

Navigating Hospital Drug Shortages

Bringing the Team Together

Among the many challenges for healthcare organizations created by the COVID-19 pandemic was drug shortages. The anticipatory purchasing of drugs around the world due to the uncertainty of COVID-19 and skyrocketing hospitalizations drove drug demand to an unprecedented high. Meanwhile, availability was reduced because manufacturers shut down to prevent the spread of COVID-19 and other supply chain disruptions. Although the shortages were predominantly related to drugs directly impacting patients with COVID-19, other drug classes were affected as well. The sudden surge in the number of critically ill and mechanically ventilated patients led to huge demands for sedatives, opioids, vasopressors, and paralytics. Concerns about aerosol-generating procedures led to the replacement of albuterol nebulized treatments with albuterol metered dose inhalers. Each of these factors contributed to scarcity of essential, lifesaving drugs. The pandemic also highlighted the fragility of a drug supply chain that relied mostly on just-in-time manufacturing that was already at capacity.

While shortages of essential drugs plagued patients and clinicians before the COVID-19 pandemic, the pandemic-related healthcare crisis laid bare the inadequacies of drug manufacturing and distribution. Hospital systems across the world devised innovative strategies to address these drug shortages during the pandemic. We review the available evidence and provide guidance on adopting a multipronged and multiprofessional approach to managing future drug shortages.[1]

It takes a team to manage drug shortages during a pandemic, and engaging key stakeholders early in the course is crucial. Anticipation of impending drug shortages and evaluation of current inventory is important, as is timely escalation and interdisciplinary engagement, followed by close communication with all involved parties.[2,3]



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Identifying Drug Shortages, Evaluating Current Inventory, and Identifying Alternatives

It is vital to foresee impending drug shortages by recognizing red flags in the health system's supply chain (e.g., orders partially filled, a manufacturer with no stock). Monitoring national Listservs and even social media might identify drug shortages impacting other parts of the country, which may be a harbinger of a more widespread shortage.

Once a potential or actual shortage has been identified, its likely effect should be ascertained by assessing current inventory and historical usage patterns and then comparing to the anticipated duration of the shortage to determine the possible consequences and next steps. When assessing how long the shortage and any alternative products will last, estimates should be based on both current use rates and reduced rates after restriction measures are implemented.

Alternative therapeutic options must also be explored with multiprofessional collaboration, including medical, nursing, pharmacy, and respiratory therapy representatives as the extent of shortage is estimated. Identified alternatives should also be inventoried to ensure that adequate supplies are available to meet increased demand, especially during domino shortages, where drug A becomes unavailable and drug B is used as a replacement; anticipation of a subsequent drug B shortage should then be considered. Education on unique aspects of these alternatives should also be provided to clinicians, especially if these alternatives are not commonly used, are high-risk medications, or have unique side effect profiles.

Contingency Plans

Instituting backup plans to mitigate the impact of drug shortages is critical. Certain drugs may be available only from a compounding pharmacy, from another nontraditional source, or not at all. Specific federal laws, such as the Drug Quality and Security Act, apply to the use of drugs from compounding pharmacies, and it is important to assess compliance before these products are used. Each health system should establish a well-defined policy on purchasing drugs from the gray market or compounding pharmacies, and clear guidelines should be incorporated for managing situations in which a critical drug is not available at all.

Depending on available resources, health systems may choose to compound shortage products if they can meet certain requirements and if raw materials are available. Procuring scarce drugs or alternative products from nontraditional sources is likely to have financial implications, and estimates of additional costs should be prepared and presented to obtain contingency funds. Documented expenditures due to drug shortages can help explain budget variances and support future budget proposals.

Escalation to All Involved Parties

After identifying the drug shortages, the concerns should be escalated to appropriate authorities, and the information should be shared among all affected disciplines. Formation of a drug shortage committee under the auspice of the hospital Pharmacy and Therapeutics Committee consisting of prescribers, pharmacists, and other clinicians is helpful. The committee should meet at frequent intervals to discuss current drug shortages and management strategies. Timely and frequent communication with medical, nursing, pharmacy, and respiratory therapy representatives can help to mitigate frustration, stabilize relationships, and minimize the risk of errors in drug prescribing, dispensing, and administration. A point person from pharmacy should be designated to allow practitioners to communicate ongoing patient safety concerns or other identified problems.

In addition to email communication, incorporation of alerts in the electronic medical record (EMR) system may help with healthcare professional notification. The alternative use alert (AUA) should be used to provide healthcare professionals guidance on ordering. The verbiage could be decided based on the nature of the shortages. For example, if a parenteral formulation is not available, an enteral option

could be included, if applicable. Oral solutions could be identified to be reserved for patients with enteral feeding tubes, the pediatric population, or patients who cannot tolerate solid dosage form medications.

If one agent is not available in a therapeutic class, another agent within the same drug class that has evidence supporting its use would be identified as an alternative. Ordering panels within the EMR can also be designed to guide the shortage with drop-down menus or choices to guide the ordering process in the event of drug shortages. A hospital drug shortage committee should meet at least weekly to discuss shortage status updates. EMR drug shortage alerts and AUAs should be modified on a weekly basis based on the status reports.

Management Strategies

It is estimated that drug shortages cost U.S. hospitals $359 million a year.[4] Therefore, it is critical for health systems to take steps to mitigate drug shortages. Here are some suggested steps of an appropriate management strategy:

1. Estimate duration of drug shortage.
2. Determine how long existing stock will last based on average daily use.
3. Determine the need for a therapeutic alternative(s).
4. Determine whether usage restrictions are needed to conserve drug (e.g., reserved for pediatric patients, available route of administration).
5. Identify whether an interhospital drug loan is possible or necessary.
6. Communicate with drug manufacturers, wholesalers, and distributers on available drug supplies.
7. Develop usage criteria to ensure that the most vulnerable patients get treatment priority.
8. Operational pharmacists should focus on obtaining drugs, working closely with clinical pharmacists who communicate with clinicians to focus on judicious use of the current supply and the use of appropriate alternative agents, when appropriate.
9. Clinicians, including clinical pharmacists, should use evidence-based conservation strategies in managing drug shortages by using treatment guidelines and protocols or EMR ordering panels.
10. Hospital executives and policymakers should be included in drug shortage communications.

Creating a drug shortage dashboard can also be helpful. Medications should be grouped together based on their therapeutic class. Data on current inventory, usage, procurement, and restrictions should be compiled and analyzed on the dashboard on a daily basis during shortages. The dashboard should be shared and easily accessed by all members of the multiprofessional drug shortages committee to maintain transparency.[5,6]

Mitigating Future Drug Shortages

Once a shortage has been resolved, the multiprofessional team should be informed so normal prescribing patterns can resume. Depending on the duration of the shortage, reminders regarding normal prescribing patterns may need to be included. Another strategy for mitigating future drug shortages is to create drug shortage documents or pathways as part of hospital policies. These could be living documents located within the hospital policy site, which can then be easily accessed by anyone in the event of repeated drug shortages.

Institutional living documents can draw on already available public resources. SCCM's Drug Shortages and Medication Safety Committee provides resources on drug shortage topics at sccm.org/drugshortages. The American Society of Health-System Pharmacists (ASHP) has a guideline on managing drug shortages.[7] The Federal Drug Administration (FDA) provides an up-to-date drug shortage database at fda.gov/drugshortages.

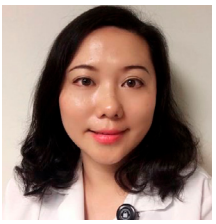
Conclusion

A multiprofessional, systematic approach should be in place in the event of any drug shortage. Communication is paramount to ensure appropriate pharmacotherapy. Alternate dosage forms, therapeutic alternatives, limited duration of therapy, and limiting indications should be implemented to mitigate shortages. Institutions should establish guidelines for drug shortages with easy access to everyone, using resources from Listservs, social media, ASHP, FDA, and SCCM to help maintain optimal care, especially in urgent lifesaving crises. ▲

Stay up to Date on Drug Shortages

Visit sccm.org/drugshortages for general resources and specific guidance on the following shortages:

- Alternative Medications for Procedural Sedation
- Electrolytes
- Sodium Bicarbonate
- Intravenous Loop Diuretics
- Intravenous Antiepileptics
- Heparin Sodium Solution for Injection
- Parenteral Benzodiazepines
- Parenteral Advanced Cardiac Life Support Medications



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