effective oral pain reliever and has many disadvantages compared to other narcotics. Avoid using in older persons.
<b>Antidepressants</b>	
amitriptyline (Elavil®) doxepin (Sinequan®)	Used to treat depression. These medications can cause sedation, weakness, blood pressure changes, dry mouth, problems with urination, and can lead to falls and fractures.
<b>Sleeping Pills and Antianxiety Medications</b>	
flurazepam (Dalmene®)	Used to treat insomnia. This medication produces prolonged sedation/sleepiness (often lasting for days and can worsen if taken daily) and can increase the risk of falls and fractures.
alprazolam (Xanax®) 2 mg lorazepam (Ativan®) 3 mg oxazepam (Serax®) 60 mg temazepam (Restoril®) 15 mg triazolam (Halcion®) 0.25mg zolpidem (Ambien®) 5 mg	Used to treat insomnia and anxiety. Older people should be prescribed small doses of these medications. Total daily doses should rarely exceed the suggested maximum doses noted to the left.
chlordiazepoxide (Librium®) diazepam (Valium®)	Used to treat insomnia and anxiety. Chlordiazepoxide and diazepam produce prolonged sedation (often lasting several days and can worsen if taken daily) and can increase the risk of falls and fractures.
<b>Heart Medications</b>	
digoxin (Lanoxin®) [doses above 0.125 mg]	Used to treat abnormal heart rhythms and heart failure. Because of decreased processing of digoxin by the kidney, doses in older persons should rarely exceed 0.125 mg daily, except when treating certain types of abnormal heart rhythms.
dipyridamole (Persantine®)	Used to help stop blood from clotting in people who have experienced strokes, heart attacks, and other conditions. Dipyridamole frequently causes light-headedness upon standing in older persons. Dipyridamole has been proven beneficial only in patients with artificial heart valves. Whenever possible, its use in older persons should be avoided.
methylodopa (Aldomet®) methylodopa/HCTZ (Aldoril®)	Used to treat high blood pressure. Methylodopa may cause a slowed heart beat and worsen depression. Alternate treatments for hypertension are generally preferred.
<b>Diabetes Medications</b>	
chlorpropamide (Diabinese®)	Used to control blood sugar in people with diabetes. Chlorpropamide can cause prolonged and serious low blood sugar.
<b>Stomach and Intestinal Medications</b>	
dicyclomine (Bentyl®) hyoscyamine (Levsin®, Levsinex®) propantheline (Pro-Banthine®) belladonna alkaloids (Donnatal®)	Used to treat stomach and intestinal cramps. These medications can cause sedation, weakness, blood pressure changes, dry mouth, problems with urination, and can lead to falls and fractures. All of these drugs are best avoided in older persons, especially for long term use.
trimethobenzamide (Tigan®)	Used to control nausea. This is one of the least effective medications used to control nausea and vomiting, yet can cause severe side effects, such as stiffness, shuffling gait, difficulty swallowing, and tremor.
<b>Antihistamines</b>	
chlorpheniramine (Chlor-Trimeton®) diphenhydramine (Benadryl®) hydroxyzine (Vistaril®, Atarax®) cyproheptadine (Periactin®) promethazine (Phenergan®)	Used to treat the runny nose of the common cold and allergy symptoms. Most nonprescription and many prescription antihistamines can cause sedation, weakness, blood pressure changes, dry mouth, problems with urination, and can lead to falls and fractures. Many cough and cold preparations are available without antihistamines, and these are safer substitutes in older persons.
diphenhydramine (Benadryl®)	Used to treat allergies and insomnia. Diphenhydramine can cause sedation, weakness, blood pressure changes, dry mouth, problems with urination, and can lead to falls and fractures. When used to treat or prevent allergic reactions, it should be used in the smallest possible dose and with great caution.

Adapted from: <http://www.seniorcarepharmacist.com/inappropriate/>. Used with permission. For a complete list, go to <http://mqa.dhs.state.tx.us/qmweb/MedSim/MedSimTable1.htm>

## The Beers Criteria: Screening for Potentially Inappropriate Medications in the Elderly (Continued)

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### IHI Offers Patient Safety Leadership Guide

The Institute for Healthcare Improvement (IHI) has produced a leadership guide outlining eight steps healthcare leaders can take to help make their organizations safer.

"The Leadership Guide to Patient Safety: Resources and Tools for Establishing and Maintaining Patient Safety" offers practical strategies for self-assessment, communicating safety as an organizational priority, and redesigning systems to improve safety.

The eight steps outlined in the guide include:

1. Address strategic priorities, culture, and infrastructure
2. Engage key stakeholders

3. Communicate and build awareness
4. Establish, oversee, and communicate system-level aims
5. Strengthen reporting and analysis functions
6. Support staff and patients/families impacted by medical errors
7. Align system-wide activities and incentives
8. Redesign systems and improve reliability

IHI's Leadership Guide contains links to many resources and tools that will help to implement each of the eight steps. The Guide is available at no cost on IHI's Web site at [www.ihl.org](http://www.ihl.org).

## From the Mouths of Babes: Healthcare Supplies and Environment Pose Dangers to Children

It is well known that young children are attracted to small things that they may swallow or place into a body orifice. Developmentally, during that time frame, the child becomes independent in both mobility and hand-to-mouth activity, and exploratory behavior increases. They are able to encounter hazards but have not developed avoidance skills or a cognitive awareness of hazards.<sup>1</sup>

Particularly during the ages of one to three years of age, children may swallow food items such as meat, nuts, popcorn, fruit pits, candy, seeds that may become lodged in their airway. Nonfood items commonly ingested include marbles, wads of paper, clay, crayon pieces, beads, buttons, coins, safety pins. Small batteries can also be swallowed. Small toys/toy components also place children at risk—the reason why so many toys are labeled as not appropriate for a child under three years old.<sup>2,3</sup>

What may be less obvious is that the healthcare environment and the supplies commonly used by healthcare workers may also place children at the same kind of risk as small food items and toys.

### Healthcare Supplies Can Be Hazardous To A Child's Health

Healthcare supplies that can be safely used in older patients may be hazardous if used on a young child. PA-PSRS reports have indicated the use of adhesive bandages, gauze, and tape on the fingers of youngsters. These supplies can be easily removed and have been found in children's mouths. Therefore, they can be choking hazards in the pediatric population. Here is one example:

*A nurse found a 16-month old patient with gauze wrapped with paper tape in his mouth. The object was removed before choking occurred. The bandage had previously been applied to the child's finger after laboratory work was drawn.*

### Items Inadvertently Left Within Reach

PA-PSRS reports also reflect dangerous objects that were unintentionally left within the grasp of children:

*When an IV team nurse approached the crib of a 22-month-old patient, a mini-*

*infusion pump lay in the crib with the electrical cord unwrapped and near the child's feet. The pump syringe was disconnected and near the child's head. (Fortunately, the child did not reach for the pump or syringe, which had small components that the child could have placed into her mouth, nor did the child become entangled in the electrical cord.)*

*A blue plastic cap was discovered on the bed of a 9-month-old patient, after the child had been coughing.*

### Healthcare Supplies Used as Toys

*During transport to OR, a 22-month-old patient was playing with a syringe (without needle). The patient had taken the syringe apart with the barrel in one hand and plunger in the other hand. In the OR, the anesthetist found that the patient had bitten off the black rubber gasket from the plunger and had it in her mouth.*

*A three-year-old child was receiving IV pain management. The father asked if the patient could have a clean syringe to play "doctor" with family members. The child was given a syringe with a blunt clean tip. The father reported that the child put the syringe tip into his IV line and injected a small amount of air. The staff disconnected the IV lines and reprimed the tubing. No air actually went into the patient.*

These PA-PSRS reports reflect attempts to give a child a "toy" to play with, seemingly with good intentions. However, these syringes could have resulted in significant adverse events.

How many times has a child been given a blown-up surgical glove to play with – sometimes with a funny face drawn upon it? To date, no negative outcomes associated with this practice have been reported in PA-PSRS. Yet, the potential for tragedy associated with this "toy" does exist. Ordinarily, one would not give a young child a deflated glove to play with. But an inflated glove can easily become deflated (such as, when a child bites a hole in one of the glove's fingers). A portion of the deflated glove could be inhaled, thus causing the child to choke.

## From the Mouths of Babes: Healthcare Supplies and Environment Pose Dangers to Children (Continued)

### Risk Reduction Strategies

PA-PSRS reports provide insight into how the risk to children can be reduced:

- Conducting regular assessments of supplies/equipment used on children to determine what risks may exist.
- Developing and enforcing policies concerning the use of certain supplies on children under a certain age.
- Providing age-appropriate toys for children to play with and avoiding using medical supplies as toys.
- Avoiding/prohibiting the use of bandaging material where a child can suck on it, reach it, and/or place it in his/her mouth.
- Removing from pediatric treatment areas healthcare supplies that may be hazardous to children.
- When dangerous supplies are clinically required, considering methods to prevent a child from placing objects in his/her mouth.
- Carefully sweeping for and removing small objects inadvertently left in healthcare/ waiting areas accessible to young children.
- Educating healthcare workers, volunteers, and family members concerning such risks.

### A Closing Comment

Because children are not “little adults,” meeting their needs safely must be considered during the

development of medical devices. Furthermore, monitoring and assessment are important even after pediatric devices enter clinical practice. The Institute of Medicine has recently published a report entitled *Safe Medical Devices for Children*. This comprehensive report evaluates the FDA’s post-market monitoring and surveillance activities as they pertain to medical devices used for children.

Suggestions for improvement are provided in the following areas: monitoring of postmarket study commitments, public access to information about postmarket studies, adequacy of required postmarket studies, adverse event reporting, independent oversight, and the need for organizational attention to pediatric issues. The report also includes recommendations for medical facilities: providing better patient and family education, designating a person responsible for tracing and responding to safety alerts and recalls, considering safety information when making device purchase decisions, and providing training in adverse event evaluations and reporting.<sup>4</sup>

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### Study Finds Noncompliance with Drug Black Box Warnings Is Common

A large, nationwide study of prescribing patterns for drugs with black box warnings (FDA’s strongest labeling requirement) found that these high-risk medications are prescribed frequently—often in a way that does not comply with the label warnings.

Over the 30-month study period, more than 40% of patients in the health plans studied received at least one drug with a black box warning that could apply to them. The most frequent type of non-compliance identified in the study was a failure to

get a baseline laboratory test before initiating therapy with drugs where monitoring is recommended.

The study was conducted by retrospective review of automated claims data from 10 geographically diverse health plans throughout the US with more than 929,000 enrollees. It was released electronically on November 18 and will appear in an upcoming issue of *Pharmacoepidemiology and Drug Safety*.

## Emergency Department Management of the Suicidal Patient

PA-PSRS has received several reports of patient suicide attempts, failed searches of suicidal patients' possessions, and elopements of suicidal patients from emergency departments (ED). Although suicides, suicide attempts, and patient self-harm should be reported as Infrastructure Failures, facilities have reported them and their near-miss counterparts to the Patient Safety Authority (PSA). Suicidal patients are evaluated and often held for observation in the ED. Keeping an at-risk patient safe is a challenge for an ED, as the following cases indicate:

*Patient took 100 Klonopin while on suicide watch in the ED.*

*Intoxicated, suicidal patient was brought to the ED by the police for observation overnight. Six hours later, the patient was not there, and the bed was made. Security had checked the room and thought the patient was discharged.*

*Patient came to the ED with suicidal ideations. The patient's purse was not removed from the room. The patient was admitted to the ICU. Family members found the purse with medications in it. The purse was removed from the care area.*

Heightened vigilance is warranted during the holiday season, when depression can be exacerbated and substance abuse may be more likely. To optimize the safety of suicidal patients, consider the strategies below when reviewing policies and procedures for patients at risk of suicide.<sup>1</sup>

Emergent care begins with expeditious triage of the suicidal or at-risk patient, followed by a patient search. Search practices to consider include:

- Disrobing the patient and providing a hospital gown.
- Searching the patient's possessions for weapons, medications, and any other items that can be used for self-harm.
- Placing the patient's clothing and possessions in a secure location outside the room and not giving these items to family or friends.<sup>2</sup>

Often, aspects of the search are witnessed by or delegated to other staff. For example, security per-

sonnel may be assigned to examine the patient's possessions (e.g., wallet, purse). The individual performing the search looks for items that could cause harm. Any potentially harmful items, including medications, are documented and secured away from the patient.<sup>2</sup>

Providing a safe physical environment for suicidal patients often necessitates modification of the facility's structural features, as well as furnishings and equipment, in patient areas. Suggestions for review of the environment, specifically the exam room, include the following:

- Assessing the area for items that might increase the risk of suicide by hanging, such as door hinges, plumbing fixtures, privacy partitions, clothing hooks, and closet and curtain rods.
- Eliminating, to the extent possible, all means of hanging such as sheets, pants, belts, shoelaces, any cords (e.g., the call-bell, electronic equipment, and curtains or blinds). Even something as seemingly benign as a stethoscope, if left behind by a clinician, can become a strangulation device.
- Using plastic utensils and disposable dishes for meals.
- Minimizing access to glass by using Plexiglas for windows and any framed artwork.<sup>3</sup>
- Eliminating materials that present a smothering hazard, such as plastic shower curtains, trash liners, and disposable gloves.<sup>4</sup>

Rooms that are designated for behavioral health patients but may be used for any patient when demand is high—brings with it risk. Housekeeping, contracted services, and clinical staff may unwittingly leave items in the room that can enable determined patients to inflict self-harm.<sup>3</sup> Before placing an at-risk patient in an exam room, scan the room to ensure safety.

Elopement is another risk among suicidal patients. Agitated, frightened, and often angry, suicidal patients are likely to run away if the chance arises. Considerations to minimize escape opportunities include:

- Assigning the patient to a room in a location that allows easy observation and access for staff yet is away from exits.

## Emergency Departmental Management of the Suicidal Patient (Continued)

- Monitoring and observation of the patient by staff educated in observation of at-risk patients.
- Using a team-participation approach, with scheduled, documented monitoring of the patient or, through intensive, one-to-one staffing when indicated.
- Keeping the patient's attire limited to a patient gown.

Frequently, after a suicide attempt, patients are evaluated and then transferred to other settings in the chain of care. Structured collaboration is necessary between facilities during institutional transfers and between teams during intrahospital transfers (e.g., from the ED to the medical/surgical or psychiatric unit).<sup>5</sup>

In an effort to provide the at-risk suicidal patient the safest care possible, be systematic about the patient search process, the environment of care, and the risk of elopement.

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### The Highly Reliable Operating Team

At the most recent Clinical Congress of the American College of Surgeons, I had the honor of moderating a panel on the topic of "The Highly Reliable Operating Team." The panelists were Benjamin Sachs, M.B.B.S., discussing "Improving Team Performance," Michael Leonard, M.D., discussing "Improving Communication," and Forrest Calland, M.D., discussing "Standardization and Checklists."

From my notes of the discussion, I will convey the following suggestions about how surgeons can help make the operating team safer:

1. Be a good role model. Participate in the pre-operative time out; pay attention to incorrect sponge counts; honor other safety practices.
2. Introduce yourself and everyone else on the team. It has been shown that people who know each other by their first names are more likely to speak up if they see a problem.
3. Specifically ask people to speak up if they have concerns or questions.
4. Include contingency planning in your pre-operative time out.
5. Double check that equipment works and supplies are available before you start the case.
6. Bring all information you might need to make intra-operative decisions to the operating room.
7. Help people understand your goals by saying *why* you want something as well as *what* you want.
8. Make confirmation feedback a habit for your operating team.
9. Don't be afraid to ask for help.
10. Adhere to best practice standards, when they exist.
11. If you find yourself doing a "work-around," ask yourself "What can I do to keep this from occurring again?"
12. Have a short debriefing after the case.

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## Continuous Care Throughout Patient Transfer

Distinct patterns have emerged from a number of serious events and incidents reported to PA-PSRS related to intrahospital transfers involving equipment availability, communication, staff deployment, and readiness of the receiving unit to support the patients' clinical needs and/or to respond to their changing condition. In a previous article (Vol. 2, No. 3—Sept. 2005) we discussed continuity of oxygen therapy during transfers.

Transfer within an institution is a time of patient vulnerability. The literature emphasizes the risk for critically ill patient transports, reporting adverse event rates ranging from as low as 5.9% to as high as 66%.<sup>1-5</sup> The following report to PA-PSRS illustrates the risk involved.

*72-year-old patient in complete heart block with external pacemaker in standby mode while in ICU. Transported to the OR for emergency permanent pacemaker without the temporary pacemaker attached to leads. Patient's pulse rate became 30.*

PA-PSRS also has received reports of code situations involving non-critical patients when transported throughout the hospital.

*Patient brought to stress lab with cyanotic lips and nail beds, gray color of face and neck, and mottled trunk and upper extremities and was without a palpable pulse. Resuscitation was initiated, and a code was called. Resuscitation efforts were unsuccessful.*

Transfers from the emergency department and intensive care unit to non-critical care areas are deemed "the most neglected area of intrahospital transports."<sup>6</sup>

*ED patient received on med-surg unit without the four liters of ordered oxygen. Patient was cyanotic, respirations labored, oxygen sat 83%. Immediate transfer to ICU on 100% oxygen. Patient was intubated in ICU.*

*Critical care patient on loproressor protocol transferred to surgical unit without monitor. When the loproressor was to be given, it was noted that the patient was not placed on a cardiac monitor when admitted to the unit.*

The unstable patient, while being transported through the hospital, is also subject to the limitations of both the transporter and equipment availability and readiness, as shown in the following case:

*A patient was transported from the ICU for a stat CT scan. The monitor went blank after approximately 20 minutes of battery use. The patient was connected to another monitor. Clinical Engineering was notified and took the monitor for assessment. Staff was instructed on how to check the batteries before using the monitors for transport.*

### Research on Patient Transfer

Critical care transfers have been the focus of multiple studies that reinforce the tenuous nature of intrahospital travel.<sup>2-8</sup> Limited attention has been paid to the transferring of the stable patient, but much can be learned from the following published studies, which are generally applicable to any patient transportation situation:

- A study of patients on mechanical ventilation found that the risk of developing ventilator-associated pneumonia was 24.2% among patients who were transferred compared to 5.5% among the patients who never left the unit.<sup>9</sup> This finding was supported by other research but may not be a cause-and-effect relationship.<sup>10,11</sup>
- A 1998 literature review of 14 studies of intrahospital transport of critically ill adults found that coordination, appropriate level of monitoring, emphasis on patient safety, established protocols, and use of nurses educated on the risks of transporting can improve the patient outcome.<sup>2</sup>
- Another study in 1999 concluded that "equipment failures, disconnects, and power failures occur in more than one-third of the transports and place the patient at unnecessary risk."<sup>12</sup>

A few studies investigated potential improvements in the transfer process but require financial investment either in equipment or changes in staffing patterns:

- The use of a specialty cart attached to the hospital bed expeditiously organized essential equipment for a streamlined transfer process.<sup>13</sup>

## Continuous Care Throughout Patient Transfer (Continued)

- The use of a transport ventilator comparing manual ventilation to mechanical ventilation on transportation concluded that the use of a transport ventilator is “preferable to manual ventilation.”<sup>14</sup>
- A “Stat Nurse Program” demonstrated a reduction in the rate of adverse outcomes during transportation for radiological studies at one university hospital.<sup>4</sup> The literature supports the concept of team deployment.<sup>2,4,15</sup>
- A minimum of two people to accompany critically ill patients.
- Equipment is dependent on the patient’s condition but includes a blood pressure device, a pulse oximeter, fully charged battery-operated equipment, a cardiac monitor/defibrillator, appropriately sized airway equipment, and oxygen of “ample supply.”
- Drugs for resuscitation and awareness of code cart availability along the way and at the destination.

Whether a patient is in a medical/surgical, step-down, or critical care unit, these lessons learned are applicable to all transfers within the hospital.

### Risk of Transport

“Only transport the patient if the benefits of the test or procedure outweigh the risk of transport.”<sup>16</sup>

When any patient leaves the security of their unit, and especially when the unstable patient is moved, consider whether the newly obtained clinical information is crucial in determining or changing the patient’s treatment<sup>15-17</sup> with reported risks of adverse events ranging from 5.9 to 66%. Stevenson cites studies indicating “that 61% to 76% of all diagnostic procedures do not result in a change in patient management.”<sup>11</sup> Guidelines for transporting mechanically ventilated patients support this contention. “The literature suggests that nearly two-thirds of all transports for diagnostic studies fail to yield results that affect patient care.”<sup>18</sup> Waydhas concludes that about 50% of procedures result in a change in patient management, and Weg concurs.<sup>19,20</sup> Bedside procedures are preferred whenever possible.<sup>17,19</sup> With advanced technology and point-of-care testing, much can be accomplished in the security of the patient’s unit.<sup>8</sup>

Transport policies provide the minimal framework from which to begin the effort to improve care; the following guidelines are a place to start and can “remove the guesswork.”<sup>5-7</sup> The guidelines are for critical care transports, but the basic concepts are applicable in every setting.

### Guidelines for Transfer of Critically Ill Patients

Guidelines for the transfer of critically ill patients were first written in 1993 and revised in 2003 as a collaborative venture by the American College of Critical Care Medicine and the Society of Critical Care Medicine.<sup>17</sup> Highlights include:

- Pre-transport coordination and communication.

- Complete set of pediatric resuscitation equipment and medications to accompany infants and children.
- “For practical reasons, bag-valve ventilation is most commonly employed,” with acknowledgement that transport ventilators are becoming popular, as they “more reliably administer prescribed minute ventilation and desired oxygen concentrations.”
- Maintenance of the same level of basic physiologic monitoring as occurred before transportation.<sup>17</sup>

The guidelines for in-hospital transport of mechanically ventilated patients outline the equipment, personnel, and level of monitoring needed and were revised in 2002.<sup>18</sup> Both a registered nurse and a respiratory therapist are indicated, with at least one team member proficient in airway management and capable of operating and troubleshooting all equipment.

### Policy Development to Promote Consistent Care

In order to provide a safe transport, the literature suggests dividing the trip into manageable phases,

#### Considerations in Intrahospital Transport

- Is this transport necessary for treatment decisions?
- Are special preparations needed?
- Who should escort?
- What equipment and supplies are required?
- Are resuscitation drugs needed?
- Is the receiving unit or department ready?
- What is the agreed time for transport?
- What is the best route?
- Has the equipment been checked?
- Are batteries charged?
- Is the oxygen supply adequate?<sup>17,27</sup>

## Continuous Care Throughout Patient Transfer (Continued)

allowing for an incremental approach to the commonly called “road trip.”<sup>6,13,16</sup> Development of collaborative multidepartmental policies and procedures are urged to define the process, equipment, and personnel necessary.<sup>4,10,14,21</sup> Departmental emphasis involves the origin, destination and actual movement of the patient.

The following strategies address the transport process in an organized manner, allowing for prospective and retrospective review of every patient transport, whether the transporting is for a diagnostic study or for admission to another unit. They could be used as the outline for a patient transport policy.

### Pretransport Strategy

#### Communicate

- Discuss the departure/arrival schedule, orchestrate the necessary staff, and determine the route.
- Contact the receiving unit, negotiate the timeline, and discuss and verify the following:
  - The patient’s status, providing a brief overview to avoid any last minute misunderstanding.
  - The receiving staff’s ability to manage equipment needed in the patient’s care.
  - Availability of supplies and equipment.
  - Agree on what physician orders will be implemented pretransport (sedation, pain management, suctioning), and communicate what is done and still needs to be done. This is a critical step when the emergency department is transferring a newly admitted patient.<sup>22</sup>
- Use a call report providing essential patient information, and confirm arrival time.

#### Coordinate

- Anticipate potential delays and physiologic instability.
- Ready any supplies and equipment that will be needed.
  - Validate battery charges, adequacy of oxygen tank volume, plus 30 minutes additional beyond the expected need.<sup>7,15,16</sup>
  - Verify that drug box is adequately stocked.

#### Contraindications to Transporting Ventilated Patients

- Inability to maintain an adequate airway
- Inability to provide adequate oxygenation and ventilation
- Inability to maintain acceptable hemodynamic performance
- Inability to adequately monitor cardiopulmonary status
- Inability to recruit sufficient staff<sup>11,18</sup>

- Stock any supplies unique to the patient such as a replacement tracheotomy tubes, suction catheters, or isolation garb.

- Reserve elevators if necessary.
- Know where the code carts are located along the route and within the unit or department receiving the patient.

#### Documentation

- Assess the patient and document before the move. A sample checklist is provided by Pope.<sup>16</sup>
- Record any medications given to ease the trauma of the transfer, especially sedation, pain management, and neuromuscular blocks.<sup>23</sup>

#### Transport - Maintain Consistent Care

- Monitor the patient at the same level as before transportation.
- Document the patient’s condition as needed during the transport.
- Communicate, keeping each team member abreast of the patient’s condition in route, particularly regarding any unanticipated changes or equipment malfunctions.

#### Post-transportation - Arrival

- Confirm unit and staff readiness to receive the patient, verifying equipment/supply availability and code cart location.
- Set the patient up, verifying connections with oxygen, intravenous and equipment whether in a new unit or for diagnostic studies.

## Continuous Care Throughout Patient Transfer (Continued)

- Deliver the “face to face” report, detailing the clinical information according to the responsibility to be assumed.
- Maintain vigilance, and monitor as though still in the sending unit while the patient is in the CT or MRI situation in which visualization may be impeded.<sup>23</sup>
- Document the time of arrival, current patient assessment, and the caregiver assuming responsibility.
- Coordinate the patient’s return if needed.

### Opportunities for Improvement

Some suggestions obtained from the literature include:

- Use paper or electronic transfer records to summarize the patient’s status and provide physician order reconciliation for medications and diagnostic studies.<sup>24,25</sup>
- Use specialized transport teams or “Stat Nurses.”<sup>15-17</sup>
- Use “Patient Passport” documents specifying patient identifiers, allergies, whether the patient must be transported with a nurse, and the name of the nurse and physician caring for the patient. The transporter signs the passport, and the technician in the receiving department uses the document for additional verification of patient identity.<sup>26</sup>
- Use portable phones for transporters for immediate access to support staff when a patient’s condition has changed.<sup>26</sup>
- Monitor transports internally to assess breakdowns in the transportation process and to determine best practices and/or innovative ways to deal with similar situations in the future.<sup>7</sup>

### Conclusion

Emphasis is placed on planning, communicating, establishing policies, and educating staff accordingly. From the time the decision is made to transfer, the process begins with patient assessment dictating the level of intervention to be maintained. The skilled professional must anticipate potential changes in a patient’s condition during the transport and the concomitant equipment, supplies, or drugs needed. Coordination of staff to accompany the patient, determination of responsibility upon arrival, and reporting of the patient’s condition promotes a smooth transition. The ultimate goal is to provide the patient with consistent

care throughout the continuum of care inclusive of the transferring process.

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### NPSF Announces Patient Safety Awareness Week 2006

The theme of the 2006 Patient Safety Awareness Week has been announced: "*Our Patients-Our Partners: One Team, One Goal.*" The theme emphasizes patient and family-centered care and promotes building partnerships between providers and patients, families and advocates. It encourages healthcare facilities to actively engage their community in patient safety activities and in all aspects of their healthcare.

Scheduled for March 5-11, 2006, Patient Safety Awareness Week is sponsored by the National Patient Safety Foundation (NPSF), in collaboration with the Agency for Healthcare Research and

Quality (AHRQ) and Joint Commission Resources, Inc.

We encourage all healthcare facilities to participate in this national observance, especially by finding new and more effective ways to involve patients, their families, and the broader community in outreach activities that will help them understand what they themselves can do to improve healthcare safety.

Visit NPSF's web site for more information and resources: [www.npsf.org](http://www.npsf.org).

## Workarounds: A Sign of Opportunity Knocking

This recent report submitted to PA-PSRS is an example of a workaround:

*Humulin regular insulin was administered instead of Humalog (2 doses) as ordered. The Pyxis system was overridden to obtain the Humulin regular insulin due to a delay in the Humalog medication being profiled in Pyxis.*

A workaround is a method of accomplishing an activity when the usual system/process is not working well.<sup>1</sup> While a workaround provides a temporary solution to the immediate problem, it is also a symptom of a system that may need improvement.

Healthcare workers may use workarounds with good intentions, such as getting a medication to a patient quickly or providing more efficient care for multiple patients. The rewards are usually positive and immediate, promoting convenience and patient comfort, and saving time. In many cases, workarounds may not result in patient injuries, fostering attitudes of “No harm, no foul” and “Workarounds may hurt other patients, but not mine.”

While workarounds may have a place in certain emergency situations when no system solution exists, using them on a regular basis negatively affects patient safety. Workarounds are considered at-risk behaviors that do not solve a system-based problem.<sup>2,3</sup> Workarounds may vary according to the individuals that use them. Such inconsistency introduces a variety of “fixes” that may not provide optimal solutions, as well as a multiplicity of ways that errors can occur. When one standard process is not used, it becomes difficult to determine exactly where failure modes occur. Thus, error analysis and system improvement are thwarted. No matter how carefully applied, workarounds are likely to promote error, thereby compromising patient safety.<sup>4</sup>

For example, numerous PA-PSRS reports have been submitted for just one type of workaround: overrides of automated dispensing cabinets. These reports reflect the following types of errors:

- Wrong drug given (sound-alike medications).
- Wrong dose.

- Wrong route.
- Documented allergy to medication administered.
- Wrong frequency.
- Wrong patient.
- Medication dispensed without an order.

All of these errors may have been prevented if the automated dispensing cabinet were not overridden.

### Symptoms

Workarounds are a symptom of a system or process problem that requires resolution. Whenever a workaround occurs, think about the basic system

*Though workarounds are signs of errors “waiting to happen,” they can be used as opportunities for system improvement.*

problem that encourages the use of that workaround. Analyzing the workaround can provide a wealth of information about why the system is not working, as well as possible approaches to improve it.

Problems with technology may be identified. For example, a VA hospital discovered that staff were forced to rely on informal patient

identification processes because barcodes on patient armbands were easily water-damaged—a situation that can be remedied with waterproof wristbands.<sup>5</sup> Workarounds may also uncover unnecessarily complex processes that can be simplified.

### Human Factors Engineering

Human factors engineering (HFE) concepts can be used to analyze the established system and the workaround. HFE incorporates human characteristics, limitations, and capabilities into the analysis and design of systems, machines, and tools.<sup>6</sup> HFE focuses on “user centered design” – user needs and characteristics, as well as feedback from repeated end user testing. The goal is to ensure that a system is designed to fulfill the intended purpose and operates as intended.<sup>6</sup> Analyzing workarounds using HFE concepts may help to identify safer and more user friendly system changes.

### Organizational Culture

Some organizational cultures may tolerate, or even reward, at-risk behaviors such as workarounds and/or informally punish or create disincentives for practicing safe behaviors. In fact, at-risk behaviors may even be viewed as being efficient.<sup>7</sup>

Conducting an organizational self-assessment may help determine to what extent the organization tol-

## Workarounds: A Sign of Opportunity Knocking (Continued)

erates such behavior. Sharing the results of the assessment may help to increase staff awareness of such behaviors.

The following types of questions might prove enlightening if incorporated into a self-assessment:

- How do you react when you must locate a patient's medication administration record for a physician who wants to make sure no medications have been accidentally discontinued?<sup>8</sup>
- How does it make you feel when a nurse takes more time to administer medications because she asks colleagues to double-check high-alert medications?<sup>8</sup>
- Are those who request independent verification of their medication calculations considered independent workers?<sup>8</sup>
- What criteria are used when assigning persons the responsibility for fixing a safety problem?<sup>8</sup>

### Exhibit 1. Examples of At-Risk Behaviors

Following are over 70 at-risk behaviors the Institute for Safe Medication Practices (ISMP) has identified. These examples are associated with prescribing/dispensing/administering medications; however, many may apply to other processes as well. Which of these behaviors apply to other healthcare processes? What additional at-risk behaviors can you identify in other healthcare processes?

#### Patient Information

- Preparing more than one patient's medications/more than one medication at one time
- Not checking patient identification using two identifiers (e.g., name, medical record number, birth date)
- Using an estimated patient weight rather than an actual weight
- Prescribing/dispensing/administering medication without checking patients' laboratory values and vital signs
- Not checking a patient's allergies before prescribing/dispensing/administering medications
- Not waking the patient for assessments/medications
- Not viewing/checking the patient's complete medication profile (or medication administration record [MAR]) prior to prescribing/dispensing/administering medications

#### Drug Information

- Prescribing/dispensing/administering medications without complete knowledge of the medication
- Unnecessary use of manual calculations
- Not taking the MAR to the patient's bedside when administering medications
- Administering medications before pharmacy review of the medication order
- Excessive prescribing of non-formulary medications/refusal of therapeutic substitution
- Not questioning unusually large doses of medications
- Writing incomplete discharge instructions
- Failing to validate/reconcile the medications and doses that the patient states are taken at home

#### Communication

- Rushed communication with next shift/covering colleague

- Intimidation/not speaking up when there is a question or concern about a medication
- Use of error-prone abbreviations/apothecary designations/dangerous dose designations
- Unnecessary use of verbal orders
- Not reading back verbal orders
- Overuse of stat orders or stat process as a workaround for slow pharmacy service
- Providing incomplete orders (e.g., lack of full drug name, route, strength, frequency)
- Not questioning incomplete orders
- Not communicating important patient information to the pharmacy (e.g., allergies, height, weight, chronic and acute diagnoses)
- Documenting medication administration/monitoring parameters at the end of the shift
- Not sending all orders to pharmacy (i.e., if they contain no medication orders, or if medication is available as unit-based floor stock)
- Illegible handwriting
- Writing for multiple prescriptions on one prescription blank

#### Labeling, Packaging, Nomenclature

- Removing medications from packages prior to reaching the patient's bedside
- Not labeling or poor labeling of syringes/solutions/other medication packages
- Grab and go without fully reading the label of a medication before dispensing/administering/restocking medications
- Storing medications with look-alike labels and packaging beside one another
- Placing hospital-prepared or auxiliary labels over important information on the manufacturer's label

#### Drug Stock, Storage, Distribution

- Leaving medications at bedside
- Leaving medications in an unlocked storage area
- Preparing IV admixtures outside of the pharmacy
- Not notifying physicians, nurses, and other personnel who order and administer drugs of impending and actual drug shortages

## Workarounds: A Sign of Opportunity Knocking (Continued)

- Do you see co-workers taking shortcuts that could be dangerous to patients?<sup>5</sup>
- When you see a workaround occurring, do you directly confront the colleague?<sup>5</sup>

The results of such an assessment can be used to promote a change in organizational culture – encouraging the identification of workarounds as a foundation for system improvement, while at the same time heightening awareness of at-risk behaviors and their negative consequences on patient safety.

### Communication

Workarounds can provide an opportunity to promote communication that enhances patient safety. A study of 1,700 physicians, nurses, clinical care staff, and administrators was conducted nationwide. The majority of healthcare workers (82% of physicians; 62% of nurses/other clinical care providers) have seen colleagues take shortcuts that might be dangerous to patients. Yet, only 10% reported directly confronting their colleagues about the concern.<sup>9</sup> However, the few healthcare workers who raised such concerns reported better patient outcomes, greater staff satisfaction, enhanced commit-

### Exhibit 1. Examples of At-Risk Behaviors (Continued)

- Keeping unused medications from discharged patients in patient care areas for potential administration to other patients
- Borrowing medications from one patient to administer to another patient
- Carrying medications in a uniform or coat pocket
- Placing more importance on financial criteria than on safety when procuring medications (e.g., multiple-dose vials vs. single-use vials or prefilled syringes)
- Failure to dispense medications in unit doses or patient-specific doses
- Non-pharmacist access to the pharmacy when closed

#### Environment/Staffing Patterns

- Managing multiple priorities/addressing interruptions while carrying out complex processes (e.g., order entry, transcription, drug administration, IV admixture)
- Holding/admitting overflow patients in inappropriate units/areas
- Not notifying management if staffing is inadequate
- Failure to adequately supervise/orient staff
- Inadequate staffing based on patient acuity

#### Patient Education

- Prescribing/administering/dispensing medications without educating the patient
- Disregarding the patient's/caregiver's concerns about a medication's appearance, reactions, effects, or other expressed worry
- Discharging patients without proper education about the medications to take at home

#### Staff Education

- Inadequate orientation of new/agency staff
- No organizational incentives to achieve certification or attend continuing education
- Lack of a structured and ongoing staff competency program related to medication use

#### Quality/Culture

- Sacrificing safety for timeliness

- Failure to report and share error information
- Organizational culture of secrecy rather than openness about medication errors
- Organizational culture of finger pointing rather than system change

#### Double Checks

- Overconfidence in colleague's work (failure to independently double check thoroughly)
- Filling/checking medications using the label, not the order/prescription
- Failure to ask a colleague to double check manual calculations before proceeding
- Failure to ask a colleague to double check high alert medications before dispensing/administering
- Failure to ask a colleague to double check high risk processes (e.g., patient controlled analgesia) before proceeding

#### Teamwork

- Reluctance to consult others or ask for help when indicated
- Lack of responsiveness to colleague/patient requests

#### Technology

- Technology workarounds
- Overriding computer alerts without due consideration
- Over reliance on technology as a safety tool
- Using outdated/poorly maintained technology
- Failure to fully engage available technology
- Failure to provide education/training for new/updated technology
- Inadequate ongoing participation of frontline clinical staff in technology user/planning meetings

**Source:** Examples of at-risk behaviors for healthcare providers. Used with permission from The Institute for Safe Medication Practices. At-risk behaviors [online] 2004 Oct 7 [cited 2005 Jun 10]. Available from Internet: [http://www.ismp.org/pdf/At\\_Risk\\_Behaviors.pdf](http://www.ismp.org/pdf/At_Risk_Behaviors.pdf).

## Workarounds: A Sign of Opportunity Knocking (Continued)

ment to remaining in their jobs, and worked beyond the required minimum.<sup>9</sup>

### Education/Heightening Awareness

Even conscientious healthcare workers can use workarounds and other at-risk behaviors. Staff may not realize that such behaviors place patients at risk. Awareness of at-risk behaviors and their consequences can reduce staff tolerance of at-risk behaviors. Analyzing facility reports of errors and near misses will help identify at-risk behaviors. Presenting this information with corresponding safe behaviors will help set the tone for promoting safety.<sup>8</sup>

The Institute for Safe Medication Practices (ISMP) has prepared a list of examples of medication-related at-risk behaviors (See Exhibit 1). Such a list can be used to heighten staff awareness of the problem. After reviewing the list, staff could be encouraged to document one at-risk and one safe behavior daily, as well as the circumstances under which the behaviors occurred. Such data can be aggregated and used as a foundation for system improvement and positive reinforcement of safe behaviors.<sup>8</sup>

### Accountability

Instead of disciplining individuals who work around the system, involve them in analyzing, changing, and improving the system. Changing the focus of accountability from individual blame to participation in system improvement can refocus the culture (and individuals) upon process improvement in which safety is consistently highly valued.

### Motivation/Reinforcement

Rewarding based upon patient outcomes, or disciplining individuals who use at-risk behaviors, may inadvertently discourage reporting of occurrences, errors, injuries, or workarounds. Incentives are more likely to promote a safer environment if based upon safe behaviors. Small rewards for all who meet established criteria for safe behaviors are more effective than a large reward given to one person.<sup>10</sup> Behavior changes and system improvements resulting from identifying and analyzing work-

arounds provide success stories which can be used in positive reinforcement.

### Conclusion

Workarounds are a clue of system weakness. Examining workarounds as a means for process improvement can provide opportunities to transform healthcare workers and facilities from being risk tolerant to risk adverse. Patient safety can become an unwavering value associated with every healthcare activity – not one of many priorities that shift according to changing circumstances or competing concerns such as cost effectiveness, efficiency, productivity, or expediency.<sup>7,10</sup> Replacing a workaround with a standardized system improvement will consistently ensure patient safety over time.

### Notes

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## Clear Liquids May Place Patients at Risk

These reports to PA-PSRS highlight the hazards of using unlabeled or mislabeled clear liquids, such as Domeboro solution, in the provision of healthcare:

*A patient noted that the solution in the oxygen humidifier was Domeboro solution instead of sterile water. The container was labeled incorrectly.*

*A patient accidentally drank a large gulp of Domeboro solution. This was an external treatment for the patient's foot. Patient thought it was water.*

Domeboro solution has been used for more than 50 years in health applications such as swimmers ear, athlete's foot, foot odor, insect bites, poison ivy/sumac, eczema, skin rashes, herpetic lesions, and wound care.<sup>1</sup> When Domeboro powder or tablets are dissolved in water, the ingredients calcium acetate and aluminum sulfate produce a chemical reaction that results in aluminum acetate.<sup>2</sup> This acidic astringent solution reduces itching, and soothes and dries weeping wounds/lesions. Ordinarily, the solution is used as a soak with compresses or wet dressings or in a bath. Any unused portion can be stored for up to 7 days in a clean, capped/covered container, at room temperature.<sup>1</sup>

It is at this point of storage that patient safety may be compromised. Because Domeboro solution is clear, it can easily be mistaken for other clear liquids, if actions are not taken to reduce risks of accidental exposure. Moreover, leaving unused Domeboro solution at the bedside for recurrent soaks/treatments may increase the risk of confusion with other liquids.

Domeboro solution is not innocuous. It can cause irritation, redness, and itching upon skin exposure, resulting in contacting the physician if irritation develops. When in contact with eyes, Domeboro can cause eye irritation: tearing, stinging, reddening, requiring flushing the eyes with water for 15 minutes and contacting a physician. If ingested, it may produce nausea and vomiting, and contacting the regional poison control center or a physician immediately is advised. If inhaled, the person should be provided with fresh air.<sup>3</sup>

Additionally, there is the risk of aluminum toxicity, particularly in patients with chronic severe renal failure and in preterm infants with underdeveloped renal function.<sup>4,5</sup>

Symptoms of aluminum toxicity include anemia, dementia, bone disease, impaired neurologic development, encephalopathy in uremic patients, impaired calcium metabolism that can lead to osteoporosis, impaired kidney function, colic, gastrointestinal problems, headaches, liver dysfunction, forgetfulness, extreme nervousness, and memory loss.<sup>1,2,5-7</sup>

Inadvertent ingestion/inhalation of Domeboro solution may increase the risk of aluminum toxicity, particularly in renal compromised patients. Treatment for toxicity may even require the use of chelating agents to rid the body of aluminum,<sup>8,9</sup> which has no biologic role in humans.<sup>6</sup>

### Other Examples

As suggested by the PA-PSRS reports above, both healthcare workers and patients can confuse Domeboro solution with other liquids. However, Domeboro solution is just one example of many clear liquids that are used in healthcare, each of which carries the potential for confusion with another product.

Sources outside of PSRS have reported the following scenarios in which liquids have been confused:

- A 100 ml bottle of sterile water and an identical bottle containing Dakin's solution were stored next to each other on a counter in a patient's room. Instead of using the sterile water to dilute crushed medications for administration to the patient, the Dakin's solution was used. Fortunately, the mistake was identified prior to administration.<sup>10</sup>
- In an OR, it was discovered that house-keeping personnel obtained sterile sodium chloride irrigation solution bottles, added a disinfectant concentrate to the containers, and placed a label provided by the manufacturer over the irrigation solution label. This practice was discovered before any patients were affected.<sup>7</sup>
- Antibiotic solutions have inadvertently been reconstituted with 10% formalin solution and administered, resulting in patient hospitalization.<sup>7</sup> Non-pharmacists working in pharmacy used empty gallon containers of distilled water to prepare the formalin solution. The formalin containers were accidentally placed with distilled water containers.

## Clear Liquids May Place Patients at Risk (Continued)

- Almost 4,000 patients were exposed to surgical instruments that were inadvertently washed with used elevator hydraulic fluid instead of detergent. The used hydraulic fluid was placed in empty detergent barrels. These barrels were mistakenly shipped to two hospitals that used the product as a detergent, as the barrel labels indicated.<sup>11</sup>

The common theme in these examples is that containers of one liquid were re-used to hold another, dramatically different, liquid. Applying a new label to the container that accurately indicates the new product may not be sufficient to solve this problem. The original label may be inadvertently left on the container, as well. Furthermore, the relabeling step could be forgotten, or the new label might not be placed over the original label but on the opposite side of the container.<sup>7</sup> The shape, color, or location of the container may lead a person to assume that the container holds the original product/liquid, overlooking a clear label to the contrary—an example of confirmation bias.

### Risk Reduction Strategies

The following risk reduction strategies may be appropriately applied to any clear solution that is used in healthcare.

#### Assessment

- When conducting the admission assessment and subsequent assessments, evaluating the patient's mental status and ability to understand the use of products left at the bedside.
- If any assessment so indicates, removing patient treatment products from the patient's bedside/room.
- Routine assessment<sup>7</sup> by a multidisciplinary team of facility departments to identify practices that increase the risk of inadvertent administration of non-drug/healthcare substances.

#### Education

- Heightening awareness of both clinical and non-clinical staff concerning this issue (food services, housekeeping, central supply, laundry, etc) and explaining the dangers of adding non-drug items into drug, irrigation, or IV containers.
- Educating patients/family about the purpose of solutions left at bedside.

#### Storage

- Not leaving the solution at bedside.
- Segregating patient treatment products from products used by patients for cleanliness/hygiene purposes.
- Designating separate spaces for patient treatment products and items intended for ingestion (e.g., not placing patient treatment products on the overbed table, where water and food trays are placed).
- Considering storing unused solutions in a central storage area, away from the patient room.
- Installing shelves in patient rooms dedicated solely to patient treatment products.

#### Labeling

- Standardizing labels for each solution that are unique in size, lettering, color and that are different from other labels, such as for sterile water.
- Preparing unique labeling to clearly differentiate between irrigation/wound care products from those that might be used orally or parenterally.

#### Containers

- Providing a visual cue by standardizing containers for different types of solutions that are a different shape/color/size.<sup>10</sup>
- Poking holes into empty plastic containers to prevent reuse.<sup>7</sup>

#### Preparation

- Having the Pharmacy Department mix standard, extemporaneously prepared solutions used for healthcare,<sup>10</sup> rather than mixing such solutions on the patient care unit.

#### Discarding

- Discarding unused solutions immediately after a treatment is provided.
- Discarding any unlabeled containers or containers with more than one label.

## Clear Liquids May Place Patients at Risk (Continued)

### Policies/Procedures

- Developing written protocols that support the above risk reduction strategies and prohibit container reuse for other solutions.<sup>7</sup>

### Lesson Learned

In response to occurrences of incorrect use of Domeboro solution, one Pennsylvania facility developed a procedure for handling of Domeboro, which places the responsibility on Pharmacy for mixing and labeling all topical medicated solutions used for nursing care.

Elements of the policy include the following:

1. When the order for Domeboro is entered in the pharmacy computer system, an alert appears to the pharmacist concerning how to enter the order for dispensing, specifying that Domeboro tablets are not sent to the nursing unit and that pharmacy prepares all Domeboro solutions for soaks or compresses.
2. Pharmacy mixes a standard solution of 1:20 dilution by adding four effervescent tablets to 1000 cc of water for irrigation.
3. Pharmacy labels the solution with:
  - a) A computer-generated label from the pharmacy computer system
  - b) For External Use Only
  - c) Discard After: \_\_\_\_\_ [time specified]
  - d) Any other warning labels considered appropriate
4. Pharmacy enters the order for Domeboro solution with a route that ensures that it

appears on the medication summary for nursing to verify, but it does not appear on the active worklist in the medication administration Kardex for charting.

5. Nursing uses a function in the pharmacy computer system to reorder Domeboro solution from Pharmacy.

No reports of incorrect use of Domeboro solution have been reported by the facility to PA-PSRS since this process was implemented.

### Notes

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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](http://www.psa.state.pa.us).



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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.