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Medication Safety:
ISMP Targeted Medication Safety Best Practices for Hospitals (2024)

About the Guideline

- The Institute for Safe Medication Practices (ISMP) is a nonprofit organization dedicated solely to the prevention of medical errors.
- The goal of this guideline is to make hospitals aware of medication errors that have caused harm and even death and to promote the implementation of recommended medication safety best practices to avoid such errors.
- Although the guideline's focus is hospital-based sites, these best practices can also be implemented in other types of health care organizations.
- The ISMP encourages health care organizations nationally to review and implement these best practices within a two-year time frame.
- These best practices have been reviewed by an outside expert advisory panel and accepted by the ISMP board of trustees.

Key Clinical Considerations

Become familiar with the recommendations and best-practice statements provided in this guideline, especially if you work in an acute care setting.

Best Practice 1

- VinCRIStine and other vinca alkaloids should **not** be supplied in a syringe; instead, use a minibag diluted with a compatible solution.
    - This practice helps ensure that the medication is delivered intravenously and not intrathecally, due to the risk of neurological effects, which can be fatal.
    - The minibag should contain a volume of at least 25 ml for pediatric patients and 50 ml for adult patients, both of which are too large a volume for intrathecal administration.

Best Practice 2

- When electronic order entry for oral methotrexate is used, a default weekly dosing schedule should occur automatically.
- All daily oral methotrexate orders should necessitate a “hard stop” for an applicable oncologic diagnosis.
    - In manual systems and those electronic systems that cannot offer a hard stop, all daily methotrexate orders should require clarification if an oncologic indication is not documented.
    - Hospitals, software vendors, and information technology departments need to work collaboratively to make hard stops an integral part of electronic order-entry systems.
- Upon discharge on oral methotrexate, detailed patient or family education should be provided.
    - All printed oral methotrexate discharge orders should be double-checked before being given to the patient or family, to ensure the correct dosage regimen is reflected.
    - The oral methotrexate dosing schedule should be written clearly and reviewed verbally. Emphasize that the medication should be taken only as needed, and educate the patient or family about the danger of taking additional doses.
    - Ask the patient or family to repeat back the methotrexate instructions given, including the dangers of taking additional doses, to ensure understanding.

  - Give a copy of the ISMP high-alert medication consumer pamphlet on oral methotrexate to the patient or family.

Best Practice 3

- The patient's weight should be an actual, measured weight. Do not use a previously documented, verbal, or estimated weight. At each encounter (for example, on admission, in the emergency room, or at an outpatient visit, if not an emergency situation), the patient's weight should be measured as soon as possible.
  - Metric scales should be placed in all areas where patients are received, and the metric weight should be documented in the medical record.
- Metric units should be the standard and only measurement system used to measure a patient's weight:
  - Disable the setting for weight in pounds so that it is unavailable on scales that give readings in both kilograms and pounds.
  - Newly purchased or replacement scales should be locked in to measure in metric units only.
  - If the patient or family asks for the weight in pounds, have a conversion chart available near the scale.
  - Ensure that all devices (for example, infusion pumps and places for documentation, such as medical records, order forms, and patient instruction sheets) activate a prompt for weight in kilograms only.

Best Practice 7

- Neuromuscular blocking agents (NMBs) should be isolated from all other medications in all areas where they are stored.
  - If NMBs are not used regularly in an area, they should not be available in that area.
  - In areas where NMBs are used regularly, they should be stored in a sealed case, or preferably, in a rapid sequence intubation (RSI) box.
  - In areas such as critical care, labor and delivery, perioperative areas, and the emergency department, NMBs may be made available, in limited amounts, in automated dispensing cabinets (ADCs), preferably in pockets or drawers within a locked ADC or RSI box.
  - NMBs should be placed in separate lidded containers in the refrigerator or other secure, isolated storage area and should remain segregated from all other medications in the pharmacy.
  - Auxiliary labels should be added to all NMB cases wherever they are available in the hospital, as well as on all final medication NMB containers (e.g., intravenous bags, syringes). They should note the following: **"WARNING: Causes respiratory arrest—patient must be ventilated"** or **"WARNING: Paralyzing agent—causes respiratory arrest"** or **"WARNING: Causes respiratory paralysis—patient must be ventilated"** to clearly convey that respiratory arrest can occur and that, in cases of respiratory arrest, ventilator assistance will be needed.
  - Users should be alerted by an interactive ADC alert prior to removing the drug; a user should be prompted to select or enter clinically relevant information such as the purpose of removing the drug, a code situation, and whether the patient is ventilated.

Best Practice 8

- Programmable infusion pumps with dose error-reduction systems should be used in all situations in which medications are infused by IV or epidural routes:
    - Should be used for medication infusions.
    - Maintain a 95% or greater compliance with their use.
    - Determine the monthly compliance rate for the use of smart-pump dose error-reduction software.
    - When programming allows and a loading dose is a portion of the continuous infusion, divided limits should be programmed separately for each dose.
    - Maintenance, updating, and testing of the software, drug library, and interoperability should be performed regularly on all smart infusion pumps, and resources should be made available as required.
    - Confirm compatibility between the smart pump drug library and the drug data and nomenclature (drug name, dosing units, dosing rate) in the electronic medical record.
    - Plan to use bidirectional smart infusion pumps that interface with the electronic medical record (automatic programming and documentation) and establish organizational expectations for medication and hydration infusions.

Best Practice 9

- Ensure that antidotes, reversal agents, and rescue medications are immediately accessible. These medications should be provided in standardized protocols and/or order sets that allow for emergency administration of all appropriate reversal agents, antidotes, and rescue agents used in the facility. Instructions for use should be made available in clinical areas that use high-risk medications.
    - To prevent injury in an emergency setting, determine which antidotes, reversal agents, and rescue medications can be given without delay.
    - After determining the list of these antidotes, develop standardized protocols or coupled order sets for their appropriate use.

Best Practice 11

- Workflow management systems should be utilized when compounding sterile preparations.
    - Sterile compounding should be minimized outside a pharmacy environment.
    - Technology usage should follow safe pharmacy processes.
    - For each technology, specific safety gaps should be identified with an action plan created to avoid errors.
    - An implementation plan should be created if a workflow management system is currently not being used.
    - A failure mode and effects analysis of the new system and workflow process should be performed before implementing compounding technology.
    - Enhance the manual process by using technology to assist with verification (for example, using barcodes, IV workflow software, or robotics).

Best Practice 12 (*Incorporated into Best Practice 15*)

- FentaNYL patches should not be ordered for patients with acute pain or opioid-naive patients.

Best Practice 13

- Injectable promethazine should be eliminated from the formulary.
    - Eliminate injectable promethazine from within the organization, including the pharmacy.
    - All clinical personnel should be aware that promethazine is classified as a nonstocked, nonformulary medication.
    - Medical staff should approve and create a policy for a different antiemetic as an automatic therapeutic alternative to convert to when promethazine is ordered.
    - Promethazine should not be available on ordering protocols, order sets, or medication order screens.
- Because an intramuscular injection (IM) of promethazine can inadvertently go intra-arterial and potentially cause tissue damage, this best practice also applies to IM injections.

Best Practice 14

- Develop a method of learning about medication risks and errors that have occurred outside your organization, and create practices in which you can identify vulnerability within your organization. Then, develop procedures that can prevent similar occurrences.
    - Appoint a single healthcare professional, such as a medication safety officer, to have oversight of activity within the hospital.
    - Utilize reputable resources to learn about external risks and errors.
    - Formally establish a process of monthly review of medication risks and errors reported externally, and have an interdisciplinary team or committee responsible for medication safety within your organization.
    - Determine appropriate actions to minimize risk, document decisions made, and gain approval as necessary.
    - Share external risk and error stories with staff, discuss current and new actions to prevent risk and error within your organization, and begin implementation.
    - Periodically monitor actions to ensure implementation and risk reduction occur within your organization, and share results with staff.

Best Practice 15

- Prior to ordering and distributing extended-release and long-acting opioids, determine and document the type of pain (acute versus chronic) and the patient's opioid status (naive versus tolerant).
    - When ordering extended-release and long-acting opioids, create a method in the order-entry system to ensure it will default to the lowest dose and frequency.
    - Due to age, kidney and liver impairment, or other narcotics ordered, dose modification may be needed for extended-release and long-acting opioids, and practitioners should be alerted.
    - Avoid prescribing fentaNYL patches in patients who are opioid-naive or in acute pain.
    - Avoid storing fentaNYL patches in clinical locations where acute pain is primarily treated, such as the operating room, emergency department, procedural areas, and post anesthesia unit.
- FentaNYL patches should be used only in the management of pain in opioid-tolerant patients.

  - Patches should be considered only when alternative treatment options have been proven inadequate, and the pain is severe enough to require daily, around-the-clock, long-term opioid treatment.
- Extended-release formulations should be used only to manage pain for which alternative treatments are inadequate and that is severe enough to require daily, around-the-clock, long-term opioid treatment.

Best Practice 16

- The override function on an ADC should be limited to a small number of medications.
- A medication order (either verbal, written, via phone, or electronic) should be required prior to removing any medication, including via an override, on an ADC.
- Override medications should be monitored to determine the appropriateness of the medication, that the order exists, the accurate transcription of the order, and that the medication was dispensed and documented correctly.
- Override medications should be assessed intermittently for appropriateness.
- Limit medications that can be obtained via override for emergencies (as defined by the organization) such as antidotes, lifesaving medications, reversal agents, and comfort measures (for intractable nausea and vomiting or acute pain).

Best Practice 17

- Safety measures in the use of oxytocin should be in place to prevent errors.
  - Provide a consistent method utilizing standard order sets for prescribing oxytocin antepartum and or postpartum to manage postpartum bleeding during labor induction/augmentation.
  - Oxytocin infusion bags should be available in one identical concentration for both antepartum and postpartum (e.g., 30 units in 500 mL Lactated Ringers).
  - Standardize the system of oxytocin delivery in terms of concentration, dose, and infusion rate. The smart infusion pump dose error-reduction system should be supported by the method in which the oxytocin dose rate is ordered (e.g., milliunits/minute).
  - Ready-to-use oxytocin infusions should be available and marked boldly on both sides of the bag, so they cannot be mistaken for hydrating fluids or magnesium infusions.
  - Before an oxytocin order is given or required, infusion bags should not be brought to the bedside.

Best Practice 18

- The use of barcode authentication for dispensing medications and vaccinations should be increased beyond the inpatient arena.
  - Special consideration should be given to clinical areas in which limited patient stays occur frequently, such as the emergency department, radiology, dialysis, cardiac catheterization suites, labor and delivery areas, infusion centers, perioperative areas, and outpatient arenas.
  - Quality assessment of the use and effectiveness of safety technology, such as scanning consistency and alarm responsiveness vs. evading, should be reviewed regularly for compliance.

Best Practice 19

- High-alert medication should have a multiple-layer approach throughout its utilization process to improve safety measures.
    - Medications on the high-alert list in an organization should have multiple actions along the course of their use to decrease the risk of error.
    - All clinical professionals, such as practitioners, nurses, and pharmacists, involved in the medication administration practice should be affected by the strategies created at the susceptible points of medication use (ordering, delivering, administering, and observing).
    - Prevent errors by developing combined mid- and high-level risk tactics along with low-level risk-reduction approaches (e.g., providing education, high-alert labels on pharmacy bins, etc.).
    - High-alert medications that are at the highest risk for error should require independent double-check systems, but these should be limited (e.g., intravenous insulin, heparin infusions, chemotherapy, opioid infusions).
    - Both internal and external resources should be used to assess procedures of and risks to safe medication use in an organization on a regular basis.
    - Assess risk-reduction strategies by collecting outcome data to determine their safety and effectiveness.

New Best Practice 20

- Safeguard against tranexamic acid wrong-use errors.
    - Prior to medication administration, utilize barcode-assisted medication safety checks.
    - Utilize premixed intravenous bags, rather than vials of tranexamic acid.
    - Avoid tranexamic acid storage in an anesthesia tray.
    - Store tranexamic acid away from local anesthetics; ensure vials are stored in a way that the label is always visible; consider labeling vial caps with an auxiliary label that states "**Contains Tranexamic Acid.**"

New Best Practice 21

- Implement strategies within the organization to prevent medication errors throughout the continuum of care.
    - Obtain accurate medication lists upon admission and include allergies, over-the-counter medications, herbal supplements, and non-enteral medications.
    - Evaluate that the medications and doses ordered for the patient are appropriate for the patient's state of health.
    - Ensure providers perform appropriate medication reconciliations and modifications to current therapy upon admission, each level of care change, and at discharge.

New Best Practice 22

- Safeguard against vaccine administration errors in healthcare settings.
    - Provide healthcare staff with ongoing education about vaccines, including selection, administration, monitoring, and storage.
    - Use standardized order sets. Require an order prior to vaccine administration and avoid using abbreviations.
    - Verify patient information, including immunization status, prior to providing vaccines.

- Provide vaccine education and information to patients, caregivers, and family members prior to vaccination.
- Store two-component vaccines together, and separate stored vaccines based on formulation and type.
- Utilize barcode scanning technology to verify the correct vaccine and dose is being delivered.
- Document the vaccine's lot number, national drug code, and expiration date prior to administration; document administration in the electronic health record.

Archived Best Practices

"Archived" best practices remain important but allow for attention to be paid to new and other best practices not readily implemented. All archived best practices will keep their original number and be cataloged after the unarchived new best practices.

Best Practice 4 (*Moved to Archived Status in 2022*)

- Oral liquid medications need to be delivered in unit-dose packaging, whenever possible, or they should be distributed in an oral or enteral syringe by a pharmacy that meets the International Organization for Standardization (ISO) 80369 standard:
  - Bulk oral liquid medications should not be available on patient care floors or departments.
  - Use only oral syringes labeled "Oral Use Only."
  - Even when using ISO 80369 syringes, always add a label or highlight that they are for oral use only.
- Ensure that parenteral tubing is not compatible with oral or enteral syringes within the organization. (Exception: Some pharmacies may only use oral liquid medications in unit-dose cups and bottles. In these cases, patient care floors or departments should be supplied with ISO 80369 syringes for patients who unable to swallow from a cup or bottle.)

Best Practice 5 (*Moved to Archived Status in 2022*)

- The metric unit should be labeled on oral liquid-dosing devices (cups, bottles, syringes).
  - Upon discharge, teach patients who use oral liquid-dosing devices to ensure that the devices use measurements in milliliters (mL) only.

Best Practice 6 (*Moved to Archived Status in 2020*)

- Glacial acetic acid should not be available in any area of the hospital.
  - Replace it with vinegar (5% solution) or commercially available, diluted acetic acid 0.25% (for irrigation) or 2% (for ear use).

Best Practice 10 (*Moved to Archived Status in 2020*)

- Remove all 1,000 mL (1L) bags of sterile water from any area outside the pharmacy.
  - Create a different process for making sterile water available in clinical areas that need it for irrigation, inhalation, or injection, such as 2,000 mL (2 L) bags, bottles or vials of sterile water.
  - Create a policy that states that only the pharmacy can order 1,000 mL (1 L) bags of sterile water.

- Collaborative efforts need to occur between the pharmacy and appropriate clinical areas or departments, such as respiratory therapy, to develop procedures for safe patient care when large volumes of sterile water are required.

Additional Reading

- Institute for Safe Medication Practices. (2024). *2024–2025 ISMP targeted medication safety best practices for hospitals*. Retrieved September 2024 from https://www.ismp.org/guidelines/best-practices-hospitals (Level VII)