May 2024 | Volume 22 ■ Issue 5

ISMP
An ECRI Affiliate

Nurse AdviseERR®
Educating the Healthcare Community About Safe Medication Practices

Minimizing distractions and interruptions during medication safety tasks

A distraction occurs when an individual's attention is drawn away from one task to a different task, or when attempting to work on multiple tasks at the same time. An interruption occurs when an individual is engaged in a task and stops or performs another task with the intention of returning to the initial task. In today's healthcare environment, practitioners are expected to multitask, and distractions and interruptions are generally accepted as the norm. In fact, a study showed that pharmacists, technicians, and nurses can be distracted or interrupted as frequently as once every 2 minutes (www.ismp.org/ext/1166). Distractions and interruptions in healthcare environments are a threat to human performance and patient safety.

Interruptions can be necessary and appropriate when crucial information, such as holding a patient's medication due to a critical laboratory value or speaking up about a potential medication error, must be conveyed to prevent patient harm. This includes the use of well-designed alerts, clinical decision support, and person-to-person communication to bring someone's attention to a potential safety issue. However, researchers have shown that interruptions can also lead to an increase in errors when performing clinical tasks such as medication prescribing, dispensing, and administration (www.ismp.org/ext/1183). When interrupted, practitioners do not remember where they left off with the task when they return to it. Minimizing unnecessary distractions and interruptions is essential for ensuring patient safety, quality of care, and the healthcare practitioner's well-being.

Sources of Distractions and Interruptions

Understanding the types of distractions and interruptions is important to drive appropriate risk-reduction strategies. Distractions may be voluntary, such as scrolling through emails, text messages, social media; multitasking; or socializing. Or they may be involuntary (e.g., hunger, thirst, fatigue). However, interruptions are generally involuntary, such as taking phone calls, answering patient questions, colleagues having a conversation nearby, or responding to electronic health record [EHR] alerts or healthcare device alarms. These contribute to diversion of attention, stress, fatigue, and forgetfulness, and can lead to medication errors.

Impact of Distractions and Interruptions

While most research on distractions and interruptions is based on direct observation, the first retrospective analysis that used patient safety events to understand the impact was recently published.[1] Researchers included data from multiple hospitals' patient safety reporting systems between 2013 and 2016. They defined a distraction or interruption as an event that caused a healthcare practitioner to stop working on their current task and focus their attention on the other issue. Using a free-text keyword query to search for variations of the terms distraction and interruption (e.g., distract, distracted, interrupt, interrupted) resulted in 220 event reports for analysis. They found that nurses (50%) were most often interrupted, followed by technicians (17%) and pharmacists (16%). Interruptions were frequently attributed to an environmental cause (64%) (e.g., high workload) or an interruption by another individual (e.g., patient, nurse). These interruptions contributed to errors such as wrong dose, wrong medication, omission, and mislabeling. Two recent examples of distractions and interruptions that were reported to ISMP from separate hospitals are provided below.

Before intubating a patient, a prescriber gave verbal orders to a nurse for doses of midazolam, vecuronium, propofol, and ketamine. The prescriber thought the concentration of ketamine was 30

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SAFETY wire

How fast is too fast for IV push medications? Over the years, we have written about errors with intravenous (IV) push medications. In fact, in our December 2023 newsletter, the main article, *Intravenous (IV) push medications—bridging the gap between education and clinical practice*, focused on the lack of a standardized curriculum in educating nurses how to safely administer IV push medications. Although there are many steps to administering IV push medications safely, a recent error reminded us of a potentially harmful aspect that may go unnoticed—administering an IV push medication too quickly.

A physician ordered morphine 4 mg IV to treat a patient with unrelieved substernal/epigastric pain. The nurse administered the morphine over 5 seconds via a saline lock. Within a few minutes the patient became diaphoretic and unresponsive. His pulse dropped from 80 to 30. A code was called. The team responded and administered atropine 1 mg IV push and started a liter of 0.9 % sodium chloride at 100 mL per hour. The patient's heart rate went back up to 120 and he became more alert and responsive.

The nurse was unaware that according to the

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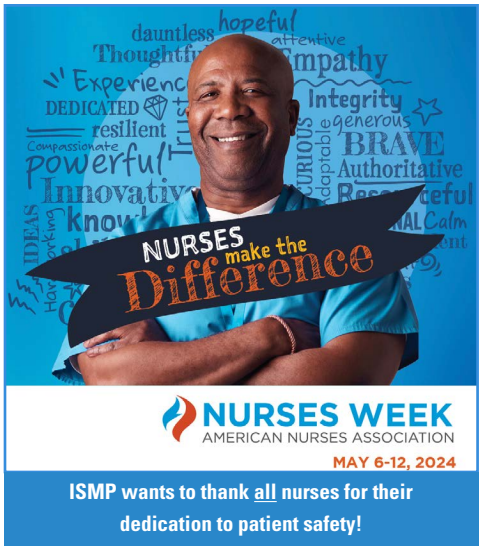

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mg/mL and told the nurse to remove two vials from the automated dispensing cabinet (ADC) to provide a 60 mg dose. Orders were not placed in the EHR, so the nurse removed the medications from the ADC via override. The nurse typed "KET" to search for ketamine and was interrupted to answer a colleague's question. When the nurse returned to the task of removing ketamine from the ADC, she saw a 30 mg/mL concentration and selected what she thought was ketamine. The nurse removed two vials along with the other ordered medications. The intensive care unit (ICU) was extremely busy at the time, so the nurse prepared the doses and quickly returned to the patient's room. While administering the medications, the nurse was also responding to questions from other practitioners about the patient's past medical history. When discarding the medication waste, the nurse noticed that ketorolac was on the list of medications that had been removed from the ADC via override. The nurse identified that ketorolac had inadvertently been administered rather than ketamine. The prescriber was then notified of the error. No patient harm was reported.

A pharmacy technician was preparing an intrathecal dose of cytarabine to be diluted to a final volume of 5 mL. The technician was interrupted by a call from a nurse requesting another patient's chemotherapy. When the technician returned to finish preparing the dose, he prepared an underdose of cytarabine and also incorrectly diluted it to a final volume of 3 mL. The pharmacy had an intravenous workflow management system (IVWMS) with barcode scanning technology but had not implemented gravimetric analysis. A pharmacist checked the dose and did not identify the error. After the dose was administered, the oncologist called the pharmacy to ask why the volume was different from the typical intrathecal volume of 5 mL. The error was confirmed through the digital images captured in the IVWMS, and the remaining dose was prepared and administered to the patient.

Like most preventable events, latent (system) and active (individual) failures contributed to these errors, and both organizations implemented changes to their systems and processes to prevent reoccurrence. It is also important to note that the practitioners felt they were distracted during critical parts of the medication-use process and these distractions need to be avoided.

Recommendations

While distractions and interruptions cannot be fully eliminated, organizations should consider the following recommendations to limit them.

Define critical tasks. Determine which critical tasks require dedicated time. These may include activities such as entering or verifying a medication order, preparing a medication dose, removing medication from an ADC, programming a smart infusion pump, or administering a medication.

Improve systems and processes. Identify the sources of common distractions and interruptions and remedy any system issues. Establish systems for the electronic communication of information (e.g., used between nursing and pharmacy) that do not require immediate phone contact. Evaluate the environment where critical tasks are performed and rectify poor environmental conditions (e.g., unnecessary noise, dim lighting). For example, place ADCs in locations with limited foot traffic to reduce distractions (www.ismp.org/node/1372). Provide medications to patient care units in ready-to-administer formulations to reduce the time needed to prepare medications for administration (i.e., mixing, diluting), thus, reducing the risk of interruption during a critical task.

Limit alerts, alarms, and noise. Reduce the frequency of invalid, insignificant, or overly sensitive computer alerts and device alarms to promote the delivery of necessary critical notifications. Minimize the noise of overhead pages and other unnecessary chatter in areas where medication tasks are being performed.

Optimize the phone tree. Establish a triaging system for incoming phone calls to avoid interruptions in designated areas where critical tasks are being performed. When possible, have designated ancillary staff (e.g., front desk staff, technician) screen non-emergent calls in patient care units and the pharmacy to prevent unnecessary interruptions.

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manufacturer's instructions morphine should be administered slowly. In fact, most drug references (www.ismp.org/ext/1318) state to administer morphine over 4 to 5 minutes rather than giving as a rapid IV push. The package insert and drug references also state that if morphine is administered too quickly, the patient is at risk for developing respiratory depression, chest wall rigidity, hypotension, and cardiovascular collapse, which is most likely what happened in this case.

It is important for organizations not to underestimate the added risks associated with the administration of IV push medications. We encourage all organizations who promote the use of IV push medications to review the risks of this practice with staff and develop policies and procedures around IV push practices. Resources such as the ISMP ***Safe Practice Guidelines for Adult IV Push Medications*** (www.ismp.org/node/97) as well as the tool ISMP ***Gap Analysis Tool (GAT) for Safe IV Push Medication Practices*** (www.ismp.org/node/1188) to evaluate current policies and practices against best practices. In addition, a competency validation checklist, similar to the Quality and Safety Education for Nurses (QSEN) checklist (which can be downloaded at: www.ismp.org/ext/1275), should be developed and used as an initial assessment and on an ongoing basis to evaluate practitioners who will be administering IV push medications within your organization.

To prevent errors with IV push medications for adults, consider the following:

- **Improve access to information.** Be sure policies and procedures and organizational guidelines around IV push medications are accessible during medication preparation and administration and updated on a regular basis.

- **Provide medication in ready-to-administer form.** Nursing leadership should work with pharmacy to purchase or have pharmacy prepare and dispense IV push medications in a ready-to-administer form, as much as possible. Only dilute IV push medications when

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Be prepared. To minimize task disruption, ensure that all the supplies that practitioners will need are organized together in medication preparation areas prior to preparing or administering medications.

Develop a checklist. Create a checklist of important information for lengthy critical tasks that can be used as a reference. When available, utilize guided technologies to ensure staff follow approved medication preparation procedures, and can return to the appropriate step if an interruption occurs.

Find the best time. Practitioners should establish set times to address non-urgent questions. If urgent notifications are necessary when practitioners are prescribing, dispensing, or administering medications, others, especially practitioners and ancillary staff, should attempt to intervene during transitions between subtasks, such as between patients or doses being prescribed, prepared, or administered.

Manage the use of mobile devices. Educate staff about the risks associated with distractions from the use of personal mobile devices. Any inattentive behavior related to personal use of mobile devices should be treated as an at-risk behavior that requires coaching to promote safe behavioral choices. For facility approved mobile devices, which are used for medication administration, and obtain input from stakeholders regarding their appropriate and inappropriate use. Implement a strategy to address appropriate use while minimizing the distraction risks.

Educate staff. Remind practitioners not to disturb colleagues completing critical tasks unless significant alteration in a patient's therapy must be communicated immediately. Embed distractions and interruptions into annual simulation training when practitioners are practicing critical tasks. This targeted training can make staff aware of how distractions and interruptions impact their processes. In one school of nursing where students participated in simulations with high noise levels and varied background noises (e.g., music, conversations), the students found that distractions decreased accuracy in medication preparation and administration.[2] For suggestions on how to use simulations, see our February 2024, newsletter article, *The role of simulation when onboarding healthcare professionals—Part II* (www.ismp.org/node/120212).

Manage patient questions. Conduct regularly scheduled bedside rounds to facilitate appropriate times for patients/caregivers to ask questions. Before performing a critical task in front of a patient, practitioners should explain to the patient/caregiver what they plan to do and provide them with time to ask any questions before initiating the task, when possible.

Reassess. After implementing interventions to address distractions and interruptions, directly observe practitioners completing critical tasks, gather feedback from end-users, and provide coaching as needed. Also, monitor error reports and reevaluate if additional strategies are needed.

References

1) Kellogg KM, Puthumana JS, Fong A, Adams KT, Ratwani RM. Understanding the types and effects of clinical interruptions and distractions recorded in a multihospital patient safety reporting system. *J Patient Saf.* 2021;17(8):e1394-e1400.

2) Thomas CM, McIntosh CE, Allen R. Creating a distraction simulation for safe medication administration. *Clin Simul Nurs.* 2014;10(8):406-11.

Be a Nurse Leader at ISMP!

ISMP is seeking a **nurse** with at least 10 years of clinical experience and 5 years in a senior leadership role to fill a full-time **Director** position. This individual will oversee our consulting and education services and will report directly to ISMP's President. For more information and to apply, please visit: www.ismp.org/node/20395.

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recommended by the manufacturer or in accordance with institutional guidelines.

- **Clear communication of the rate of administration in the order.** The order set should be built to say, for example, "IV push over 5 minutes" and include the rate of administration on the medication administration record (MAR).
- **Use reminders.** Consider asking pharmacy to add an auxiliary label to product labels specifying the safe timeframe for IV push administration if the medication must be administered slowly. Consider adding an identical alert to the MAR or automated dispensing cabinet screen on removal.
- **Administer slowly.** Administer IV push medications at the rate recommended by the manufacturer, supported by evidence in peer-reviewed biomedical literature, or in accordance with approved institutional guidelines.
- **Consult a timing device.** Use a watch, clock with a second hand or cell phone to guide administration time to ensure the dose and subsequent flush are administered at the rate recommended by the manufacturer.
- **Administer flush at the same rate.** Use an appropriate volume of a compatible flush solution to ensure the drug dose has been administered. Administer the flush at the same rate as the drug to ensure any residual drug is administered at the appropriate rate.
- **Use a smart pump.** For medications that are not intended to be administered manually via IV push, consult with pharmacy to dilute/compound doses and build options in your smart pump drug library, and implement dose error-reduction systems (DERS) to safeguard the appropriate rate of administration. Review our ***Guidelines for Optimizing Safe Implementation and Use of Smart Infusion Pumps*** (www.ismp.org/node/972) for additional information.

what's in a Name?

The "-gepant" drug stem name

Medications that end with the suffix "-gepant" belong to a class of medications known as calcitonin gene-related peptide (CGRP) antagonists. This is a relatively new class of medications that are used to treat migraines. CGRP is a molecule that is chemically created in the neurons of the brain and spinal cord. It is a strong vasodilator and is also believed to trigger pain processes when released from the trigeminal ganglion in the meninges of the brain resulting in migraines. CGRP antagonists work by blocking CRGP from attaching to its receptors, thus, preventing pain.

Currently, there are four single-agent CGRP medications approved for use in the United States (**Table 1**). There is one other CGRP antagonist that is a monoclonal antibody, erenumab (**AIMOVIG**). It is administered subcutaneously on a monthly basis to treat migraines. Since erenumab does not contain the -gepant suffix, it will not be discussed further in this article.

Table 1. Medications with the suffix "-gepant" available in the United States.

Generic name	Brand name
atogepant	**QULIPTA**
rimegepant	**NURTEC**
ubrogepant	**UBRELVY**
zavegepant	**ZAVZPRET**

Three of the CGRP antagonists are taken by mouth, either in the form of a tablet that is swallowed or a tablet that disintegrates on or under the tongue. The fourth drug, zavegepant, is provided as a nasal spray. These medications are generally taken at the first sign of a migraine or when migraine pain starts. Most CGRP antagonists have dosing restrictions regarding how many milligrams can be taken in a 24-hour period. For example, a dose of urbrogepant can be repeated after 2 hours for a maximum dose of 200 mg in 24 hours. In addition, atogepant is the only CGRP antagonist approved for daily treatment of episodic migraines. Rimegepant can also be given every other day to prevent migraines. All others should not be taken on a daily basis.

Oral CGRP antagonists are generally well-tolerated, although they should not be taken with grapefruit or grapefruit juice, which may increase side effects and blood levels of the drug. The most common side effects are nausea, dry mouth, fatigue, and dizziness. This class of drugs may also be beneficial for individuals with migraines who are unable to tolerate other classes of migraine medications, such as serotonin 5-HT receptor agonists, due to allergies or side effects. In addition, they may be an option for individuals who do not receive adequate relief from other migraine treatments or who are at a greater risk for conditions affecting the heart or the blood vessels in the brain.

Treatment of migraine during pregnancy should be individualized considering the available safety data, the potential for adverse maternal and fetal events, and the needs of the patient. Patients should discuss the risks versus benefits of taking CGRP antagonists during pregnancy or lactation with their healthcare provider.

CGRP antagonists have multiple drug interactions. Therefore, it is important for healthcare providers to review all of the prescription and non-prescription medications the patient takes prior to prescribing one of these medications.

Top 10 patient safety concerns for 2024

ISMP's affiliate, ECRI, recently released the ***ECRI's Top 10 Patient Safety Concerns for 2024*** (which can be downloaded at: www.ismp.org/ext/1350). This annual report from ECRI and the Institute for Safe Medication Practices (ISMP) Patient Safety Organization (PSO) presents the top 10 patient safety concerns currently confronting the healthcare industry. Drawing on ECRI and ISMP's evidence-based research, data, and expert insights, this report sheds light on issues that leaders should evaluate within their own institutions as potential opportunities to reduce preventable harm. The 2024 list includes the following:

1) Challenges transitioning newly trained clinicians from education into practice
2) Workarounds with barcode medication administration systems
3) Barriers to access maternal and perinatal care
4) Unintended consequences of technology adoption
5) Decline in physical and emotional well-being of healthcare workers
6) Complexity of preventing diagnostic error
7) Providing equitable care for people with physical and intellectual disabilities
8) Delay in care resulting from drug, supply, and equipment shortages
9) Misuse of parenteral syringes to administer oral liquid medication
10) Ongoing challenges with preventing patient falls

Editors: Ann Shastay, MSN, RN, AOCN; Jennifer Gold, MSN, RN; Shannon Bertagnoli, PharmD; Rita K. Jew, PharmD, MBA, BCPPS, FASHP. ISMP, 5200 Butler Pike, Plymouth Meeting, PA 19462. Email: ismpinfo@ismp.org; Tel: 215-947-7797.