

Intravenous Fluid Shortage Strategies

Current as of October 9, 2024

ASPR TRACIE attempts to summarize the best available information on emerging issues and make it available for healthcare use. The information in this tip sheet is from existing published resources (based primarily on previous shortage experiences). It is not intended to provide clinical guidance and it does not represent official policy or guidance from the U.S. Department of Health and Human Services or the Administration for Strategic Preparedness and Response.

During shortages of sterile fluids for intravenous (IV) injection, hospitals and healthcare providers must modify usual practices for administration to conserve product. This summary of strategies includes links to additional resources at the end.

For current information on shortages, refer to:

- [Drug Shortages | FDA](#)
- [Current Drug Shortages - ASHP](#)

Healthcare providers and systems should adopt the least restrictive strategies possible given the known supply situation and tailor these strategies to their environments.

During shortages of IV fluids, providers that must adapt their care should document in the patient's medical record the reason the treatment was considered but unable to be given and, ideally, refer to best practice recommendations adopted by their healthcare facility or system that support the decision. Because resource shortages can be dynamic, documenting changes in care can improve understanding of the situation, inform future planning efforts, and potentially provide liability protection.

Ideally, healthcare coalitions or other regional coordinating entities should share information and promising practices during critical supply shortages to boost situational awareness with the goal of a regionally consistent standard of care. The following strategies can help hospitals and systems attain that goal.

General Strategies

- Maintain situational awareness of available formulations of fluids and use alternatives when available.
- Prioritize the use of crystalloid fluids for resuscitation/critical care and during major surgical procedures.
- Centralize stock of IV bags to the degree possible. Minimize par levels on units, particularly in non-critical care areas.
- Transition as much fluid management as possible to oral and enteral forms.
- Provide IV fluids in relation to need and acuity rather than empirically.
- Transition medications that require secondary IV fluids for administration to oral.
- Calibrate fluids to the type of bags available and the minimum necessary (e.g., if 500mL bags are in adequate supply, consider giving one of those rather than a 1000mL bag).

- Do not use IV fluids for non-IV use (e.g., irrigation).¹
- Reserve dextrose-containing IV fluids for patients who are hypoglycemic or at high risk (e.g., a pediatric patient unable to take oral fluids).
- Work with information technology to implement ordering alerts in the electronic health record (EHR) to prompt consideration of alternatives.

Emergency Medical Services (EMS)

- Start saline locks rather than IV fluids.
- Adopt push-dose rather than infusion strategies whenever possible (e.g., magnesium, tranexamic acid).
- Reduce the use of infused medications in conjunction with medical direction.
- Limit the use of crystalloid to resuscitation. Validate vital signs prior to administration.
- Consider smaller volume IV fluid bags for initial EMS fluid therapy, reserving larger volume bags for in-hospital use, depending on product availability.
- Recommend that the receiving hospital use the remaining fluids started by EMS rather than swapping to hospital IV sets and fluids.

Pharmacy

- Review common infusion medications for potential conversion to push-dose (e.g., ceftriaxone).
- Consider changes to infusion concentrations to adapt to available bag sizes.
- Switch to oral antibiotics as soon as possible.
- Consider thresholds for repletion of electrolytes via intravenous route (e.g., intravenous potassium use restricted unless below a threshold value).
- Consider oral or IV alternatives to antibiotics that require large-volume IV fluids (e.g., vancomycin, trimethoprim/sulfamethoxazole).
- Use sterile water when appropriate for reconstitution and administration of medications.
- Consider allowing use of spiked/primed IV bags that were prepared but never connected to a patient for a short period of time (e.g., 12-24 hours).
- Use small-volume bags when appropriate for slow infusion rates.
- Use syringe pumps when appropriate for pediatric or other infusions obtaining sterile saline from vials rather than bags to fill syringes.
- Consider extending “hang times” beyond 24 hours for IV bags as appropriate.

Emergency Department

- Guide fluid resuscitation based on individual patient assessment rather than a protocol approach (e.g., consider whether a patient with potential sepsis but not signs of shock requires 30mL/kg IV fluids).

¹ NOTE: When shortages of irrigation solution occur, if IV fluids are *not* in shortage this substitution may be reasonable. However, tap water is safe for most wound care applications. Refer to the Fernandez article in the Resources section.

- Trial oral hydration whenever possible.
- Avoid use of medications that require IV bags when possible (e.g., antibiotics, electrolytes).
- Consider whether the patient is appropriate for non-invasive monitoring. Arterial lines require IV saline bags for circuit priming and pressurization.

Surgical Services

- Consider changing nothing by mouth (NPO) times prior to procedures to allow the ingestion of clear fluids closer to the time of procedure (e.g., up to 2 hours prior to procedure).
- Consider on an individual basis which patients require fluids based on the anesthetic, procedure, procedure duration, anticipated blood loss, patient medical history (e.g., renal function), and other factors.
- Consider whether the patient is appropriate for non-invasive monitoring. Arterial lines require IV saline bags for circuit priming and pressurization.

Inpatient Units

- Encourage oral or enteral fluids rather than IV; review IV maintenance fluids daily for discontinuation. Consider EHR prompts for alternatives to IV fluid orders.
- Consider removing maintenance fluids from order sets in the EHR and allow orders for 24-hour periods only.
- Do not use “keep open” lines or orders.
- Switch to oral/enteral alternatives as soon as possible from medications that require IV secondary administration bags.

System/Incident Command

- Communicate supply situation with providers and keep them updated with current strategies and expectations.
- Communicate with suppliers about ongoing needs/product availability.
- Establish a process to review current strategies and adjust to dynamic changes in product availability. This process should include pharmacy, clinician leaders, and leadership/incident command.
- Review/update treatment protocols.
- Reinforce provider and patient safety principles when not using usual products and procedures to prevent provider injury and medical errors.
- Share information with healthcare coalition, state, and other regional partners to ensure awareness of the severity of the shortage and currently implemented strategies.

Resources

American Society of Health-System Pharmacists. (2024). [Small- and Large-Volume Fluid Shortages – Suggestions for Management and Conservation](#).

ASPR TRACIE. (2024). [Medical Product Shortages and Scarce Resources Page](#).

- ASPR TRACIE. (2024). [Partnering with the Healthcare Supply Chain During Disasters](#).
- ASPR TRACIE. (2024). [Pharmacy Topic Collection](#).
- ASPR TRACIE. (2024). [Template – Hospital Crisis Standards of Care Resource Allocation Annex](#).
- Becze, E. (2017). [Yes, There’s a Saline Shortage, but Here’s What You Can Do About It](#). ONS Voice. (NOTE: This resource applies to small volume IV solution bag strategies.)
- Fernandez, R. and Griffiths, R. (2012). [Water for Wound Cleansing](#). Cochrane Database of Systematic Reviews. DOI: 10.1002/14651858.CD003861.pub3
- Koehl, J. and McCreary, E. (2017). [Strategies for Surviving the IV Fluid Shortage: Antibiotic IV to PO Conversions and First Dose via IV Push](#). Academic Life in Emergency Medicine.
- Mazer-Amirshahi, M. and Fox, E., (2018). [Saline Shortages – Many Causes, No Simple Solution](#). [The New England Journal of Medicine](#). 378:1472-1474.
- Minnesota Department of Health. (2021). [Patient Care Strategies for Scarce Resource Situations](#). (NOTE: Refer to pages 13-14.)
- Patino, A., Marsh, R., Nilles, E., et al. (2018). [Facing the Shortage of IV Fluids – A Hospital-Based Oral Rehydration Strategy](#). [The New England Journal of Medicine](#). 378(16):1475-1477.
- University of Wisconsin Hospitals and Clinics Authority. (2107). [Electrolytes: Enteral and Intravenous – Adult – Inpatient Clinical Practice Guideline](#).
- Vest, T., Carrasquillo, M., and Eberwein, S. (2018). [Strategies for Managing the IV Fluid Shortage](#). [Pharmacy Purchasing & Products](#). 15(3 Supplement)
- Yagnik, K., Brown, L., Saad, H., et al. (2022). [Implementation of IV Push Antibiotics for Outpatients During a National Fluid Shortage Following Hurricane Maria](#). [Open Forum Infectious Diseases](#). 9(5):ofac117.