ISMP Medication Safety Alert!®

A federally certified Patient Safety Organization

Nurse Advise-ERR®

Educating the healthcare community about safe medication practices

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Inattentional blindness: What captures your attention?

A nurse pulls a vial of heparin from an automated dispensing cabinet (ADC). She reads the label, prepares the medication, and administers it intravenously to an infant. The infant receives heparin in a concentration of 10,000 units/mL instead of 10 units/mL and dies.

A nurse reaches in the refrigerator for a piggyback antibiotic for her patient. She reads the label, spikes the bag with IV tubing, and administers the medication to her patient. The patient receives a neuromuscular blocking agent instead of the intended antibiotic and dies.

A pharmacy technician labels and delivers an IV infusion to the dialysis unit. The nurse reads the pharmacy label and hangs the bag while preparing her patient for dialysis. The patient receives sterile water for injection intravenously instead of 0.9% sodium chloride and dies.

A nurse picks out a prefilled syringe of pain medication for her patient. She reads the label, believing it to be morphine, and administers it intravenously. The patient receives HYDROmorphone instead of morphine and experiences respiratory arrest.

Inattentional blindness is failure to see an object because your attention is not focused on it.

All of these actual errors, and many more in healthcare and other industries, have happened under similar circumstances: *the person performing the task fails to see what should have been plainly visible, and later, they cannot explain the lapse.*[1] In many cases, people involved in these errors have been identified as careless and negligent. But these types of errors are common—even with intelligent, vigilant, and attentive people. The cause is usually rooted in *inattentional blindness*, a condition all people experience at some point in time.[1] So, even though the person reads the label, they see what they believe to be true and miss what is actually in print.

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Problems with barcodes. Please let us know if you identify problems with a company's unit dose package barcode. An example of an **ARICEPT** (donepezil) unit dose package with a barcode problem appears in Figure 1. Note the labeling material has been applied to the unit dose package in such a way that tearing the doses apart destroys the barcode! Quality control problems are by no means isolated to one company. When issues like this occur, staff are forced to take extra steps to maintain the quality of the barcode, or they have to relabel the product so it can be scanned at the bedside. This takes time and increases the risk of a labeling error. Send us barcode

Figure 1. Part of the barcode is above the crease that separates the two unit doses.

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ISMP Survey: What's a near miss?

We're interested in knowing how you define the term **near miss** as it applies to medication-related conditions and/or events. Which of the following definitions best describes your understanding of a **near miss**?

1 **An error that did not reach the patient.** An error took place but was captured before the drug was ingested, applied, or injected into the patient. For example, penicillin was ordered for a patient allergic to the drug; however, the pharmacist was alerted to the allergy during computer order entry, the prescriber was called, and the penicillin was not dispensed or administered to the patient.

2 **An error that reached the patient but did not result in harm.** An event, situation, or error that reached the patient but did not result in injury. For example, a patient received the wrong dose of an opioid but was not harmed.

3 **A hazard.** A hazard—such as look-alike product packaging—that could cause an error but has not resulted in an error when the condition is reported.

4 Other: please specify

Please take this opportunity to click here (www.ismp.org/survey/NSurvey200907.asp) to enter your response before **September 7.** Thank you!

Editors' note

We want to thank you for sending us comments about your experiences with automated dispensing cabinets (ADCs) in response to our June 2009 newsletter feature, ***Message in our mailbox: A nursing perspective on ADCs*** (www.ismp.org/newsletters/nursing/articles/062009.asp). The comments were very insightful. We are compiling them into an anonymous summary for publication in our September newsletter. Meanwhile, we encourage an interdisciplinary team at your organization to complete our new tool, the **ISMP Medication Safety Self Assessment for Automated Dispensing Cabinets,** which can be freely accessed at: www.ismp.org/selfassessments/ADC/Survey.pdf.

Baxter *Supported by educational grants from Baxter Healthcare and McKesson* McKESSON Empowering Healthcare

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How do we process information?

Most mental processing occurs outside of conscious awareness. The amount of information taken in by our senses is limitless, but the brain has very limited resources when it comes to attentiveness. Our senses receive much more information than can possibly be processed at one time. To combat information overload, the brain allows large amounts of information through, almost entirely unassimilated, peeling off just a few pieces of selected information for a closer look.[2]

When deciding what to focus on, the brain scans about 30-40 pieces of information (e.g., sights, sounds, smells, tactile information) per second, until something captures its attention.[2] Our attention filter selects just a small amount of information to process, and anything left over gets short shrift. The rest of the information never reaches our consciousness—thus the term *inattentional blindness*. Unfortunately, the brain is a master at filling in the gaps and compiling an integrated portrait of reality based on just a flickering view.[1]

Accidents happen when attention mistakenly filters away important information and the brain fills in the gaps with what is aptly referred to as a "grand illusion."[2] Thus, in the examples above, the brains of the individuals involved in the errors filtered out important information on medication labels, and filled in the gaps with erroneous information that led them to believe they had the correct medication or had read the warning appropriately.

What captures your attention?

Visual attentiveness, or what captures your attention, is shaped by four factors.

Conspicuity. The degree to which an object or a piece of information jumps out to capture your attention falls into two categories: *sensory conspicuity* and *cognitive conspicuity*.

Sensory conspicuity deals with the physical properties of information. For example, a high degree of contrast with the background is the most important feature in making information conspicuous,[1] and luminance (brightness) contrast is more important than color contrast.[3] Factors such as bright colors, movement, and flicker do not ensure conspicuity;[1] however, pre-attentive properties (the brain automatically processes the information without being aware of it) such as color and shape have been used successfully on visual displays to call attention to specific items or categories.[3]

Cognitive conspicuity deals with the perceived relevance of the information. The "cocktail party" effect[4] is a classic portrayal of this factor. This is the term used for the phenomenon of being in a crowd, listening to a conversation, and still being able to hear your name mentioned across the room.[3] Functioning somewhat like the volume control on a radio, you can turn down the volume of background noise at a cocktail party and turn up the volume as you listen attentively to one conversation at a time. While engaged in conversation, if someone behind you mentions your name, you are automatically attracted to the other conversation because it is meaningful to you. Meaningful visual information can also jump out at you automatically, such as scanning the newspaper and finding your attention drawn to articles that include your child's first name. Attention to something of particular relevance can also be purposeful. For example, you may scan a luggage carousel for your black suitcase, looking purposefully for the broken wheel or yellow ribbon that distinguishes your suitcase from all the other black suitcases on the carousel.

Mental workload and task interference. Inattentional blindness is more likely to occur if part of your attention is diverted to secondary tasks, like answering the phone while you are documenting information into the

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problems along with a publishable photo, so we can alert clinicians and remind companies about the need for adequate quality control.

Just a FLUke? A hospital float nurse saw an order for influenza vaccine on her patient's medication administration record (MAR). She recalled a memo informing nurses that the vaccine would be stored in the automated dispensing cabinet (ADC) to assure patients wouldn't miss receiving the vaccine when it was ordered to be given at discharge. The nurse looked but couldn't find the influenza vaccine. She was unaware that pharmacy staff had removed the vaccines in response to a product recall and had not yet replaced the vaccine in the ADC. However, she found another drug that appeared to be "flu" vaccine and used the ADC override feature to obtain this medication. Luckily, the nurse asked a pharmacist, "Once I draw up the dose, do I just put the rest of the flu vaccine back in the cabinet?" Knowing there were no vials of the vaccine in the ADC, the pharmacist looked at the vial and found that the nurse had drawn up 0.5 mL of flumazenil, a reversal agent to treat benzodiazepine overdoses. To prevent this type of mix-up, the safest practice is to have pharmacy dispense vaccine products as they are ordered. But if the vaccine is kept in an ADC with other drugs that start with "flu…", be aware of the risk for confusion. Another important point: Nurses should not remove vaccines from an ADC before the order has been reviewed by a pharmacist. The need to override the ADC to obtain a dose can signal an error; so can removal of a drug thought to be a vaccine from non-refrigerated areas in the ADC, as vaccines are usually refrigerated. One final point: pharmacy staff should always indicate why a medication that is typically found in the ADC has been removed.

Volume control set safety. Hospitals that still use **BURETROL** or **SOLUSET** volume control sets (VCS) should examine how they are being

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medical record, or even thinking about your dinner plans while transcribing an order. We all learn to function amazingly well while multi-tasking, but more complicated tasks require our full attention. However, auditory tasks (listening to the radio) will interfere less with visual tasks (seeing a pedestrian crossing the road) than would a second visual task (focusing on a street sign).[1]

Low workload causes boredom and reduces the mental attention given to tasks, as does carrying out highly practiced tasks, such as drawing medication out of a vial into a syringe. In fact, we spend a large majority of our waking life functioning with the equivalent of an automatic pilot, with occasional conscious checks to ensure tasks are being carried out properly. This makes us particularly prone to inattentional blindness. Reliance on technology has also lessened our ability to notice abnormalities.

Expectation. Expectation has a powerful effect on our ability to pay attention and notice information. If the medication we are looking for comes in a carton with a highly stylized label, we come to expect this presentation every time we look for the medication. If a new medication comes in a similar looking carton, our brain may not pay attention to any information that disconfirms our belief that the new medication is the old one—a well-known phenomenon called *confirmation bias* to which highly experienced practitioners are most prone.

Our past experiences also teach us what is relevant. Errors occur when new or unusual circumstances happen in highly familiar situations. The nurse who picked up a vial of heparin in the wrong concentration had never experienced removing the wrong medication from an ADC cabinet before this event. The same holds true for the nurse who picked the wrong pain medication from the narcotics cabinet. Each of the practitioners in the examples above had subconsciously learned that there was nothing important to see when carrying out these tasks. Nothing had ever happened, so attention was automatically filtered away from the details to conserve mental processing.

Capacity. The capacity to pay attention is variable from person to person and influenced by age and mental aptitude. From time to time, attention is also variable within an individual due to influences such as distractions, alcohol, drugs, and fatigue.

It is difficult to reduce the risk of inattentional blindness, as it is an involuntary and unnoticed consequence of our adaptive ability to defend against information overload. Error-reduction strategies such as education, training, and rules are of little value. Instead, efforts should center on *increasing conspicuity* of critical information, and *decreasing diversions of attention and secondary tasks* when carrying out complex tasks.

References: 1) Green M. "Inattentional blindness" and conspicuity. *Visual Expert* 2004 (www.visualexpert.com/Resources/inattentionalblindness.html). **2)** Angier N. Blind to change, even as it stares us in the face. The New York Times April 1, 2008 (www.nytimes.com/2008/04/01/science/01angi.htm?_r=2&ex=1207713600&en=204&oref=slogin). **3)** Federal Aviation Administration (FAA). FAA human factors awareness course (www.hf.faa.gov/webtraining/Intro/Intro1.htm). **4)** Arons B. A review of the cocktail party effect. MIT Media Lab; 1992 (www.media.mit.edu/speech/papers/1992/arons_AVIOSJ92_cocktail_party_effect.pdf).

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Report medication errors to ISMP at 1-800-FAIL-SAF(E).

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used to deliver IV medications in patient care units, including the emergency department. Of concern is the lack of identifying the drug placed in the VCS—particularly in an emergency—as well as the potential for chemical inactivation or precipitation that may occur in the VCS or IV tubing when multiple medications are administered using the same set. If VCS are used, ensure that staff label the chamber when medications are added, check incompatibilities with pharmacy before adding the drug, and maintain sterile technique.

ISMP October Teleconferences

October 6 - Beyond the 5 Rights: A Safety Bolus for Nursing Leadership

Are nurse leaders in your organization worried about the risk of drug administration errors? Are they concerned that the "5 Rights" alone will not keep patients safe? Don't let a medication-related sentinel event be your wake-up call! Learn where risk is present but "hidden" in your drug administration system, and discover the error-reduction strategies that can reduce the risk of harmful errors. Speakers will also discuss common at-risk behaviors that lead to errors and the nurse leader's role in establishing a learning culture.

October 15 - Preventing Errors with Insulin: A Multidisciplinary Approach

While the number of people with diabetes mellitus rises at alarming rates, insulin use and the risk of errors are also increasing. ISMP invites nurses to join us for this important presentation during which we will explore the current trends in insulin therapy (including use of insulin pens), barriers to optimal therapy and safety, common errors that occur with insulin, and error prevention strategies.

For details on both programs, visit: www.ismp.org/educational/teleconferences.asp.