



Determining Appropriate Surface Disinfection

Tech Talk

This Tech Talk is based on the regulatory framework for disinfectants for non-critical surfaces in the United States, which may vary from requirements in other countries. Local regulations should always be consulted when evaluating disinfectant claims outside of the U.S.

Surface disinfection is used to help minimize the risk of infection from contaminated surfaces, so when determining what cleaning and disinfection practices are appropriate for a given situation, it is often helpful to use a risk assessment approach – along with an understanding of the regulatory framework for disinfectants – to obtain the maximum risk management benefit from your surface disinfection resources. Understanding the disease transmission cycle is important to the risk assessment process. Also known as the “chain of infection,” this cycle needs to be broken in at least one place to help prevent infection. While surface disinfection can help manage the risk where an infectious agent can be transmitted to a susceptible host from a contaminated surface, it is just one example of a way to break the chain. Other well-known examples are: vaccination – so individuals are no longer susceptible – and isolation/respiratory protection for airborne diseases.

A risk assessment approach to disinfection was used by Dr. Spaulding in a well-known classification scheme that goes by his name. The Spaulding Classification Level for objects that touch only intact skin is called Non-Critical, and has a lower risk category than Critical or Semi-Critical levels applied to medical devices which enter sterile tissue or touch mucous membranes. In fact, because the risk is considered lower, an option to just clean rather than disinfect is part of the Non-Critical classification.¹ Additional guidelines and standards can be used to help determine appropriate cleaning and disinfection practices, including those from the Centers for Disease Control and Prevention (CDC)² and industry-related professional associations. A legal requirement for disinfection comes from the Occupational Health and Safety Administration (OSHA) Standard to protect workers from bloodborne pathogens. Disinfectants used to clean up blood and other potentially infectious materials covered by that standard originally were required to be bleach or carry tuberculocidal claims, but for over a decade now, products with EPA-approved Human Immunodeficiency Virus (HIV) and Hepatitis B Virus (HBV) claims can help meet this requirement.³

Disinfectants for Non-Critical surfaces are regulated as pesticides by the Environmental Protection Agency (EPA) under FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act). Formulated chemical disinfectant substances are approved by the EPA after submitting acceptable data and granted an EPA Registration Number, which must then appear on the product label. That number can be used to retrieve the EPA-allowed claims for that product from the EPA website for the Pesticide Product Label System at www.epa.gov/opp00001/pestlabels and is a useful reference for critically evaluating disinfectant product claims. There are several types of disinfectants in the EPA regulatory framework, and for a product to be labeled as Hospital Grade, it must have efficacy against certain bacteria considered representative of that type of microorganism: *Staphylococcus aureus* (Gram Positive), *Salmonella choleraesuis* (Gram Negative), and *Pseudomonas aeruginosa* (Nosocomial). These products may also be referred to as low-level disinfectants.⁴

Manage the risk
of infection from
contaminated surfaces
by understanding both
product and process.

Surface disinfection products and practices are often targeted specifically toward organisms more likely than others to be a cause of infectious risk. Frequently touched, or “high-touch surfaces,” act as a common mode of transmission in the infectious disease cycle. Pathogenic microorganisms such as Norovirus, *Clostridium difficile*, and *Acinetobacter* species are often targeted by those products and practices as they are easily transferred from such surfaces.⁵ Other microorganisms, though environmental contamination may not be a significant mode of transmission, are used as markers of efficacy (effectiveness) for disinfectants because they may be more difficult to kill than common vegetative bacteria. The causative agent of tuberculosis is an example of that type of microbe, and disinfectants with that intermediate level of efficacy are called tuberculocidal.

In general, the structure of the microorganism influences the level of disinfectant needed (see Fig. 1), and low-level disinfectants are considered to have general efficacy against vegetative bacteria, while an intermediate level may be needed for harder-to-kill microorganisms. Spore-forming bacteria, like *Clostridium difficile*, need a high-level or sporicidal disinfectant, as they form a shell-like spore coat around the cell that renders it resistant to most conventional disinfectants.⁶ It should also be noted that in some cases, the same disinfectant formulation can be used for harder-to-kill microorganisms if the contact time (how long the surface needs to stay wet with disinfectant) is lengthened.

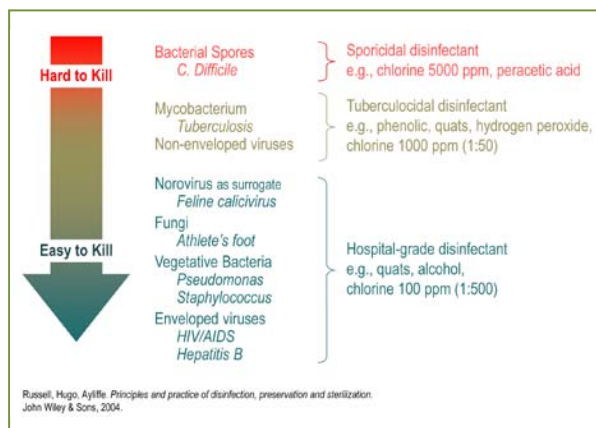


Fig. 1 Structure of the Microorganism Influences the Level of Disinfectant Chemistry Needed

This general information, as well as the EPA-approved claims for a disinfectant product, can be used to make professional judgments about appropriate surface disinfection as part of the risk assessment process. However, if the application is covered by the OSHA Bloodborne Pathogen Standard, then the disinfectant product and process used must comply with that regulation. When conducting a risk assessment, some of the considerations for what cleaning and disinfection products and processes will be appropriate are the type of facility and patient population involved, as well as the infection prevention surveillance data for that facility. A review of the type of information presented here, and the relevant peer-reviewed literature, should also be part of your risk assessment that demonstrates a thoughtful decision process on appropriate surface disinfection to manage the risk of infection from contaminated surfaces in your facility.⁷

How to begin

Start your risk assessment process by understanding your facility in relation to the chain of infection.

- Do you have patient populations with differing levels of susceptibility, such as bone marrow transplant or burn units?
- What does your surveillance data tell you about infection types, rates, and problem areas in your facility?

Next, understand your disinfectants by reviewing the chemistry and EPA label information, and relate the claims back to your facility disinfection needs.

- Are you mainly concerned with low-level bacterial and/or bloodborne pathogen claims to manage risk?
- Or do you need to manage to a higher level of efficacy so that a tuberculocidal claim or contact time is needed?
- Do you have a Norovirus concern, so the products and processes important for that virus should be used? (See the Norovirus Tech Talk for additional information.)

This process should help utilize your disinfection resources to obtain the maximum risk management benefit and to maintain compliance, but also should be considered dynamic and be periodically reviewed as new infection prevention challenges arise.

References

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