DISINFECTION DIGEST
...FOCUSED ON SCIENCE

Selection of the Ideal Disinfectant

(Rutala and Weber, Infection Control and Hospital Epidemiology. 2016)

Abstract

Healthcare-associated infections (HAIs) remain an important source of morbidity and mortality. A major source of nosocomial pathogens is thought to be the patient's endogenous flora, but an estimated 20%-40% of HAIs have been attributed to cross infection via the hands of healthcare personnel. Contamination of the hands of healthcare personnel could in turn result from direct patient contact or indirectly from touching contaminated surfaces. Healthcare personnel have frequent contact with environmental surfaces in patients' rooms, providing ample opportunity for contamination of gloves and/or hands. Scientific literature has demonstrated that improving surface cleaning and disinfection reduces HAIs.

Background

The selection of the right disinfectant is one of the two essential components for effective disinfection. The other component, the practice, relates to the proper application of disinfectant onto surfaces, the proper training of users, and the adherence to manufacturer's label instructions. The combination of product and practice results in effective surface disinfection, which reduces patient risk and improves patient outcomes. The purpose of this article is to assist users in the selection of the optimal disinfectant for use with environmental surfaces and non-critical patient care items. This article reviews the 5 key criteria that should be used when evaluating disinfectant products today.

5 Key Criteria:

Kill claims for the most prevalent healthcare pathogens

a) The product selected should be effective against microorganisms that are the most common causes of HAIs and outbreaks. A small number of pathogens (mainly vegetative bacteria) are responsible for almost 80% of HAIs. It is important to note that antibiotic-resistant pathogens are not more resistant to disinfectants than antibiotic-sensitive pathogens.

b) To comply with OSHA's (Occupational Health and Safety Administration) and CCOHS' (Canadian Center for Occupational Health and Safety) bloodborne pathogen standard for cleaning blood spills, a disinfectant should be registered as a tuberculocidal, or registered effective against HIV and HBV.

c) Disinfectants should be EPA or Health Canada registered. There are 3 types of registrations: limited, general or broad-spectrum, and hospital disinfectants. To be a hospital disinfectant, the product must be effective against a Gram positive organism (*Pseudomonas aeruginosa*) and a Gram positive organism (*Staphylococcus aureus*). Due to the constant evolution of pathogens, especially emerging pathogens, it is likely that a new or emerging pathogen may not be listed on the manufacturers' labels. Until an EPA-approved claim is available, user should refer to the hierarchy of microbial susceptibility to select the appropriate disinfectant for the emerging pathogen.

Fast kill times and acceptable wet-contact time to ensure proper disinfection of noncritical surfaces and patient care equipment

a) Ideally contact times should be greater or equal to kill time. Wet contact time is critical component of the evaluation because if a product evaporates too quickly, it will not remain in contact with the microorganisms for the necessary kill/contact time. Fast kill times are important because they provide confidence that the prevalent healthcare-associated pathogens are killed before the disinfecting solution can dry or be removed.

b) By law, all applicable label instructions on the EPA-registered products must be followed or the user assumes liability.

c) If the disinfectant dries before achieving the recommended contact time, it is recommend that preparation a formal risk assessment be presented to surveyors when challenged.

d) Nothing is more important than thorough cleaning and disinfection of all hand contact surfaces, i.e. environmental surfaces and patient care equipment.

Safety

a) The product should be nontoxic and should not cause any harm to users, patients and visitors.

b) The toxicity ratings for disinfectants are danger, warning, caution and none. A facility should choose a product with the lowest toxicity and flammability rating, requiring the least PPE, to provide protection from exposure to adverse health effects.

c) Additionally, disinfectants selected should have an acceptable compatibility profile to ensure that they will not cause damage during routine use on common healthcare surfaces.

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Ease of Use

a) The easier a product is to use, the more likely the achievement of use compliance.
b) Disinfectants should be effective in the presence of environmental factors such as organic matter (blood) and hard water which enables one step cleaning and disinfection verses having two independent steps (cleaning followed by disinfecting).
c) Disinfectants should have an acceptable odor, a substantial use life in concentrated form and at the use dilution, and have good cleaning properties.
d) To facilitate use, disinfectants should be available in multiple and convenient forms, and should be composed of a durable substrate that will not easily tear, fall apart, or dry out quickly.
e) Some disinfectants may be affected by certain fabrics or cloths, i.e. cotton and woven microfiber may retain the quaternary ammonium compound (quat binding).

Other Factors

a) Consider suppliers who provide onsite support and training, consultative services and education to help with compliance.
b) Total cost per use as well complexity for the user should be considered. Keep it simple for the staff, standardize where possible to minimize the number of disinfectants to reduce confusion and aid in compliance.

Conclusions

Disinfection of non-critical environmental surfaces and equipment is an essential component of an infection prevention program. Disinfection should render surfaces and equipment free of pathogens in sufficient numbers. While the perfect disinfecting product may not yet exist, a careful process of selection and appropriate use of current disinfectants are necessary to reduce harm to patients and staff.

Implications for AHP®

Accelerated Hydrogen Peroxide® (AHP®) is a globally patented oxidizing-based disinfectant chemistry that exceeds all the criteria set forth by Rutala. AHP® is a leading innovative technology that continues to be supported by its pillars of strength:

AHP® Disinfectants are One-Step Disinfectant Cleaners

•AHP® has been proven to reduce HAIs by 20%[i] and provides superior cleaning efficiency which results in lower costs and faster results

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 to eyes and skin 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 preserves your investments in equipment, furniture, and building surfaces.

AHP® Disinfectants are environmentally sustainable

•AHP's® active ingredient, hydrogen peroxide, breaks down into water and oxygen leaving no active residues and will not negatively impact indoor air quality.

[i] Use of a daily disinfectant cleaner instead of a daily cleaner reduced hospital-acquired infection rate. AJIC 43 (2015) 141-6

PTSHH0175.0 (07/2016)