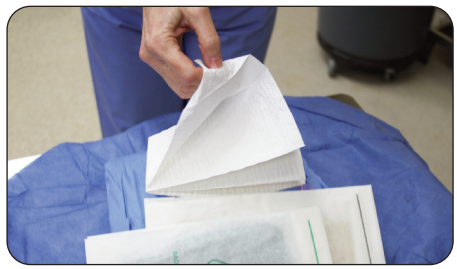
Perioperative Medication Safety



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STUDY GUIDE

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Perioperative Medication Safety

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LEARNING OUTCOME

After completing this study guide and the accompanying video, the perioperative registered nurse (RN) and other perioperative team members will have increased their knowledge of interventions to improve patient safety and minimize the risk of medication-related errors throughout all phases of medication use in the perioperative setting.

OBJECTIVES

After completing the study guide and viewing the video, the participant will be able to

- take precautions to minimize errors during prescription and ordering of medications,
- safely prepare medications,
- administer medications during the perioperative period,
- transfer medications to the sterile field,
- mitigate medication-related errors during transitions of care,
- provide patient education related to safe use of medications, and
- safely handle hazardous medications.

INTRODUCTION

Medication errors can have serious consequences and occur more frequently than many realize.[1] Almost 5% of hospitalized patients experience some type of adverse drug event, about half of which are estimated to be preventable.[2] Adverse drug events are among the most common types of errors for hospital inpatients.[2]

Compared with other areas of patient care, the perioperative setting has unique considerations for medication safety[1]:

- The usual transcription and documentation phase for ordering medications may be omitted or modified.[1]
- Medications are often removed from their original packaging for delivery to the sterile field.[1]
- An intermediary (eg, scrub person) often receives and transfers dispensed medication to the proceduralist or assistant.[1]
- Medications dispensed to the sterile field may be handled by multiple individuals before they are administered.[1]
- Medications may be ordered and administered by multiple health care providers.[1]
- Team members working in the perioperative environment must frequently deal with distractions.[1]

Medication errors can occur at any point in the medication use process and may or may not be detected before administration. Errors detected before administration to the patient are commonly referred to as "near misses." Errors can be influenced by many factors and may be connected to any person who is involved in the process. Results of medication errors can include substantial threats to patients, increased health care costs, and compromised patient confi¬dence in the health care system.[1]

The perioperative RN plays an important role in minimizing the risk for medication-related errors throughout all phases of medication use. This study guide and the accompanying video will assist the perioperative team in developing, implementing, and evaluating safety precautions that can help decrease medication errors and improve patient safety in the perioperative setting.[1]

MULTIDISCIPLINARY TEAM

Each health care organization should establish a multidisciplinary team to be responsible for oversight of the medication management plan. Common names for this team include "pharmacy and therapeutics committee" and "medication safety committee."[1]

Members of the multidisciplinary team should include

- administrators,
- anesthesia professionals,
- infection preventionists,
- licensed independent practitioners,
- perioperative RNs,
- pharmacists,
- purchasing personnel, and
- risk management and quality personnel.[1]

Including representatives of all health care professionals involved in medication use strengthens policies and procedures, contributes to interprofessional collaboration, assists with identification of risk factors for medication errors, and may enhance teamwork and compliance. Depending on organizational staffing, one individual may represent more than one discipline.[1]

The multidisciplinary team should develop a plan for medication management that includes processes for

- administering medications;
- creating, maintaining, and reviewing preference cards and standing order forms;
- managing hazardous medications;
- managing high-alert medications;
- managing look-alike and sound-alike medications;
- managing medication shortages, discontinuations, and recalls;
- monitoring quality assurance and improvement;
- performing medication reconciliation;
- procuring, storing, and disposing of all medications; and
- transcribing medication orders.[1]

The multidisciplinary team should ensure that the perioperative medication plan is consistent with the health care organization's facility-wide plan, that the plan is implemented consistently in all areas where operative and invasive procedures are performed, and that the plan is communicated to all perioperative team members.[1]

The multidisciplinary team should select technological devices (eg, bar code systems, biometrics, electronic medication reconciliation tools) to be used in all phases of medication use. Selection should be based primarily on safety aspects of the devices. Benefits of using technological devices include decreasing medical errors, providing nurses with more time for patient contact, improving turnaround time for medication orders, and decreasing time required for prescribing. Use of computerized ordering systems decreases the number of illegible and incomplete prescriptions.[1]

The team should develop and periodically review a "do not use" list of abbreviations and symbols that are unsuitable for medical documentation.[1]

PROCUREMENT AND STORAGE

The health care organization should take precautions to mitigate the risks associated with procurement and storage of medications and medication-related supplies.[1]

Medications should be procured in single-dose units whenever available and in a size as close as possible to the anticipated clinical dose. Single-dose units in small sizes have been shown to reduce waste. Medications should be obtained in limited concentrations and in the form of prefilled syringes if they are available. Use of prefilled syringes reduces the potential for errors related to relabeling.[1]

All medications and related supplies must be securely stored in areas with limited access, including refrigerated areas, anesthesia carts, and emergency carts. All Class II, III, IV, and V medications must be stored in a locked location. When not in use, all non-mobile carts must be locked, and all mobile carts (eg, nursing medication carts, anesthesia carts) must be secured in a locked room.[1]

Some medications may have temperature-sensitive formulations that can deteriorate if they are stored outside of their recommended temperature range. These medications should be stored according to the manufacturer's instructions. Medications that require refrigeration must be stored in a segregated area of the refrigerator with restricted access.[1]

Medications in storage should be organized in a standardized manner using safety precautions that include

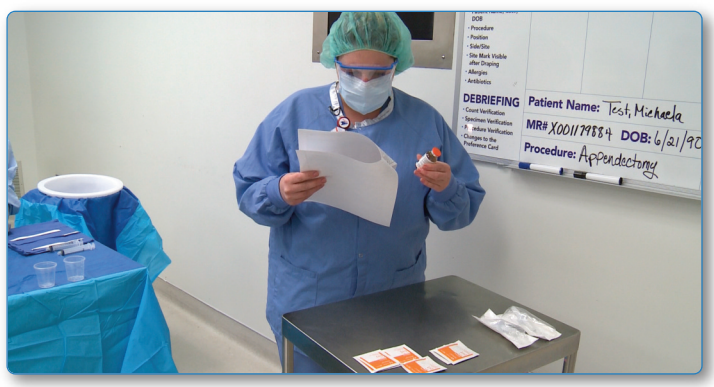
- avoiding alphabetical storage,
- labeling storage bins with both generic and brand names,
- positioning containers with the labels visible,
- providing separate bins or dividers for all medications in storage,
- separating high-alert medications,
- separating medications by generic name and packaging, and
- separating sound-alike and look-alike medications.[1]

PRESCRIPTION

The perioperative team should take precautions to minimize the risk for errors when medications are prescribed. Factors that can lead to errors include incorrect abbreviations, illegible handwriting, and incomplete information.[1]

All medications must be prescribed by a licensed independent practitioner in accordance with state and federal regulations. Handwritten medication orders should be legible and include a legible signature of the prescriber.[1]

Medication orders should contain leading zeros if the dose is less than 1 unit of measure and should not contain trailing zeros. All abbreviations used in orders should be approved by the health care organization. Incorrect, nonstandard, or confusing abbreviations can lead to medical errors.[1]



Pick lists, preference cards, and protocols that include medication orders may be considered preprinted orders depending on the policies and procedures of the health care organization. If these are considered preprinted orders, they should be included in the patient's medical record, unless they are recorded by some other means. Preprinted orders must be reviewed for accuracy by the prescribing practitioner every time they are changed. Even if no changes are made, the prescribing practitioner must review the orders at least annually.[1]

Verbal orders can be a source of medication-related errors. Factors that can lead to misinterpretation of verbal orders include regional dialects, background noise, muffled voices behind surgical masks, and orders involving sound-alike or commonly confused medication names. Verbal medication orders must only be used when required by clinical necessity.[1]

When used, verbal orders should

- be received and carried out only by persons authorized to do so, consistent with state and federal law and the policies and procedures of the health care organization;
- be confirmed by reading back the order to the prescriber;
- be immediately recorded in the patient's medical record;
- be reviewed, validated, and signed by the prescriber as close as possible to the time of medication administration;
- contain the legible signature of the person documenting the order; and
- contain all components of a written order.[1]

PREPARATION

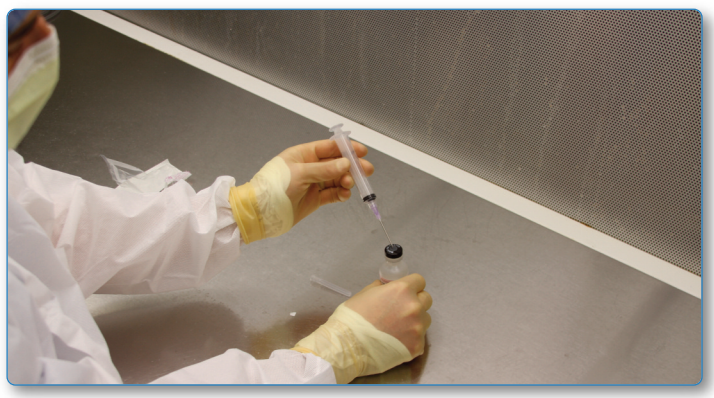
The perioperative team should take precautions to minimize the risk for errors when medications are obtained and prepared.[1]

The perioperative RN should retrieve medications from storage bins, automated dispensing storage systems, or a satellite pharmacy for only one patient at a time. It may seem more efficient to collect medications for multiple patients at once, but this can increase the chance for error. Incorrect medications are sometimes placed in storage bins because of errors that can occur during restocking. The RN is more likely to detect restocking errors if he or she is focused on retrieving medications for only one patient at a time. The perioperative RN should verify the medications against the original order whenever they are taken from storage.[1]

Compounding

Compounding is defined as the process of combining two or more different medications. It includes adding a medication such as heparin into IV normal saline solution. It does not include mixing, reconstituting, or similar actions performed in accordance with directions on a single medication's label or package insert.[1]

Whenever possible, medications should be compounded in a pharmacy that meets specified standards.[1,3] Compounding in a pharmacy under strict conditions of cleanliness and sterility reduces the risk for contamination.[1] The pharmacy may be physically located in the health care facility or may be located off-site.[1] If medications from a compounding pharmacy are not available, the perioperative team may compound them in the perioperative suite for immediate use.[1]



Air flow is closely regulated in an OR but does not meet the same standards of cleanliness and sterility as the air in a compounding pharmacy. For this reason, medications compounded in the perioperative suite are considered to be at high risk for contamination. Administration of compounded medications must begin, but not necessarily be completed, within 1 hour of compounding. If they are not administered immediately, compounded medications must be kept under continuous observation.[1]

Team members must complete competency verification activities before compounding medications. The following precautions should be observed when team members compound medications in the perioperative area:

- verifying the correct medication, amount, and concentration;
- performing hand hygiene before compounding;
- disinfecting nonsterile surfaces, including the medication container;
- using aseptic technique;
- using dispensing equipment or a sterile syringe to remove medication from the container;
- combining no more than three medications together;
- visually inspecting the compounded medication for particulate material; and
- applying a label unless the medication is administered immediately or verify the label applied by the scrub person if medication is transferred to the sterile field.[1]

When team members prepare medications off the sterile field, they should apply a label that includes the following information:

- patient identification,
- beyond-use date and time,
- date of preparation,
- name or initials of the person who prepared the compounded medication, and
- names and amounts of all ingredients in the compounded preparation.[1]

When preparing the label, team members should use the full name of each medication and avoid abbreviations. If a medication is prepared in multiple concentrations, the labels for the different concentrations should be different colors.[1]

ADMINISTRATION

The perioperative team should take precautions to minimize the risk for errors when medications are administered.[1] Causes of administration errors include, but are not limited to, miscalculation of doses, name confusion, omissions, swapping of syringes, and administration at the wrong time.[1] Team members should administer all medications according to the package insert or other manufacturer instructions.[1] This information may be available in drug directories and databases, either published or online.

Before administering any medication, the perioperative RN should verify the following:

- right patient, using at least two patient identifiers;
- right medication, including dose, strength or concentration, and correct adjustment for the patient's weight;
- right route;
- right time;
- right rate of administration;
- infusion pump settings, if applicable; and
- that the patient is not allergic to the medication.[1]

If multiple medications are administered through a single IV line, the RN should verify the compatibility of the medications and IV solution. Team members should implement a double-checking system, also called an independent double check, performed by two licensed individuals for high-alert and high-risk medications identified by the health care facility (eg, heparin, insulin).[1]

Perioperative team members should carefully read the labels on all containers before medications are removed for preparation or administration. Team members should discard any medication container (eg, vial, ampule) with compromised sterility and any medication removed from its

original packaging and found in an unlabeled container.[1]

Team members responsible for administering medications must monitor the patient to detect signs of adverse reactions and to assess therapeutic effects. Specific requirements for monitoring and documentation are based on the patient's condition, the procedure, and the policies of the health care organization.[1]

Single and Multidose Vials

Single-dose vials and single-use dispensing devices (eg, insulin pens) can become contaminated and transmit infections.[1] The perioperative RN should not use a single-dose vial or single-use dispensing device on more than one patient.[1] Multidose vials can also become contaminated and spread infections.[1] The RN should not use a multidose vial for more than one patient when medication is prepared at the point of use.[1,3]

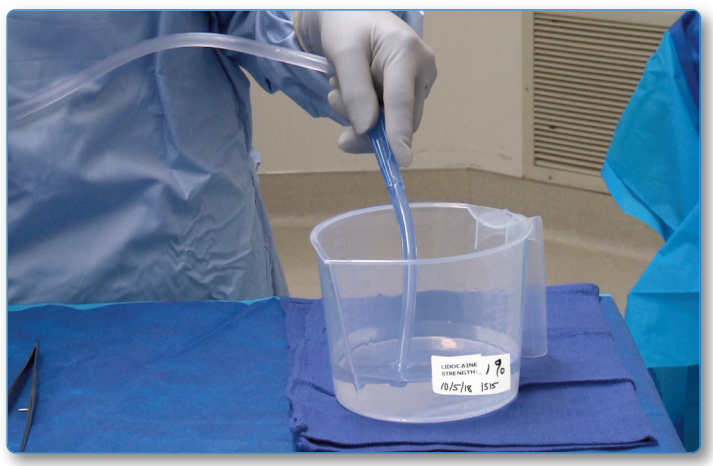
Perioperative team members should use a new sterile needle and sterile syringe and should disinfect the rubber septum with alcohol and allow it to dry each time a medication is withdrawn from a vial.[1,3] This includes both single and multidose vials.[1] Needles and syringes should not be reused.[1] Syringes should not be reused even if the needle is changed.[3] When a multi-dose vial is packaged with individual applicator tips for use, the RN should change the tip between uses for different patients.[1]

The perioperative RN should use a needle and syringe only once to administer a medication to a single patient. Then the syringe and needle should be discarded. An exception to this is when incremental doses of a medication are given to a single patient using the same syringe as an integral part of a procedure. In this case, the syringe and needle may be reused if strict adherence to aseptic technique is followed. The syringe should never be left unattended, and it should be discarded as soon as the procedure is finished.[1]

Perioperative team members should place a label on a multidose vial the first time it is used.[1] This label should include a beyond-use date of 28 days, or shorter if specified by the manufacturer.[1] The manufacturer's original expiration date is no longer valid after a product has been opened or a cap on a vial has been punctured or removed.[1] Whenever possible, multidose vials should be stored outside the immediate patient treatment area.[1,3]

Irrigation and IV Fluids

Irrigation and IV fluids, containers, and supplies should be considered single-patient use items. Reusing surplus volume for more than one patient increases the risk for cross contamination. At the end of a procedure, the perioperative RN should discard any unused irrigation or IV solutions that have been opened.[1]



The perioperative RN should puncture, or spike, bags of IV fluid within 1 hour of intended use.[1]

The perioperative team should take precautions to minimize the risk of errors associated with tubing, including

- aligning tubing to avoid tangling and to facilitate easy identification;

- allowing only individuals deemed competent to manage connections and lines;
- avoiding the use of Y-port extension tubing;
- avoiding the use of standard Luer-lock syringes for medications intended for oral or enteric administration;
- labeling all tubing and injection ports with the point of exit (eg, venous, arterial, epidural);
- tracing tubing to the points of origin and insertion; and
- using only non-Luer lock connectors on spinal, epidural, and combined spinal/epidural devices.[1]

PERIOPERATIVE MEDICATIONS

Although it is not possible to provide a comprehensive list of every medication that might be used in the perioperative setting, the following table presents some commonly used medications.

Depending on state regulations and the policies of the health care organization, perioperative RNs may be authorized to administer medications to achieve moderate sedation for patients undergoing procedures.[4]

MEDICATION NAME	CLASS	INDICATION
Bupivacaine[5] (Marcaine, Sensorcaine)	Local anesthetic	Local and regional anesthesia
Cefazolin[6] (Ancef, Kefzol)	Cephalosporin antibiotic	Treatment and prophylaxis for infections
Epinephrine[7] (Note similarity of name to Ephedrine)	Catecholamine	Cardiac stimulation, vasoconstriction, Advanced Cardiac Life Support, treatment of bronchospasm, treatment of anaphylaxis, mydriasis during intraocular surgery, prolonging the effects of local anesthetics during regional anesthesia
Ephedrine[8] (Note similarity of name to Epinephrine)	Sympathomimetic agent	Treatment of hypotension, treatment of acute bronchospasm
Fentanyl[9] (Sublimaze)	Opioid	Analgesia
Heparin[10] (Hep-Lock, Hepflush)	Anticoagulant	Treatment and prophylaxis for thrombosis, maintaining patency of arterial lines
Lidocaine[11]	Local anesthetic, antiarrhythmic	Local, topical, and regional anesthesia, treatment of ventricular arrhythmia
Midazolam[12] (Versed)	Benzodiazepine	Amnesia, anxiolysis, sedation
Morphine sulfate[13]	Opioid	Analgesia
Propofol[14] (Diprivan)	Intravenous nonbarbiturate anesthetic	Induction and maintenance of general anesthesia, sedation
Ropivacaine[15] (Naropin)	Local anesthetic	Local and regional anesthesia

STERILE FIELD

The perioperative team should take precautions to minimize the risk for errors during transfer and handling of medications to and on the sterile field. Errors can occur when incorrect medications are drawn up from unlabeled bowls or administered from unlabeled syringes on the sterile field.[1]

Before transferring medications to the sterile field, the RN circulator should check the expiration date and visually inspect the medication for discoloration or particulate matter. If there is any indication that the medication has been compromised, it should be discarded. Both the RN circulator transferring the medication and the person receiving it should verify the name, strength, dosage, and expiration date by reading the label aloud.[1]

Perioperative team members should carefully observe aseptic technique during transfer.[1] The RN should not remove rubber stoppers from vials unless they are specifically designed to be removed.[1,3] Vials are not designed to aseptically pour medications into containers on the sterile field.[1,3] Instead of pouring directly from the vial, the RN circulator should use a transfer device (eg, sterile vial spike, filter straw, catheter) to minimize splashing and spilling.[1,3] Only one medication should be transferred at a time, and the scrub person should immediately put a label on the receiving container.[1] Additional medications should not be transferred until the label is in place.[1]

The label should include the name of the medication, strength, dilution, any diluent used, and the date and time the medication was received onto the sterile field. The label should not include any unnecessary information and should not have any unapproved abbreviations. The RN circulator and the scrub person should both verify the label on the container or syringe. Any medications or solutions found on the sterile field without a label should be discarded.[1]

Medications and solutions should be delivered to the sterile field as close to the time of use as possible. The labels on medications or solutions should be verified by the scrub person and RN circulator whenever team members are relieved.[1] The scrub person and surgeon or other licensed proceduralist should verbally and visually confirm the medication before administration of the medication.[1]

TRANSITIONS OF CARE

The perioperative team should take precautions to minimize the risk for errors during transitions of care. Potential errors, including omissions, medications prescribed without indication, incorrect routes, and incorrect dosages, can occur during all phases of perioperative care. Medication reconciliation can help to detect these potential errors. The perioperative RN plays an important role in the reconciliation process.[1]

At admission, the preoperative RN should interview the patient or patient's caregivers and obtain a baseline medication history. This history should include:

- the patient's allergies;
- symptoms of any reactions to medications;
- the name, dose, frequency, route, and purpose of all products taken, including over-the counter medications and herbal supplements; and
- the date and time of the last dose taken for all products.[1]

The preoperative RN should confirm that the patient has taken or discontinued medications and herbal supplements on the day of surgery or the designated number of days before surgery as ordered. The RN should notify the surgeon and anesthesia professional if the patient has not taken or has not discontin-ued medications as ordered.[1]

During transfer of care, the medication history and medications administered during each phase of care should be communicated by the perioperative RN to the receiving RN and should include

- the patient's allergies and reactions to medications;
- preoperative medication history, including last doses taken;
- medications administered during the preoperative period, including dose, time, and effects;
- medications administered intraoperatively, including dose, time, and the patient's response;
- IV and irrigation fluids administered;
- anesthesia administered, including type and route;
- current and pending laboratory tests related to medications;
- physician's orders for medications, if any;
- infusion pump settings, if applicable; and
- medications and IV fluids administered postoperatively, including dose, time, and the patient's response.[1]

Team members should complete the medication reconciliation process before the patients is discharged. The process should include a comparison of the patient's medication history with post-discharge instructions to verify that ordered medications are indicated and that dosages are appropriate. The process should be standardized for all patients, use a standardized form, and engage patients and their caregivers. If any discrepancies are found, the team member performing reconciliation should alert the licensed prescriber.[1]

PATIENT EDUCATION

A person designated by the health care organization must provide education to the patient, caregivers, and other individuals involved in the patient's care regarding the preoperative and postoperative medication regimen.[1] Patients might not understand how they should take their medications. Evidence indicates that up to 14% of patients have one or more discrepancies, defined as what patients report taking compared with prescribed prehospital and post-discharge regimens, in their medications after discharge.[16] By providing education and ensuring the patient understands how and when to take his or her medications, the perioperative RN can help reduce the risk for adverse reactions and readmissions.[1]

Before the procedure, the perioperative RN should educate the patient about which medications to hold before surgery and which to take. If the timing of certain medications needs to be changed before surgery, the perioperative RN should verify any changes with the prescribing physician.[1]

After the procedure, the RN should provide education to the patient on the following topics:

- a list of medications to be taken after surgery;
- when to discontinue medications;
- list of discontinued medications;
- when to resume medications that were held;
- how the patient should measure and administer the medications at home;
- medication safety precautions, including that medications should be taken only as prescribed, should not be shared, and should be secured;
- when to obtain medication-related laboratory tests;
- potential adverse effects of medications;
- when to seek medical attention;
- methods for storing, handling medications, and disposing of unused medications;
- how to use patient-controlled administration devices;
- the importance of keeping a list of current medications and current allergies; and
- sources for additional information.[1]

In addition to verbal instructions, the perioperative RN should provide written instructions to the patient and his or her care providers. The perioperative RN should document these instructions in the patient's medical record. Patient instructions should be tailored to meet the patient's needs. Written instruction sheets should be standardized and printed electronically.[1]

Factors to consider when preparing written instructions include

- age-specific needs (eg, large print for elderly patients who may have difficulty reading small print),
- needs of special populations (eg, non-English speakers, hearing impaired),

- readability or level of comprehension (eg, patient's reading comprehension grade level), and
- health literacy level.[1]

SAFE HANDLING OF HAZARDOUS MEDICATIONS

The perioperative team should take precautions to minimize risks related to handling hazardous medications. Hazardous medications can affect health care workers by absorption through the skin, inhalation, ingestion, accidental injection, and exposure to the excrement of patients receiving chemotherapy.[1]

The health care organization must create a plan for the management of hazardous medications. This plan should be reviewed, updated annually and whenever new hazardous medications are introduced, and include

- a list of hazardous medications administered in the facility,
- safe work practices to be used when handling hazardous medications,
- role-specific educational requirements,
- when personal protective equipment (PPE) should be used and who should use it, and
- processes for handling and disposing of waste.[1]

The health care organization should provide the following to health care personnel related to hazardous medication management:

- policies and procedures based on the most current evidence,
- primary engineering controls (eg, ventilation hood),
- supplemental engineering controls (eg, closed-system transfer devices),
- PPE as applicable,
- discipline-specific education,
- instructions for patients and caregivers,
- provisions for disposal of hazardous waste, and
- spill kits.[1]

The perioperative team should handle hazardous medications according to manufacturer's instructions, regulatory requirements, and advisories from professional organizations.[1]

Perioperative team members must wear PPE whenever they handle hazardous medications or excretions from patients who have received hazardous medications within the previous 48 hours. The team should select PPE based on the risk of exposure and the activities being performed.[1]

The perioperative RN should wear two pairs of powder-free chemotherapy gloves when handling hazardous medications because these medications can sometimes penetrate a single layer of gloves. The RN should change gloves every 30 minutes unless the glove manufacturer's instructions state otherwise.[1]

The RN should also wear a single-use chemotherapy gown. This gown should be sterile if hazardous medications are handled on the sterile field. The gown should be lint free, impermeable to hazardous medications, and long sleeved. It should fasten in the back, have elastic or knit cuffs, and have seams and closures impermeable to the medication being handled.[1]

Perioperative team members must wear goggles or goggles with full face shields when handling hazardous materials. Eye glasses or glasses with side shields do not provide adequate protection. Face shields alone do not provide full protection for the eyes and face. If there is a risk for airborne powder or generation of aerosols, team members must wear respirators rated N95 or better.[1]

After use, the team members should place PPE in a hazardous disposal container. This container should be sealable, leak proof, resistant to breakage, and labeled with applicable hazard warnings. Team members should wash their hands with soap and water as soon as possible after removing PPE.[1]

The perioperative RN should use single-use devices, if they are available, to administer hazardous medications. Use of disposable single-use instruments avoids the need for deactivation and decontamination.[1]

If hazardous medications are spilled, the perioperative RN should contain the spill. Spill kits should be available in any area at risk for hazardous spills. Team members must wear PPE when cleaning up spills. Contaminated surfaces and instruments should be deactivated, cleaned, and decontaminated according to manufacturer's instructions and

the instructions provided in the safety data sheet for the medication. The RN should not use a spray bottle to apply agents for deactivation or decontamination because spray application may aerosolize the hazardous material. The perioperative RN should document details of the spill including the name of the medication, time of exposure, and names of anyone exposed, according to the health care organization's policies and procedures.[1]

Perioperative team members should seek immediate medical attention if they are exposed to hazardous medications.[1]

DISPOSAL

Perioperative team members should dispose of medications according to the manufacturer's instructions and local, state, and federal regulations. Some medications may be classified as controlled substances or hazardous waste and have specific requirements for disposal. Team members should review the safety data sheet for the medication and collaborate with a pharmacist to determine the correct method for disposal.[1]

Team members should collaborate with pharmacy personnel to determine optimal methods for returning unused and unopened medications to the pharmacy.[1]

DOCUMENTATION

Perioperative team members and the health care organization should take precautions to minimize the risk for errors associated with medication-related documentation, including transcription.[1]

Documentation for administered medication should be timely, legible, easily accessible, and free of unapproved abbreviations and acronyms.[1]

The perioperative RN should use a consistent format to document medications administered and include the

- name of medication;
- concentration of the medication and/or solutions administered;
- date and time the administration began;
- duration of administration or time treatment was completed;
- identity of the team member administering the medication;
- patient response, if applicable, including adverse events;
- rate of administration;
- route of administration; and
- total amount administered if multiple injections of the same medication were administered during a procedure.[1]

The perioperative RN should document communications with patients, health care providers, and caregivers, including dates and times of events, names of persons involved, and steps taken to resolve questions and problems. The perioperative RN should document discharge instructions.[1]

EDUCATION AND COMPETENCY VERIFICATION

The health care organization should provide education and verify competency regarding precautions to minimize the risk of medication-related errors.[1]

Education and competency verification activities should be role-specific and should include the following:

- age-related patient requirements when obtaining, preparing, and administering medications;
- applicable storage requirements for medications;
- documentation requirements;
- double-checking processes;
- handling and administration of high-alert medications;

- identification of distinct pairs for look-alike and sound-alike medications;
- storage requirements for look-alike and sound-alike medications;
- injection techniques;
- labeling processes for medications taken out of their original containers;
- maintenance of preference cards and standing order forms;
- medication allergies and treatment;
- medication disposal;
- medications associated with emergency care;
- methods for handling and preventing near miss incidents;
- methods for and significance of reporting adverse drug events;
- methods to decrease interruptions;
- monitoring of patients' responses to medications;
- pharmacology, including the intended use of medications and contraindications;
- processes for medication use, including reconciliation;
- receiving and processing of verbal, written, or electronic orders;
- regulations relevant to safe medication practices;
- retrieval or return of medications, including outdated medications, from and to medication storage areas;
- review of policies and procedures;
- rotating stock;
- safe dosage limits and dosage calculations;
- securing of medication inventory;
- tubing types and correct methods for connection;
- use of abbreviations;
- use of medication containers, adjunct equipment, and supplies;
- use of medication-related education tools for patients and their support persons;
- use of technology for error prevention and administration; and
- use of visual and verbal validation when placing a medication on the sterile field.[1]

The health care organization should provide current, readily accessible medication-related reference materials to team members.[1]

POLICIES AND PROCEDURES

The health care organization should develop policies and procedures covering medication use in all phases of perioperative care. These policies and procedures should be reviewed and revised as needed and should be readily available to team members.[1]

Policies and procedures should address the roles and responsibilities of each health care discipline (eg, RN, certified RN anesthetist, physician assistant) regarding who may administer medications, types of medications that may be administered, and routes and techniques for administration.[1]

Policies and procedures related to medications should address the following:

- Acceptable types of orders
  - Automatic stop
  - PRN
  - Range
  - Signed and held
  - Standing
  - Taper
  - Titrating
  - Verbal
- Content of medication orders
- Culturally sensitive medication practices for communities served
  - Age-specific populations
  - Ethnically diverse populations
  - Special populations (eg, women's practices, ophthalmology, oncology)
- Disposal
- Documentation
- Handling of hazardous medications
- Handling of medication containers
- Labeling
- Management of medication shortages
- Monitoring after administration
- Prevention of tubing misconnections
- Processes for medication reconciliation
- Storage
- Use of patient-controlled analgesia devices[1]

Policies and procedures for verbal orders should

- define criteria for read-back techniques,
- describe when verbal orders may be used,
- list the required contents of a complete verbal order,
- list who may give and receive verbal orders, and
- provide a means to determine the validity/authenticity of the prescriber.[1]

QUALITY

The health care organization should establish a quality plan that includes evaluation of all phases of medication use. Mechanisms to identify and analyze medication errors, near misses, and adverse drug events might include trigger tools, self-reporting tools, direct observation with immediate feedback, or chart review.[1]

The quality plan should include clearly defined quality metrics that

- address preventable adverse events, medication errors, and technology;
- are applicable to the facility; and
- can lead to specific interventions.[1]

The plan should include methods for analyzing medication errors, assessing technology workarounds, and identifying medication errors that occur during medical emergencies.[1]

Perioperative team members should immediately report errors related to administration of medications to the attending physician and, when appropriate, to the health care organization's quality program.[1]

SUMMARY

Safe use of medications is particularly challenging in the perioperative setting. Medications are often handled by multiple providers. Patients routinely experience multiple transitions of care as they progress through preoperative, intraoperative, and postoperative phases of surgery, and they are often confused about perioperative changes to their usual medication schedule. It is important for every health care organization to establish procedures to minimize errors during all phases of medication use, including procurement, storage, prescription, preparation, and administration. The perioperative RN plays an important role in establishing and following medication safety procedures, providing patient education, and helping to ensure good patient outcomes and satisfaction.

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ADDITIONAL RESOURCES

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POST-TEST

PERIOPERATIVE MEDICATION SAFETY

Multiple choice. Please choose the word or phrase that best completes the following statements.

1. A multidisciplinary team established to oversee a medication management plan should address which of the following issues?
   a. Communicating the medication plan to all perioperative team members
   b. Ensuring the perioperative medication plan is consistent with the facility-wide plan
   c. Ensuring consistent implementation of the medication plan in all areas where operative and invasive procedures are performed
   d. Selecting technological devices to be used with medications
   e. All of the above
2. Whenever possible, medications should be obtained in _____ units in _____ sizes.
   a. multidose; large
   b. multidose; small
   c. single-dose; large
   d. single-dose; small
3. How should medications be stored?
   a. Label storage bins with both generic and brand names.
   b. Store all medications of the same class in a single bin.
   c. Store medications in alphabetical order.
   d. Store sound-alike and look-alike medications next to each other.
4. A perioperative RN should always question the surgeon about a medication order if the order
   a. contains abbreviations not approved by the health care organization.
   b. contains leading zeros.
   c. is handwritten.
5. How often must preprinted orders be reviewed for accuracy by the prescribing practitioner if no changes are made to the orders?
   a. Every 6 months
   b. Every 12 months
   c. Every month
   d. Every week
6. What is the maximum number of medications that can be combined when team members compound medications in the perioperative suite?
   a. Two
   b. Three
   c. Five
   d. Ten
7. How soon after compounding medications should the preparation be administered?
   a. Immediately
   b. Within 30 minutes of compounding
   c. Within 1 hour of compounding
   d. Within 3 hours of compounding
8. The perioperative RN should verify which of the following before administering medication?
   a. The correct patient is receiving the medication, verified by using at least two patient identifiers.
   b. The dose has been correctly adjusted for the patient's weight.
   c. The patient is not allergic to the medications.
   d. The route of administration is correct.
   e. All of the above

9. When is it acceptable to use a needle and syringe multiple times for administration of medication?
   a. When medications are drawn out of a multidose vial
   b. When medications are drawn out of a single-dose vial multiple times for administration to the same patient
   c. When incremental doses of a medication are given to a single patient as part of a procedure
   d. When the rubber septum of a vial is properly disinfected with alcohol and allowed to dry
   e. All of the above

10. Unless the manufacturer specifies otherwise, what is the maximum duration for safe use after a multidose vial has been opened for the first time?
   a. 7 days
   b. 14 days
   c. 28 days
   d. 2 months
   e. The medication can be used safely until the original expiration date.

11. To help reduce the risks for medication errors related to IV tubing, the perioperative RN should
   a. trace tubing to points of origin and insertion.
   b. use Y-port extension tubing.
   c. use standard Luer-lock syringes for medications intended for oral or enteric administration.
   d. use Luer-lock connectors on spinal, epidural, or combined spinal/epidural devices.

12. When should a scrub person apply a label to a medication container after receiving it on the sterile field from the RN circulator?
   a. After all medications for the procedure have been received on the sterile field
   b. Immediately and before any additional medications are received from the RN circulator
   c. It depends; if only one medication is dispensed to the sterile field, it is not necessary for the scrub person to label it

13. What action should a perioperative RN take if the preoperative assessment indicates that a patient has not properly taken or discontinued medications as ordered?
   a. Cancel the case
   b. Document the deviation from orders in the patient's medical record and take no further action
   c. Notify the surgeon and anesthesia professional
   d. Notify the health care organization's quality committee

14. The perioperative RN should educate the patient about medications and should include all the following elements EXCEPT
   a. a list of discontinued medications.
   b. methods for sharing unused medications.
   c. methods for storing medications.
   d. when to obtain medication-related laboratory tests.

15. When handling hazardous medications, perioperative team members should observe which of the following precautions regarding personal protective equipment?
   a. Wear 1 pair of powder-free chemotherapy gloves
   b. Change gloves every 2 hours
   c. Wear eye glasses with side shields
   d. Wear a single-use chemotherapy gown
   e. All of the above

POST-TEST ANSWERS
PERIOPERATIVE MEDICATION SAFETY

1. e
2. d
3. a
4. a
5. b
6. b
7. c
8. e
9. c
10. c
11. a
12. b
13. c
14. b
15. d