

## Tips for Preventing Medication Related Prescribing Errors

- Use at least 2 patient-specific identifiers to help ensure the right patient.
  - **Example:** Tizanidine ordered for and administered to the incorrect patient resulting in the patient becoming very sleepy requiring AVAPS while asleep.
- Perform a thorough medication reconciliation (e.g., admission, transfer, discharge): review the patient's existing drug therapy, including any over-the-counter medications or herbal or dietary supplements. Double check that the correct formulation is documented and prescribed for medications with multiple formulations (IR, SR, CR etc.) available.
  - **Example:** Patient missed 2 days of sildenafil due to it being missed during the home medication reconciliation process.
- Identify patient drug allergies and inquire about any changes at each encounter. For patients with allergies to dyes or ketogenic diet consult pharmacist for review of excipient ingredients.
  - **Example:** Contraindicated medication (diphenhydramine oral tab) prescribed, verified, and administered to patient with documented red dye allergy due to care team lack of awareness that red dye is an excipient in this product and lack of allergen alert in EHR for this product.
- Confirm that the patient's weight, in kg, is current and correct for weight-based dosages. Ensure doses are updated as children grow and their weight or dosing schedule changes. Use the correct weight scale when prescribing medications to underweight or obese patients.
  - **Example:** Patient underwent sedation for reduction of right distal displaced closed radius fracture and ketamine for sedation was dosed off actual body weight instead of ideal body weight. The patient experienced prolonged apnea and desaturations in the ED requiring positive pressure ventilation.
- Max out per kg doses to adult max doses or capped doses when appropriate.
  - **Example:** Supratherapeutic doses of midazolam continuous infusion and bolus doses ordered and administered over 15 hours (total dose received = 273 mg) due to orders being placed as per kg without maxing out doses in adult sized patient; patient experienced over sedation, bradycardia (lowest HR = 38) and hypotension (lowest BP = 72/49).
  - **Example:** wrong dose of preoperative midazolam prescribed and given (31 mg vs. 20 mg) due to order being placed as mg/kg and Epic not prompting that the dose exceeded recommended max single dose for indication, subsequently the patient experienced prolonged somnolence with minimal to no response to verbal or physical stimulation, hypotension (79/33) and respiratory depression requiring 6L O<sub>2</sub> by simple mask respiratory support.
- Avoid the use of a terminal zero to the right of the decimal point (e.g., use 5 rather than 5.0); always use a zero to the left of a dose less than 1 (e.g., use 0.1 rather than .1) to minimize 10-fold dosing errors.
  - **Example:** clobazam ordered as 1.2575 mg/kg/dose instead of intended 0.125 mg/kg/dose and the patient needed to be placed on pulse ox overnight to monitor for respiratory depression.
- Avoid abbreviations, especially as related to drug names (e.g., MS can mean morphine sulfate or magnesium sulfate).
- Beware of dose calculation errors. For example, misinterpreting recommended pediatric dosing schedules e.g., being asked to prescribe an anticonvulsant as 20mg/kg/day (i.e., in divided doses), but prescribing 20mg/kg as a single dose.
  - **Example:** Wrong dose of IVIG (2 g/kg vs. 1 g/kg) ordered and administered to a patient due to misunderstanding of consulting service recommendation which was 2 g/kg divided over 2 days vs. 2 g/kg/dose x 2 days); subsequently the patient experienced aseptic meningitis syndrome presenting as backache, headache, and multiple episodes of emesis, requiring treatment.

- **Example:** Wrong initial dose of ketamine started (0.1 mg/kg/hr vs. 1 mg/kg/hr) for status epilepticus management potentially due to a decimal point error
- Always prescribe doses by weight (i.e., mg, mcg) and not volume (mL), especially important where multiple solution strengths/concentrations exist.
  - **Example:** The patient's clonidine home dose was documented in the medication history with the incorrect concentration and dose in terms of mLs only. The inpatient and outpatient prescriptions were both ordered based on incorrect dose in medication history resulting in a 10-fold supratherapeutic dose being given during admission and subsequently at home post discharge. The patient experienced increased sleepiness and soft blood pressures throughout admission and post discharge resulting in an ED visit.
  - **Example:** Wrong dose of zonisamide 500 mg given x 2 vs. 50 mg due to the titration instructions provided in mLs only and not updated when notified that a different concentration was compounded. Subsequently, the patient experienced lethargy, abnormal gait, slurred speech, and missed school.
- Help avoid errors with look-alike / sound-alike medications by including an indication. This indication can then be used by all multi-disciplinary care team members to ensure the correct drug and dose has been prescribed, dispensed, and administered.
  - **Example:** Wrong medication (diazoxide vs. acetazolamide) was ordered, verified by pharmacy, and administered x 2 doses due to the use of brand name in consult note contributing to a look-alike / sound-alike error at prescribing (searching Diamox in EHR).
  - **Example:** The patient received an incorrect medication (clonazepam vs. clobazam) resulting in a supratherapeutic dose of clonazepam (10 x normal dose). Subsequently the patient experienced desaturations requiring oxygen and an increased length of stay s/p adenoidectomy.
- Avoid use of verbal orders whenever possible. If verbal orders are to be used, spell out common error words (e.g., always say 'one five' for 15 or 'five zero' for 50) and require a 'read back' of what was verbally ordered to ensure the recipient correctly understood.
  - **Example:** Wrong dose of hydromorphone bolus X 2 (0.6 mg in 10 kg pt) directed verbally by provider after patient's continuous infusion ran dry and dose had to be drawn up from vial; subsequently patient experienced transient hypotension (BP = 67/36).
- Discuss medication changes with nursing and other appropriate staff and families.
  - **Example:** Changing a preparation to a different strength or schedule, but not telling the parents can result in the incorrect dose of medication being administered.
- When possible, speak with the patient or caregiver about the medication that is prescribed and any special precautions or observations that should be noted, such as allergic or hypersensitivity reactions.
  - Encourage patients and families to ask questions about all medications ordered.
- When changing the frequency of an order double check the start time of the next order to avoid duplicate or omitted doses – communicate with the RN if a due time is imminent.
  - **Example:** Omission of scheduled oxycodone doses for 12 hours when frequency was changed from Q4 HS to Q6hrs due to incorrect start time of new order resulting in worsening withdrawal symptoms.
- When prescribing maintenance IV fluids double check the components to ensure nothing is unintentionally left out or contraindicated.
  - **Example:** When changing fluids to a higher dextrose concentration the sodium chloride component was left out resulting in hyponatremia.
  - **Example:** Wrong maintenance IV fluids were ordered and administered (LR vs D5LR) for 12 hours - no dextrose containing fluids given while NPO when MIVFs changed due to hyperchloremic metabolic acidosis while the patient was on D5NS; patient experienced severe hypoglycemia (BG - 28) with lethargy and diaphoresis.
- Discontinue medications no longer indicated in a timely manner from the active medication orders so that they are not given in error.

- **Example:** Duplicate maintenance fluids due to D5W-LR MIVF not being discontinued when new TPN started resulting in the patient receiving 45 mL/hr for 10 hours extra fluid; patient experienced fluid overload with pulmonary edema and significantly increased left pleural effusion with mass effect on the mediastinum.
- With patient condition changes re-evaluate all active medications to ensure that they are still indicated and not contraindicated.
  - **Example:** Hydromorphone and midazolam continuous infusions were continued despite the patient being extubated in the OR, the patient required several doses of naloxone and increased respiratory support.
  - **Example:** Inappropriate continuation of celecoxib after the patient developed gastritis and occult + stool; patient experienced a GI bleed with tarry, dark stools.
- Timing of transitions from continuous insulin (either from a home pump or from DKA continuous infusion on hospital pump) to long-acting insulin is critical. Ensure that all team members are on the same page about how to transition.
  - **Example:** Insulin glargine was not started for 16 hours after home continuous insulin pump was stopped due to psychiatric admission and patient had hyperglycemia with ketonuria (greater than 80) that had to be treated with several additional doses of insulin lispro.
- Ensure that all orders relevant to intake management are updated and accurate each day to avoid conflicting or outdated information. Do not place additional nursing communication orders for this information, instead use the intake management order.
  - **Example:** The wrong rate of TPN was given X 13 hours due to a nursing communication order not matching the intake management order details and the patient had worsening edema and weight gain.
- For GIR dependent patients ensure that they do not experience a break in their GIR, partner with nursing when there are issues with access or equipment malfunctions for these patients. Ensure that the GIR is adequate for all fluid orders.
  - **Example:** Wrong dose of dextrose in maintenance IVF in TPN dependent patient (D5 vs. D10) for 18 hours.
- Plan ahead and communicate with nursing and any consulting services for when patients will have a potentially painful or anxiety provoking procedure completed outside of procedural sedation to ensure that medications are ordered and available to be given prior to start of procedure.
  - **Example:** Omission of pain medication and nerve block prior to leg manipulation for splint due to lack of care coordination, patient was in distress, crying and yelling during splint with difficulty calming after (FLACC = 9-10).
- When clicking the “include now” button on an order evaluate the timing of any past doses and the subsequent doses to ensure that doses are not given too close together.
  - **Example:** Wrong timing of initial captopril dose due to "include now" button checked upon order entry (doses given at 1700 and 2100). Subsequently, patient experienced hypotension requiring a dose reduction for subsequent doses to preclude further hypotension.
- When ordering medications ensure that the “for \_\_\_ doses” section of the order is correct, especially when re-ordering a medication or using order sets with defaults for number of doses. If the medication is meant to be continued indefinitely, ensure that this field of the order is blank.
  - **Example:** Omission of Q8h sildenafil x 10 doses due to order inadvertently being placed to complete after 8 total doses; subsequently the patient experienced pulmonary hypertensive crisis requiring treatment with inhaled nitric oxide and escalating oxygen support.