

Antibiotic & Antimicrobial Stewardship: Disinfectants are Ongoing Focus of Sensitivity, Resistance Debate

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ABSTRACT

Antibiotic resistance has become a significant topic of importance as antibiotic resistance threatens the effective prevention and treatment of an ever-increasing range of infections caused by bacteria. Given the growing problem of antibiotic resistance, environmental cleaning and disinfection can play an important role in helping to prevent the spread of antibiotic resistant bacteria. As such, there is a growing body of evidence to demonstrate the effectiveness of environmental cleaning and disinfection as part of multimodal strategies to reduce pathogen transmission, prevent infections and improve patient outcomes.

BACKGROUND

Effective antimicrobial drugs are prerequisites for both preventative and curative measures, protecting patients from potentially fatal diseases and ensuring that complex procedures can be provided at low risk. However, pharmaceutical companies are backing away from new antibiotic development for several reasons – the high cost of and high chance of failure in antibiotic research and development, the length of time it takes to develop new drugs, the slow approval process once a new antibiotic has been developed, and the low return on investment. This redirection means more emphasis will be placed on preventing illness, and that's where effective and environmentally responsible cleaning comes in.

DISINFECTANTS AND THE ISSUE OF RESISTANCE

Much less is known still about microorganisms' reduced sensitivity to germicides such as surface disinfectants. There have been some studies indicating that imprudent use of chemicals can encourage the beginning stages of resistance, but experts have not reached consensus on this issue.

There is emerging research that suggests that the use of quaternary ammonium-based antimicrobial compounds may lead to decreased susceptibility in bacteria and cross-resistance to antibiotics. Studies have demonstrated that exposure of bacteria to sub-lethal concentrations of quaternary ammonium compounds in laboratory settings, which mimics disinfectant misuse over long time periods, can trigger resistant mechanisms. There is also evidence to support the position that the use of disinfectants does not contribute to antibiotic resistance, and some have cited studies demonstrating that both antibiotic resistant and antibiotic susceptible bacteria are still susceptible to surface disinfectants under normal usage conditions.

PREVENTION

Preventing the spread of resistant bacteria is a critical step in preventing infections from occurring and helps to preserve the efficacy of existing antibiotics by reducing the amount of antibiotics that have to be used and the likelihood that resistance will develop during therapy. Environmental hygiene plays a vital role as part of a horizontal approach to infection prevention and control and is especially important when it comes to resistant pathogens like MRSA and VRE. Antibiotic-resistant and nonresistant bacteria have the same level of susceptibility to surface disinfectants approved by the Environmental Protection Agency (EPA) or Health Canada. The likelihood of bacteria developing resistance to surface disinfectants is low due to their rapid kill times. For this reason, facilities are increasingly coupling antibiotic stewardship initiatives with comprehensive environmental cleaning and disinfection programs. The main challenge for facilities is educating their staff on how to implement better protocols to achieve compliance. Education can help improve infection prevention practices to kill antibiotic-resistant organisms before infections can be spread, better protecting patients, staff and communities. Proper application of surface disinfectants - including ensuring contact times are achieved and disinfectants are accurately diluted - as well as following proper protocols for environmental hygiene, plays an essential role in preventing the spread of antibiotic-resistant pathogen because no matter what surface disinfectant a facility uses, if the product is not used correctly, it will not be as effective.

The following are some tips for facilities to consider when performing daily surface disinfection and terminal cleaning procedures:

- Use trusted EPA or Health Canada registered disinfectants with appropriate claims for daily and terminal cleaning to ensure pathogens of concern are killed
- When adopting semi-automatic technology (such as UV-C light devices), always start with routine manual cleaning and disinfection of environmental surfaces. Technology should be used as a supplement – not as a replacement – to disinfect rooms more effectively

Routinely launder and clean privacy curtains, linens, employee uniforms and other soft surfaces in your facility. Consider using an EPA-registered product to kill bacteria on soft surfaces between laundering and on soft surfaces that cannot be laundered.



CONCLUSION

It cannot be overstated that environmental hygiene is a critical component of combating antibiotic-resistant pathogens. Daily environmental surface disinfection can reduce the amount of antibiotic resistant pathogens in the environment and help prevent their spread. Furthermore, environmental cleaning and disinfection is one component of a bundled horizontal approach to prevent the spread of infections. Other components include a focus on hand hygiene, the use of contact precautions, staff education and ongoing training. All of these steps, in conjunction with the prudent use of antibiotics, are critical and work together to help keep patients safe.

IMPLICATIONS FOR AHP

Accelerated Hydrogen Peroxide® (AHP®) is a patented oxidizing-based disinfectant chemistry with proven effectiveness against a number of antibiotic resistant organisms. AHP® is a leading innovative technology that has proven to reduce antibiotic resistant pathogens including VRE, MRSA and *Clostridium difficile* by as much as 23%*.

AHP® disinfectants are one-step disinfectant cleaners

- AHP® has proven cleaning efficiency resulting in lower costs and faster results as well as added confidence that disinfection will occur
- AHP® has been proven to prevent transmission of bacteria to other surfaces**

AHP® disinfectants are environmentally sustainable

- AHP's® active ingredient, hydrogen peroxide, breaks down into water and oxygen leaving no active residues which can contribute to antibiotic resistance

AHP® disinfectants have realistic contact times

- Short contact times ensure surfaces remain wet for the required contact time, providing comfort and confidence that disinfection has occurred

AHP® disinfectants provide the perfect balance between safety and efficacy

- AHP's® non-toxic, non-irritating and non-skin sensitizing formula is designed to be easier on employees and occupants resulting in protocol compliance

AHP® disinfectants are compatible

- AHP® formulations are tested to ensure compatibility that preserve your investments in equipment, furniture, and building surfaces

REFERENCE

*Alfa, J. et al. (2015). Use of a daily disinfectant cleaner instead of a daily cleaner reduced hospital-acquired infection rates. American Journal of Infection Control 43 (2015) 141-6.; Boyce, Presented at the National APIC Conference, June 2016

**Disinfectant wipes are appropriate to control microbial bioburden from surfaces: use of new ASTM standard test protocol to demonstrate efficacy. J Hosp Infect. 2015 Dec; 91(4):319-25 <http://www.ncbi.nlm.nih.gov/pubmed/26518272>