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Lessons Learned about Human Fallibility, System Design, and Justice in the Aftermath of a Fatal Medication Error

Presented by:

The Institute for Safe Medication Practices
and
The Just Culture Company

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Tragedy in Tennessee

Two days after Christmas in 2017, Charlene Murphey, a patient at Vanderbilt University Medical Center, died after receiving an IV medication in error. The medication was administered by RaDonda Vaught, an experienced registered nurse who had retrieved the wrong drug and subsequently failed to detect and correct her mistake. Standard safety norms and technologies used to prevent and detect the original error before it could reach the patient were absent or incompletely deployed. The nurse, attempting to accomplish multiple tasks simultaneously, did not perform standard visual checks that could have surfaced the error.

In this tragic constellation of individual and system failures, patient Charlene Murphey lost her life. Her family lost a beloved mother and grandmother, and Ms. Murphey's community lost a treasured friend and engaged citizen. Eight days later, Vanderbilt University Medical Center fired RaDonda Vaught, citing her failure to adhere to the Five Rights of Medication Administration. In July 2021, the Tennessee State Board of Nursing revoked RaDonda Vaught's nursing license and on March 25, 2022, she was convicted on two criminal counts: criminally negligent homicide and gross neglect of an impaired adult. She will be sentenced on May 13th in Davidson County, TN and could serve up to 12 years in prison.

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The Story, as recalled by RaDonda Vaught and other caregivers

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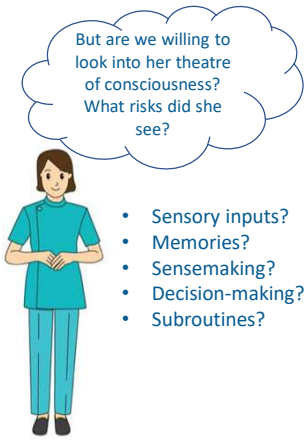
A Good Root Cause Analysis



We can see RaDonda Vaught's visible actions

We can see the behavior of RaDonda's peers

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The Story: Roles & Responsibilities of the Help-All Nurse

People & Processes

Background & Activities of Note
The Neuro-ICU designates a nurse (Help-All Nurse) to assist other nurses in moving planned care forward for patients within the unit
RaDonda Vaught is the designated Help-All Nurse on 12-26-17
She is the preceptor of a new-graduate RN, orienting to the Neuro-ICU
The preceptor-preceptee dyad were preparing to go to the ED to perform a swallowing study immediately before RaDonda is tapped to provide care to Ms. Murphey

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The Story: Prescribing the Medication

People, Processes, Technology

Background & Activities of Note
The need for Ms. Murphey to have an anxiolytic was not anticipated, creating an urgency when discovered after her arrival in Radiology
A radiology team member alerted the primary nurse in the Neuro-ICU of Ms. Murphey's need for anxiolysis
A provider's order for an IV anxiolytic, *midazolam*, was secured
The order was entered electronically (accurately)

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The Story: Adaptive Care Planning

People, Processes, Technology

Background & Activities of Note
The schedule was too busy for one of the Radiology RNs to administer the ordered anxiolytic
Ms. Murphey's primary nurse could not go & sought task-assistance from the Help-All nurse **to prevent the case from being cancelled**
The name of the ordered anxiolytic was communicated verbally between the primary nurse & RaDonda as **Versed**
Neither the primary nurse nor RaDonda routinely administer **Versed**
Patient monitoring was discussed by the primary nurse and the Radiology Tech with the primary nurse concluding monitoring was not indicated
Patient monitoring was discussed by the primary nurse and RaDonda, with the same conclusion. RaDonda **did not plan to provide monitoring** to Ms. Murphey

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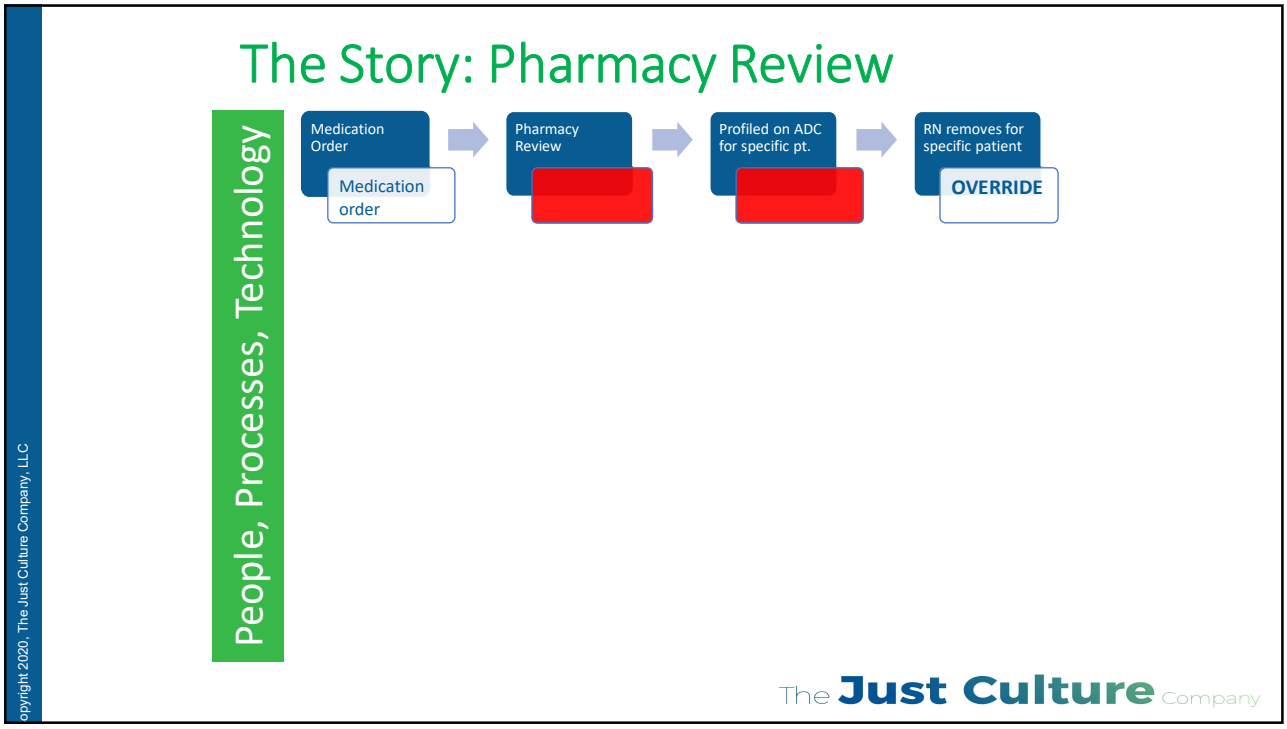
The Story: Pharmacy Review
People, Processes, Technology
Medication Order
Medication order
Pharmacy Review
Profiled on ADC for specific pt.
RN removes for specific patient
OVERRIDE
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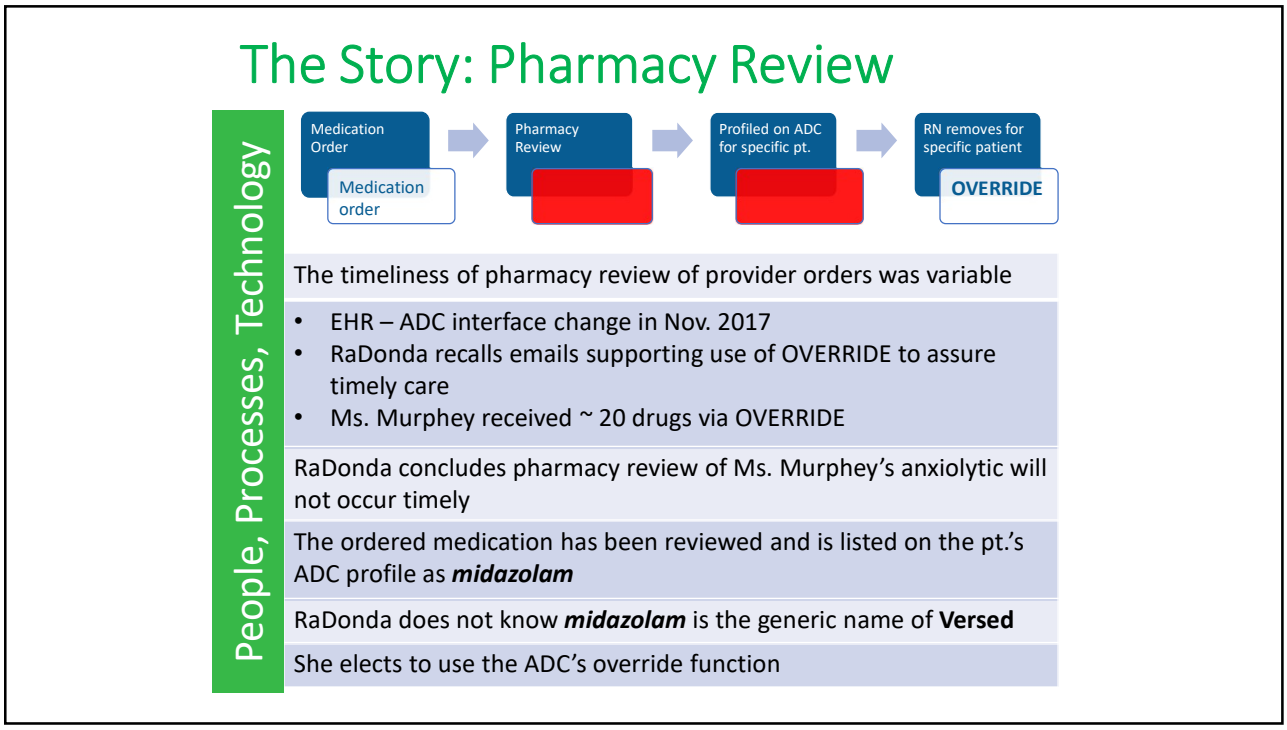
The Story: Pharmacy Review
People, Processes, Technology
Medication Order
Medication order
Pharmacy Review
Profiled on ADC for specific pt.
RN removes for specific patient
OVERRIDE
The timeliness of pharmacy review of provider orders was variable
• EHR – ADC interface change in Nov. 2017
• RaDonda recalls emails supporting use of OVERRIDE to assure timely care
• Ms. Murphey received ~ 20 drugs via OVERRIDE
RaDonda concludes pharmacy review of Ms. Murphey's anxiolytic will not occur timely
The ordered medication has been reviewed and is listed on the pt.'s ADC profile as midazolam
RaDonda does not know midazolam is the generic name of Versed
She elects to use the ADC's override function

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The Story: ADC Drug Procurement

People, Processes, Technology

Background & Activities of Note
RaDonda's preceptee is present at the time of drug selection. She is multi-tasking & recalls focus of conversation as the upcoming procedure in the ED
Types in V-E
Vecuronium appears at the top of the list
Selects it
Interacts with **standard warnings** that were present for all drugs removed on **OVERIDE**
• Vecuronium, a paralytic, was not constrained nor differentiated from other vials in the ADC nor through programmed screen warnings
RaDonda **removes the <wrong> drug** from the ADC bin
Upon retrieval, she notes powdered formulation; flips the vial and begins to read reconstitution directions on the back of the label
She **does not read the label** on front of vial

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The Story: Drug Administration

People, Processes, Technology

Background & Activities of Note
RaDonda locates & identifies Ms. Murphey in the Radiology corridor
She attempts to locate an EHR terminal and barcode scanning equipment
• **Barcode scanning is not in place in the Radiology area** • EHR access for documentation is not available
RaDonda **does not read the drug name** or appreciate the warnings **on the vial label**
She reconstitutes the medication & administers it IV via central venous catheter
The Radiology Tech is present while the medication is administered

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The Story: Drug Monitoring

People, Processes, Technology

Background & Activities of Note
RaDonda is not familiar with Radiology norms, flow or competing priorities within the Radiology Suite
Ms. Murphey is taken to a Holding Area by the Radiology Tech
Nurse Vaught and the preceptee proceed to the ED as planned
The Holding Area where the patient awaits PET scanning is equipped with a surveillance camera
Post-administration drug monitoring does not occur
Ms. Murphey is discovered unresponsive ~25 minutes later. She undergoes resuscitation but experiences brain damage such that supportive care is withdrawn the next day

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Opportunities for Improvement

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Lessons Learned about Human Fallibility, System Design, and Justice in the Aftermath of a Fatal Medication Error

April 7, 2022 • Volume 27 Issue 7

SPECIAL ISSUE

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Acute Care

ISMP Medication Safety Alert!®

Educating the Healthcare Community About Safe Medication Practices

Criminalization of human error and a guilty verdict:

A travesty of justice that threatens patient safety

On March 25, 2022, most of the healthcare community were shocked and dismayed after learning that RaDonda Vaught had been convicted of criminally negligent homicide and gross neglect of an impaired adult following the 2017 death of Charlene Murphey.[1] A full description of the error can be found in our January 17, 2019, newsletter (www.ismp.org/node/1329). RaDonda is a former registered nurse who was fired from Vanderbilt University Medical Center after making a fatal medication error and then stripped of her professional nursing license by the Tennessee Board of Nursing (www.ismp.org/node/26713). During her 3-day trial, RaDonda faced a charge of reckless homicide, but the 12-member jury found her guilty of a lesser charge, negligent homicide. Sentencing will occur on May 13, 2022; until then, RaDonda remains free on bond. According to sentencing guidelines, RaDonda faces 3 to 6 years in prison for felony neglect and 1 to 2 years for negligent homicide.[2]

First and foremost, our heartfelt condolences go out to the Murphey family for their tragic loss. Next, discussions about this case are dominating the healthcare community—from social media to headline-grabbing news reports.[3,] In addition, several professional and patient safety organizations have issued statements about the negative impact of the criminalization of human error and the guilty verdict, including the:

- American Association of Critical-Care Nurses (www.ismp.org/ext/886)
- American Nurses Association and Tennessee Nurses Association (www.ismp.org/ext/866)
- American Hospital Association and American Organization for Nursing Leadership (www.ismp.org/ext/867)
- Academy of Medical-Surgical Nurses (www.ismp.org/ext/885)
- American Society of Health-System Pharmacists (www.ismp.org/ext/882)
- Institute for Healthcare Improvement (IHI) and IHI Lucian Leape Institute (www.ismp.org/ext/880)
- Outcome Engenuity and The Just Culture Company (www.ismp.org/ext/883)

Leadership at some hospitals and health systems have also issued statements to staff in response to the guilty verdict, reinforcing their commitment to stand with staff in the wake of an error, stressing the importance of transparency and error reporting, and noting their ongoing focus on learning and system redesign, not individual blame. ISMP would be remiss to not share what we perceive to be our most significant disappointments with the inadequate way the trial was handled, the unfairness of the trial and the guilty verdict, and the verdict's negative impact on the healthcare community.

Inadequate Handling of the Trial

Lack of evidence about the system failures. It appears that, in deciding to charge RaDonda, the prosecution chose to ignore the fact that the error was a culmination of multiple system failures throughout the medication-use process that contributed to Charlene Murphey's death. During the trial, the defense failed to fully educate the jury about these system failures. Examples include access to a neuromuscular blocking agent via override in an automated dispensing cabinet (ADC) after entering just the first two letters of a drug's name; inability to search simultaneously by brand and generic drug names; unsafe ADC storage of a neuromuscular blocking agent outside of a sealed box or rapid sequence intubation (RSI) kit; allowing medications to be ordered by a brand name, Versed, that has long been discontinued (2003); lack of barcode technology in the radiology unit; disallowing a family member to accompany the patient to radiology; and so many more. Instead, the prosecution singled out the individual nurse closest to the final step of the event, RaDonda, and repeatedly accused her of not following the "five rights," not reading the vial label, disregarding warnings on the vial and ADC, and abandoning the patient after administration of the drug, which the prosecution's nursing "expert" erroneously termed "conscious sedation" because midazolam (Versed) is sometimes used for that purpose, but not in this case.

While RaDonda has never once shirked responsibility for the error, she has often noted that the blame is not hers alone,[4] and ISMP fully agrees with her. But in the trial summation, the prosecution claimed that the event "is not an issue of systematic errors" and even implied that certain conditions, such as the absence of barcode technology in radiology, was not a system failure but merely a need for nurses to rely on the "five rights." There was no discussion (and likely no jury understanding) about the latent failures that allowed this error to happen—only the active failures of one nurse, RaDonda. In the end, the defense failed to educate the jury about the complexity of healthcare errors so they could make an informed decision regarding RaDonda's conduct. This lack of critical information distorted the jury's image of RaDonda and made her a scapegoat for this tragic error.

continued on page 2 — Travesty of Justice >

www.ismp.org/node/30912

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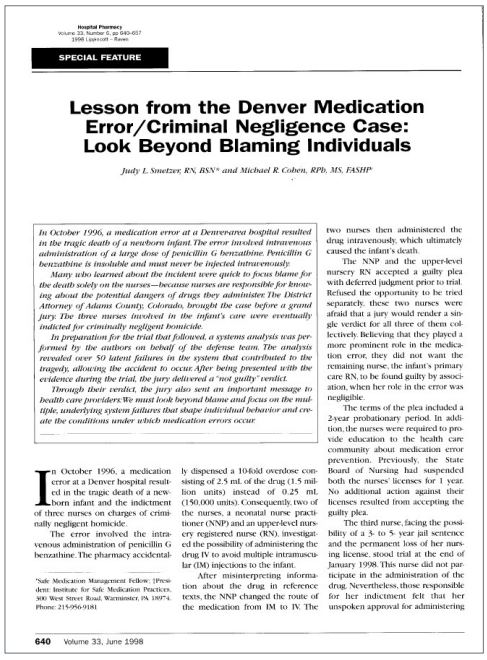

Hospital Pharmacy

Volume 33, Number 6, pp 640-657

1998 Lippincott - Raven

SPECIAL FEATURE

Lesson from the Denver Medication Error/Criminal Negligence Case: Look Beyond Blaming Individuals

Judy L. Smetzer, RN, BSN and Michael R. Cohen, RPh, MS, FASHP*

In October 1996, a medication error at a Denver area hospital resulted in the tragic death of a newborn infant. The error involved intravenous administration of a large dose of penicillin G benzathine. Penicillin G benzathine is insoluble and must never be injected intravenously.

Many who learned about the incident were quick to focus blame for the death solely on the nurses—because nurses are responsible for knowing about the potential dangers of drugs they administer. The District Attorney of Adams County, Colorado, brought the case before a grand jury. The three nurses involved in the infant's care were eventually indicted for criminally negligent homicide.

In preparation for the trial that followed, a systems analysis was performed by the authors on behalf of the defense team. The analysis revealed over 50 latent failures in the system that contributed to the tragedy, allowing the accident to occur. After being presented with the evidence during the trial, the jury delivered a "not guilty" verdict.

Through their verdict, the jury also sent an important message to health care providers: We must look beyond blame and focus on the multiple, underlying system failures that shape individual behavior and create the conditions under which medication errors occur.

In October 1996, a medication error at a Denver hospital resulted in the tragic death of a newborn infant and the indictment of three nurses on charges of criminally negligent homicide.

The error involved the intravenous administration of penicillin G benzathine. The pharmacy accidentally dispensed a 10-fold overdose consisting of 2.5 mL of the drug (1.5 million units) instead of 0.25 mL (150,000 units). Consequently, two of the nurses, a neonatal nurse practitioner (NNP) and an upper-level nursery registered nurse (RN), investigated the possibility of administering the drug IV to avoid multiple intramuscular (IM) injections to the infant.

After misinterpreting information about the drug in reference texts, the NNP changed the route of the medication from IM to IV. The two nurses then administered the drug intravenously, which ultimately caused the infant's death.

The NNP and the upper-level nursery RN accepted a guilty plea with deferred judgment prior to trial. Refused the opportunity to be tried separately, these two nurses were afraid that a jury would render a single verdict for all three of them collectively. Believing that they played a more prominent role in the medication error, they did not want the remaining nurse, the infant's primary care RN, to be found guilty by association, when her role in the error was negligible.

The terms of the plea included a 2-year probationary period. In addition, the nurses were required to provide education to the health care community about medication error prevention. Previously, the State Board of Nursing had suspended both the nurses' licenses for 1 year. No additional action against their licenses resulted from accepting the guilty plea.

The third nurse, facing the possibility of a 5- to 5-year jail sentence and the permanent loss of her nursing license, stood trial at the end of January 1998. This nurse did not participate in the administration of the drug. Nevertheless, those responsible for her indictment felt that her unspoken approval for administering

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ISMP National Medication Error Reporting Programs

- National Medication Errors Reporting Program
- National Vaccine Errors Reporting Program
- Consumer Errors Reporting Program

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https://www.ismp.org/report-medication-error

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June 16, 2016 • Volume 21 Issue 12

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Paralyzed by mistakes

Reassess the safety of neuromuscular blockers in your facility

PROBLEM: Neuromuscular blocking agents are high-alert medications because of their well-documented history of causing catastrophic injuries or death when HIGH-ALERT used in error. These drugs are used during tracheal intubation, during surgery of intubated patients, and to facilitate mechanical ventilation of critically ill patients. However, neuromuscular blockers have been inadvertently administered to both adult and pediatric patients who were not receiving proper ventilatory assistance. Because neuromuscular blockers paralyze the muscles that are necessary for breathing, some patients have died or sustained serious, permanent injuries if the paralysis was not witnessed by a practitioner who could intervene.

After a patient receives a neuromuscular blocker, progressive paralysis develops, initially affecting the small muscle groups such as the face and hands, then moving to larger muscle groups in the extremities and torso until all muscle groups are paralyzed and respiration ceases. However, full consciousness remains intact, and patients can experience intense fear when they can no longer breathe. They can also sense pain. The experience can be horrific for patients and can lead to psychological trauma, including post-traumatic stress disorder.[1]

The ISMP National Medication Errors Reporting Program (MERP) has received well over 100 reports of errors involving neuromuscular blockers. However, the true incidence of injuries from erroneous administration of neuromuscular blockers is much higher than reflected in our error-reporting program. While some errors have occurred during anesthesia in the operating room (OR), many have taken place outside this setting, in emergency departments (EDs), interventional radiology departments, intensive care units (ICUs), and other medical, surgical, and psychiatric units.

The most common type of error with neuromuscular blockers appears to be administration of the wrong drug. A 2009 analysis of 154 events over a 5 year period showed that a neuromuscular blocker was not the intended drug in approximately half of all wrong drug errors.[2] Practitioners thought they were administering a different drug, so patients may not have been supported with mechanical ventilation. More than 80% of these wrong-drug errors reached the patient, and approximately a quarter resulted in patient harm—a rate significantly higher when compared to less than 1% of events causing harm with all other wrong-drug errors during the same study period.[2]

Errors with neuromuscular blockers can be attributed to one or more common causes. The following provides a sampling of the causes of errors with examples.

Look-alike packaging and labeling

An ED nurse administered pancuronium instead of influenza vaccine to several patients. The vials were the same size, and the labels were quite similar. The look-alike vials had been stored next to each other in the refrigerator. The patients experienced dyspnea and respiratory depression but, fortunately, sustained no permanent injuries.

continued on page 2—Neuromuscular blockers >

SAFETY briefs

A liquid dose cup you can read. Comar has begun distribution of mL-only liquid dose cups with an easy-to-read, printed scale. These are being distributed by MedDose (www.ismp.org/sc?id=1748) and are available in three capacities: 20, 30, and 60 mL. Previous dosage cups we have seen have had embossed scales that were difficult to read or displayed both mL and teaspoonful amounts. We

Figure 1. A mL-only dosage cup with printed scale.

continued on page 3—SAFETY briefs >

20-year anniversary of this newsletter. The *ISMP Medication Safety Alert!* began publication on January 15, 1996. Now in its 20th year, we are highlighting some of the significant ISMP patient safety milestones—small snippets of articles or safety briefs we wrote so many years ago that are memorable, humorous, or still newsworthy.

A glimpse down memory lane

April 24, 1996 newsletter:

Be ready for accidental IV potassium overdoses

By 1996, ISMP was aware of multiple deaths and patient injuries that had been associated with accidental intravenous administration of concentrated potassium chloride injection prior to dilution. The drug was inadvertently given as a direct intravenous (IV) push injection or erroneously used as a diluent to prepare sterile antibiotic powders, then injected by direct IV

continued on page 2—memory lane >

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www.ismp.org/node/247

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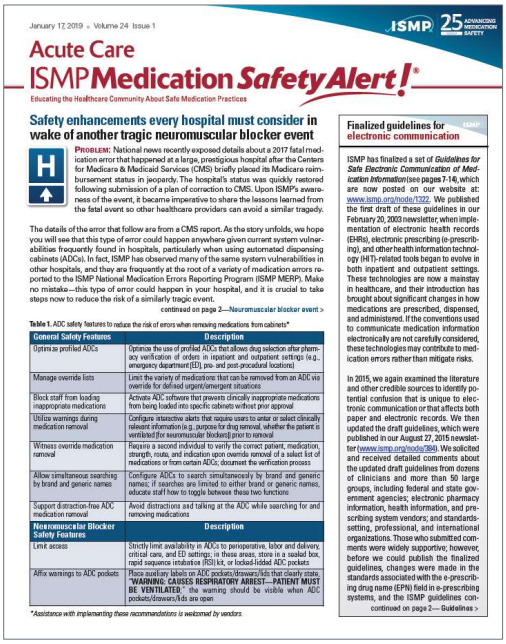

January 17, 2019 • Volume 24 Issue 1

ISMP 25 ADVANCING MEDICATION SAFETY

Acute Care

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Safety enhancements every hospital must consider in wake of another tragic neuromuscular blocker event

PROBLEM: National news recently exposed details about a 2017 fatal medication error that happened at a large, prestigious hospital after the Centers for Medicare & Medicaid Services (CMS) briefly placed its Medicare reimbursement status in jeopardy. The hospital's status was quickly restored following submission of a plan of correction to CMS. Upon ISMP's awareness of the event, it became imperative to share the lessons learned from the fatal event so other healthcare providers can avoid a similar tragedy.

The details of the error that follow are from a CMS report. As the story unfolds, we hope you will see that this type of error could happen anywhere given current system vulnerabilities frequently found in hospitals, particularly when using automated dispensing cabinets (ADCs). In fact, ISMP has observed many of the same system vulnerabilities in other hospitals, and they are frequently at the root of a variety of medication errors reported to the ISMP National Medication Errors Reporting Program (ISMP MERP). Make no mistake—this type of error could happen in your hospital, and it is crucial to take steps now to reduce the risk of a similarly tragic event.

continued on page 2—Neuromuscular blocker event >

Table 1. ADC safety features to reduce the risk of errors when removing medications from cabinets*

General Safety Features	Description
Optimize profiled ADCs	Optimize the use of profiled ADCs that allows drug selection after pharmacy verification of orders in inpatient and outpatient settings (e.g., emergency department [ED], pre- and post-procedural locations)
Manage override lists	Limit the variety of medications that can be removed from an ADC via override for defined urgent/emergent situations
Block staff from loading inappropriate medications	Activate ADC software that prevents clinically inappropriate medications from being loaded into specific cabinets without prior approval
Utilize warnings during medication removal	Configure interactive alerts that require users to enter or select clinically relevant information (e.g., purpose for drug removal, whether the patient is ventilated [for neuromuscular blockers]) prior to removal
Witness override medication removal	Require a second individual to verify the correct patient, medication, strength, route, and indication upon override removal of a select list of medications or from certain ADCs; document the verification process
Allow simultaneous searching by brand and generic names	Configure ADCs to search simultaneously by brand and generic names; if searches are limited to either brand or generic names, educate staff how to toggle between these two functions
Support distraction-free ADC medication removal	Avoid distractions and talking at the ADC while searching for and removing medications
Neuromuscular Blocker Safety Features	**Description**
Limit access	Strictly limit availability in ADCs to perioperative, labor and delivery, critical care, and ED settings; in these areas, store in a sealed box, rapid sequence intubation (RSI) kit, or locked-lidded ADC pockets
Affix warnings to ADC pockets	Place auxiliary labels on ADC pockets/drawers/lids that clearly state: "**WARNING: CAUSES RESPIRATORY ARREST—PATIENT MUST BE VENTILATED.**" the warning should be visible when ADC pockets/drawers/lids are open

*Assistance with implementing these recommendations is welcomed by vendors.

Finalized guidelines for electronic communication

ISMP has finalized a set of *Guidelines for Safe Electronic Communication of Medication Information* (see pages 7-14, which are now posted on our website at: www.ismp.org/node/1222. We published the first draft of these guidelines in our February 20, 2003 newsletter; when implementation of electronic health records (EHRs), electronic prescribing (e-prescribing), and other health information technology (HIT)-related tools began to evolve in both inpatient and outpatient settings. These technologies are now a mainstay in healthcare, and their introduction has brought about significant changes in how medications are prescribed, dispensed, and administered. If the conventions used to communicate medication information electronically are not carefully considered, these technologies may contribute to medication errors rather than mitigate risks.

In 2015, we again examined the literature and other credible sources to identify potential confusion that is unique to electronic communication or that affects both paper and electronic records. We then updated the draft guidelines, which were published in our August 27, 2015 newsletter (www.ismp.org/node/368). We solicited and received detailed comments about the updated draft guidelines from dozens of clinicians and more than 50 large groups, including federal and state government agencies; electronic pharmacy information, health information, and prescribing system vendors; and standards-setting, professional, and international organizations. Those who submitted comments were widely supportive; however, before we could publish the finalized guidelines, changes were made in the standards associated with the e-prescribing drug name (EPN) field in e-prescribing systems, and the ISMP guidelines con-

continued on page 2—Guidelines >

www.ismp.org/node/1326

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With neuromuscular blockers, many hospitals have been paralyzed by mistakes

- ISMP has observed many of the same system vulnerabilities in other hospitals, and they are frequently at the root of a variety of medication errors reported to the ISMP National Medication Errors Reporting Program (ISMP MERP)
- Make no mistake—this type of error could happen in your hospital, and it is crucial to take steps to reduce the risk of a similarly tragic event

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Recommendations for providers

(upstream interventions)

- Retire discontinued brand names
  - The brand name Versed (midazolam) was discontinued in 2003
  - Related errors have happened when "Versed" was typed on cabinet override
- ADC order entry on override – use 5-letter characters when typing drug names
  - Recent error report: RO – Rocephin – rocuronium

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How a Few Letters Can Spell Trouble

Many hospital medication cabinets can be searched by inputting only a few letters. Since 2017, there have been at least eight reports of hospital staff accidentally withdrawing and then administering or nearly administering the wrong drug for this reason. Because hospitals are not required to report most drug mix-ups, this is likely a small sampling of a much larger total.

Letters typed	Intended drug (effect)	Withdrawn drug (effect)	Year of error report
V-E	Versed (sedative)	vecuronium (paralytic)	2017
V or V-E*	Versed (sedative)	vecuronium (paralytic)	2019
K-E-T	ketamine (aids in anesthesia)	ketorolac (pain reliever)	2019
R-O	rocuronium (paralytic)	Romazicon (reverses sedatives, overdoses)	2019
R or R-O*	rocuronium (paralytic)	Romazicon (reverses sedatives, overdoses)	2021
R-O	rocuronium (paralytic)	Rocephin (antibiotic)	2021
P-I-T	Pitocin (induces labor)	Pitressin (treats diabetes insipidus)	2021
V-E-R	Versed (sedative)	verapamil (treats high blood pressure, chest pain)	2022

*Unknown is whether the hospital staffer typed one or two letters.
Source: Institute for Safe Medication Practices error reports
Lydia Zuraw and Brett Kelman/KHN Embed

KHN

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October 21, 2021 • Volume 26 Issue 21

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Challenges with requiring five characters during ADC drug searches via override

PROBLEM: Since 2019, ISMP has recommended the entry of a minimum of the first five characters of a drug name (unless the name has fewer than five letters) during searches in automated dispensing cabinets (ADCs) (Statement 4.4 in the ISMP ***Guidelines for the Safe Use of Automated Dispensing Cabinets***, www.ismp.org/node/1372) and other electronic forms of communication (Statement 19 in the ***ISMP Guidelines for Safe Electronic Communication of Medication Information***, www.ismp.org/node/1322).The use of only the first two to four characters of the drug name, mnemonics or short names (e.g., "met"), skipped character abbreviations (e.g., "mtx"), or a combination of the first few characters and dose (e.g., "meth10") has led to the presentation of similar looking drug names on the screen, which has resulted in drug search selection errors. For example, entering "met" has led to mix-ups between methylphenidate, methadone, metOLazone, methotrexate, metFORMIN, and metroNIDAZOLE; and entering "ve" has led to mix-ups between vecuronium and VERSED (midazolam).

Recently, we received two error reports involving confusion between rocuronium and ROMAZICON (discontinued brand of flumazenil). One event occurred during cardiopulmonary resuscitation in a critical care unit. When a physician gave a verbal order for rocuronium for intubation, a nurse logged into an ADC, selected the override function, entered "ro," and accidentally selected and administered "Romazicon" to the arresting patient. Fortunately, the intubation and resuscitation were successful. As it turns out, rocuronium, the neuromuscular blocking agent, was not available via override as an individual drug; it was only available via override in a rapid sequence intubation (RSI) kit. In the other event, a head trauma patient in the emergency department, who needed urgent intubation, required an additional vial of rocuronium that the nurse did not know was available in the RSI kit the team was currently using. Again, only "ro" was entered into the ADC to access the medication via override, and "Romazicon" was selected in error and administered to the patient. The patient was still intubated successfully and experienced no permanent harm despite receiving the wrong drug.

Some ADC vendors have modified the functionality to allow organizations to require five characters when searching for drug names via the override feature. Based on practitioner comments on listservs and error reports, some organizations have implemented this functionality when using the override feature. However, we are also aware of several challenges, some of which have been present when entering two to four characters during drug name searches, but have been intensified with the five-character requirement:

continued on page 2 — Five characters >

Customized ISMP consulting services

ISMP's nationally recognized experts are here to support you, even during the pandemic! Our multidisciplinary consulting team can offer medication safety solutions for healthcare facilities of all sizes, virtually or in person. Whether you need assistance getting your medication safety program started, identifying potential issues, or solving ongoing problems, we can help. Our consulting team can provide you with an unbiased analysis of the medication-use process and a customized roadmap for improvement to help you reduce the risk of medication errors. For information on services tailored to your specific needs, visit: www.ismp.org/node/23050.

SAFETY briefs

Potential for inaccurate medication history data. Surescripts operates an electronic network that, in part, supports the transmission of electronic prescriptions from prescribers to community pharmacies and provides electronic medication histories to prescribers. We recently learned that prescription information sent to Surescripts from three pharmacy data sources may have contained inaccurate medication history instructions, such as a missing forward slash mark (/) or dash (–). For example, instead of "Take 1-2 tablets by mouth at bedtime," the listing read "Take 1 2 tablets by mouth at bedtime." Or, instead of "Take 1 & 1/2 tablets by mouth once a day," the listing read "Take 1 & 1 2 tablets by mouth once a day." And "Take 1 1/2 tablets by mouth once a day" was displayed instead of "Take 1 1/2 tablets by mouth once a day." The duration of therapy has also been impacted. For example, "Take for 2-3 weeks" has appeared as "Take for 2 3 weeks."

Health systems and electronic health record vendors should be aware of this situation as it could potentially lead to misinformation when performing medication reconciliation during an emergency department visit or hospital admission. Incorrect prescription information can also appear as part of the patient's medication list in the after-visit summary following a clinic visit. Please note: no characters have been missing during the dispensing process while filling prescriptions, only on medication histories.

Immediately upon learning of this issue, Surescripts worked with the three pharmacy data sources to fix the issue. For now, the sig field is being removed in all medication history response messages from the affected pharmacy data sources until they implement permanent fixes in their systems. Once the three pharmacy data sources have permanent fixes in place, Surescripts will communicate the resolution of this issue.

continued on page 2 — SAFETY briefs >

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www.ismp.org/node/28130

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Recommendations for providers

(upstream)

- Store neuromuscular blockers safely
  - Eliminate storage of neuromuscular blockers where not routinely needed. Limiting neuromuscular blockers in ADCs can also help reduce mix-ups with other drugs due to similar appearance
  - Outside ICU, ED and perioperative settings, provide in sealed box, clear plastic zip bags, or rapid sequence intubation (RSI) kit.
  - Enable an ADC block load feature where available, to prevent users from inappropriately stocking the cabinet. If vials must be stored, keep them in locked-lidded pockets, never open matrix

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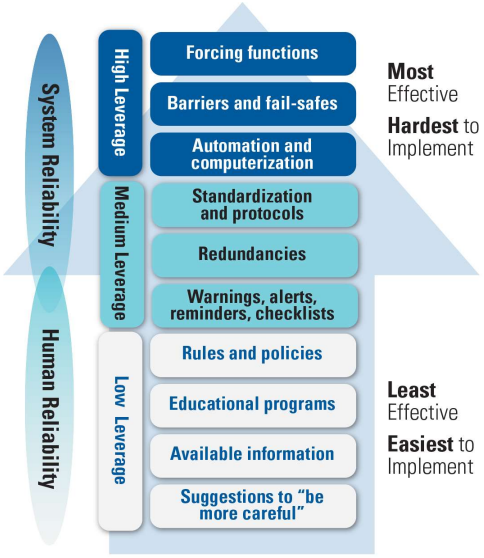
ISMP Hierarchy of Error Reduction Strategies



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Recommendations for providers

(upstream)

- Plan for sedation
  - In procedural areas, including radiology, establish a standard process for patients who require sedation prior to procedures that starts with an oral anxiolytic (e.g., **LOR**azepam) as the medication of choice
  - Include patient monitoring requirements during and after drug administration that avoid handoffs. Who is responsible? What is needed?
  - Patients who receive sedation for procedures (e.g., IV midazolam) require some level of monitoring, regardless of the indication
  - Hospital procedures should specify required monitoring, including use of pulse oximetry and other means of evaluating the adequacy of ventilation, along with criteria for when monitoring can be stopped
  - Monitoring requirements should be approved by the anesthesia department to standardize the care of patients who receive IV sedation and provide oversight

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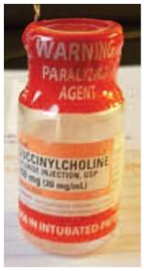
Recommendations for providers

(upstream)

— Affix warnings

- Place auxiliary labels on all storage locations and/or ADC pockets/drawers/lids that contain neuromuscular blockers that clearly warn that respiratory paralysis will occur, and ventilation is required (e.g., "**WARNING: CAUSES RESPIRATORY ARREST—PATIENT MUST BE VENTILATED**")
- Warnings should be visible when ADC pockets/drawers/lids are open
- Consider shrink wrap sleeves for vials, although these can make different neuromuscular blockers look similar



— Build interactive ADC warnings

- Display an interactive warning (e.g., "**Patient must be intubated to receive this medication**"). The warning should require user to enter or select the purpose of the medication removal ("other" should not be a choice) and verify that the patient is (or will be) manually or mechanically ventilated. In most ADC systems, this type of warning is configurable by medication, and in some systems, by cabinet

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Recommendations for providers

(upstream)

— Clarify override policies

- Safety risks exist when removing and administering medications via override before pharmacy verifies the order
- Review the hospital's ADC override policy to confirm its permitted use is limited to emergency or urgent situations when a patient would be significantly compromised by the delay (or if a licensed independent practitioner controls the medication use process)
- Manage the override list. Be sure the policy clearly communicates the hospital's overall expectation of very limited overrides for defined urgent and emergent situations (e.g., antidotes, rescue agents, reversal agents, lifesaving medications, comfort care medications for acute pain and intractable vomiting)

— Educate staff

- Allow simultaneous searching by brand and generic names. Teach practitioners how to toggle between brand and generic or display both on-screen
- Teach practitioners to access and remove medications in profile mode whenever possible, as it directs them to a patient-specific medication profile and limits their access to medications that were verified by a pharmacist
- Teach practitioners how to toggle between brand and generic name search functions

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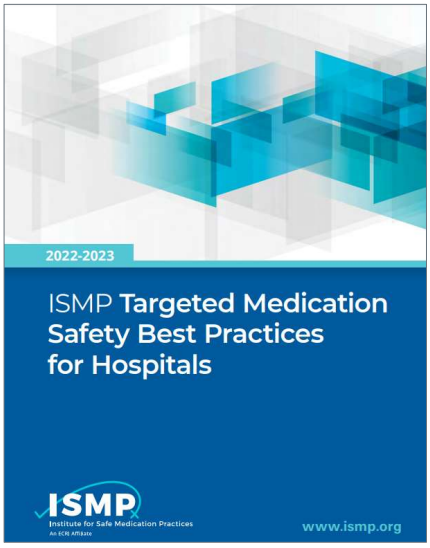
Recommendations for providers

(upstream)

- ISMP Targeted Medication Safety Best Practices
  - New Best Practice #18 consists of interventions designed to expand the use of barcode verification prior to medication and vaccine administration beyond inpatient care areas
  - However, lower levels of full implementation reported in radiology (31%), catheterization (23%), procedure rooms (16%), and operating rooms (7%)



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https://www.ismp.org/guidelines/best-practices-hospitals

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Recommendations for providers

(downstream)

- Implement barcode scanning verification in all areas
  - Prior to administration, verify each medication via barcode medication administration (BCMA) to ensure accuracy
  - Get ready for the future - RFID
- Avoid unjustifiable overrides
  - Neuromuscular blockers may be needed via override for emergency intubation. Nevertheless, if neuromuscular blockers are on a list of overridable medications, each override should be situation dependent and justifiable, and not only based alone on its availability on a list of overridable medications
- Require a witness upon removal of certain medications on override
  - Provide an automated prompt and for documenting an independent double check with another practitioner at the ADC when removing facility-defined medication via override.
  - "Witness on dispense" by cabinet and by drug is an available prompt with some ADC systems that also allows documentation of the verification process

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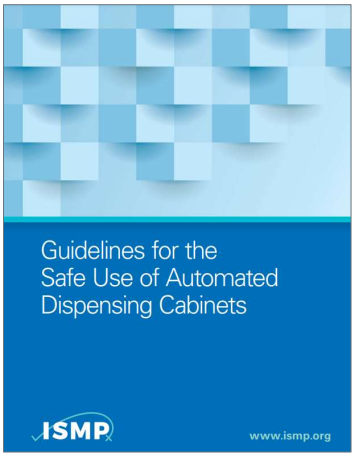
Recommendations for providers

(downstream)

- **Distraction-free ADC drug removal.** Avoid distractions and talking at the ADC while searching for and removing medications
- **Monitor overrides.** Monitor overrides daily to verify appropriateness, transcription of orders, and documentation of administration. Review aggregate override usage reports monthly, trending by medication, user, and location, to assess appropriateness, determine how well the hospital is managing overrides, and address barriers to the pharmacists' review of medication orders prior to drug removal



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For cabinet vendors

- Assist hospitals with increasing the number of drug name letter characters when searching
  - While efficiency is important, and spelling errors are a concern, safety may be jeopardized by allowing fewer than 5 letters of a drug name to populate the search results. It is recommended that vendors review potential software changes to allow a configurable option for the required number of letters to narrow the choices, ideally to one drug of drug category. Vendors have been helpful.
- Alert users to generic/brand name searches
  - Some newer ADC systems allow both brand and generic drug names to be displayed and searched. Earlier versions may allow only one or the other. Vendors should enable simultaneous searching by both brand and generic drug name. If brand and generic search capabilities are separate, the ADC screen should clearly display to the user which type of search is currently being conducted (generic or brand) and make it easy to toggle between the two functionalities. Allow display of both generic and brand simultaneously
- Retire discontinued brand names
  - In consultation with customers, drug information vendors (Medispan, FirstDatabank, Multum, etc.) should retire discontinued brand names sooner than they now do (the brand name Versed was discontinued in 2003).

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Lessons Learned about Human Fallibility, System Design, and Justice in the Aftermath of a Fatal Medication Error

The "five rights"

1. Right time
2. Right patient
3. Right drug
4. Right dose
5. Right route

ISMP MEDICATION SAFETY ALERT!

VOLUME 4, ISSUE 7
APRIL 7, 1999
Educating the healthcare community about safe medication practices

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Subscriber Hotline: 1 800 FAIL SAFE
E-mail: ismpinfo@ismp.org

Safety Briefs (cont'd)

•Before a new drug is added to an organization's formulary, a Pharmacy and Therapeutics (P&T) Committee often contemplates criteria such as cost, efficacy and serious potential adverse drug reactions. Yet, the drug's potential for error may not be fully anticipated and considered. As a result, guidelines or protocols may not be developed or restrictions may not be placed on new formulary drugs to maximize their safe use. To avoid this problem, include *error potential* as a standing item for discussion on all drugs submitted to the P&T Committee for formulary addition. Use *ISMP Medication Safety Alert!* as one source of information that is provided to the committee for discussion before approval. Likewise, establish necessary guidelines, protocols or restrictions for new formulary drugs with heightened error and/or harm potential and educate staff prior to their use. To evaluate the effectiveness of newly established guidelines, protocols or restrictions, consider initiating a drug use evaluation (DUE) immediately after introducing the new formulary drug. Just as important, after formulary approval of newly marketed drugs, develop a tickler system to search the literature for at least 6 months to identify errors or adverse drug reactions that have may been reported since product launch.

•A physician with exquisite handwriting wrote a set of four numbered orders and signed his name close to the last order. Order number one was for lab work and orders two to four were drug orders. However, order number two contained two different drug orders with one appearing as "2.5 Tylenol 650 mg q4h prn." A pharmacist, puzzled by the "2.5" designation, called the physician for clarification. Apparently, when the physician realized he had forgotten to write an order for **TYLENOL** (acetaminophen), he added it adjacent to order number two since there was no room between his signature and the last written order. He labeled the Tylenol order as order number 2.5 to assure that it would not be overlooked. Since Tylenol is not available in 650 mg, the risk of misinterpreting the order as two and one half tablets of Tylenol 650 mg is unlikely. Still, the patient could have received five 325 mg tablets. Further, errors are possible when any number, even consecutive whole numbers, precede drug orders.

•A comprehensive medication error taxonomy has been created by the National Coordinating Council on Medication Error Reporting and Prevention. The taxonomy can be used to help design local reporting forms and accompanying databases. According to the Council, the taxonomy may be reproduced without special permission by health care facilities for internal non-commercial use. Access the document at www.nccmerp.org/taxo0202.pdf.

•ISMP has several new, colorful, medication safety posters available in addition to our 13 original posters. Please contact us (215 956 9181 or ismpinfo@ismp.org) if you would like to order posters to help **celebrate National Nurses Week on May 6-12, 1999.**

The "five rights"

It's likely that most healthcare professionals, especially nurses, have learned about the "five rights" of medication use: the right patient, drug, time, dose, route. They're generally regarded as a standard for safe medication practices. Still, many errors, including lethal errors, have occurred in situations where practitioners firmly believed they had verified the "five rights." Why does this happen? First, the "five rights" are goals of safe medication practices. As such, they offer little procedural guidance (how to) to practitioners during medication use. For example, how does a pharmacist identify the "right patient" when the patient's name and room number on an order copy are blurred and the physician's signature is illegible? Who does he call for follow-up? How does a home care nurse providing care in an assisted living facility identify the "right patient" when name bracelets are not used? Can she depend on verbal questioning, which has led to errors when names were misheard or patients were confused? Without adequate systems in place to help practitioners achieve the goals of the "five rights," errors are likely.

Further, the "five rights" focus on *individual performance* and do not reflect that safe medication practices are a culmination of multidisciplinary efforts where responsibility for accurate drug administration lies with *multiple individuals and reliable systems to support safe medication use*. For example, poor lighting, inadequate staffing patterns, poorly designed medical devices, handwritten orders, trailing zeroes, ambiguous drug labels and lack of an effective double check system for high alert medications can contribute to staffs' failure to accurately verify the "five rights," despite their best efforts.

Finally, the "five rights" do not take into account the significant contribution of human factors to errors. For example, human factor researchers have demonstrated that "confirmation bias" causes practitioners to misperceive important information in their environment. As a result, professionals who select the wrong product with a label or package similar to the correct product often will say that they looked at the label to verify the "right drug." In truth, they may have even read it carefully. However, they did not "see" it correctly. We "see" with both our eyes and our mind. While our eyes, with proper eyesight, have the capacity to take in all information, our mind learns to screen out information that it considers less useful to prevent information overload. Additionally, as we gain experience, we develop a picture in our mind of items in our environment. Thus, as we attempt to locate or recognize items through comparison with our mind's picture, often we are unable to see any disconfirming evidence if the wrong product is selected. Instead, we see what we intend to see. The ability to filter information and locate or recognize items using a picture in our mind is vital to correct performance. Yet, it contributes to errors when our fallible minds make corrections for what our eyes are actually seeing.

The "five rights" are not the "be all that ends all" in medication safety. Unfortunately, many times management staff may simply admonish practitioners who make an error for not following the "five rights" without recognizing or addressing the human factors and system-based causes. Likewise, regulatory agencies often sanction practitioners based on their lack of verifying the "five rights," thus perpetuating the belief that individuals should be blamed and punished. While the "five rights" should remain as medication use goals, we must help practitioners achieve these goals by establishing strong support systems that encourage safe medication practices.

PLEASE! Complete the automated dispensing cabinets survey

On page 3 is a survey designed to assess safety measures currently used by hospitals that use unit-based automated dispensing cabinets. We'll share the results in an upcoming issue so you can compare your practices with those of other hospitals. The deadline for submitting completed surveys is May 10, 1999.

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The fallacy of the five rights as an individual responsibility

- The focus is on individual performance where responsibility for accurate drug administration lies with multiple individuals and reliable systems to support safe medication use.
- The five rights are goals for safe medication practices but do not themselves provide procedural guidance on how to achieve them.
- Many errors, including lethal errors, have occurred in situations where practitioners firmly believed they had verified the "five rights."
- Without adequate systems in place to help practitioners achieve the goals of the "five rights," errors are likely.
- The "five rights" do not consider the significant contribution of human factors to errors

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ISMP articles & statements

- Criminalization of Human Error and a Guilty Verdict: A Travesty of Justice that Threatens Patient Safety (www.ismp.org/node/30912)
- Paralyzed by Mistakes – Reassess the Safety of Neuromuscular Blockers in Your Facility (www.ismp.org/node/247)
- Safety Enhancements Every Hospital Must Consider in Wake of Another Tragic Neuromuscular Blocker Event (www.ismp.org/node/1326)
- When did Human Error Become a Crime? (www.ismp.org/node/30896)
- The Five Rights: A Destination Without a Map (www.ismp.org/node/909)
- ECRI and ISMP Public Statement | Medication Errors are Complex; Criminal Charges Will Not Improve Care (www.ismp.org/node/31129)

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ISMP Recommendations

- ISMP Targeted Medication Safety Best Practices for Hospitals (www.ismp.org/node/160)
- Guidelines for the Safety Use of Automated Dispensing Cabinets (www.ismp.org/node/1372)

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An Engineering Look at Preventing Wrong Drug Administered

The Just Culture Company

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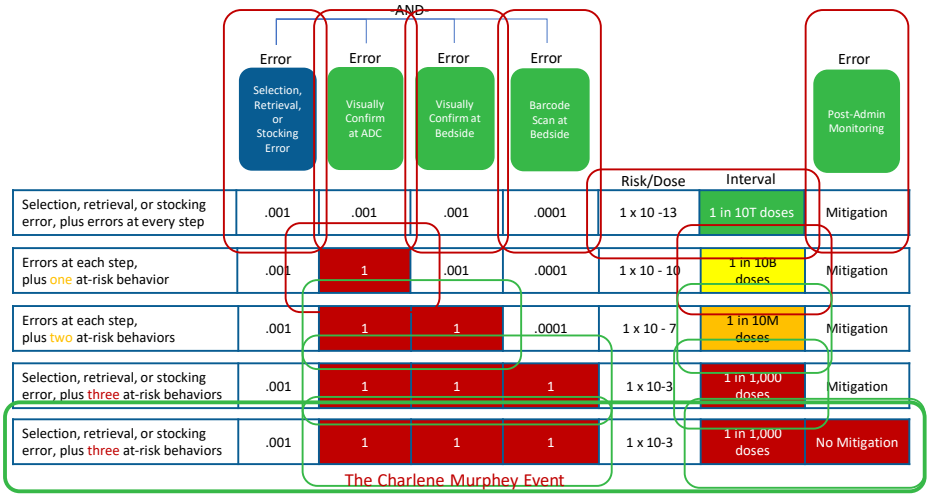
The General Safeguards for Preventing Wrong Drug by Nurse Selection Error, Retrieval Error, or Pharmacy Stocking Error



Humans modeled at .001, Barcoding at .0001

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A Just Culture at Work?

An Analysis of the Firing, License Revocation, and Criminal Conviction of RaDonda Vaught

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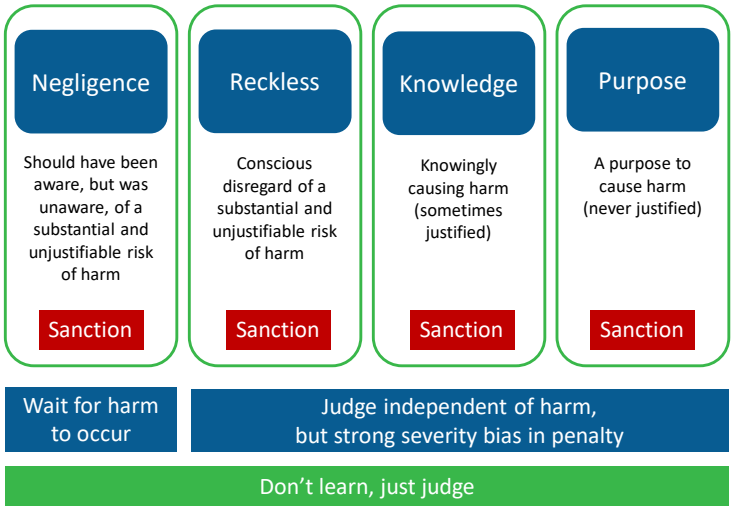
The Criminal Law's General Approach



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The People of Tennessee

- Negligence
  - when the person ought to be aware of a substantial and unjustifiable risk
  - With no harm, not a crime
  - When death results, 1-6 years in prison
- Reckless
  - consciously disregards a substantial and unjustifiable risk
  - With no harm, less than 1 year in jail
  - When death results, 2-12 years in prison

- What say the People of Tennessee?
  - Don't be reckless
  - And don't kill another person by mistake

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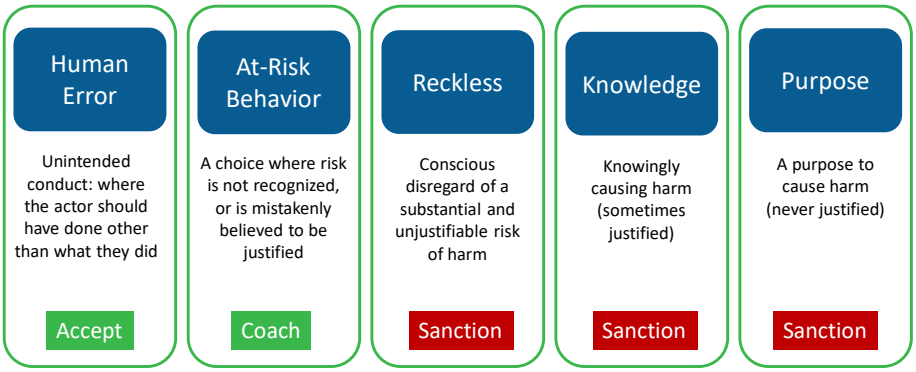
Our Model



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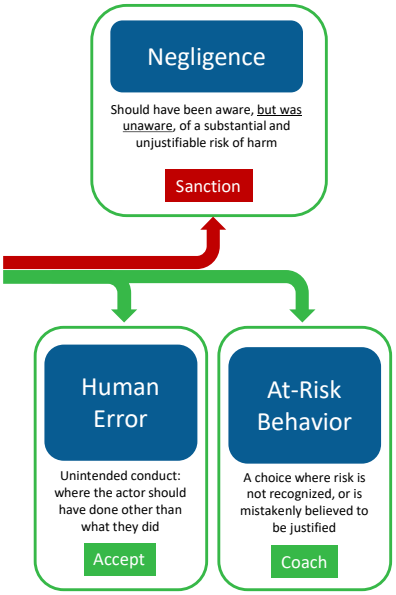
A Fundamental Disconnect

Patient safety specialists use human error, and if sophisticated, at-risk behavior to describe what the human resource leaders and legal systems see as negligence



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A Fundamental Disconnect

From one hospital's Just Culture policy

"Blaming individuals creates a culture of fear and defensiveness that diminishes both learning and the capacity to constantly improve systems."

"when incompetence or sub-standard performance is revealed after careful collection of facts, and/or there is reckless or willful violation of policies or negligent behavior, corrective or disciplinary action may be appropriate."

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What You Can Do as Leaders

1. Redesign the system to reduce the rate of harm

For both patients and providers, the best thing that can be done is to prevent the harm in the first place.

2. Conduct and share a complete root cause analysis

By conducting a meaningful investigation, we can develop understanding and empathy for another person's experience and in doing so, we can focus on the real work of safety improvement, rather than on our generally punitive, self-righteous response of "I'd never do that. I'm a good employee."

3. Revise your disciplinary policies

An organization can and should make the unilateral commitment to employees that they will not face disciplinary action, in response to an event, for any conduct falling short of reckless behavior. This prohibition should cover both human error and at-risk behavior*, regardless of the severity of the outcome.

4. Get professional boards, regulators, and the press on board

If the goal of professional boards, and state and federal regulators is to keep the public safe, they too should adopt the tenets of Just Culture.

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Questions?

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