As a result of ongoing issues with the reuse of insulin pens on multiple patients, we believe that hospitals should closely reexamine the safe use of these pen devices, with strong consideration given to transitioning away from insulin pens for routine inpatient use.

In our January 24, 2013, acute care newsletter, we mentioned that more than 700 patients at a New York (NY) hospital may have been exposed inadvertently to human immunodeficiency virus (HIV), hepatitis B, or hepatitis C because of the reuse of insulin pens on multiple patients after changing the disposable needle (www.ismp.org/sc?id=144). Then, on the very same day that our newsletter was published, another NY hospital announced that it, too, had to notify patients about possible exposure to bloodborne pathogens due to improper sharing of insulin pens. In this latest case, 1,915 insulin-dependent patients were exposed between November 2009 and January 13, 2013 (www.ismp.org/sc?id=149).

These most recent cases are similar to other incidents of insulin pen reuse. In 2009, at a Texas hospital, 2,114 insulin-dependent diabetic patients were exposed to disease transmission risk (www.ismp.org/sc?id=159). Then in 2011, more than 2,000 patients were exposed to this risk at a Wisconsin hospital and outpatient clinic. In addition, smaller numbers of patients have been involved in several other cases we have published over the years.

All it takes is one or two individuals who are not aware that just placing a new sterile needle on a pen previously used for one patient is not enough to ensure pen sterility for delivery of a dose of insulin to another patient. A graduate nurse or a temporary nurse, for example, may not have received proper training regarding the use of insulin pens, so a knowledge deficit may exist. Controlling for this is difficult, perhaps impossible, given that unsafe pen use has persisted despite educational efforts and monitoring.

Side tracks on the safety express

**Interruptions lead to errors and unfinished… Wait, what was I doing?**

If you’re a health professional, it’s hard to get through a single hour of the day without being distracted or interrupted, even when performing critical tasks. For instance, nurses administering medications, and pharmacists and technicians dispensing medications are distracted and interrupted as often as once every 2 minutes!¹² Physicians are interrupted, too—about once every 5 minutes in an academic emergency department (ED) setting and once every 10 minutes in a community ED setting.³ Multi-tasking is expected from those being interrupted, and constant distractions and interruptions are generally accepted as the norm in healthcare. However, the argument that distractions and interruptions contribute to medication errors is persuasive in the literature. To cite one study, the risk of any medication error increases 12.7% with each interruption, and the risk of a harmful medication error is doubled when nurses are interrupted 4 times during a single drug administration and tripled when interrupted 6 times.⁴ Thus, distractions and interruptions have major consequences in healthcare.

**check it out! 📅📅📅**

To help decrease distractions, consider the following:

- **System improvements for medication administration.** Identify the sources of common interruptions and remedy any system issues such as frequently missing medications or untimely dispensing of medications. Pharmacists should provide medications to patient care units in the most ready to use form to minimize interruptions associated with mixing, diluting, or crushing medications.

- **Preparation.** To minimize task disruption, ensure that all needed supplies and documents are available. For example, all needed supplies should be available on a medication cart prior to medication administration.

- **No Interruption Zone (NIZ).** The NIZ uses aviation’s concept of a sterile cockpit in which a discreet area where critical medication tasks are performed is cordoned off, as with a dedicated medication room or a visual marker to signify that talking and interruptions are not permitted within the boundaries.¹⁶ These zones can be created around automated dispensing cabinets, drug preparation areas, computer order entry locations, and other areas where critical tasks are carried out.

- **Establish best times for necessary interruptions.** If interruptions or notifications are necessary during drug prescribing, dispensing, or administration, attempt to intervene during transitions between subtasks, such as between patients or doses being prepared or prescribed. Avoid interruptions during the most complex parts of the task.

- **Do not disturb.** The Institute of Medicine recommends wearing a visual reminder.
Insulin pen—continued from page 1

To date, no cases have been reported in which bloodborne pathogens were transmitted from patient to patient when pens have been misused. Also, a study that was completed following the incident at the Texas hospital failed to demonstrate actual cross contamination (www.ismp.org/sc?id=150). However, other studies have shown that risk is certainly present when pens are reused for more than one patient since blood and tissue can travel back into the insulin pen cartridges.

Hemoglobin was detected in 6 out of 146 cartridges (4.1%) used by diabetic patients in one study (Sonoki K, et al). Regurgitation of blood into insulin cartridges in the pen-like injectors. Diabetes Care. 2001; 24(3):603-4; www.ismp.org/sc?id=151).

In another study of 120 patients, non-inert material, including squamous cells and other epithelial cells, was found in 58% of the cartridges (Le Floch JP, et al). Biological material in needles and cartridges after insulin injection with a pen in diabetic patients. Diabetes Care. 1998; 21(9):1502-4; www.ismp.org/sc?id=152). The authors noted that air bubbles could enter a cartridge after injection unless the needle is removed, suggesting that biological materials could do the same while the needle is in place.

The US Food and Drug Administration (FDA) (www.ismp.org/sc?id=153) and Centers for Disease Control and Prevention (CDC) (www.ismp.org/sc?id=154) direct users to remove the needle immediately after injection to decrease the risk of air entering the cartridge. They also warn against sharing the device between patients. Despite these warnings, reports of patients placed at risk continue to surface.

Insulin pens offer convenience and may help to avoid certain types of medication errors; however, they were originally developed for use in ambulatory care, not hospitals. Placing a label on the pen for a single patient has its difficulties. Other problems such as using pen cartridges as multi-dose vials, the risk of needlestick injuries, and user technique errors have also been identified as serious safety concerns with pens used in hospitals (www.ismp.org/sc?id=155).

Based on the risks associated with reusing insulin pens on multiple patients, some hospitals have never transitioned to pens or have reverted back to using vials (including 3 mL vials available from one insulin manufacturer). Most recently the Veterans Health Administration (VA) National Center for Patient Safety prohibited the use of multi-dose pen devices on patient care units at VA facilities (www.ismp.org/sc?id=156). In doing so, the VA allowed for several exceptions, which we endorse (Table 1). Of course, we have no issue with the use of pens by patients at home as long as they are not shared with others. The VA further expects hospitals to review and update local facility policies for the use of all multi-dose pen devices or other types of pen devices that are used in patient care areas. Multi-dose pen devices must be stored in the pharmacy, and dispensed and labeled for an individual patient.

Table 1. The VA’s Exceptions to the Use of Insulin Pens for Inpatients

| Patients who are being educated prior to discharge to use a patient-specific, multi-dose pen device |
| Inpatients requiring treatment with a medication delivered only in a multi-dose pen device, and no alternative formulation is available for treating the patient while on a patient care unit |
| Patients participating in a research protocol requiring the use of a multi-dose pen device while on a patient care unit |
| Pen devices dispensed directly to the patient for use in an outpatient setting |
| Eligible patients participating in the VA medical center’s self-medication program |

We hope that the ongoing issues with insulin pens will lead to recognition that a knowledge deficit regarding their safe use is more widespread than initially thought, and that the issue cannot be easily solved with education and monitoring alone or fairly dealt with by punishing those who have never learned the correct way to use these devices. We believe that the risk is best mitigated by removing insulin pens from use in inpatient settings.

In our March newsletter, look for a feature article about safe practices associated with using insulin vials instead of insulin pens in hospitals.

New tools on safe injection practices. The Centers for Disease Control and Prevention (CDC) and the Safe Injection Practices Coalition (SIPC), of which ISMP is a member, recently released a suite of new materials to make it easier for doctors, nurses, and other healthcare providers to learn about and follow safe injection practices (http://blogs.cdc.gov/safehealthcare/?p=2802). The tools include PowerPoint slides, videos, podcasts, posters (including one about the danger of sharing insulin pens), and even a press kit. CDC estimates that more than 150,000 patients have been impacted by unsafe injection practices since 2001. Breakdowns in proper infection control practices are often involved, including providers’ reuse of needles, syringes, or single dose medication vials, all of which are meant for one patient and one procedure. Please take this opportunity to help get the word out by putting these materials to use in your organization.

Effects of Distractions and Interruptions

Distractions and interruptions include anything that draws away, disturbs, or diverts attention from the current desired task, forcing attention on a new task at least temporarily. When the desired task is stopped to attend to a new activity or stimulus, it is an interruption. If the initial task continues synchronously to the new task with divided attention, it is considered a distraction. Attending to the new task increases the risk of an error with one or both of the tasks because the stress of the distraction/interruption causes cognitive fatigue, which leads to omissions, mental lapses, and mistakes.

An error reported to ISMP a decade ago is still an excellent example of how easy it is to make an error when distracted and interrupted. A nurse who had just measured a dose of liquid chloral hydrate into a cup was interrupted by a pharmacist on her way to the patient’s room. The conversation was social, and the nurse—who often had a cup of coffee in her hand—absentmindedly drank the medication, as if taking a sip of coffee! The nurse had to be driven home.

Distractions and interruptions impact the prospective memory, or the ability to remember to do something that must be deferred.1 When a person forms an intention, their memory establishes a specific cue to remind them to act. If the task is interrupted and the cue is encountered later, a spontaneous process is supposed to bring the intention to mind. However, individuals are less likely to remember the intention if they are outside the context in which the cue was established.2 For example, an interruption that causes a nurse to leave the patient’s room decreases the likelihood that the nurse will remember to come back to finish the interrupted task.

A study on multi-tasking with computers found that 40% of the time, individuals wandered off in a new direction after the interruption ended.3 They forgot what they were doing before the interruption. If an individual remembers to go back to the initial task, some of the steps may be omitted or repeated, or the entire task may be repeated. For example, a nurse may readminister a medication, or a pharmacist may dispense a second dose of medication, forgetting that she had already done so. When returning to a task, it takes time for the working memory to get back to where it was before the interruption or distraction.4

If the task is complicated, individuals who feel pressured may not spend the time it takes for the working memory to catch up, thereby rushing the task and risking errors. In fact, a study on physician distractions found that interrupted tasks were actually completed in less time than if the task had not been interrupted!5 The researchers suggest that the physicians were rushing, which is especially prone to omissions and other types of errors.

New staff are particularly vulnerable to distractions and interruptions because interrupting a new task to do a second task affects how the brain processes and stores the information, thereby compromising the ability to recall the new task correctly at a later date.6

Studies have shown that distractions and interruptions early in the completion of a task are more error-prone than those that occur near the end of the task or between subtasks.7 When interruptions occur at natural breakpoints or transitions between parts of a task, instead of during the busiest moments, errors are less likely. These are the points at which important notifications may be attended to more closely.

Sources of Interruptions and Distractions

The sources of interruptions most often include people—healthcare staff, patients, and visitors—or medical devices, such as computers, infusion pumps, and phones. The sources of distractions can be auditory (e.g., alarms, noise, overhead pages) or visual.

Check it Out! cont’d from page 1

- Staff education. Ask all staff to avoid interrupting nurses administering medications or physicians during the prescribing process. The health professional should only be disturbed if a significant alteration in a patient’s therapy must be communicated immediately. Also educate staff about the risks associated with distractions from the use of mobile devices.12

- Checklists. A checklist of important points during lengthy critical tasks can be affixed to work areas for reference when leaving one task and returning to complete it to aid in remembering where the person left off.

- Mobile device management strategy. Implement a management strategy that addresses appropriate use of mobile devices while minimizing the risks associated with distractions.12 Any inattentive behavior related to personal business should be treated as an at-risk behavior that requires coaching to promote safer behavioral choices.

- Alerts, alarms, and noise. Reduce the frequency of invalid, insignificant, or overly sensitive computer alerts and device alarms to promote the delivery of critical notifications that are necessary and considered. Minimize the noise of overhead pages and other unnecessary chatter in clinical areas.
Health professionals may also become distracted by electronic devices, including, tablets or notebooks, wireless communication devices (e.g., Vocera), electronic references, and notification systems. In hospitals, many of these devices are used for timely notification of patient or drug information that is needed to provide optimal patient care. Thus, the “interruption” may be useful. Therin lies the rub—health professionals may use these devices for quick access to data, drug information, clinical alerts, and other patient information; but the unintended consequence is that professionals can be glued to the screen and not focused on the patient, even during moments of critical care.11

With connectivity just a click away, health professionals may be tempted to conduct personal business while at work. Listing caregiver distractions from mobile devices as one of the top 10 technology hazards for 2013, ECRI cites an example: While a medical resident was using her smartphone to discontinue anticoagulation, she was interrupted by a personal text message before completing the order. She quickly responded to the message but forgot to go back to finish the order in the electronic prescribing system. Anticoagulation continued unnoticed for days, and the patient developed hemopericardium and tamponade requiring emergency surgery.11 In a 2010 poll, half of the perfusionists operating bypass equipment admitted to texting during heart-lung bypass procedures.14 In a 2012 survey, almost half of surgical suite managers had witnessed health professionals distracted by electronic devices, and more than 5% reported that personal use of a mobile device was possibly linked to an adverse event, including wrong-site surgery.15 Younger staff may be more susceptible to distraction because they have grown up being constantly “connected” via text messaging, instant messaging, Facebook, browsing the Internet, and so on.

While distractions and interruptions in healthcare cannot be fully eliminated, there are steps that can be taken to create a far less chaotic environment for the medication use process. Some of these steps can be found in the check/talk! column, starting in the right hand column on page 1.

References


Special Announcements

ISMP webinar

Join us for our April webinar, Safety Strategies with Oral Chemotherapy, on April 23. The speakers will discuss the safety challenges associated with the growing availability of oral chemotherapy agents, and the implementation of safeguards and best practices for these therapies. For details, please visit: www.ismp.org/education/2013-webinars.asp.

Fellowship opportunities

ISMP is now accepting applications for three 2013-2014 Fellowships. The year-long Fellowships provide a nurse, pharmacist, or physician with a unique opportunity to work with interdisciplinary professionals on national and local medication safety projects. For details, please visit: www.ismp.org/profddevelopment.

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