ADDITIONAL BACKORDER GUIDANCE

ACTIVE

ATIVAN SHORTAGE Fall 2025 - expected return ~December 2025

- **Adult use limited to:**
  - **Treatment of active seizures**
  - **For palliative care/end-of-life (use midazolam where possible - e.g. ICU, IV infusion)**

*No restrictions apply to pediatric patients at this time

Alternatives - We have an adequate supply of:

- Oral LORazepam
- Diazepam oral and injection (although supply has dropped sharply)
- Midazolam injection (in approved settings)
- Phenobarbital oral and injection for alcohol withdrawal (also limited supply)

Common benzodiazepine equivalents:

- LORazepam 1 mg IV/IM ~ LORazepam 1 mg PO/SL soln (approved for automatic interchange when ordered pre-procedure)
  - NOTE: The oral concentrate solution may be given sublingually
- LORazepam 1 mg IV/IM ~ ALPRAZolam 0.5 mg PO
- diazePAM 5 mg IV/IM ~ LORazepam 1 mg IV/IM
- LORazepam 1 mg IV/IM ~ midazolam 1-2 mg IV/IM
  - A dosing range of midazolam of 2 mg-5 mg IV has been found to be effective, but it is generally recommended to start with the lower end of the range for most indications (unless patient is being intubated or in surgery)

A few notes about using midazolam:

- Midazolam IV push is restricted to ICU patients and procedural areas (intubated).
- Midazolam infusions may be given outside the ICU for end-of-life comfort measures (see Injectable Benzodiazepine Guidelines and the Titration and IV Medication Use Guidelines)
- It has a quicker onset and shorter duration than LORazepam which should be kept in mind based on indication (e.g. midazolam should not be given prior to patient transport to procedural area due to the risk of respiratory depression)
- It is a highly lipophilic drug compared to other benzodiazepines which can lead to more CNS depression
- Use caution in special populations like the elderly, obese, and patients with altered kidney or hepatic function, half life is increased

For more information see the comprehensive guide linked below:
LORazepam Drug Shortage Alternatives Jan 2024.

Erythromycin injection

- National backorder (currently 10 day supply), expected to be available again in November-December 2025, commonly used for GI motility. We do have an adequate supply of oral erythromycin.
    - Alternatives:
        - **Metoclopramide** – Effective prokinetic agent; please be mindful of CNS side effects, including the risk of tardive dyskinesia with long-term use.
        - **Azithromycin injection** – An off-label alternative for GI motility; note that it carries a warning for QT interval prolongation.
        - **Diet modification** – Please consider non-pharmacological strategies where appropriate.

Penicillin G Benzathine (Bicillin L-A)

- Effective immediately, Penicillin G Benzathine **(Bicillin® L-A)** injectable suspension will be restricted at HH Main, HH W&C, and Madison Hospital to the use in patients with **confirmed congenital syphilis and syphilis in pregnancy** (risk of congenital syphilis) due to manufacturer recall and extremely limited supply.
    - Alternatives:
        - Doxycycline 100 mg PO BID x 14 days
        - Ceftriaxone 2 g IM or IV for 10 to 14 days

Meperidine (Demerol) Long Term Backorder (2028) Management

- Currently removed from all PACU and other perioperative/postoperative powerplans.
- For replacement of meperidine for **postoperative shivering**, recommendations are as follows:
    - **Dexmedetomidine (Precedex)** 0.3 mcg/kg IV Push administered over 2 minutes
    - Ketamine 0.2 mg/kg IV Push administered over 2 minutes (back up alternative)
    - Dexamethasone 0.1 mg/kg IV Push (postoperative shivering prophylaxis only)
- **Dexmedetomidine (Precedex)**
    - When compared to placebo, Precedex shows significant efficacy but when compared to meperidine there are concerns for potential adverse events. It acts on the alpha-2 adrenergic receptors in the brain to lower vasoconstriction threshold to hold heat and promote sympathetic nervous system activity. Due to this reduced sympathetic outflow, potential negative effects such as hypotension and bradycardia can occur. In patients without concern for hypotension (<90 SBP) or bradycardia (<60 bpm), Precedex would be a suitable alternative to Demerol. Precedex should be given as a single dose at 0.3 mcg/kg administered over 2 minutes. **Use with caution in patients with cardiovascular disease or diabetes**; cardiovascular adverse events (hypotension and bradycardia) may be more pronounced.
    - PACU is currently using Precedex most often as an alternative, and this is loaded in their Pyxis.
- Ketamine (back up alternative)
    - Ketamine controls shivering by its effects on the hypothalamus and the alpha-adrenergic effects. It is less likely to cause hypotension and bradycardia due to the increased sympathetic nervous system stimulation but displays less efficacy in treating postoperative shivering. Therefore, ketamine should be reserved for patients with concern for hypotension and bradycardia. Ketamine should be dosed at 0.2 mg/kg administered over 2 minutes. Ketamine is contraindicated in patients with a thyroid disorder or receiving a thyroid medication due to an enhanced sympathomimetic effect.
    - Ketamine can be used if a patient cannot tolerate Precedex, but per our policy, **it may only be administered by a provider (physician, CRNA, etc.)**.

- For preventing post-surgical shivering, dexamethasone 0.1 mg/kg can be used before induction of anesthesia. A study from 2013 concluded that dexamethasone results in increased central and peripheral body temperatures during and post procedure. Pre-treatment with dexamethasone showed the shivering rate decreased to 10% of patients, while the shivering rate with meperidine was 37.5% and placebo was 47.5%. Dexamethasone acts by decreasing the temperature gradient between core and skin due to its anti-inflammatory effects and inhibition of release of vasoconstrictors and pyrogenic cytokines. Dexamethasone is used for postoperative shivering prophylaxis only.
- For replacement of meperidine for **sickle cell crisis,** recommendations are as follows:
    - IV morphine (0.1 – 0.15 mg/kg; max initial dose 10 mg) or IV hydromorphone (0.02 – 0.05 mg/kg; max initial dose 1.5 mg)
    - IV fentanyl (0.5 mcg/kg bolus every 10-15 mins as needed)
    - IV Ketamine (0.3 mg/kg in 100 ml NS over 30 minutes; 0.1-0.3 mg/kg/hr with max of 1 mg/kg/hr)
- For the replacement of meperidine for pre-procedural sedation, recommendations are as follows:
    - Midazolam IV (0.5-2.5 mg)
        - Onset of 1-5 minutes; repeat every 2 to 5 minutes until desired effect achieved
    - Fentanyl IV (0.5-1 mcg/kg up to every 2 mins until desired effect achieved; max total dose 250 mcg per procedure/to achieve sedation)
    - Morphine IV (2 -10 mg)
        - Onset of 5 to 10 minutes; repeat 2-4 mg every 1 to 2 hours for maintenance if needed
    - Propofol IV (0.5-1 mg/kg initial; 0.25-0.5 mg/kg up to every 1-3 minutes until desired effect achieved)
    - Ketamine IM/IV (4-5 mg/kg IM single dose; 1-2 mg/kg IV)
        - IM onset of 5 minutes, repeat 2-5 mg/kg after 5 to 10 minutes until desired effect; IV onset of 30 seconds, repeat 0.5-1 mg/kg every 5 to 10 minutes if sedation is inadequate or for longer procedures
    - Dexmedetomidine IV (0.5-1 mcg/kg loading dose over 10 minutes; followed by 0.2-1 mcg/kg/hour continuous; titrate to desired level of sedation)
    - Melatonin 3 mg SL or 3-10 mg PO given 90 minutes prior to procedure; repeat dose after 60 minutes if desired effect is not achieved
    - Oral Benzodiazepines: Midazolam (7.5 mg), Lorazepam (1-2 mg), Diazepam (2-10 mg)
        - Give 30-60 minutes prior; if desired effect is not achieved repeat after 30-60 mins (Lorazepam and Diazepam should be given at 50% of initial dose)

RESOLVED/ARCHIVED

(RESOLVED) BULK Methadone oral liquid (10 mg/5 mL) shortage

- Effective immediately, please **convert all orders for methadone oral liquid in ADULTS over to oral tablets** unless the patient cannot tolerate tablets. Tablets available in 5 and 10 mg

(RESOLVED 7/2/24) IV ACYCLOVIR SHORTAGE MANAGEMENT

- See the guidance document sent out by AMT linked below:
    - Updated IV Acyclovir Shortage Management

(RESOLVED) Alteplase (CATHFLO) Shortage

- There is currently a shortage of Cathflo 2 mg vials and we have almost exhausted our supply. This shortage will last several weeks.
- PSP has added a batch recipe for alteplase 2 mg syringe preparation in Pharmacy Keeper.
    - PSP will utilize the 50 mg vial size of alteplase as our stock solution.
    - Once we draw the 2 mg syringes, we will need to take them to Central Pharmacy to be stored in the freezer.
    - The BUD when frozen is 14 days. Once thawed the BUD drops to 48 hours.
- The supply of 50 mg and 100 mg vials are equally hard to procure, so we need to avoid as much waste as possible.
- Currently evaluating other alternatives

(RESOLVED) IRON SUCROSE (VENOFER) SHORTAGE:

- We now have Ferrlecit in stock. It will be stored in PSP.
- Venofer stock has been pulled from Pyxis and the remaining stock is in PSP.
- The preferred products listed below in David's email are NOT automatic interchanges at this time, with the exception of unattached dialysis patients (this is an automatic interchange; see below*). All other interchanges will require an order from the provider.
- Ferrlecit will be the preferred alternative for unattached dialysis patients due to the complications of the iron dextran test dose process.
    - See FormWeb: 100 mg of Venofer = 125 mg of Ferrlecit
- Iron Dextran (Infed) requires a test dose to be given and the patient be evaluated for 2 hrs before the full dose can be given. Typical dosing is 25 mg test dose then 975 mg 2 hrs later for a total of 1000 mg.
- *General Iron Replacement Dosing Rationale: Normally ~1000 mg TOTAL dose for all preparations
    - Iron sucrose (Venofer) = generally administered in multiple doses of 100 mg to 500 mg for a total of 1000 mg.
    - Iron dextran (Infed) = generally administered in a single dose of 1000 mg (25 mg test dose + 975 mg infusion) OR multiple doses of 100 mg. For inpatients, wait to verify the infusion until after the test dose monitoring period is complete to ensure the patient tolerated it.
    - Ferric gluconate (Ferrlecit) = generally administered in multiple doses of 125 mg to 250 mg for a total of 1000 mg

***Unattached Dialysis Patients Clarification**

- Nephrology has approved the use of Ferrlecit in place of Venofer for the unattached dialysis patients.
- Dialysis RNs have been instructed to continue to follow their standard process for ordering Venofer as the medical management is protocol- and policy-driven in these patients.
    - You should see iron replacement ordered as Venofer, especially for new starts.
    - This creates a documentation trail showing RNs were following their policy.

- The verifying pharmacist may then change the Venofer order to Ferrlecit following our Drug Shortage Mitigation Strategy.
- Iron doses at future encounters may be entered by the RN either as:
    - Venofer (standard practice) with the pharmacist again interchanging OR
    - Ferrlecit following the dosage guidance provided at initiation of therapy

*These recommendations will not apply to every situation and are intended to familiarize you with products you may have never seen or dealt with before. Please use your clinical judgment, your references, and each other to evaluate each individual situation.

(ARCHIVED) ATIVAN SHORTAGE:

Update 8/1/24

- Normal use of Ativan IV may resume with the exception of continuous IV infusions

Update 2/1/24

Based on our current stock of lorazepam and some clinical situations that have arisen over the last few weeks, we have decided to **update the restrictions** for the use of **IV lorazepam** as follows:

- **Seizures**
- **End of life comfort measures** (compassionate extubation, imminent end of life comfort): Please **communicate with nursing staff and/or MDs about limiting use** and transitioning to drips if prolonged use needed (>4 doses or >24 hrs). If more doses are needed, MDs **should consider switching to midazolam gtt per the Taper and Titration Guidelines**

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Recommended alternative agents for **pediatric patients** based on the indication:

- LORazepam for sedation/anxiety
    - NICU - midazolam
    - PICU/Peds ED - midazolam or PO LORazepam
    - Peds floor - PO LORazepam or IN midazolam
- LORazepam for agitation - OLANZapine or PO LORazepam
- diazePAM for muscle spasms - PO LORazepam or Robaxin

Please use clinical judgment when converting between benzodiazepines. A conservative conversion may be appropriate in certain patients (especially those on the floor) and the oral route is preferred when possible.

Feel free to reference this online conversion calculator (https://clincalc.com/Benzodiazepine/) if you desire and, as always, cross check with multiple sources when asked for clinical recommendations.

For more information see the comprehensive guide linked below:
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