Crothall Healthcare’s Strategic Initiatives for Reducing Healthcare-Associated Infections

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Very few people … have any idea of the exquisite cleanliness required in a sick room!

– Florence Nightingale, 1859

EXECUTIVE SUMMARY

Crothall Healthcare’s Environmental Services program focuses on the challenges healthcare personnel (HCP) face in reducing healthcare-associated infections (HAIs) while meeting regulatory compliance, maximizing limited financial and human resources—all while meeting expectations of improved operational efficiency and maintaining a competitive edge.

Crothall’s effective, synergistic and proven approach managing environmental hygiene and the impact on patient safety sets the industry standard for efficiency and effectiveness. By using a thorough, integrated, best-practice approach that requires standardized processes, outcomes measurement, ongoing training and innovative technologies, Crothall is able to reduce environmental contamination and pathogen transmission that lead to reduced HAIs and favorable patient outcomes.

This white paper:

• Discusses the association among hospital environmental contamination, pathogen transmission and patient safety
• Describes Crothall’s strategic initiatives with reducing environmental contamination and promoting improved patient outcomes
INTRODUCTION

The rising cost of HAIs

There are an estimated 35 million admissions to acute care facilities annually,\(^1\) with 1.7 million patients being affected by a secondary healthcare-associated infection,\(^2\) and 99,000 associated deaths.\(^3\) Thirty-two percent of the infections originate from the urinary tract; 22% of the infections are a result of surgery; 15% of the infections are pneumonia; and 14% are bloodstream infections (fig. 1).\(^2\) HAI medical costs range from $28.4 to $45 billion dollars annually; infection prevention interventions can result in savings of $5.7 to $31.5 billion dollars annually.\(^3\)

The rising costs of treating infection coupled with the knowledge that certain infections can be prevented has led the Center for Medicare and Medicaid’s (CMS) Inpatient Prospective Payment System and some private insurers to no longer reimburse for several preventable HAIs, e.g., catheter-associated urinary tract infections, surgical site infections after coronary artery bypass surgery. Clearly, HAIs result in a mounting personal, medical and economic toll, especially impacting patients who are immuno-compromised.

Patients are routinely exposed to microorganisms that are ubiquitous in the healthcare environment. Increasingly resilient and opportunistic bacteria, spores and viruses are shed from patients and staff, and these pathogens:

- Can contaminate the hospital environment
- May be transmitted between patients and the healthcare provider
- May lead to potential infection with significant morbidity and/or mortality

Microorganisms are progressively more adept at surviving and reproducing on environmental surfaces\(^4\) while also developing increasing resistance to available treatments,\(^5\) thus posing a challenge to the infection prevention and medical teams.

Healthcare leaders need to consider new management strategies to achieve operational efficiency. Crothall Healthcare’s proactive and vigorous response to environmental hygiene is focused on a commitment to patient safety coupled with innovative and strategic initiatives. Our proactive, proven approach to disinfection cleaning processes sets the industry standard for thoroughness and effectiveness with reducing potential infection risk and resulting in improved patient outcomes and satisfaction. These strategic initiatives and positive outcomes can be found in the Mt. Sinai Hospital case study beginning on p. 10.

BACKGROUND

Patients’ Perspective

Patients expect their hospital room to be clean,\(^6\) it’s critical the hospital room is meticulously cleaned and disinfected prior to their admission and on a daily basis during their stay. Additionally, they anticipate a satisfactory and uneventful outcome and do not want to become ill with an HAI, potentially resulting in additional morbidity, extended hospital admission and possible mortality. Many variables impacting pathogen transmission are associated with infection prevention practice compliance; environmental cleaning, hand hygiene, staffing challenges, antibiotic policies, disinfection/sterilization practices, employee vaccination compliance, hospital census, patient acuity and facility design may all affect total outcomes. All of these variables must be proactively addressed to be able to meet patient expectations in today’s competitive marketplace.

Contaminated Environmental Surfaces

An estimated 20% to 40% of HAIs have been attributed to transmission by the hands of HCP who have become contaminated from direct patient contact or by indirect contact with contaminated environmental surfaces.\(^7\) While hand hygiene is the most important way to reduce pathogen transmission in the healthcare environment, it is exceptionally challenging to measure adherence, with varying compliance rates across studies.\(^8\)

The evidence that pathogens responsible for healthcare-associated infections can be widely found in the hospital environment\(^9\) and hence readily acquired on the hand by touching surfaces\(^10\) does demonstrate the importance of decontaminating hands before every patient contact.\(^11\)

Patients are the prime source for environmental contamination; surfaces within the patient’s vicinity, also known as the “patient zone”\(^12\) that are frequently touched by the patient and HCP have an increased contamination frequency than other sites.\(^13\) Environmental surfaces and equipment can harbor pathogens (fig. 2). This contamination may contribute to the spread of disease-causing, multidrug-resistant organisms (MDROs), such as MRSA (Methicillin resistant...
Staphylococcus aureus), VRE (Vancomycin resistant Enterococcus), and C. diff. (Clostridium difficile).[16,17]

**MRSA Surface Contamination**

Epidemiological studies have shown that patients admitted to rooms previously occupied and contaminated by patients with these pathogens are at significant risk of acquiring these organisms from contaminated environmental surfaces that were not properly disinfected and cleaned upon discharge of the previous patient.[17]

**Microorganism Transmission**

Patients—and sometimes HCP—will shed bacteria, spores and viruses into the hospital environment, creating potential threats to other staff members, patients and visitors.[17] Microorganisms may be attached to droplets, skin scales or other particles and disperse through the hospital environment, where they have the ability to survive for hours to days to months (fig. 3). Transmission of many healthcare-associated pathogens is related to contamination of near-patient surfaces and equipment.[10, 20] Environmental contamination depends on the following:[17]

- The ability to culture the organism
- The degree of patient shedding; infected patients shed more than those colonized
- The number of culture-positive body sites
- Sampling methodology
- Difficulty of cleaning the environment
- Presence of an ongoing outbreak
- Diarrhea, with widespread contamination
- Type of patient

In addition, horizontal surfaces have a greater amount of microorganisms and contamination than vertical surfaces, ceilings, and intact walls.

**Importance of Cleaning and Disinfection**

Cleaning, the removal of soil and contaminants from surfaces, is recognized as a vital component of the intervention package required to reduce hospital infection.[21] Disinfection results in destroying pathogens. Friction is also used to remove surface contamination. The type of materials used in environmental surfaces and the design/amount of equipment in a patient’s room will impact cleaning effectiveness.

Effective cleaning and disinfection will decrease the number of environmental pathogens, reduce the risk of transmission and potential infection, and be an integral part of a hospital’s infection prevention and control plan. It is highly likely that cleaning practice plays a larger role in positive outcomes than does the product used.[22]

**Daily Cleaning and Disinfection Challenges**

Numerous clinical studies indicate thoroughness of disinfection cleaning may be suboptimal and can be significantly improved.[20] Environmental surface contamination may contribute to the spread of disease[16] and potential infection by contaminating HCP hands, gloves, uniforms, gowns and equipment. Several significant pathogens, including MRSA, VRE, C. diff. spores and Acinetobacter baumannii can survive, under certain conditions, for four to five months or more.[17] Norovirus can survive for a week or more.[17]

The number of microorganisms on a surface is impacted by:

- Amount of surface moisture
- Amount and type of activity taking place in the immediate vicinity
- Amount of air flow
- Prevailing ambient temperature
- Number of people interacting with the environment
- Type of environmental surface and its ability to foster microbial growth
- Biofilm development on equipment and furnishings

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**Lingering Contamination**

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>Length of Survival</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Acinetobacter</em></td>
<td>3 days–5 months</td>
</tr>
<tr>
<td><em>Clostridium difficile</em></td>
<td>5 months</td>
</tr>
<tr>
<td><em>Enterococcus, including VSE</em></td>
<td>5 days–4 months</td>
</tr>
<tr>
<td><em>Klebsiella</em></td>
<td>2 hours–30 months</td>
</tr>
<tr>
<td><em>Staphylococcus aureus</em>, including MRSA</td>
<td>7 days–7 months</td>
</tr>
</tbody>
</table>

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Hospital environments are complex and may result in disinfection cleaning challenges. A surface may appear “clean” but still harbor pathogens. Frequent environmental contamination has been implicated as a contributing factor during protracted outbreaks of MRSA, *C. diff.*, VRE, *Acinetobacter baumannii*, and norovirus. Evidence exists that improved cleaning regimens are associated with the control of outbreaks and bacterial transmission. Environmental surface contamination with pathogens can be transmitted onto the hands of HCP and may spread disease-causing organisms like MRSA, VRE and *C. diff.* to the patient.

**Regulatory and Governmental Agencies’ Perspectives**

Regulatory agencies, including The Joint Commission (standards and National Patient Safety Goals) and the Centers for Medicare and Medicaid Services (CMS), in conjunction with the United States Department of Health and Human Services (HHS) and the Centers for Disease Control and Prevention (CDC), recognize the importance of environmental hygiene to reduce infection. These organizations are increasing their recommendations and standards to improve environmental hygiene. The regulatory agencies are requiring documentation demonstrating that hospitals are focused on reducing HAIs. The evolving regulatory and governmental healthcare emphasis is to supervise, inspect, analyze and optimize the thoroughness of disinfection cleaning to ensure safe patient care.

**Importance of a Clean Environment**

There is generalized agreement that a clean environment is necessary to provide both good standards of hygiene and maintain patient and staff confidence. Patient satisfaction surveys also question the hospital’s cleanliness. Patients may subjectively consider hospitals “dirty” and will associate this with a general lack of care. The media also have a heightened interest with environmental hygiene and reporting on “dirty hospitals.” Many states now have public reporting of hospital infection rates, with diminished reimbursement in some situations, for having higher-than-expected infection rates. The hospital must strive to meet community standards and exceed expectations to avoid negative outcomes. The impact of negative media coverage can adversely affect the bottom line.

A clean, disinfected environment may promote a healthier workforce. HCP who work in close proximity to patients, including those who provide either direct or indirect patient care, need to stay healthy to come to work, reduce infection risk to their families, and minimize the potential of spreading illness to patients.

**Meeting the Challenges**

Healthcare providers must align their operations to more efficiently meet HAI challenges. Effective administration and management of environmental services resources are critical for improving processes and maintaining a safe and clean environment for patients and healthcare personnel.

**THE CROTHALL HEALTHCARE SOLUTION**

**Strategic Initiatives for Improved Outcomes**

The Centers for Disease Control and Prevention (CDC) divides housekeeping surfaces into two distinct groups: those with minimal hand contact (e.g., floors and ceilings) and those with frequent hand contact (also known as “high touch surfaces”), which have the potential to become reservoirs for infection. High-touch surfaces can quickly become contaminated; pathogen transmission is related to the contamination of near-patient surfaces and equipment.

High-touch housekeeping surfaces include:
- doorknobs
- bedrails
- light switches
- wall areas around the toilet in the patient’s room
- edges of privacy curtains
- sink
- bedside table
- side rail
- call box
- telephone

§482.42 Condition of Participation: Infection Control

“... The hospital must provide and maintain a sanitary environment to avoid sources and transmission of infections and communicable diseases.”

Standard EC.02.06.01

“Areas used by patients are clean and free of offensive odors” (The Joint Commission. Accreditation Program: Hospitals)
The CDC recommends that high-touch housekeeping surfaces should be cleaned and/or disinfected more frequently than surfaces with minimal hand contact and that programs be developed that optimize cleaning thoroughness.

**The Human Factor**

Every day, HCP perform thousands of interventions and actions that have the potential to transmit infection and/or cause environmental contamination. To address the problem, there is a focus on technical solutions—re-engineering protocols, adopting new products and researching new technology. But what cannot be overlooked is the human factor: the front-line housekeeping staff, whose daily cleaning and disinfecting activities help to protect the patient. The cultural divide between the environmental services and clinical staff is a resultant theme impeding hospital cleanliness. Optimal performance barriers include:

- Gaps in training, education and understanding of their role
- Separation from traditional hospital clinical team
- Potential for language or understanding barriers
- Pressure from nursing and admitting staff to clean a room under the allotted time
- Feeling of disempowerment to challenge hospital staff

This results in hospital equipment and furniture not being appropriately cleaned and an increase in pathogen transmission risk to patients and HCP.

Crothall’s Environmental Services program, respected as an integral part of a facility’s infection prevention program, is designed to go beyond basic cleaning to disinfect surfaces by implementing specially designed protocols that consist of best practices to protect patients, staff and visitors from acquiring pathogens. To be healing environments, hospitals must not only look visibly clean; they must also be free of microbial contamination.

Crothall’s thorough, integrative environmental cleaning and disinfection approach (fig. 4) that reduces HAIs and leads to positive patient outcomes is accomplished through multiple systems and processes.

Crothall proactively responds to these human factor challenges by:

- Ongoing and direct employee coaching, training, engagement, partnership, accountability and empowerment of staff members to ensure they are clear about their individual responsibility for promoting environmental hygiene through correct cleaning/disinfection processes and proper personal protective equipment (PPE) use

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**Continuing employee education**

- New hire orientation
- Weekly “Minders”
- Monthly in-service CHAT sessions
- Annual refresher training
- Training, including hand hygiene, PPE, C. difficile modules, VRE, MRSA, isolation room cleaning, and safe work practices

**Fig. 4  Integrated Infection Prevention Approach**
• Educating the environmental services and healthcare teams in the proper use of hospital-grade chemical agents
• Designing comprehensive, specific and integrative protocols and strategies, including a 10-step process that focuses on disinfecting and cleaning of high-touch points in the patient zone
• Auditing staff to ensure strict adherence to standard protocols that have a high-touch-point focus
• Diligently using the Clean-Trace™ performance improvement technology for immediate employee feedback to ensure service quality and monitoring long-term trending
• Using checklists to ensure all procedures are being followed
• Competency testing to assess worker performance

**Crothall recognizes that a successful environmental services program depends upon:**

- Acknowledging the Environmental Services (EVS) Department as a key player in infection prevention
- Clinically involving the EVS staff
- Viewing EVS as full-fledged health care team members
- Team cooperation breeding empowerment
- Partnering with the hospital’s Infection Prevention Team, serving on the Infection Prevention and Control Committee, and participating in regular environmental rounds performed with Environment of Care and Infection Prevention colleagues
- Using appropriate one-step EPA-registered hospital disinfectants for cleaning and disinfecting high-touch, environmental surfaces
- Cleaning/disinfecting C. difficile rooms with CDC recommended Environmental Protection Agency (EPA) registered disinfectants with a C. difficile sporocidal label claim
- Implementing microfiber products, H2O2 liquid products, ultraviolet (UV) technology, and H2O2 vapor technology
- Conducting periodic independent consultant assessment surveys

• Scientific testing of emerging antimicrobial product technology for reducing environmental contamination in the patient zone
• Partnering with a manufacturer and hospital to perform a clinical evaluation with a new disinfectant that will have a C. difficile sporocidal label claim
• Using High Efficiency Particulate Air (HEPA) filtration in selected clinical situations
• Allocating significant resources for piloting and studying the results of emerging innovative technologies
• Researching optimally constructed hospital furniture and equipment surfaces to reduce environmental contamination
• Staying current with emerging chemicals and technology
• Implementing and ensuring compliance with evidence-based policies and procedures based on:
  - The Centers for Disease Control and Prevention (CDC), World Health Organization (WHO), Canadian and British infection prevention guidelines and recommendations
  - Regulatory agencies (e.g., OSHA, Department of Public Health, CMS)
  - Accrediting agencies (e.g., The Joint Commission, Healthcare Facilities Accreditation Program (HFAP), National Integrated Accreditation for Healthcare Organizations (NIAHO)
- Incorporating well-designed research from medical literature
- Implementing industry studies and recommendations
- Adopting best practices from other leading organizations (e.g., AORN, APIC)
- Understanding that the implementation of newer technologies will always complement basic environmental cleaning and disinfection
- Evaluating an organization’s specific and unique needs when recommending proper cleaning procedures, products and new technologies
- Embracing Crothall’s research and scientific experience
The “Clean-TraceTM” Performance Improvement Tool for Reducing Contamination

Some hospitals use visual inspections, which are subjective, inaccurate and unreliable indicators of environmental cleanliness and invisible microbial contamination. Based on the CDC’s recommendation to monitor cleaning performance, Crothall relies on the 3M Clean-TraceTM Surface ATP test, with its proven high sensitivity and repeatability, as an objective indicator of high-touch surface cleanliness in seconds. Clean-Trace detects adenosine triphosphate (ATP), an enzyme present in all living cells. This ATP monitoring system detects the amount of organic matter that remains after cleaning an environmental surface. In one study, after the implementation of an intervention program, ATP readings provided quantitative evidence of improved cleanliness of high-touch surfaces. A second study noted ATP testing can provide instant feedback on surface cleanliness and is an effective tool for demonstrating deficiencies in cleaning protocols to the staff.

The use of Clean-Trace, with its standardized methodology, is an integral component of monitoring a hospital’s sanitation efficacy. Measuring and documenting right after cleaning allows for specific, timely and constructive feedback to the front-line employees, leading to remarkable cleaning efficacy and patient satisfaction results. Employees feel more motivated and engaged with their roles. Crothall quickly realized the value of Clean-Trace and offered this performance improvement technology to its customers.

Clean-Trace is superior in that it provides:
- Rapid surrogate test for assessing surface hygiene
- Objective, quantifiable verification for monitoring and evaluating surface cleanliness and contamination
- Optimization and enhancement of cleaning practices to verify the efficacy of current methods
- Assessment of the hygienic status of high-risk surfaces in 30 seconds, enabling immediate feedback to staff members and the opportunity to take quick corrective action
- Reduction in the risk of cross-contamination due to inadequate cleaning
- An automated, performance-improvement tool to trend, benchmark and continually improve environmental hygiene cleaning performance while acceptable, national scientific standards reflecting cleanliness and safety continue to be studied
- Assistance in protecting the client’s integrity due to the inability to manipulate or falsify findings

Crothall managers collaborate with a hospital’s Infection Prevention and Control Department to determine the high-touch surfaces that will be measured. Ongoing target goals are established with the client, infection prevention and control, and appropriate Crothall regional leadership.

Managers test 50 surfaces per week, equaling 10 surfaces per patient room; this ensures thorough and accurate results. Outcomes scoring outside the pre-determined acceptable range of 0 to 499 will require immediate associate re-training.

**CLEAN-TRACE TESTIMONIALS**

“By using standard testing protocols and empirical data, we can prove that the environment has been cleaned and sanitized properly, thereby eliminating patient contamination by contact surfaces.”

Peter Duffy, VP of Operations
Hospital of Saint Raphael
New Haven, Connecticut

“We had a successful Clean-Trace EVS/ICP to JCAHO in which they remarked that this was the first time they had seen the program in practice and asked for a demonstration—and they were impressed immensely!”

Dayan Sangha, EVS Operations Manager
Inova Fair Oaks Hospital
Fairfax, Virginia

“We implemented the 3M Clean-Trace in the first quarter of CY 2011. Initially, we used the target of achieving 80% pass rate for each of the 10 high-touch surfaces. Within a few months, each one of these tough points was exceeding this target. Instead of just staying with this metric, we decided to move the target to 90% pass. Once again, within a few months, we were able to consistently achieve this new and higher target.”

Patrick Cassese, Resident Regional Manager, Environmental Services and Patient Transportation Departments
Allegheny General Hospital and Suburban Campus
Pittsburgh, Pennsylvania

“The Clean-Trace tool provides us with an effective means of producing data that our cleaning practices are effective and helps us deliver a product that is state-of-the-art to our customers.”

Newlson Darrow, Unit Director EVS
Hahnemann University Hospital
Philadelphia, Pennsylvania

“Infection control and the nurse managers have been very supportive with our testing. Their only request has actually been to increase the number of swabs we are conducting weekly.”

Alan Rothstein, Director of Housekeeping
Hebrew Rehabilitation Center
Dedham, Massachusetts

**Fig 5: Clean-Trace implementation, February 2011 through January 2012**
Follow-up testing occurs within 24 hours for all deficient surfaces. Surfaces that reveal no improvement will result in additional training as well as performance counseling. Outcomes are reported during quarterly management and joint review committee meetings for assessment; data may also be reported through the Infection Prevention and Control Committee.

Crothall’s Senior Leadership Team is fully engaged with reinforcing quality inspections of high-touch patient surfaces in a systematic manner. The operations manager, assistant director and unit manager/resident regional manager conduct quality inspections. Any deficiencies are investigated within 24 hours. Findings and outcomes are additionally reviewed by the team during documented bi-weekly management and joint review meetings. Action plans are created for deficiencies related to project work. Additionally, data is inputted daily to meet weekly guidelines and company expectations.

**Crothall’s Clean-Trace Implementation**

During February 2011, Clean-Trace was implemented at Crothall accounts, with an initial target of 80% compliance (fig.5). High-touch points inspected included the following:

- telephone
- remote control
- light switches
- sink faucets
- toilet and flusher
- bed hand rail
- shower handle rail
- call button
- restroom door handle
- bedside table

The initial goal of 80% was met and exceeded. Compliance started to increase due to the leadership team’s ability to assess and refine the process and ongoing, immediate staff feedback. The target goal was then raised to 90% with consistent performance.

**Ultraviolet Sterilization Technology; Reducing Unwanted Microbes**

Crothall partnered with American Ultraviolet (AUV) and became an early adopter of ultraviolet (UV) technology as an innovation to destroy microorganisms and fight HAIs. Ultraviolet germicidal irradiation (UVGI) destroys airborne organisms or inactivates microorganisms on surfaces.\(^3\) Its advantages include:\(^3\)

- Biocidal activity against a wide range by destroying pathogen DNA
- Environmental surface and equipment decontamination
- Rapid vegetative bacteria decontamination, including activity against *C. difficile* spores
- No requirement to seal room
- Ability to keep the heating, ventilation and air conditioning systems fully functioning
- Residual-free process
- Well-distributed UV energy in a room

![Fig. 6: Automatically Reliably Targeting Zero (ARTZ) Mobile Room UVC Germicidal Solution](image)

First, as part of the hospital patient room or operating room terminal disinfection process, the room is manually cleaned and disinfected. Then, the Automatically Reliably Targeting Zero (ARTZ) Mobile Room UVC Germicidal Solution is activated (fig. 6). This technology uses high-intensity UVC lamps to deliver a critical dose to all room surfaces to quickly, safely and effectively reduce harmful pathogens in patient rooms and surgical suites. This process is more efficient than conventional disinfection. The ARTZ uses reflected energy to reach shadowed areas and increase overall intensity in the treated space. A touch-
screen tablet acts as a remote controller and transmits reportable data to an SD memory device. Infrared sensors provide a 360-degree field of view, preventing the unit from turning on and even extinguishing the lamps should anyone enter the room from an unsecured door. ARTZ releases no ozone and has proven effectiveness against C. diff. spores.\(^{(35)}\)

Crothall managers proactively introduce UV technology specifics and outcome data to the Infection Prevention and Control Representative, key client and key other related hospital customers. During the implementation period, initial test specifics are established for a pre-determined period of time including controlled specialty areas (OR, Burn Unit, isolation precaution rooms, etc.) and testing methods (typically, hospital microbiology or designated resource). The appropriate application locations are then chosen. The manufacturer's recommendations for training, safety, product handling, device maintenance and usage are followed. Ongoing product training and education is included during orientation and annual refresher sessions. An outcomes report in partnership with Infection Prevention and Control is given during joint review meetings.

**Clostridium difficile (C. difficile)**

**Room Cleaning**

The CDC recognizes the importance of the Environmental Services Department with having a key role in reducing C. difficile contamination that can directly be transmitted to patients or contaminate the hands of HCP.\(^{(36)}\) C. difficile spores resist destruction by the usual hospital disinfectants, e.g., quaternary ammonium compounds. Resultantly, the CDC recommends using an EPA-registered disinfectant with a C. difficile sporocidal label claim in conjunction with thorough physical cleaning.\(^{(36)}\) Crothall was using EPA-registered disinfectants with a C. difficile sporocidal label claim prior to the formal CDC recommendation.

**Return on Investment**

The Mount Sinai Hospital case study on page 10 clearly demonstrates how the implementation of Crothall’s work procedures, including Clean-Trace and UV technology, dramatically reduced infection with improved patient outcomes. Crothall Healthcare’s long-term investment in and commitment to patient safety and standardization, coupled with innovative and strategic approaches, such as the ability to rapidly embrace innovative emerging technologies, raises HCAHPS scores, improves revenue streams and maximizes staff productivity.

**Ongoing Commitment to Providing a Safe Environment**

Over the years, countless new technologies have emerged. As part of our ongoing journey to continually improve and expand our support services, Crothall has put significant resources into piloting and studying the results of each new technology or innovation. Clinical testing is always done in conjunction with our clients as well as third-party infectious disease and infection prevention experts. And, it is an ongoing process to exhaust all avenues in the search for better solutions.

In summary, Crothall Healthcare’s approach to ensure a safe patient zone:

- Increases focus on patient safety and care
- Prevents HAIs
- Embraces innovative technologies
- Ensures consistently high levels of cleanliness
- Employs environmentally conscious cleaning practices
- Raises patient and staff satisfaction
- Meets regulatory compliance
- Guarantees service outcomes
- Keeps staff up to date with ongoing training programs

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**Successful C. difficile infection reduction**

A 400-bed hospital in Maryland experienced a sharp increase with C. difficile infections during 2006. A CDC root cause analysis concluded that there were opportunities to improve environmental hygiene. Crothall was hired to manage the EVS Department and decrease infection.

Interventions:

- Immediately implemented bleach cleaning
- Later transitioned cleaning to Oxivir
- Created a cleaning guideline checklist

The hospital concurrently:

- Enhanced antibiotic stewardship
- Increased numerous infection prevention interventions addressing surveillance and isolation precautions
- Installed automatic hand sanitizer dispensers and CHG soap

Resultantly, a dramatic infection decrease was noted.\(^{(36)}\)

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**Yearly Totals of HA C. diff.**

![Graph showing yearly totals of HA C. diff.](Fig 7: Results with Crothall intervention at a 400-bed hospital in Maryland.)
• Reduces supply costs
• Is customer-focused (e.g., provides independent continuous readiness audits)
• Focuses on standardization in protocols, quality assurance and management tools

MOUNT SINAI HOSPITAL CASE STUDY: AN OUNCE OF PREVENTION

As one of the largest hospitals and best teaching institutions in the world, The Mount Sinai Medical Center in New York is not satisfied merely with controlling infections. They are dedicated to prevention, using the Environmental Services (EVS) Department as the first line of defense.

Compatibility, Responsiveness, Resources
Mount Sinai’s 1,171-bed facility has a huge EVS department, with more than 650 full- and part-time employees in EVS and Patient Transportation (PT), and with an additional 44 Crothall Healthcare managers.

For years, Mount Sinai had been using another national services company for EVS and PT, but by 2008, Mount Sinai’s leadership decided they needed to make a change. In the eyes of Mount Sinai Vice President of Support Services Daryl Wilkerson: “We were looking for quality, more services, more empathy for our employees, and more of a team approach. Crothall told us what they would accomplish. The expectations were put out there in front of everyone.”

Starts with Training, Ends with Technology
The Mount Sinai story is more than a simple EVS transition story. In 2008, Mount Sinai had 1.06 C. diff. infections per 1,000 patients—and a hospital goal of dropping that rate to 0.78.

The first strategy, according to Crothall Regional Manager Paul Killion, was simply to strengthen the EVS department, with a special emphasis on retraining. “We had to do major retraining when we began the contract,” Killion recalled. “Employees were mixing their own chemicals; sometimes, they weren’t even using the right chemicals.”

Crothall went beyond simply updating department processes. They overhauled everything from technology to attitude:
• Hospitality training
• New, state-of-the-art equipment
• Environmentally friendly products

HAI rates began dropping. Significantly. In the first year, the C. diff. rate dropped to 0.91.

Then, in 2010, Crothall began piloting a new cleaning program specifically geared toward infection prevention. Two new technologies—3M™ Clean-Trace™ and Tru-D SmartUVC™ (a UV-irradiation device)—were introduced at Mount Sinai.

Clean-Trace detects ATP, a protein present in all living organisms. The test is a simple swab that gives results in 30 seconds. This was a huge step over previous measures used at Mount Sinai. “There was no technology; they just used their vision and a form,” explained Wilkerson. “Clean-Trace gives measurable, empirical data. You either disinfected the surface or you didn’t,” said Killion.

Crothall’s program focuses on high-touch surfaces known to spread infection, such as toilet flushers, doorknobs and bed rails. Clean-Trace allows for directed coaching of staff to actually show them what they missed and help them improve. In the first six months of the program, the EVS staff did surprisingly well—84% compliance in patient rooms and 78% in OR suites. In the subsequent six months, compliance jumped to 86% and 81%, respectively.

The next step was Tru-D, a device that uses highly concentrated doses of UV energy to sterilize not only all room surfaces, but also the air itself, destroying all living organisms, including MRSA, influenza and even C. diff. spores. A recent study showed that admission to a room previously occupied by a MRSA-positive or a VRE-positive patient significantly increased the odds of
acquiring these pathogens. Tru-D is used by Mount Sinai in patient rooms with confirmed infections, as well as high-risk areas like OR suites and L&D rooms.

“At the end of the day, it’s all about patient care,” Wilkerson said. “You’ve got to change your approach. You have to be forward thinking or you’ll lose the game. Crothall has a lot more resources, and they know the trends. That’s why we rely on Crothall to bring those things to our attention.”

Running Down the Numbers

After a full year with new infection prevention goals and two years operating with Crothall’s management focus, the results at Mount Sinai are conclusive:

- 57% reduction in C. diff. infection rates, from 1.06 in 2008 to 0.60 in February 2011
- HCAHPS cleaning scores have increased from 60% in 2008 to 67% in 2011
- 50% reduction in OSHA incidents, from 49 to 25
- 48% reduction in lost work days, from 1004 to 527, saving at least $441,000 a year

“I attribute the first-year improvements in both safety and effectiveness to proper use of chemicals and training of our staff. Our continued progress is thanks to the amazing tools we have introduced, like Clean-Trace and Tru-D,” Killion said. “It wasn’t just the technology. It was about modifying our behavior. It was making sure that we were cleaning and disinfecting effectively.”

For Wilkerson, this level of leadership and performance is even more than he expected. “A lot of it is the management on the ground,” he explained. “Our Crothall managers truly drive the program.”

After partnering with Crothall Healthcare, Mt. Sinai Hospital in New York had a 57% reduction in C. difficile infection rates, from 1.06 in 2008 to 0.60 in February 2011.

SUMMARY

“We must ensure a safe and healthy environment in which to heal.”

– Crothall Healthcare

Crothall was founded in 1991 to address the need for a specialized, high-quality, innovative and responsive support services company, exclusively serving the unique needs of the healthcare industry. With more than 1,200 healthcare clients accompanied with an unblemished Joint Commission survey record, Crothall provides excellence with every delivered solution.

As the industry front-runner, Crothall continually integrates scientifically proven, evidence-based recommendations, tools and industry best practices to reduce environmental contamination and provide a safe environment for patients and HCP. This synergistic approach, coupled with ongoing, extensive research and testing, assists with identifying many innovative, exciting, cutting-edge technologies that offer significant, unified advantages to augment our infection prevention efforts.

Infection prevention is a constant battle that must be waged daily for the health and safety of patients and HCP. Crothall’s people and processes deliver sustainable outcomes that meet high standards of quality and safety resulting in total customer satisfaction.

Crothall remains in the forefront and will continue to pioneer new solutions for our healthcare customers. No other company has the training, technology, and, most importantly, thorough processes, that have made Crothall Healthcare the industry leader.
REFERENCES


