

## **Injectable Opioid Shortage: February 27, 2018**

Beginning approximately June 2017, the supply of hydromorphone injection started to become an issue across the U.S. due to demand exceeding supply per most manufacturers. At least one manufacturer has discontinued hydromorphone production for marketing reasons, contributing to supply and demand issues. Another manufacturer reported issues with prefilled syringes at a manufacturing facility — these issues have also impacted morphine prefilled syringes.

Estimated resupply dates for both morphine and hydromorphone are variable, with some supply potentially returning in March through April 2018, but full restoration of supply may not occur until June 2019. Estimated resupply dates for fentanyl may be as early as late February 2018.

**Mercy Medical Center (MMC) has reached a critical low supply of hydromorphone (Dilaudid) injection and there is limited allocation currently available for purchase/distribution.**

**Last week the following actions were taken:**

1. Hydromorphone injection was restricted for use in the OR and PACU areas only.
2. Providers were encouraged to reserve all other injectable opioids for patients who are strictly NPO.

**The EPIC LMA that exists on the hydromorphone injection order will be updated Wednesday, Feb. 28, to reflect the following FOR ADULTS ONLY:**

In the event that an adult patient's clinical condition requires the use of an injectable opioid, and morphine is not an option, the following options may be utilized (please cancel the current order and enter a separate order).

1. Fentanyl 25 mcg every 1 hour PRN severe pain.
2. Hydromorphone PCA (utilize PCA order set).

**Fentanyl administration restrictions based upon patient location have been temporarily lifted. The attached flyer was developed for communication to nursing staff.**

**Additional Resources:** Equianalgesic Dosing Chart is available on the Portal. Go to Portal>Pharmacy>Nursing Staff Resources>Equianalgesic Dosing Chart.

**Current Opioid Supply Assessment:**

### **Hydromorphone**

- MMC has approximately a 12-day supply on hand (using both concentrations) of injectable hydromorphone. A small allocation from the manufacturer is expected to release on Tuesday, Feb. 27.

### **Morphine**

- MMC has approximately a 60-day supply of injectable morphine at this point. A transition of all hydromorphone use to morphine use will result in slightly less than a month's supply on hand.
- Supply availability from our wholesaler is limited. We have been receiving intermittent allocations that have allowed us to keep up with current demand.

### **Fentanyl**

- MMC has approximately a 60-day supply (inclusive of all sizes of fentanyl) currently.
- Supply from the wholesaler is limited. We have been receiving intermittent allocations that have allowed us to keep up with demand.

**Pharmacy will continue to assess this shortage on a daily basis and provide updates as they become available. Thank you for your cooperation and attention.**



## Intravenous Fentanyl for Adults

February 27, 2018

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2. Hydromorphone PCA (utilize PCA order set).

**Patient location restrictions for use of IV fentanyl have been lifted, during this critical shortage period, fentanyl IV will be available for pain control throughout the hospital.**

**What do you need to know to safely administer Fentanyl IV?** All opioids, including fentanyl are high risk medications. Fentanyl is an opioid agonist that binds with receptors at many sites within the CNS, increases pain threshold, and alters pain perception.

Fentanyl will be stocked into the AcuDose upon pharmacist order verification.

- **Dose: 25 mcg IV q1h prn severe pain.**  
**Important: This will be a FRACTION OF THE VIAL**
  - Currently we have 50 mcg/ml vials, in the future we may be using ampules.
    - Remember to use filter needles if drawing up from an ampule.
- **Administer IV slowly over 1 to 2 minutes;** rapid IV infusion may result in skeletal muscle and chest wall rigidity, impaired ventilation, or respiratory distress/arrest.
- Onset of action: almost immediate, but maximal analgesic and respiratory depressant effects may not be seen for several minutes.
  - Duration of action: 30 to 60 minutes

**Important nursing considerations regarding any opioid administration:** Reassess pain. Monitor blood pressure, CNS and respiratory status, mental status and over-sedation.

**REMEMBER: Use of oral agents is highly encouraged, monitor closely and encourage the provider to change patient to oral pain management agents as soon as appropriate, or if oral order already exists for the patient nurses may utilize oral analgesics when appropriate.**

**Additional Resources:** Equianalgesic Dosing Chart is available on the Portal. Go to Portal>Pharmacy>Nursing Staff Resources>Equianalgesic Dosing Chart.

# NATIONWIDE IV FLUID SHORTAGE

## MANAGEMENT BULLETIN

### UPDATE FEBRUARY 27, 2018

**Hospitals across the country are experiencing shortages of ALL IV FLUIDS** as a result of several natural disasters, including the hurricane in Puerto Rico (where several manufacturers reside). Production of commonly utilized IV solutions (e.g., saline and dextrose) has been impacted, constraining the supply across the United States. Resolution of the shortage is expected in Spring 2018.

Mercy utilizes IV solutions for the compounding of many medications, including antibiotics, supportive infusions and hydration. To help conserve our supplies during the national shortage, Mercy implemented new clinical protocols as needed for medication delivery systems and the use of alternative therapeutic medications.

The supply chain for small volume IV piggyback bags (50 mL and 100 mL) has improved over the past few weeks. At the same time, the supply of 20 mL and 30 mL syringes has been constrained due to the number organizations who adopted similar conservation strategies (delivering medications as IV Push vs. IVPB).

In response to ongoing monitoring, the **following changes will be made effective Wednesday, Feb. 28:**

- The following medications will be supplied in small volume IV Mini-Bags/Duplex Bags instead of IV Push:
  - **Meropenem 500 mg** (Merrem)
  - **Ceftriaxone 1 GM and 2GM** (Rocephin)
  - **Ertapenem 1 GM** (Invanz)
- The following medications will be supplied as Mini-Bags/AddEase instead of admixtures:
  - **Ampicillin 2 GM**
  - **Ampicillin/Sulbactam (Unasyn) 1.5 gm**
  - **Ampicillin (Omnipen) 1 gm**
- **The “dispensable” for orders of the above medications will be changed by pharmacists on Wednesday.**
- **Digestive Health ONLY:** Currently there is a **3 day supply of D5 1/2NS 500 mL bags**. In the event this supply is depleted, the previously agreed alternate for ordering is **LR 500 mL**.

**Everyone’s assistance and agility over these past months has been appreciated.** As we continually assess the IV fluid shortage, other medications may be able to be converted back to IVPB administration from IVP administration. **Your dedication to supporting the best patient experience through *The Mercy Touch* is greatly appreciated!**

## Previous Announcements

10/19/17

- **NS 250 mL bags** are in short supply. During this shortage, Materials Management will stock reserve NS 250 mL bags for Pharmacy only for compounding medications. ~~100 mL bags will be used for “chasers”/flushing of IV tubing lines.~~ **Exception: CV Lab will be supplied 250 mL bags for emergent isoproterenol administration.**

11/3/17/Reversed 2/21/17

### ~~IV Mini-Bag fluid for Piperacillin/tazobactam (Zosyn):~~

- ~~Providers who order piperacillin/tazobactam (Zosyn) will be prompted in EPIC to order cefepime (Maxipime) +/- metronidazole (Flagyl) +/- vancomycin depending on the type of infection.~~
- ~~Cefepime (Maxipime) 1 gm doses will be delivered as a 10mL IV solution in a syringe to be given via slow IV Push over 3-5 minutes to avoid potential adverse reactions.~~
- ~~Flush the IV line after administration of all IV Push medications~~
- ~~Patients who are currently prescribed Zosyn will continue to receive Zosyn until all Mini-Bags are depleted. At that time, a pharmacist will contact the provider with recommendations for de-escalation or to change orders to the first bullet point.~~

### Other affected IV fluid bags:

- ~~**Meropenem (Merrem) 500 mg** Mini-Bags are no longer available. Doses will be dispensed from Pharmacy for IV Push administration. Meropenem will be supplied in a 10mL syringe to be given via slow IV Push over 3-5 minutes. Flush IV line after administration.~~
- ~~**Ampicillin 2 GM** Mini-Bags are no longer available for **ENDO** and **Pre-op**. Doses will be sent from the pharmacy in a 100mL NS bag.~~
- **Cefazolin (Ancef) 2 GM** bags are no longer available.
  - **OB Anesthesia:** Anesthesiologists will reconstitute cefazolin vials and administer via IV Push for c-sections.
  - **Plaza Dialysis & Cath Lab/Angio:** Nursing staff will administer two 1 GM premix bags of cefazolin IV for a 2 GM dose.
- **Doxycycline EPIC LMA (message) for Providers**  
*Due to ongoing nationwide shortage of IV fluids, we are requesting that the use of IV Doxycycline be restricted to patients who are strictly NPO. For patients able to take PO medications, please use the doxycycline PO order listed below.*

11/8/17

### HPCC

- **Dexamethasone** (Decadron), **famotidine** (Pepcid), **diphenhydramine** (Benadryl) will be administered IV Push over 3-5 minutes. Flush the IV line after administration of all IV Push medications.
- Alternatively, **dexamethasone** will be added to the ondansetron (Zofran) or palonosetron (Aloxi) IVPB bags for administration.

## Anesthesiology/OR

- **Tranexamic Acid for total joint surgery:** Anesthesiologists will administer via slow IV Push. Recommended IV Push rate is 100 mg/min. Tranexamic acid will be added to the AnesthesiaRX machines in OR Rooms 10, 12, 14, 5 and 6 and the CUR AcuDose.
- **Aminocaproic Acid (Amicar) shortage:** Aminocaproic acid is on shortage due to manufacturing delays. The estimated resolution is late December 2017. Once aminocaproic acid is unavailable for open heart surgery, tranexamic acid will be added to the OR CUR AcuDose, the perfusion kit, and the AnesthesiaRX machine in OR 19. Anesthesiologists will administer the required dose(s) via slow IV Push.

11/15/17

## HPCC/Inpatient Oncology Patients

- **Palonosetron (Aloxi)** will be administered IV Push over 30-60 seconds. Flush the IV line after administration of all IV Push medications.

## IV Mini-Bag Fluid for:

- ~~**Ampicillin/Sulbactam (Unasyn) 1.5 gm** Mini-Bags will no longer be available for stocking in Pre-Op. Once the current supply of Mini-Bags is exhausted, doses will be sent from Pharmacy in a 50 mL NS bag.~~
- ~~**Ampicillin (Omnipen) 1 gm** Mini-Bags are will longer available for stocking in Pre-Op. Once the current supply of Mini-Bags is exhausted, doses will be sent from Pharmacy in a 50 mL NS bag.~~
- ~~**Ertapenem (Invanz) 1 gm** Mini-Bags are will no longer available for stocking in Pre-op and ED. Once the current supply of Mini-Bags is exhausted, doses will be sent from Pharmacy in a 50 mL NS bag. See 11/27/17 update.~~

## Daptomycin (Cubicin)

- **Last week** it was communicated doses would be dispensed from Pharmacy for IV Push administration over 2 minutes. At this time, this change will **NOT** be implemented. Daptomycin will continue to be supplied as an IVPB.

11/16/17

## Lactated Ringers (LR) 1 L Infusion Bags

- **LR 1 L infusion bags** are in short supply. During this shortage, Materials Management will stock areas with LR 1 L bags, when available. **If LR 1 L bags are not available, 500 mL LR bags will be stocked in place of LR 1 L bags.** This will be an on-going shortage issue into calendar year 2018.
- **Barcode scan the 500 mL LR bag as you would a 1 L LR bag.** EPIC is built to recognize the 1 L and 500 mL bags.
- **When using a LR 500 mL bag on an infusion pump, set the VTBI to 450 mL to 475 mL to ensure a “call back” alarm.**

## Dopamine 400 mg/ 250 mL D5W Pre-Mix Bags

- **Dopamine 400 mg/ 250 mL D5W pre-mix bags are currently unavailable.** During this shortage dopamine bags will be compounded by Pharmacy. At this time, pre-mix bags will continue to be

stocked in AcuDose machines in invasive procedural areas (Cath Lab, EP Lab, OR 19, PACU, OR CUR, and ED).

**11/20/17**

#### **NS 100 mL bags**

- **NS 100 mL bags** are in are in short supply. Previously, Materials Management was stocking areas with NS 100 mL bags in place of NS 250 mL bags for use in IV line flushing and blood administration.
- **During this shortage, Materials Management will stock areas with NS 500 mL bags.**
- **When applicable, consider utilizing NS 10 mL syringes for flushing.**
- NS 100 mL bags and NS 250 mL bags will be reserved for Pharmacy use only for medication compounding and administration. **Exception: CV Lab will be supplied NS 250 mL bags for emergent medication preparation.**

**11/29/17**

In response to ongoing monitoring, the **following changes have been made:**

- **Ondansetron (Zofran)** doses of 8 mg or less will be administered IV Push over 2 minutes.
- **Phytonadione (Vitamin K)** will be administered IV Push at a rate of 1 mg/min.
- **Calcium gluconate 1 GM** will be administered IV Push at a rate of 200 mg/min.
- **Dexamethasone (Decadron)** doses of 10 mg or less will be administered IV Push over 1 minute.
- **Ertapenem (Invanz) 1 GM** will be administered IV Push over 5 minutes. Doses will be reconstituted and sent from Pharmacy.
- **Furosemide (Lasix)** intermittent bolus doses will be administered IV Push at a rate of 40 mg/minute.
- **REMINDER:** Flush the IV line after administration of all IV Push medications.
- **The exception to the above is the Healing Center.** If the above medications are ordered for a Healing Center patient, the medication will continue to be supplied as an IV Piggyback (IVPB).

In addition, the following change will **be effective Thursday, Nov. 30th:**

- **Penicillin 5 million unit IVPB bags** are no longer available. In anticipation of this medication shortage, a substitution from penicillin 5 million units to **penicillin 6 million units** was approved for use in OB for Group B Strep treatment.
- The penicillin 6 million unit dose will be supplied as **two penicillin 3 million unit IVPB bags. Both bags must be administered.**

**11/30/17**

- ~~**Ceftriaxone 1 GM and 2 GM doses will be administered**~~ via IV Push over 2 minutes. Doses will be reconstituted and sent from Pharmacy.
- **REMINDER:** Flush the IV line after administration of all IV Push medications.
- **The exception to the above is the Healing Center and pediatric patients.** If the above medication is ordered for a Healing Center or pediatric patient, the medication will continue to be supplied as an IV Piggyback (IVPB).

12/5/17

#### NS 50 mL bags

- NS 50 mL bags are in are in short supply.
- **During this shortage, Pharmacy will supply Radiology with NS 50 mL Mini-Bag Plus bags for flushing the auto-injectors used in Radiology.**
- “Regular” NS 50 mL bags will be reserved for Pharmacy and CV Lab only for medication compounding and bivalirudin (Angiomax) administration.

#### Plasmalyte Solution

- **Plasmalyte solution** is in short supply. The alternative to Plasmalyte is Normasol, however, Normasol is also in short supply.
- **During this shortage, Materials Management will supply the OR area to the established par level with either Plasmalyte or Normasol depending upon availability of product.**
  - The perfusionist may use either product or a combination of the products during the surgical case.

12/11/17

#### D5W 150 mL bags

- As the result of being supplied by only one manufacturer, **D5W 150 mL bags** are unavailable.
- The **diluent for vasopressin has been D5W** at Mercy Medical Center (MMC).
  - Pharmacy will begin supplying **compounded vasopressin infusions in 150 mL of normal saline instead of D5W 150 mL.**
  - **OR 19 (“heart room”) has 150 mL bags of normal saline available for vasopressin preparation if needed.**

#### Morphine Sulfate 250 mg/250 mL bags

- **The pre-mixed morphine sulfate 250 mg/250 mL bags** are currently unavailable from the manufacturer. The current MMC supply is *estimated* to be 7 days, but could vary based upon patient demand.
- During this shortage, Pharmacy will compound morphine infusion bags.
  - Pharmacy compounded morphine sulfate infusion bags are unable to be stocked in AcuDose machines due to short expiration dating (48 hours).
- **Morphine sulfate infusion bags have been removed from the Z21 (ICU) AcuDose machine.**
- **Once the pre-mixed morphine sulfate infusion bags have been depleted, this medication will not be available in the Hospice House AcuDose machine.**
- Doses will be sent from Pharmacy upon request. **Please request bags from Pharmacy in advance of immediate need.**

## Magnesium Sulfate 40 GM/ 1000 mL Sterile Water for Injection (SWFI)

- **The pre-mixed magnesium sulfate 40 GM/1000 mL SWFI bags are currently unavailable from the manufacturer.** The current MMC supply is *estimated* to be 45 days, but could vary based upon patient demand. The number of days on hand is updated information from today's IV Fluid Shortage Meeting.
- During this shortage, Pharmacy will compound magnesium sulfate 40 GM infusion bags.
  - Pharmacy compounded morphine infusion bags are unable to be stocked in AcuDose machines due to short expiration dating (48 hours).
- **Once the pre-mixed magnesium sulfate 40 GM infusion bags have been depleted, this medication will not be available in the Birthplace AcuDose machine.**
- Doses will be sent from Pharmacy upon request. **Orders for magnesium sulfate 40 GM infusion bags are being built as "stat" in EPIC.**

12/14/17

## Heparin 2000 units/1000 mL Normal Saline

- **The pre-mixed heparin 2000 units/ 1000 mL NS (heparinized saline) bags are intermittently available from the manufacturer.** The heparin 1000 units/ 500 mL NS bags are not available from the manufacturer.
- During this shortage, Pharmacy will compound heparin 2000 units/ 1000 mL NS bags when pre-mixed bags are unable to be obtained. Pharmacy-prepared bags have 48-hour expiration dating.
- Pharmacy will prepare bags M-F for Cath Lab, Angio, and EP Lab. **Storage of the Pharmacy-compounded preparation and the commercial preparation are being centralized to the "middle room" between Cath 1 and Cath 2.**
- **For emergent cases or in the event a pharmacy-supplied preparation is not available, the current commercially available stock will be used.**

12/19/17

## Potassium Chloride (KCL) 10 mEq/ 100 mL Normal Saline (NS)

- **The pre-mixed KCL 10 mEq/ 100 mL NS are not available from the manufacturer.**
- During this shortage, Pharmacy will compound KCL bags for peripheral administration.
  - **Providers will receive an alternative medication message when placing an order for KCL 10 mEq/ 100 mL NS directing them to oral ordering options or the pharmacy-compounded peripheral preparations.**
- The compounded medication will be **10-20 mEq/ 250 mL NS** depending upon the replacement order.
  - Due to the shortage of 100 mL NS bags, 250 mL NS bags will be used.
- The IV Pump Library will be updated to reflect options for potassium chloride 10 mEq/ 250 mL and 20 mEq/250 mL for peripheral line infusion.
- Pharmacy-prepared bags have 48-hour expiration dating.
- Pharmacy will reserve the current supply of pre-mixed KCL 10 mEq/100 ml NS bags for the Cath Lab.



## **Clinimix E (pre-mixed total parenteral nutrition (TPN))**

- **All formulations of Clinimix E are in short supply.**
- Providers will receive the following BPA when ordering a TPN from the TPN Order Set: “There is currently a shortage of Clinimix parenteral nutrition solutions. Please use alternate nutrition strategies whenever possible and reserve parenteral nutrition for patients without other options.”
- The pharmacists and dietitians are communicating regularly and making necessary changes to TPN orders (based upon availability of products) to meet the needs of our patients.
  - Providers and nursing staff may see frequent changes to the TPN formulations.

**12/27/17**

## **Morphine Sulfate PCAs**

- **Morphine PCAs are not available from the manufacturer.**
- Pharmacy will reserve the current supply of manufacturer supplied morphine PCAs for the PACU AcuDose.
- Manufacturer supplied morphine PCAs will be removed from the C-section Recovery AcuDose and the ICU AcuDose.
  - During this shortage, Pharmacy will compound morphine PCAs for administration.
  - Pharmacy-prepared PCAs have 48-hour expiration dating.
  - Morphine PCAs for all areas other than the PACU will be supplied patient-specific with a Controlled Substance Record (“yellow sheet”) from the Pharmacy.

## **Lactated Ringers (LR) IV Solution**

- **The supply of Lactated Ringers (LR) solution (500 mL and 1000 mL bags) is nearing a critical low.**
- The primary area affected is the Peri-Op area. The Peri-Op order sets contain several alternative solutions.
  - At this time, the recommendation is for Peri-Op nursing staff to follow the order as originally written for LR. But, if/when LR becomes unavailable, contact the anesthesiologist for an order of an alternative IV solution. **Normal Saline would be the current preferred alternative based upon medication availability.**
- Other areas of the hospital may need to implement the same practice of notifying the provider for an order of alternative IV fluid if the supply of LR is exhausted.