Guideline Implementation: Medication Safety

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Byron L. Burlingame, MS, BSN, RN, CNOR

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PURPOSE/GOAL

To provide the learner with knowledge specific to implementing recommendations from the AORN "Guideline for medication safety."

OBJECTIVES

1. Describe the medication use process.
2. Identify challenges that may contribute to medication errors.
3. Discuss precautions to mitigate risk for medication errors.

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Byron L. Burlingame, MS, BSN, RN, CNOR, has no declared affiliation that could be perceived as posing a potential conflict of interest in the publication of this article.

The behavioral objectives for this program were created by Liz Cowperthwaite, BA, senior managing editor, and Helen Starbuck Pashley, MA, BSN, CNOR, clinical editor, with consultation from Susan Bakewell, MS, RN-BC, director, Perioperative Education. Ms Cowperthwaite, Ms Starbuck Pashley, and Ms Bakewell have no declared affiliations that could be perceived as posing potential conflicts of interest in the publication of this article.

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PODCAST

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Byron L. Burlingame, MS, BSN, RN, CNOR

ABSTRACT

Every surgical procedure involves the use of medications. The medication use process includes procuring, prescribing, transcribing, dispensing, administering, and monitoring. During each phase of this process, there are opportunities for medication errors to occur, which could cause injury to a patient. The surgical environment has specific considerations for medication use (eg, multiple prescribers, medications removed from the original containers, equipment noise) that may additionally complicate the process. The updated AORN "Guideline for medication safety" provides guidance on safe practices for all the phases of the medication use process applicable to the perioperative RN role. This article focuses on key points of the guideline that address precautions to take during the prescribing and administration phases, medication information to share during transitions in care, and patient education. Perioperative RNs should review the complete guideline for additional information and for guidance when writing and updating policies and procedures.

Key words: *medication orders, medication administration, multidose vials, medication reconciliation, patient education.*

All members of the perioperative team may be involved in one or more of the steps of the medication use process during any surgical procedure. The medication use process includes procuring medication, prescribing medication, transcribing medication orders, dispensing medication, administering medication, and monitoring the patient after medication has been administered. Medication errors have been shown to occur during all phases of the medication use process. An error may be identified before the medication is administered to the patient or may not be recognized until after administration, resulting in outcomes ranging from no effect to serious injury to the patient.[1-3]

In the perioperative environment, the risk for medication errors may be increased related to the unique challenges that are present, including medications being prescribed by multiple people (ie, the surgeon, anesthesia professional, surgical assistant) and simultaneous administration of medications by these same people or the RN circulator. Another challenge is that medications are frequently handled by an intermediary in sterile attire (eg, the scrub person) before the medication is administered, and as a part of this process, medications are removed from their original containers and placed into different containers in preparation for use. The OR is full of distracting sounds created by instruments being placed on the Mayo stand, equipment use or equipment alarms, and patient care–related conversation, which can increase the potential for a medication error occurring.[4]

The precautions that perioperative team members take to help ensure medication safety vary depending on the phase of the medication use process. Some of the precautions are performed at multiple times during the process (eg, verification of the correct medication occurs when medication is obtained and before it is administered). Other precautions occur during only one phase of the process (eg, verification of transcription occurs only during the transcribing phase).

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The AORN "Guideline for medication safety,"[5] which was updated in September of 2017, addresses precautions to be taken during all the phases of the medication use process except for dispensing of medications from the pharmacy to the caregiver or patient, which is considered to be outside the role of the perioperative RN. AORN guideline documents provide guidance based on an evaluation of the strength and quality of the available evidence for a specific subject. The guidelines apply to inpatient and ambulatory settings and are adaptable to all areas where operative and other invasive procedures may be performed.

This article elaborates on key takeaways from the guideline; however, perioperative RNs should review the complete guideline for additional information and for guidance when writing and updating policies and procedures.

Key takeaways from the AORN "Guideline for medication safety"[5] include the following:

- Precautions should be taken to mitigate the risk for medication errors in the prescribing phase of the medication use process.
- Precautions should be taken to mitigate the risk for medication errors during medication administration.
- During transitions in care, a person designated by the health care organization should communicate the medication history and medications administered during each phase of care to the receiving caregiver.
- A person designated by the health care organization must provide education regarding the preoperative and postoperative medication regimen to the patient and other individuals involved in the patient's care (Figure 1).

SCENARIO

A 56-year-old man is scheduled for craniotomy for a brain tumor. Ten days before the surgery, the nurse in the preadmission department calls the patient to conduct the preoperative assessment, which includes a medication history. The patient tells the nurse that he is taking acyclovir 400 mg twice a day, oxybutynin 15 mg daily, baclofen 10 mg four times a day, doxazosin 2 mg daily, and ginkgo biloba every day. The nurse consults with the anesthesia professional and the surgeon to determine which of the medications the patient should stop taking and when he should stop taking them. They determine that the patient should discontinue taking the ginkgo biloba one week before surgery and hold all of the remaining medications on the morning of surgery. The nurse notifies the patient of this decision and documents the information in the patient's health record.

On the day before surgery, the RN circulator reviews the surgeon's preference cards to determine whether they contain any requests for medications that require compounding. She finds that the surgeon wants bacitracin 50,000 units in 1 L of normal saline for irrigation. She faxes a copy of the physician's preference card containing the medication request and the patient's identification to the OR satellite pharmacy, asking that the solution be compounded for the procedure the next day. After transmitting the preference card to the pharmacy, the RN circulator reviews the fax confirmation form to verify that all three pages were transmitted.

On the day of surgery, the preoperative RN interviews the patient regarding the medications and herbal or dietary supplements he takes. The patient confirms the medication information that was recorded during the preadmission assessment and also states that he has no medication allergies. He confirms that he has not taken the ginkgo biloba for the last seven days and has not taken the other medications that morning according to the instructions given during the preoperative assessment.

During the preparation for the procedure, the RN circulator goes to the OR satellite pharmacy and obtains the compounded antibiotic irrigation solution. She compares the label on the solution to the preference card order, confirming that the medication is for the correct patient, contains the correct diluent and amount of medication, and has a beyond-use date that is in the future. She then places the compounded medication on the case cart and obtains a decanter for transferring the medications to the sterile field at the appropriate time.

After completing the set-up process, the RN circulator goes to the preoperative area and confirms the patient's identification, allergies, and NPO status. She notes that the anesthesia professional had inserted a central line in addition to a peripheral line and an arterial line. She also observes that a label indicating the tubing's point of entry is present on all of the lines.

The RN circulator receives a report from the preoperative RN that includes the patient's medication history. The patient has received 1 mg of midazolam and is slightly

drowsy, and the preoperative antibiotic is currently infusing according to protocol. The RN circulator brings the patient to the OR, and the patient moves himself over to the OR bed under the guidance of the anesthesia professional and the RN circulator. The anesthesia professional separates the arterial and central line tubing and verifies the labels on the tubing by tracing the tubing to the source. The anesthesia professional then anesthetizes and intubates the patient.

The RN circulator preps the patient, and the sterile team members apply the drapes. The RN circulator leads the time out and informs the team that the irrigation solution requested is present and will be transferred to the sterile field just before it is needed.

One hour into the procedure, the surgeon asks the anesthesia professional to administer 5 mg of dexamethasone intravenously. The anesthesia professional records the order on the patient record and then repeats the order to the surgeon. He then goes to the medication cabinet to obtain the medication. The drawer in the cabinet for the 5-mg vial is empty, so the anesthesia professional asks the RN circulator to obtain the medication from the OR satellite pharmacy.

The satellite pharmacy only has a multidose vial of dexamethasone in stock. The RN circulator delivers the multidose vial to the anesthesia professional and explains that no single-dose vials were available. According to the facility medication management plan, it is acceptable to use a multidose vial when no single-dose vial is available. The anesthesia professional uses a sterile needle and sterile syringe to withdraw the medication after cleansing the rubber septum. He calculates the dosage and asks the RN circulator to double-check that the dosage is correct. Before administering the medication, the anesthesia professional traces the tubing from the insertion site to its origin to verify that he is administering the medication through the correct tubing. He administers the medication at the rate described in the package insert.

After four hours, the surgeon requests that an additional dose of the dexamethasone be administered, so the anesthesia professional takes another sterile needle and syringe and withdraws the medication after cleansing the rubber septum. He again calculates the dosage, asks the RN circulator to double-check the dosage, and then verifies that he is administering the medication through the correct tubing, as he did during the original administration.

When the scrub person determines that the surgeon is almost ready for the irrigation fluid, he asks the RN circulator to place the irrigating solution on the sterile field. The RN circulator obtains the irrigation solution and together they read the label and determine it is the correct medication, correct patient, and correct diluent. The scrub person affixes a preprinted label to the basin and verifies the contents of the label with the RN circulator. Using a decanter, the RN circulator places the medication into the labeled container. According to the facility policy and procedure, the RN circulator places the empty irrigation bag on the unsterile work surface to signify that the medication that was in this bag is on the sterile field. After five minutes, the surgeon requests the irrigation solution, and the scrub person hands him the syringe and verbally verifies the contents.

After the wound is closed, the RN first assistant applies the dressing. Before the patient is transferred to the postanesthesia care unit (PACU), the RN circulator documents the medications that were administered. She reports the medication history and the medications administered on the sterile field to the PACU nurse, and the anesthesia professional reports the anesthesia type and the medications he administered. While the report is being given, the surgeon writes orders and reviews, validates, and signs the verbal orders. After 90 minutes in the PACU, the patient is transferred to the neurological postoperative unit. The PACU nurse provides a report to the unit nurse that includes the medication history and all medications administered during the surgical encounter.

During the room turnover cleaning, the RN circulator returns the dexamethasone vial and the remaining medication to the pharmacy for disposal. The scrub person solidifies the unused irrigation solution with the solidifying agent. Then he disposes of the solidified irrigation solution and the empty irrigation solution bag into the designated waste containers.

Two days later, just before the patient's discharge, the pharmacist performs the medication reconciliation for this patient. She compares the patient's medication history to the postdischarge medication instructions and finds no discrepancies between the medications prescribed for self-administration after discharge, the medication history, and the medications the patient has been taking while hospitalized. She also verifies that the prescribed medications are indicated and that the dosages are appropriate.

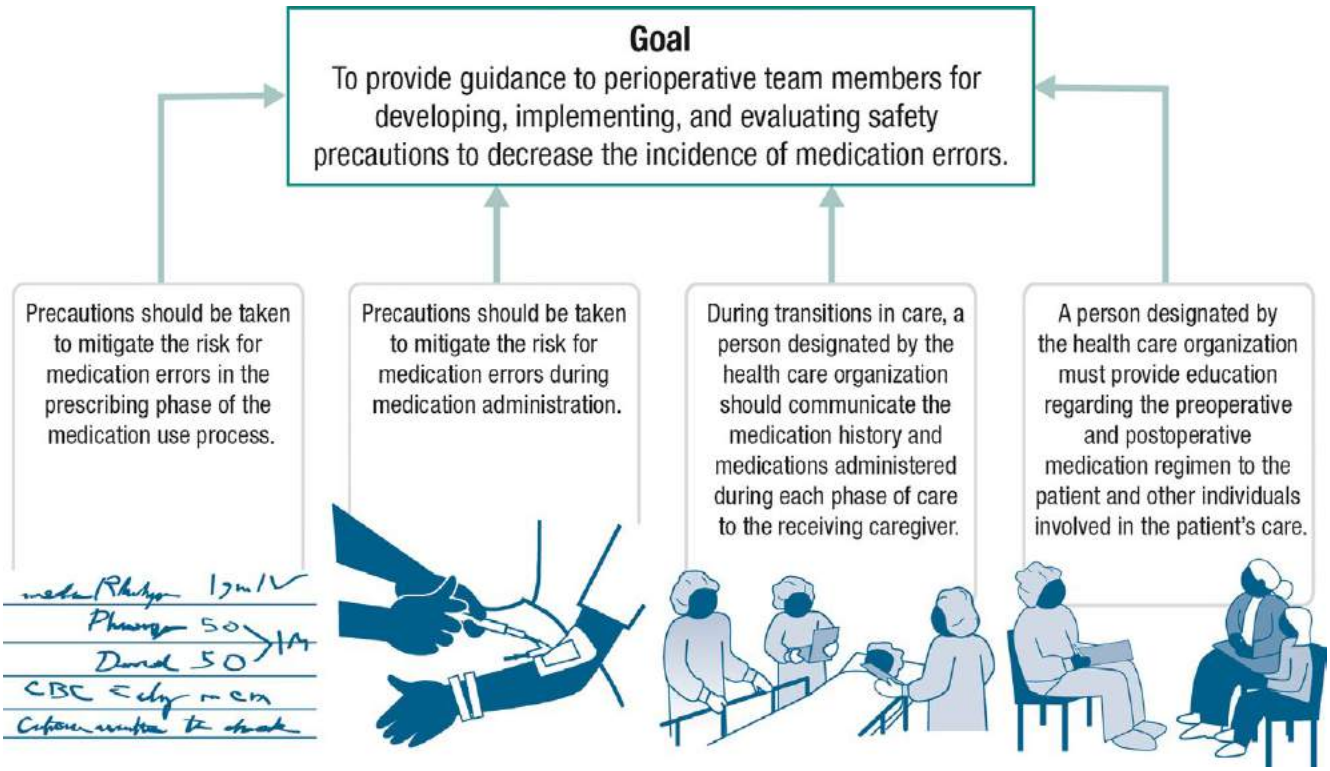

Figure 1. Key takeaways from the AORN "Guideline for medication safety."

After receiving the results of the medication reconciliation, the discharge nurse educates the patient and his wife on the medication regimen. In addition to the verbal education, she gives them written instructions that include a list of the medications the patient should be taking. The list includes the medications that the patient was taking before surgery, oxycodone for pain, and a stool softener to combat the effects of the oxycodone. They are also instructed on when to discontinue the oxycodone and the stool softener. The RN then discharges the patient and documents the instructions given.

KEY TAKEAWAYS DISCUSSION

The key takeaways from the AORN "Guideline for medication safety"[5] address precautions to mitigate the risk for medication errors during the prescribing and administration phases of the medication use process, medication information reported during transitions between phases of perioperative care, and education regarding the preoperative and postoperative medication regimen provided to the patient and other individuals involved in the patient's care. These takeaways do not cover the entire guideline. Rather, they help the reader focus on important or new information that should be implemented into perioperative practice.

Prescribing Phase

Medication errors that occur in the prescribing phase are related to the use of incorrect abbreviations, illegible handwriting, and incomplete information.[3] The physician may communicate the need for a medication on the physician preference card or as a written, standing, or verbal order. For clarity, medication orders in all formats should contain a leading zero (eg, 0.1 mg) if the dose is less than one of the selected unit of measure; should not contain trailing zeros; and should contain only approved abbreviations.[6,7] Verbal orders should only be used when clinically necessary. In the scenario, the anesthesia professional received a verbal order from the surgeon and followed safe practices by transcribing it onto the patient's record and then repeating the order to the surgeon. This was acceptable because the surgeon was in sterile attire and could not write the order. Verbally repeating the order to the prescriber helps to decrease the potential that the order has been misheard or misinterpreted. Verbal orders can be misinterpreted because of regional dialects, background noise, muffled voices behind surgical masks, and

orders involving sound-alike or commonly confused medication names.[8]

In the scenario, the RN circulator faxed the physician's preference cards to the pharmacy to request that the irrigation solution be compounded in the compounding pharmacy. Compounding should ideally be performed in a pharmacy or other location where the ultra-clean environment can be maintained and not in the OR.[9] After faxing the preference card, the RN circulator verified the transmittal of all pages to ensure one was not missed. Pages missing from faxed orders has been reported in the literature, resulting in the patient not receiving the medication ordered.[10] In the perioperative setting, this could result in a delay in the procedure or result in the medication having to be compounded in the OR.

Medication Administration

There are several aspects to the medication administration process, only a few of which are described in the scenario. The medication administration process starts when the medication is obtained from the storage location, which may be a pharmacy or the medication dispensing machine. In the scenario, the RN circulator obtained the irrigation solution and the dexamethasone from the pharmacy storage location. After receiving the medication from the pharmacy, she visually confirmed that she had the correct medication for the patient.

The next part of the administration process occurred when the anesthesia professional asked the RN circulator to double-check the amount of the dexamethasone to be administered. Double-checking the amount of medication helps to decrease the potential for errors made during dosage calculation.[11,12] Any high-risk medications (eg, insulin, heparin) that are designated on the facility high-risk medication list should be double-checked and, ideally, the double-check should be performed independently by two licensed individuals. When there are multiple tubings used for medication administration, each tubing should be traced to its origin and labeled. This action helps decrease the potential for injecting medications into the wrong tubing.[13,14]

A single-dose/single-use vial should be used each time because single and multidose vials can become contaminated after just a single puncture.[15,16] In the scenario, a single-dose vial was not available. The anesthesia professional followed the correct procedure by using a different syringe and needle and cleansing the rubber stopper each time the stopper was punctured. Use of a sterile syringe and a sterile needle each time medication is withdrawn is significant because bacterial and viral (eg, hepatitis B and C) infections can be spread by the reuse of needles and syringes.[17,18]

A single-dose/single-use vial should be used each time because single and multidose vials can become contaminated after just a single puncture.

The RN circulator and the scrub person checked the label on the irrigation solution and the label of the container that the solution was placed into before putting the medication on the sterile field. This step is performed to decrease the potential for an error occurring related to the wrong solution, wrong amount of the medication in the solution, and the medication being administered to the wrong patient. The scrub person also verbally verified the contents of the syringe with the surgeon.

The original medication vials for medications placed on the sterile field are to be retained in the room until the end of the procedure, enabling the medication to be verified if there is uncertainty related to the dose or what medication is on the sterile field any time during the procedure.[19] In the scenario, the medication solution that was unused during the procedure was disposed of according to facility policy, which was written to be in compliance with the regulatory requirements for this location.

Transitions of Care

Transitions of care occur at least four times for most surgical patients (eg, preoperative to intraoperative to postoperative phase one to postoperative phase two). When changes in intraoperative personnel are included, the number increases. Perioperative team members should share information regarding the patient's medication regimen during the transitions of care because no phase of perioperative care is exempt from the risk for medication errors.[20,21] In the scenario, the nurses and the anesthesia professional shared the information on the patient's medication regimen, including the patient's history and the

Resources for Implementation

- Guideline *Essentials*: medication safety. AORN, Inc. *https://www.aorn.org/essentials/medication-safety*. (AORN member/guideline subscriber access only). Accessed December 28, 2017.
- Guideline implementation topics: medication safety. AORN, Inc. *https://www.aorn.org/guidelines/guideline-implementation-topics/patient-and-worker-safety/medication-safety*. Accessed December 28, 2017.
- AORN Syntegrity. *http://www.aorn.org/aorn-org/syntegrity*. Accessed December 28, 2017.
- ORNurseLink. *http://www.ornurselink.org/home* [member access only]. Accessed December 28, 2017.

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What Else Is in the Guideline?

Read the AORN "Guideline for medication safety"[1] to learn what the evidence says about the following:

- What should be included in a facility or health care organization medication management plan? (Recommendation I.b.1.)
- What are the criteria for compounding medications in the perioperative suite? (Recommendations IV.c. and IV.d.)
- What should the medication history include? (Recommendation VI.a.2.)
- What precautions should personnel take when handling hazardous medications? (Recommendations X.e.1. through X.e.9.)
- What education and competency verification activities should be completed in relation to medication safety? (Recommendation XII.a.1.)

REFERENCE

1. Guideline for medication safety. In: *Guidelines for Perioperative Practice*. Denver, CO: AORN, Inc; 2018:295-330.

medications received since admission, when transferring care. Before discharge, the pharmacist performed a medication reconciliation to review the medication history, the medications the patient received in the facility, and those to be taken after discharge. The process of medication reconciliation has been shown to have a positive effect on patient outcomes.[22]

The medication safety guideline does not recommend a specific method or designate a specific person who should share the information or the process for medication reconciliation, only that these processes occur. The medication information may be shared verbally, in person, by another type of communication device, or may be in a written format. An additional aspect of communication is documentation, which is a medicolegal standard and provides data for identifying trends and demonstrating compliance with regulatory requirements and accreditation standards.[5]

Patient Education

Education regarding the patient's medication regimen occurs before and after the surgical procedure. The education may be provided by a physician, a pharmacist, an anesthesia professional, or a perioperative RN. The preprocedure education may occur in the physician's office, during the preadmission assessment, in the preoperative admission area, or in a combination of these areas. The preprocedure education should include which medications are to be held, when they are to be held, and which medications are to be administered.[23] In the scenario, the gingko biloba was discontinued one week before surgery to allow the anticoagulant properties to be neutralized. The remaining medications were held the day of surgery so the patient's stomach would be empty; they had no effects that would interfere with the surgical procedure.

Postprocedure education occurs in the nursing unit just before the patient is discharged. If it is the responsibility of the RN to provide the postprocedure education in the outpatient setting, it is performed by the nurse in the Phase 2 PACU. Patient education, provided both verbally and in writing, regarding the patient's postprocedure medication regimen is necessary because adverse drug events related to medications being improperly self-administered by the patient after discharge (eg, improper dose, medications not taken, improper storage conditions) are decreased when the patient receives education.[24] Education also helps to

decrease hospital readmissions related to improper medication self-administration.[25,26]

CONCLUSION

Precautions must be taken throughout all phases of the medication use process to prevent medication errors. These precautions are described in the AORN "Guideline for medication safety"[5] and require participation of all members of the perioperative team. Perioperative personnel should review the guideline and use it as a resource when developing or revising policies and procedures to ensure that the facility is using the best evidence-based practices to prevent medication errors.

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Byron L. Burlingame, MS, BSN, RN, CNOR, is a senior perioperative practice specialist in the Nursing Department at AORN, Inc, Denver, CO. *Mr Burlingame has no declared affiliation that could be perceived as posing a potential conflict of interest in the publication of this article.*

Continuing Education

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PURPOSE/GOAL

To provide the learner with knowledge specific to implementing recommendations from the AORN "Guideline for medication safety."

OBJECTIVES

1. Describe the medication use process.
2. Identify challenges that may contribute to medication errors.
3. Discuss precautions to mitigate risk for medication errors.

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QUESTIONS

1. The phases of the medication use process include
   1. procuring medication.
   2. prescribing medication.
   3. requesting medication.
   4. dispensing medication.
   5. monitoring the patient after administration.

   a. 2 and 4 b. 1, 3, and 5
   c. 1, 2, 4, and 5 d. 1, 2, 3, 4, and 5

2. A medication error can occur during any phase of the medication use process.

   a. true b. false

3. Challenges in the perioperative area that may increase the risk for a medication error include
   1. distraction from instrument, equipment, and alarm sounds.
   2. independent double-checking of medications by two licensed individuals.
   3. prescription and administration of medications by multiple people.
   4. removal of medications from their original containers.

   a. 1 and 4 b. 2 and 3
   c. 1, 3, and 4 d. 1, 2, 3, and 4

4. In the scenario, when the RN circulator obtained the compounded irrigation solution from the pharmacy, she reduced the risk for administering a wrong medication by
   1. comparing the label on the solution to the preference card order.
   2. confirming the medication was for the correct patient.
   3. confirming the correct diluent and amount of medication.
   4. confirming the medication had a beyond-use date that was in the future.

   a. 1 and 2 b. 3 and 4
   c. 1, 2, and 3 d. 1, 2, 3, and 4

5. In the scenario, before the anesthesia professional administered the requested dexamethasone, he reduced the risks related to medication administration by
   1. repeating the order to the surgeon.
   2. asking the RN circulator to double-check the calculated dosage.
   3. using a multidose rather than a single-dose vial of the medication.

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4. cleansing the rubber septum and using a sterile needle and syringe each time he withdrew the medication.
5. tracing the medication tubing from the insertion site to its origin.

a. 2, 3, and 4 b. 1, 2, 4, and 5
c. 2, 3, 4, and 5 d. 1, 2, 3, 4, and 5

6. In the scenario, the pharmacist completed a medication reconciliation that included
   1. comparing the medication history to the postdischarge medication instructions.
   2. verifying that the medications ordered were indicated.
   3. verifying that the medication dosages were appropriate.
   4. asking the RN circulator to double-check the dosages independently.

   a. 1 and 4 b. 1, 2, and 3
   c. 2, 3, and 4 d. 1, 2, 3, and 4

7. The physician may communicate the need for a medication
   1. as a standing order.
   2. as a verbal order.
   3. as a written order.
   4. on the preference card.

   a. 1 and 3 b. 2 and 4
   c. 1, 3, and 4 d. 1, 2, 3, and 4

8. Transitions of care occur at least ___ times for most surgical patients.

a. two b. three
c. four d. five

9. Information provided during transfers of care should include the patient's medication history and the medications received since admission.

a. true b. false

10. Patient education related to the medication regimen
    1. should occur both before and after the surgical procedure.
    2. must be provided by a pharmacist.
    3. includes what medications should be held before surgery.
    4. helps decrease hospital readmission related to improper self-administration of medications by the patient after discharge.

    a. 1 and 2 b. 3 and 4
    c. 1, 3, and 4 d. 1, 2, 3, and 4

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Guideline Implementation: Medication Safety

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This evaluation is used to determine the extent to which this continuing education program met your learning needs. The evaluation is printed here for your convenience. To receive continuing education credit, you must complete the online Examination and Learner Evaluation at *http://www.aornjournal.org/content/cme*. Rate the items as described below.

OBJECTIVES

To what extent were the following objectives of this continuing education program achieved?

1. Describe the medication use process.
   Low 1. 2. 3. 4. 5. High

2. Identify challenges that may contribute to medication errors.
   Low 1. 2. 3. 4. 5. High

3. Discuss precautions to mitigate risk for medication errors.
   Low 1. 2. 3. 4. 5. High

CONTENT

4. To what extent did this article increase your knowledge of the subject matter?
   Low 1. 2. 3. 4. 5. High

5. To what extent were your individual objectives met?
   Low 1. 2. 3. 4. 5. High

6. Will you be able to use the information from this article in your work setting?
   1. Yes 2. No

7. Will you change your practice as a result of reading this article? (If yes, answer question #7A. If no, answer question #7B.)

7A. How will you change your practice? (*Select all that apply)*
   1. I will provide education to my team regarding why change is needed.
   2. I will work with management to change/implement a policy and procedure.
   3. I will plan an informational meeting with physicians to seek their input and acceptance of the need for change.
   4. I will implement change and evaluate the effect of the change at regular intervals until the change is incorporated as best practice.
   5. Other: _____

7B. If you will not change your practice as a result of reading this article, why? (*Select all that apply*)
   1. The content of the article is not relevant to my practice.
   2. I do not have enough time to teach others about the purpose of the needed change.
   3. I do not have management support to make a change.
   4. Other: _____

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