



White Paper

Handling Clean Linen in a Healthcare Environment

FOREWORD

Conscientious linen service providers make great efforts to meet standards that ensure hospitals and other medical facilities receive the healthcare textiles (HCTs) they need to operate safely. But once HCTs reach the facility's doors, launderers' role in maintaining their hygiene is limited or nonexistent, unless the laundry's service includes linen distribution.

Healthcare linen providers who adhere to Hygienically Clean Healthcare standards are certified through laundry plant inspection and third-party, quantified biological testing. Inspection and re-inspection verify that items are washed, dried, ironed, packed, transported and delivered using best management practices (BMPs) to meet key disinfection criteria. Between inspections, ongoing microbial testing quantifies cleanliness and adherence to BMPs.

TRSA, based in Alexandria, Va., manages the program. This international organization represents companies that supply laundered garments, uniforms, linens, floor mats, towels and other products necessary for businesses to operate safe, clean facilities, serve their customers and provide a clean, attractive environment and image. TRSA members launder an estimated 90 percent of North American hospital linen volume and represent the most heavily invested linen, uniform and facility services professionals in the healthcare market.

While laundry practices are certified, standards for the function of safeguarding clean linen are not spelled out. The Centers for Disease Control and Prevention's (CDC) 2007 "Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings" simply states: "Rather than rigid rules and regulations, hygienic and common sense storage and processing of clean textiles is recommended."

The Joint Commission International's Standard PCI.7.1 (Fifth Edition)—"The hospital reduces the risk of infections by ensuring adequate medical technology cleaning and sterilization and the proper management of laundry and linen"—is equally general.

It's up to healthcare facility management to develop a written policies and procedures manual outlining their own best practices for the various aspects of HCT handling. Such a manual serves as a guide for training new staff members, and should be used for monitoring and evaluating the linen-handling process.

Proper procedures that get the right results are important because every stage of the process involves opportunities for contamination. Every surface that touches the healthcare textile must be viewed as a determinant of the cleanliness of the textile itself.

Research shows that outbreaks of infectious diseases associated with laundered health care textiles over the past 43 years have affected at least 350 patients worldwide. Exposure of clean textiles to environmental contamination is most often cited as the cause.¹

"Of all the surfaces in a hospital, a patient will have the greatest degree of contact with his gown and the bed linens," says Lynne M. Sehulster, PhD, with CDC's Division of Healthcare Quality Promotion.

Hygienically Clean Healthcare certified laundries collaborated to create this whitepaper for professionals in infection prevention, risk management, environmental services and quality management. While hospitals develop and institute policies and procedures for properly storing and distributing HCTs and train those who carry clean linen to its destination, Hygienically Clean Healthcare is pleased to provide this overview of management issues and procedures to support these processes.

Thanks to Crothall Healthcare and its environmental services staff serving Inova Fairfax (Va.) hospital for inviting TRSA to observe their linen distribution procedures in preparing this paper

1. "Developing a Plan to Handle Clean Textiles," *Health Facilities Management*, Aug. 5, 2015.

Good policies and practices ensure that all linen is hygienically clean when it leaves the laundry facility. From there, it's up to every employee who handles, stores and distributes that linen to follow proper procedures to make sure that it remains hygienic. The best way to do that is to assume that *any* contact throughout the transportation, storage and distribution process could potentially contaminate the linen.

TRANSPORTATION

Transport and storage of clean linen “is the part of the overall process that is most vulnerable to outside contamination,” according to Schulster.² Pathogens can exist from hours to months on environmental surfaces including HCTs.

Carts transporting hygienically clean textiles to a medical facility should be moved to designated linen storage areas as expeditiously as possible, minimizing time outside the facility.

Reusable or disposable covers should be checked for debris and removed and replaced as needed. Linen should always be covered: in delivery, on its way into the hospital, and in the hospital. Also, workers should be trained to properly sanitize their hands after removing and disposing of plastic covers.³

Laundry transported to and from hospitals must be separated according to whether it's clean or soiled. The same vehicle may be used for clean and soiled linen, but there must be some type of physical separation.⁴

Refined Language in Certification Addresses Exchange Carts



TRSA updated the Hygienically Clean Healthcare certification standard in 2016 to incorporate best practices for launderers' use of exchange carts in serving healthcare facilities.

Terminology added to the standard explains widely implemented procedures long recognized for ensuring safe delivery and storage of clean linens between commercial laundries and healthcare facilities. To set the precise language, the Hygienically Clean Advisory Board consulted with launderers as well as professionals in clinical management, epidemiology and process analysis.

In addition, TRSA members tested microbial content on exchange carts and linen to confirm the effectiveness of best practices and their techniques for loading, unloading and general handling of these carts.

The chosen terminology includes requirements for housekeeping and cleaning; transporting and delivering clean, unused linens retrieved from customer locations; inspecting, counting, rotating and restocking linen; and more. TRSA recommends all commercial laundries that use exchange carts adopt these practices. Hygienically Clean Healthcare certified laundries will be inspected to ensure these and other practices added to the standard are implemented.

TRSA President and CEO Joseph Ricci observed that Hygienically Clean Healthcare certification offers a holistic approach to producing and maintaining hygienically clean linens. “In consultation with our laundry operator members and other hygiene experts, we've now specified certification language related to the use of exchange carts,” he explained.

The Hygienically Clean Healthcare standard cites these references for industry best practices in exchange cart use:

- Association for the Advancement of Medical Instrumentation
- Centers for Disease Control and Prevention
- Occupational Safety and Health Administration

2. Lynne Schulster, PhD. M(ASCP), “Healthcare Textiles and Laundry 101: Management in Acute Care and Residential Care,” presentation, Nov. 16, 2011.
3. John Scherberger, “The HLAC and Handling and Storage of Clean Healthcare Textiles in Healthcare Facilities,” presentation, September, 2016.
4. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention (CDC), “Guidelines for Environmental Infection Control in Health-Care Facilities, Recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC),” 2003.

STORAGE

Adequate storage space for HCTs is especially important. Ideally, space is set aside where the linen can be both stored and prepared for distribution, and kept separate from any soiled linen and other possible contaminants. *Nothing* should be stored in the area except the clean linen.

The storage area should be free of vermin and have no drains or hot water pipes. Temperatures ranging from 68 to 78 degrees Fahrenheit are best and the area should be properly ventilated to prevent the accumulation of lint and dust (with a recommended positive air exchange rate of 6 to 10 pounds per hour.) Shelves in the storage area should be 2 inches from the wall for accessible cleaning. Shelving units should have a solid bottom. The bottom shelf should be 8 inches from the floor and the top shelf should be 18 inches below the ceiling.⁵

In the storage area, employees should be trained to properly “build” carts with the necessary linen for the various departments. Bags should be provided for any reject linen.

They also should be trained to keep all HCT storage carts or racks covered to prevent contamination from airborne dust, dirt and pathogens. Storage carts and racks should be cleaned regularly. Clean carts should be located in secure rooms to prevent patients, family members and any other personnel from handling the linen without taking proper precautions.⁶

If carts have shelves that are low to the ground, they should have a solid bottom to prevent contamination from dust kicked up by staff and by the wheels of the cart.⁷

If HCTs must be left unattended either in carts in the hallways or at work stations, the cart or work station should be cleaned, disinfected and covered before storing HCTs to ensure the hygienic integrity of the HCTs. HCTs should never be stored in patients’ rooms. Any HCTs placed in a patient’s room should be considered reserved for use for that patient and should not be transferred to another patient’s room without laundering prior to use.⁸

5. American National Standard Institute (ANSI) and Association for the Advancement of Medical Instrumentation (AAMI), “Processing of Reusable Surgical Textiles for Use in Health Care Facilities,” 2013.
6. Ibid.
7. “Follow These Linen Handling Measures to Prevent Your Hospital from RFIs,” *Environment of Care Leader*, May 26, 2014.
8. AAMI/ANSI, “Processing of Reusable Surgical Textiles.”

DISTRIBUTION

As hygienically clean linen is distributed throughout a medical facility, staff members must take care that it remains as clean as when it was laundered. They must presume that linen storage covers, cabinets, door handles or anything they contact are contaminated.

Staff members should follow proper hand hygiene procedures and sanitize prior to handling healthcare textiles and after touching potentially contaminated surfaces.

Avoiding the transfer of pathogens and other contaminants from a staff person to the hygienically clean HCTs is critical. More than 60 percent of health workers' uniforms sampled by researchers tested positive for pathogens while they wore them at work, according to a 2011 study published in the *American Journal of Infection Control*.

Staff members should avoid pressing HCTs to their uniforms at any time, including:

- Unloading from laundry bins or trucks onto racks in a clean linen storage area
- Moving HCTs from storage area to carts
- Removing HCTs from linen carts to a patient room
- When HCTs are being used to make a patient bed

It is especially important that clean HCTs do not come in contact with an employee's uniform below the waist level. Many potentially contaminated surfaces are below waist level, such as beds, hampers, chairs and other furniture, making it more likely this part of the uniform could be contaminated.⁹

Staff members should never carry clean or contaminated linen cradled in arms, for the same reason—pathogens may be transferred to the linen. The skin comes in contact with textiles more often in a hospital than many people realize.¹⁰

9. CDC, "Guidelines for Infection Control"

10. "Handling Textiles," *Hospital Facilities Management*.

Clean Linen Room Practices Scrutinized

Is poorly shelved linen a hygiene risk? Nurses interviewed in a University of Michigan (UM) study said they prefer not to use unfolded and messy linen for patient purposes because the linen looks used and may give a bad impression to patients. It may not be contaminated, but it will probably be considered soiled and therefore bound for an otherwise unnecessary washing.

UM engineering students who conducted the research envisioned the potential for compromised cleanliness when they observed clean washcloths on a linen room floor. They theorized that when nurses take these from a plastic bag of washcloths on the top of a rack, some fall to the floor. In another clean holding room, plastic totes store washcloths taken from the big bag. Nurses take washcloths from totes, eliminating their drop to the floor.

In addition to washcloths, messy pillow cases were also often observed on the shelves of some clean holding rooms, prompting the observers to recommend totes for organizing these. Totes would need to be disinfected per hospital protocol.

Doors to such rooms are always supposed to be closed for infection control. However, the team observed that most inpatient units in UM's University Hospital do not follow the rule. These open doors invite visitors and patients to take linen by themselves, a contamination risk. Not to mention the mess they might make of the storage shelves to identify the types of linen they want by rummaging through it.

Clean holding rooms at UM's Children and Women's Hospital are always locked, permitting only staff to enter. Shelves are more organized and labeled, enabling nurses to easily find what they need.

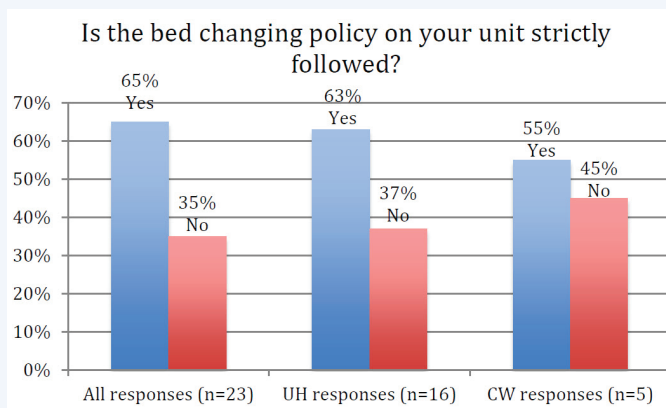
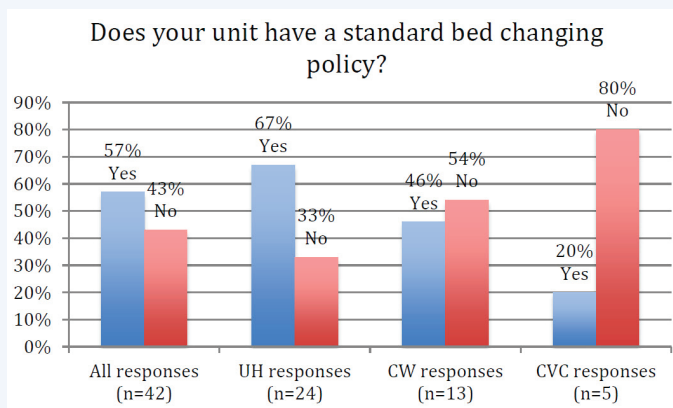
Hoon Lee, C.; Pranata, A.; Steven, A.; Taslim, R.; *Analysis of Linen Utilization throughout Inpatient Units in the University Hospital*, Industrial and Operations Engineering, University of Michigan, April 23, 2010.



Use of totes for storage (shown at right) reduces chances of items falling



Secured linen storage room (shown at right) is neater, better organized



Responses from hospital staff in UM study reflect inconsistencies in bed changing practices—but where policies exist, they're likely to be followed.

Bed-Changing Policies Seen as Key to Waste Control

TRSA estimates that healthcare facilities lose \$840 million in linen and garments each year taken out of service primarily because items are lost, abused or discarded as waste when they could be washed and reused. Awareness of the negative impact on providers' bottom line is growing. This is calling attention to the need for better clean linen handling.

The University of Michigan Health System (UMHS) has documented its linen waste not from immediate loss or abuse, but from too much washing, which raises laundry costs and leads to premature linen demise. An audit by linen manufacturer Standard Textile, Inc. found that UMHS used 1.07 more pounds per adjusted patient day of linen than comparable facilities. The UMHS laundry had been receiving an observable amount of clean, still-folded linen to be washed again.

Speculation arose that the additional laundry work had been fueled by:

- Laundering unused linens left in patients' rooms after their discharge—a must for hygiene
- Inconsistent use of nurse servers (cabinets outside patient rooms that store medical supplies and linens)
- Inconsistent bed-making policies

Analysis showed no correlation between waste and stocking clean linens in nurse servers or placing them in patients' rooms. But units that followed a bed changing policy had a lower average waste than units without such a policy. The result: proposed implementation of more bed-changing policies appropriate for various units based on the treatments provided (patient types) there.

Chen, C.; Poon, R.; Shirer, M.; Zhang, M., Analyzing Linen Usage at the University Hospital and the Children and Women's Hospital, Industrial and Operations Engineering, University of Michigan, April 30, 2013

AVOIDING CLEAN LINEN CONTAMINATION

Throughout the process of transporting, storing and distributing clean linen it is imperative to avoid any possibility of mixing it with soiled linen.

When handling any type of soiled linen in a hospital setting, TRSA recommends the Six C's: Cover, Collect, Contain, Consolidate, Clean, Cooperate. Following these practices not only reduces the spread of infections and promotes a culture of safety in hospital settings, but it also reduces healthcare costs by eliminating the expense of lost linen products.

To request a flash drive containing the *Six C's: Handling Soiled Linen in a Healthcare Environment*, a TRSA training video for hospital personnel, go to www.trsa.org/soiledlinen.

Contaminated linen should not be sorted or rinsed in the location of its use; it should be transported to the laundry for decontamination, according to the Occupational Safety and Health Administration (OSHA). Contaminated laundry should be placed and transported in properly designated (marked) bags or containers and clean textiles should be separated from soiled textiles when transporting them in a vehicle.

PERFECTING THE PROCESS

Many things can go wrong throughout the HCT transportation, storage and distribution process, as a letter to the editor published in the *Journal of Hospital Infection* illustrates. The letter reported on an audit of linen management by paramedical staff in 23 short-term care units of a 700-bed teaching hospital:

“Ninety-six percent of the units had a designated linen room, but 50 percent of these contained something other than linen (clothes, shoes, scales). In 21 units, linen was stored out of the linen room.”

“Seventy-five percent of the linen cupboards were never cleaned (65 percent had wooden racks which could not be cleaned). Moreover, 22 percent of the trolleys for clean linen were never cleaned and the linen turn-over was suboptimal because healthcare workers usually took the linen they needed from the top of the stack instead of a proper rotation of stock.”¹¹

With so many vital areas to monitor, use of the Hazard Analysis Critical Control Point (HACCP) system may be appropriate to identify critical areas on which to concentrate their efforts. The HACCP system is based on seven principles: (1) hazard analysis, (2) critical control point identification, (3) establishment of critical limits, (4) monitoring procedures, (5) corrective actions, (6) record keeping, and (7) verification procedures.

It takes a concerted effort to implement such a comprehensive approach to safeguarding HCTs. But strict adherence to practices and procedures can help avoid catastrophe.

Linen was implicated in an outbreak that claimed the lives of five children who were being treated at New Orleans Children’s Hospital in 2008 and 2009. Detailing the infectious outbreak in the *New York Times*, which cited both the CDC and the *Pediatric Infectious Disease Journal*, it was reported that hospital ultimately traced the source of the infection to the hospital’s linen.¹²

Court documents found that poor handling of the linen by hospital staff contributed to the contamination, including:

- Refusing to have clean linen delivered to the hospital in sealed bags
- Transporting linen in trash carts and trash on linen carts
- Receiving linen on the same dock where waste was handled
- Moving soiled and clean linen on the same carts without needed precautions
- Washcloths intended for patient use being used to clean bathrooms
- Storing linen in the hallway without a protective cover

The hospital took corrective action to ensure linen is handled and stored properly, including:

- Cleanliness of linen storage areas
- Changing where linen was received when transported to the hospital
- Wrapping linen for transport.¹³

Medical facilities can increase their chances of avoiding such calamity by ensuring that every employee who handles, stores and distributes HCTs follows proper procedures to get the right results every time.

11. Y.F. Chiew, “Microbiologic Quality of Linen and Linen Rooms in Short-term Care Units,” *Journal of Hospital Infection*, 56(4):329-31 April 2004.

12. “Slow Moving But Deadly Infection at New Orleans Hospital Linked to Linens,” *Environment of Care Leader*, May 26, 2014.

13. Ibid.

USE ONLY LAUNDRY PROVEN CLEAN & GREEN

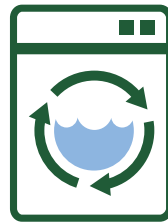
TRSA certified textile services cost-effectively launder and deliver reusable linens, gowns, scrubs, garments, towels, floor mats and more to hospitals and medical centers, allowing you to focus on patients.

To be Hygienically Clean, launderers' processes must be verified and outcomes must be quantified. To be Clean Green, laundry water and energy conservation success must be gauged.

It's the same kind of scientifically rigorous and valid performance measurement required of more and more functions in healthcare facilities. TRSA inspects laundries for compliance with industry laundry management practices and requires microbial testing to confirm cleanliness.

Prove your linen contributes to your efforts to
conserve resources and control infection.

Find a Hygienically Clean and Clean Green laundry at www.trsa.org.



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