WHITE PAPER

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A GROWING EPIDEMIC?

Striking increase in the number of reported staph infections necessitates the need for advanced cleaning methods like the one offered by Hydro Systems' ICS 8900

By Chris Torry

Executive Summary

Believed to have been eradicated in the years following World War II thanks to the widespread use of antibiotics such as penicillin, the Staphylococcus aureus infection (or staph infection) has been on the comeback trail in recent years. According to a study commissioned by the Centers for Disease Control and Prevention (CDC), and reported by *The Journal of the American Medical Association* in its October 2007 issue, this is due to more and more staph infections developing a resistance to penicillin and the other antibiotics that have traditionally been used to treat them, an opinion that is also posited by the medical community in general.

Staphylococcus aureus is a common bacterium that often resides on the skin and in the nose. While most staph infections are minor and can be easily treated, they can cause an infection when entering an open wound on the body, such as a cut or scrape. Instead of spreading across the body, staph infections tend to penetrate deeply into the body and, if not treated properly, can attack vital organs, sometimes leading to death. An increasingly virulent strain of staph infection is Methicillin-Resistant Staphylococcus aureus (MRSA), which prevents antibiotics like Methicillin from killing it. Serious infections caused by MRSA often appear as pneumonia, infection of the blood or pus-draining wounds. These conditions can cause fever, elevated white blood cell counts and tissue destruction.

In general, researchers have found that hospital visits for staph infections rose by 62 percent between 1999 and 2005. When considering cases of MRSA, CDC research has shown that in 1974 MRSA infections accounted for only 2 percent of the total number of staph infections. That number increased to 22 percent in 1995 and, by 2004, was up to 63 percent.

In the 2007 report that appeared in *JAMA,* the CDC estimates that 94,360 people in the United States developed a serious invasive (those that enter the bloodstream or destroy flesh) MRSA infection in 2005 and, of that number, 18,650 died during a hospital stay, more than are killed by AIDS every year in this country. This equates to a rate of 31.8 per 100,000 residents that developed invasive MRSA infections in 2005. While the word most closely associated with staph infections 60 years ago was "eradication," many in the medical community are now fearful that another "E" word—epidemic—may most accurately describe the current state of staph infections in this country, if not right now, then in the near future.

"This is an alarming number of infections and a very significant number of deaths," said R. Monina

Klevens, an epidemiologist for the CDC and a lead researcher on the study. "This is really a call to action for the health-care facilities to do a better job of preventing MRSA."

The Challenge

Again citing CDC research, about 85 percent of all MRSA infections are associated with the health-care industry and, of that number, about two-thirds of the cases occur outside of the hospital environment, while the other one-third occur during hospitalization. Acknowledging that hospitals and other health-care facilities are obvious breeding grounds for staph infections since they take advantage of those with serious illnesses or compromised immune systems, infection control regimes have been stepped up in recent years.

But what makes the battle against staph infections an escalating one is the fact that MRSA outbreaks have been popping up in so many previously unforeseen places that they have been given their own identity—Community-Acquired Methicillin-Resistant Staphylococcus aureus, or CA-MRSA.

In recent years, more and more schools, prisons, fitness centers, and professional, college and high school sports teams have felt the sting of an MRSA outbreak. For example:

- In 2003, the National Football League's St. Louis Rams had five of the team's 58 players incur MRSA infections. A study of the case that appeared in *The New England Journal of Medicine* determined that the infections were contracted and passed on through abrasions that the players suffered while playing on artificial-turf fields. The infections were introduced to these open wounds both on and off the field through rough play, shared towels and bars of soap, in the whirlpool, and from weight-room equipment that had not been properly sanitized. That same year also saw members of the Miami Dolphins, University of Southern California and half-a-dozen high school football teams hospitalized with various versions of staph infections.

- In 2006, Alex Rios, an outfielder for Major League Baseball's Toronto Blue Jays, was sidelined for a month with a pus-filled staph infection that settled in his lower-left leg, while teammate Ty Taubenhiem came down with a similar infection on his foot and also spent time on the disabled list. In response, the Blue Jays called in health inspectors and disinfected the entire clubhouse, including whirlpool, weight room, shower stalls and restroom areas. There have been no reoccurrences.

- In October 2007, a high school senior from Moneta, VA, died after being hospitalized for a week with a drug-resistant staph infection. He died after the infection had spread to his kidneys, liver, lungs and the muscles around his heart. That same month, four students in Fulton County, GA, were diagnosed with staph infections.

- On Feb. 28, 2008, the mother of an inmate at the Pinellas (FL) County Jail had her daughter removed from life support after a two-week battle with a staph infection and pneumonia had resulted in her being placed in a medically induced coma. Experts on MRSA were uncertain whether the deceased had contracted the infection at the jail.

The common thread between these cases of staph infections that have led to hospitalization and even death, is that they were not contracted in hospital or health-care environments, but, rather, in atmospheres where large numbers of people come together and can have close physical contact, while adequate hygiene regimens may not always be top of mind.

In a 2006 report titled "Effective Cleaning and Health," author Dr. Michael A. Berry, Chairman of the Cleaning Industry Research Institute's Science Advisory Council, writes that "bacteria live on or in virtually every material and environment on Earth. A square centimeter of skin averages about 100,000 bacteria. A cubic centimeter of topsoil contains somewhere on the order of one billion bacteria. Bacteria can live in temperatures above the boiling point of water and in temperatures that freeze blood. They 'eat' everything from sugar and starch derived through photosynthesis to sulfur and iron in rocks."

In other words, bacteria on our persons and in our environments are here to stay. It's the precautions taken to neutralize them that will keep us free from illness and disease, and from becoming one of the unfortunate victims that have succumbed to infections like MRSA.

"These life-threatening MRSA infections are much more common than we had thought," said Scott Fridkin, a medical epidemiologist with the CDC. "This is a significant public-health problem. We should be very worried."

The Solution

The simple answer to the problem is not exactly a "Eureka!" moment. "The number one thing we can do is to practice good hygiene," said Judy Collins, a regional epidemiologist with the Madison County (VA) Health Department. "Washing hands thoroughly and often with soap and water, while seemingly simple, plays a significant role in preventing the spread of staph bacteria."

To that end, the Kentucky Cabinet for Health and Family Services suggests that the following measures be taken in the battle to control or prevent staph infections:

- Keep wounds covered with clean, dry bandages
- Wash hands after touching infected skin or bandages. Put disposable wastes (dressings, bandages, etc.) in a separate trash bag and close the bag tightly before throwing it out with regular garbage.
- Advise family and other close contacts to wash their hands frequently. Caregivers should use gloves and wash hands afterward if they change your bandages or touch an infected wound or other objects that have been in contact with the wound or wound drainage.
- Do not share personal items (towels, wash cloths, soap, razors, clothing, uniforms, etc.) or other items that may have had contact with an infected wound or wound drainage
- Disinfect all non-clothing (and non-disposable) items that come in contact with an infected wound with a solution of one tablespoon household bleach mixed in one quart of water (must be prepared fresh each day) or a store-bought cleaning product that contains phenol, which is a mildly acidic and toxic coal by-product used as a disinfectant
- Wash linens and clothes that become soiled with hot water and laundry detergent. Drying clothes in a hot dryer, rather than air-drying, also helps kill bacteria in clothes.
- Wash utensils and dishes in the usual manner with soap and hot water or use a standard home dishwasher

- Avoid participating in contact sports or in other skin-to-skin contact until an infected wound has completely healed

Which, if all of us lived in our own personal, hermetically sealed bubbles, would be a snap to do. But as we come in daily contact with other people and public facilities—both of which will have varying degrees of cleanliness—we can never be quite sure what we'll rub up against.

While the level of ensuring personal hygiene is almost always at the discretion of the individual, the cleanliness of the restrooms in public facilities—from hospitals to restaurants, health clubs to gasoline stations—requires the operators of these facilities to form a public trust with the people who frequent them. In other words, if I'm going to spend time in your restroom, you have to spend the time to make sure it's as clean and bacteria-free as possible.

Through the years, traditional methods of restroom sanitation have involved often-unpleasant "hands on" cleaning, where the cleaning staff has to get down on its hands and knees and scrub floors, partitions, the underside of counters and fixtures with a wide variety of hand-applied cleaning chemicals, which then had to be wiped off or swabbed up with a mop that oftentimes went back-and-forth into a bucket containing dirty water. This method of cleaning not only brings the cleaning staff into close contact with any germs or bacteria that might be present, but with its repetitive stooping, bending and scrubbing, also takes a physical toll.

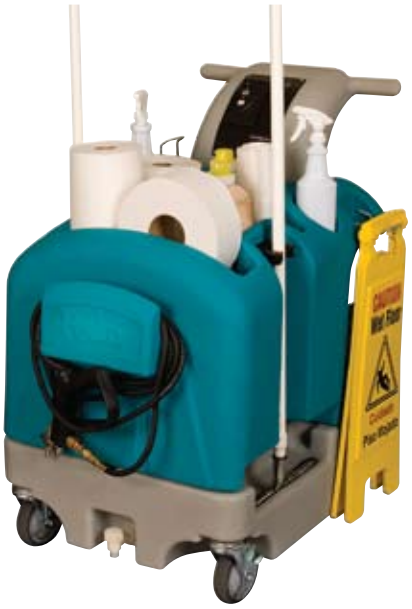
Therefore, this type of cleaning regimen can often lead to lowered employee morale, increased employee turnover, higher associated training costs and—most important to the public—ineffective cleaning practices.

To do away with this tried-but-hardly-true method of restroom cleaning and sanitation, Hydro Systems, Cincinnati, OH, the leading independent manufacturer of proportioning, dosing and dispensing systems for concentrated chemicals, and an industry leader in automatic/touch-free cleaning systems for daily cleaning applications, has created the ICS 8900, the latest in its line of mobile integrated cleaning systems and the best-in-class solution for touch-free cleaning of restrooms, locker/shower rooms, etc.

The ICS Series 8900

is an affordable, battery-powered, self-contained portable-cleaning system that uses correctly dosed cleaning chemicals that are applied by spray nozzle using low-flow/low-pressure technology. With the ICS 8900, the chemicals do the cleaning, not high pressure. The 8900 generates less than 100 psi, which protects fixtures and grout from water damage, reduces the risk of the user inhaling atomized bacteria, and eliminates the spray-back of bacteria-contaminated water, all of which may occur with high-pressure (500+ psi) cleaning systems. The design and operation of the ICS 8900 also supports ongoing efforts to eliminate from public restrooms the bacteria that causes staph infections.

The ICS 8900's unique low-flow design uses only half-a-gallon of cleaning solution per minute, eliminating the need for wet/dry-vac recovery and the handling of contaminated water, while at the same time reducing the slip-and-fall risk. Utilizing Hydro Systems' proven select-valve technology, cleaning and sanitizing chemicals are correctly dosed every time, effectively and consistently killing germs and toxins, particularly in hard-to-reach and often-overlooked areas. In addition, the ICS 8900



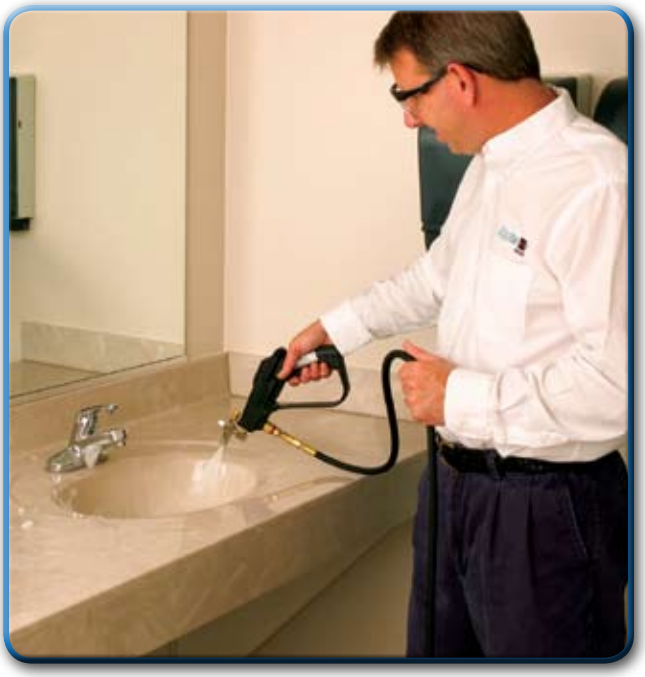
cleans faster. In fact, ISSA 447 Cleaning Times show that the use of touchless cleaning technology can reduce fixture-cleaning time by as much as 67 percent.

In addition, the ICS 8900 is kind to the environment, with 50-percent less water and chemicals used when compared with many other automated cleaning systems. The ICS 8900 operates on a rechargeable, maintenance-free 12V lead-acid battery, allowing the user to clean anywhere, regardless of power-outlet availability. It also has an on-board battery charger and battery-life indicator. The compact design and simple operation of the ICS 8900 eliminates complicated and time-consuming setup and breakdown, and its virtually silent operation also means the user can clean at any time, making it easier to manage daily cleaning schedules.

Operation is as simple as filling the unit's 12-gallon water tank, using the selector valve to choose any of up to four different chemicals to be dispensed, and applying the cleaning solution with the low-flow/low-pressure spray nozzle. After cleaning, the solution is rinsed away with water from the spray nozzle. Any remaining liquid can be maneuvered into a floor drain with a squeegee or mopped dry. An optional foaming nozzle is available to clean vertical surfaces where chemicals need longer dwell time to deliver maximum cleaning effectiveness. This is ideal for shower and locker-room applications.

Conclusion

Again quoting Dr. Barry from his report: "Hygiene is commonly understood as preventing disease and infection through cleaning. Good hygiene includes the absence of visible soil or malodors and harmful levels of bacteria and other microorganisms and harmful matter. Good hygiene as indicated by a state of cleanliness creates a sense of well-being and, among other benefits, enhances health, aesthetics, comfort, social interactions and human productivity. In many instances the process of high-performance cleaning directly aids in disease



prevention and isolation. Good hygiene—as manifested by cleanliness—maintains a healthy condition and avoids sickness and disease. In the midst of an epidemic, good personal hygiene and effective cleaning processes reduce contagiousness."

These should be words to live by as the rate of MRSA infections continues to grow. Of course, personal hygiene is the main barrier against falling prey to one of these virulent infections, but when out in public—and the cleanliness of a restroom is in the hands of the facility's operator—wouldn't you feel safer if you knew that a machine like the ICS 8900 had been used to clean and sanitize it? It is with the health and welfare of the public in mind that Hydro Systems has created the ICS 8900.

For more information contact: Chris Torry, ICS Sales Manager at (513) 271-8800 or visit www.hydrosystemsco.com