



Products to Improve Sterile Storage, Transportation, and Compliance with Professional Guidelines

Understanding how to improve sterile storage, transportation and compliance starts with knowing which products help achieve your goals.

One of the greatest responsibilities in healthcare is reducing the patient's risk for a surgical site infection (SSI). SSIs are one of the most common healthcare-associated infections (HAIs) and represent one of the leading causes of postoperative morbidity and mortality. They may also be associated with significant additional costs for hospitals and healthcare systems.¹ A recent survey conducted to determine the prevalence of HAIs in acute care hospitals found that, of the 11,282 patients included in the survey, 452 had 1 or more HAIs, with SSIs and pneumonia being the most common (21.8%).² The estimated 300,000 SSIs that occur every year in the United States increase lengths of stay by 7 to 10 days. In addition, the mortality rate associated with SSIs is 3%, with approximately 75% of deaths being directly attributable to the infection.³

The financial impact of SSIs has taken on greater significance over past decade, as changes in reimbursement for such events have been implemented. As of 2008, the Centers for Medicare and Medicaid Services (CMS) no longer reimburses health care facilities for the additional costs of patient care needed after an extreme medical error or for a condition

that was not present on admission, but is subsequently acquired during the course of the patient's hospitalization. Furthermore, the patient is not responsible for the additional costs and therefore cannot be billed.⁴

The Institute for Healthcare Improvement (IHI) notes that the majority of SSIs are essentially preventable.⁵ A key strategy for facilities to reduce the risk of SSI is providing surgical instruments and other reusable items that are free

of contamination at the time of use.⁶ Two important aspects related to this strategy are proper storage and transportation of sterilized surgical items.

Before discussing storage and transportation products available today, it is helpful to review the rationale behind the current professional guidelines and recommendations⁷:

**300
THOUSAND**
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in the United States

- Adequate space is needed around stored sterilized packages in order to:
 - > Allow for air circulation in the room (i.e., spacing);
 - > Prevent contamination during cleaning of the floor (i.e., a solid bottom shelf); and
 - > Prevent contact between sterile items and the condensation that might form on the interior surfaces of exterior walls (i.e., sterile items should be stored at least 2 inches from exterior walls).
- Fire codes designate the minimum distances below the ceiling to ensure the effectiveness of sprinkler systems (i.e., usually an 18" clearance).
- Compression of a sterile package can force air and microorganisms into the package contents, causing the seals to burst, or puncture the packaging, all of which lead to contamination.

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- Sterile items that become wet must be considered contaminated, since moisture carries microorganisms from the air and surfaces along with it.
- Sterile items should not be stored in any location other than designated counters, shelving, or containers, because:
 - > Other locations/areas may not be sufficiently clean; and
 - > Windowsills collect condensation that forms due to differences in the temperature between the inside and outside air.
- Closed cabinets limit the accumulation of dust, discourage excess handling, and minimize unintended contact with sterile items.
- Shipping containers have been exposed to unknown, as well as potentially large amounts of microbial contamination, and corrugated containers are generators of and reservoirs for dust; therefore, external shipping containers should never be permitted in any sterile storage area.

PRODUCTS DESIGNED WITH STERILE ENVIRONMENTS IN MIND

Proper storage and transportation of sterilized items are important factors in sterility maintenance and therefore reducing the risk of SSI. Today, healthcare facilities should remain aware of the various options for shelving and case carts available that facilitate effective storage and transportation of sterile items, compliance with professional guidelines, and sterility maintenance.



Non-Ideal Solution:
Wire Shelving



Ideal Solution:
Polymer (Plastic) Shelving

Polymer (Plastic) Shelving Systems

While stainless steel wire shelving units are typically used for general storage, they are not the ideal solution for sterile storage in the OR or sterile processing department (SPD). The manufacturing techniques of wire shelving (i.e., welding, soldering, etc.) can create possible snag points, which can cause tears in blue wrapped surgical kits. When evaluating shelving options, consider the following advantages to sterile storage for the OR or SPD that polymer provides.

- Polymer shelving will not rust or corrode and therefore can withstand repeated cleaning; in addition, there is no impact on its durability in a wet or moist environment. Some polymer shelving systems offer stainless steel corners to offer added durability.
- Smooth surfaces, which improve the protection of packaged items and also facilitate cleaning. Because the shelving is a one piece, all molded (i.e., not welded) design, there are no snag points that could compromise the integrity of a wrapped, sterilized package by ripping or tearing the wrap. In some systems, all of the edges are soft contoured, with plastic ends.
- Antimicrobial protection, utilizing the latest technologies, i.e., zinc and silver based antimicrobial agents, may be incorporated into the shelf mats and all touch points; since this is molded into the shelving material, it cannot be removed during cleaning procedures. The antimicrobial properties inhibit the growth of mold, mildew, bacteria, and fungi that cause odors and lead to product degradation. It is important to note that this technology is not designed to replace routine cleaning practices; cleaning practices as outlined in facility policies and procedures should be maintained.



Covered Polymer Cabinets

Sterile items that are kept in the OR and are accessed under sterile conditions are best kept in a covered cabinet. Closed or covered cabinets are preferable storage system for high traffic areas. Open or wire shelving is suitable for confined storage areas, as long as proper attention is paid to traffic control, area ventilation, and housekeeping practices. For supplies that are used infrequently, storage in closed or covered cabinets is recommended. While open shelving may be used, it also requires special attention to traffic control, area ventilation, and housekeeping practices.

Polymer cabinets, designed in various configurations, can be a standalone storage unit or one configured section within a larger storage system. These

cabinets are available with either solid or clear panels; clear panels facilitate location and retrieval of items from the cabinet. Covered polymer cabinets have many of the same benefits of polymer shelving systems introduced above. Overall, polymer provides the durability, antimicrobial protection, cleanability and long-term value today's healthcare environments demand.

**Polymer
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Stainless Steel Case Carts

Most surgical suites are constructed according to one of four basic designs: central corridor or hotel style; central core (i.e., clean core with peripheral corridor); combination of a central core and peripheral corridor (also known as a racetrack plan); and grouping or cluster combination plan with peripheral and central corridors.⁸ These designs are intended to optimize both function and safety and also protect patients from sources of contamination, since control of the surgical suite environment is a necessary component of overall infection prevention strategies.⁹ In this regard, clean and soiled areas, activities, personnel, and sterile and unsterile supplies should be clearly separated.¹⁰

Case carts are used to transport materials and instruments between SPD and the OR.¹¹ Clean case carts for a surgical procedure should be transported to the OR through the clean corridor on a dedicated cart lift or dedicated clean elevator from the clean side of the SPD. Case carts are held in a clean staging area until they are required for set up of a surgical procedure.

Upon completion of the surgical procedure, the case carts are returned via the semi-restricted corridor to the soiled side of SPD either on another dedicated cart lift or dedicated soiled elevator. In facilities where the SPD is not located below the surgical suite, an alternative traffic pattern for the case carts that separates clean and soiled case cart traffic must be established.

When transporting sterile items from the SPD to the OR, a case cart allows for ease of transport. Either open or closed stainless steel carts may be used in a case cart system. Stainless steel construction also provides several advantages, such as excellent corrosion resistance; furthermore, its tendency to conduct heat accelerates the drying process. In addition, adjustable stainless steel shelves allow clinicians to configure a cart to their specific needs and also easily reposition them as needs change. Stainless steel casters remain easily maneuverable, even after frequent cart washings.



OPEN CASE CARTS

High and low profile open case carts are typically used in facilities with a dedicated process that utilizes clean and dirty travel routes to and from the surgical suite or one in which the ORs are designed around a central sterile core. Open case carts provide several advantages over enclosed carts, including:

- Lighter weight
- Open to see through during transit
- Easy-to-clean
- More compact



CLOSED CASE CARTS

High and low profile closed case carts can be used wherever contents must be protected from an “unclean” environment, including free-standing ambulatory care centers, surgi-centers, and hospital based or out-patient surgeries. Packaged sterile items should be transported in covered or enclosed carts that have solid-bottom shelves. Closed case carts provide several advantages to note:

- Easy to maneuver
- Easy to access protected materials
- Easy to clean
- Available in various capacities and profiles
- Durable to withstand the rigors of transport

In Summary

SSIs remain a significant concern, as they are a leading cause of postoperative morbidity and mortality as well as additional costs of care, which are no longer reimbursed. Healthcare professionals need to be aware of products that improve storage and transportation of sterilized items and also facilitate compliance with professional practice guidelines. This will assist all members of the perioperative team to be confident that they are providing sterile items for surgical patient care and ultimately, promoting positive patient outcomes.

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