Important Factors to Consider Prior to Establishing a Facility C. diff Disinfection Process

Tech Talk
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Disinfection in healthcare is a continued area of focus, specifically the prevention of *Clostridium difficile* (C. diff). There are many factors that must be taken into consideration when making decisions regarding C. diff disinfection – chemistry, safety, efficacy, contact time, versatility, compatibility, GPO compliance and cost.

C. diff Disinfection Chemistries Available Today

There are three main chemistries in today's market for C. diff disinfection: Sodium Hypochlorite (Bleach), Hydrogen Peroxide/ Peracetic Acid (PAA) and Sodium Dichloroisocyanurate (NaDCC). Many manufacturers provide product options utilizing these chemistries. To determine which product to choose, chemical stability, human health hazards, efficacy and surface compatibility are all variables that should be considered. For example, each product has a concentrated and a ready-to-use (RTU) shelf life. Customers should consider both the concentrate and RTU shelf life to avoid expiration of product or any associated costs for expired chemical disposal. It is also important for facilities to clearly understand how to properly dispose of cleaning chemicals and disinfectant products used in their facilities. Disposal requirements vary based on county, state or federal regulations, and improper disposal of regulated chemicals can cause harm to the environment and result in significant fines or other consequences. The technical data sheet, US EPA-approved label and Safety Data Sheet (SDS) for each product will have valuable information to review the options and help determine which option is best suited for the facility.

Product Safety Considerations

When it comes to user safety, not every C. diff disinfectant is equal. Varying chemistries and concentrations can promote different sets of personal protective equipment (PPE) recommendations, chemical occupational exposure limits and recommendations for facility engineering controls. These safety requirements and protocols, found in section 8 of the product SDS, clearly detail the manufacturer recommendation that may prompt the facility to establish employee training, chemical storage requirements or procedures and specific chemical handling instructions within the facility.

HMIS (Hazardous Materials Identification System) and NFPA (National Fire Protection Agency) hazard rating systems and placards are efficient resources to quickly determine the potential hazards associated with chemical products. These regulatory tools help to provide ranking for human health, flammability, PPE, reactivity and physical hazards. These are universal codes in the United States that are well accepted and known within the industry and can be used as quick and helpful aids when reviewing, selecting and handling potentially hazardous chemical products. In addition to reviewing product information, each hospital group or facility should ask their local manufacturer or distributor about training programs that are available for all levels of environmental services (managers, supervisors, housekeepers, etc.) to help ensure proper usage and storage of chemical products is understood.

Surface Substrate and Facility Compatibility Review

The versatility and compatibility of the disinfectant play strong roles in the decision-making process. Driven by budgets and other factors, healthcare facilities want to streamline purchases and use fewer products to achieve a wider variety of goals. C. diff disinfectants typically carry a versatile list of "kill" claims; therefore, facilities are beginning to use C. diff disinfectants for most disinfectant needs. Surface compatibility is also important, since the usage of C. diff disinfectants could cause undesirable surface damage. To prevent damage and associated costs, healthcare decision makers and Value Analysis Team (VAT) should perform a preliminary surface compatibility risk assessment prior to purchasing a C. diff disinfectant. Decision makers can also request compatibility testing for hard and soft surface claims from the prospective C. diff disinfectant manufacturers, and consult manufacturers of the common healthcare devices and furniture such as carts, patient beds and mattresses.

Floor disinfection is another area that should be considered in healthcare facilities. One recent study by Donskey et al. demonstrated that a nonpathogenic virus inoculated onto floors in hospital rooms disseminated rapidly to the footwear and hands of patients and to high-touch surfaces in the room.[1] Another study by Deshpande et al. found that floors in patient rooms were often contaminated with Methicillin-resistant Staphylococcus aureus (MRSA), VRE and C. diff, with C. diff being the most frequently recovered pathogen found in both CDI isolation rooms and non-CDI rooms.[2] Therefore, decision makers should facilitate risk assessments to identify when floors should be disinfected. Choosing a product to disinfect floors is important to prevent damage to floor coatings since damage to floor coatings can result in unsightly floors, creating improved breeding grounds for pathogens, higher replacement costs and undesirable downtime in the affected areas. RTU C. diff disinfectants can range from pH levels of 3 to 12; chemicals with pH levels closer to neutral (7) tend to inflict less damage than chemicals with pH levels farther away from neutral.

Disinfectant Cost

In addition to chemistry, safety, efficacy, contact time, versatility and compatibility, case cost and GPO compliance should be considered when evaluating the total cost of ownership of a C. diff disinfectant. First, case costs should always be analyzed as a function of the RTU gallon or quart prices for pricing parity. Additionally, there are GPO-compliant manufacturers that offer C. diff disinfectants. Decision makers should take into consideration the GPO contracts when making the purchasing decisions in order to be compliant and take advantage of potential discounts.

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Conclusion

There are a lot of variables to consider when determining the right process and product for C. diff disinfection, but it is a critical step for most healthcare facilities. We believe what makes a great disinfection protocol is marrying the disinfectant product with a sound and effective facility process. Health care decision makers can work together with manufacturers and distributors to help determine the product and process that works best for the facility to improve the cleanliness and safety of each facility, its patients and staff.

[1] Koganti S, Alhmidi H, Tomas ME, Cadnum JL, Jencson A, Donksey CJ. Evaluation of Hospital Floors as a Potential Source of Pathogen Dissemination Using a Nonpathogenic Virus as a Surrogate Marker. *Infection Control & Hospital Epidemiology* 2016;37(11): 1374-1377. Epub 2016 8/15.

[2] Deshpande A, Cadnum JL, Fertelli D, Sitzlar B, Thota P, Mana TS, Jencson A, Alhmidi H, Koganti S, Donksey CJ. Are Hospital Floors an Underappreciated Reservoir for Transmission of Health Care-Associated Pathogens? *American Journal of Infection Control* 2017;45(3):336-38.

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