Chapter 3.A. Introduction: Writing a Procedure for Disinfection

The information in this chapter is provided to serve as guide and as a basis in developing a school district’s own set of protocols.

An extensive addition to this handbook for the 2021 update was based on the awareness that during the COVID-19 pandemic, many departments who did not traditionally conduct cleaning and disinfecting activities in their department became extensively involved in infection control activities. To do this safely, school districts must determine which departments are using cleaning and disinfecting chemicals, whether they are using appropriate products, whether they are using at the appropriate time and using the appropriate methods, and what safety precautions they are taking. The district should also ensure that departments provide their staff with the safest products, required training and protocols, and assistance and oversight for safe storage and proper disposal of expired and compromised products.

The content of this chapter and the following appendices will enable school districts to work with all involved departments to develop protocols specific to their department. Relevant appendices include:

1. Appendix D: Cleaning and Disinfecting by School Department Staff
2. Appendix E: Common High-Touch Points by Location

Written procedures should provide guidelines to the following questions:

1. Why disinfect?
2. What surfaces and objects need disinfection?
3. What is the schedule and frequency for disinfection?
4. What are the least toxic and most effective products, processes, and equipment that can be used? How will supply chain issues affect the availability of products and equipment?
5. Who should be doing the disinfecting?
6. What information, training, and personal protective equipment do personnel need to safely do the disinfecting?
7. How to protect workers and building occupants during the disinfection process?
8. What is the proper way to store and maintain disinfectants and equipment?
9. How should expired and compromised disinfectant products and by-products be disposed of?
Chapter 3.B. Choosing the Right Level of Microbe Control

Introduction

Before choosing any type of cleaning or antimicrobial product, it must be determined what “level” of microbe control is most appropriate for the surface or object. See also Chapter 3.C. Managing Surfaces for Infection Control to determine which surfaces require microbe control and what types of products can be used on each type of surface.

For a detailed explanation of the following definitions, see Chapter 1.B. Handbook Definitions.

Evaluate the Need for Disinfection

There are typically three levels of disinfection in a school building:

1. **Routine disinfection**

   This level of disinfection is used for those areas that the stakeholder team has determined need disinfecting on a regular basis (in addition to cleaning with a high-quality microfiber cloth and an all-purpose detergent). These areas would be evaluated using the following criteria:

   - Certain surfaces and items that are regulated, such as toileting areas and highchairs in preschools and/or food-contact items in food service settings.
   - Areas that are high-risk, such as some surfaces in restrooms, shower and locker rooms, the nurse’s office, and some athletic areas.

2. **Incidents**

   - Identify and prepare for these types of events. Work with the administrators in the Nursing, SPED, Facilities and Athletics departments to develop a protocol. These events may include:
     - Outbreaks of contagious disease, such as COVID-19, MRSA, influenza, and other diseases.
     - Incidents involving blood and body fluids, such as fights, nosebleeds, and accidents on the playground or the athletic field.
     - Incidents involving feces, vomit, and saliva, such as in toileting areas in preschool, special education classrooms, etc.
   - Identify the location of incidents for each of the following sectors to provide supplies (e.g., spill kits) and training to relevant staff:
     - Elementary schools
     - Middle and high schools
     - Vocational and technical education
     - Buses/transportation
     - Athletic areas

*See also Appendix A.3. Program Planning Handout: Cleaning for Healthier Schools and Infection Control.*
3. **Pandemics**

Pandemics require the use of regular disinfecting protocols but may also require the addition of site and surface/item specific protocols (e.g., common high-touch points). See *Appendix D. Cleaning and Disinfecting by School Department Staff* for specific areas in each department to consider when developing protocols, and *Appendix E: Common High-Touch Points by Location* for areas and common high-touch points in each department to address.

The three main levels of microbe control in schools are:

1. **General surface cleaning** – physically removes visible dirt, organic matter, viruses, fungi, and bacteria. General surface cleaning is accomplished with water, detergent, and physical scrubbing of the surface. The guiding principle is to *remove* microbes, if possible, rather than kill them (with a sanitizer or disinfectant).\(^1\) In addition, thoroughly cleaning a surface can reduce the need to disinfect because without the nutrients and moisture needed to survive, most microbes cannot survive on a clean and dry surface for very long.

   High-quality microfiber mops and cloths can enhance this process. A study at the University of California Davis Medical Center found that cleaning with a microfiber mop removed up to 99% of microbes.\(^2\) The quality of the microfiber will affect its ability to remove microbes, so select a product with a denier of at least 1.0 or smaller.

2. **Sanitizing** – reduces but does not necessarily eliminate all the **bacteria** on a treated surface. Sanitizers do **not** have claims for viruses or fungi. To be a registered sanitizer, the test results for a product must show a reduction of at least:

   - 99.9% in the number of each type of bacteria tested on non-food-contact surfaces.\(^3\)
     Examples of non-food-contact sanitizers include carpet sanitizers, air sanitizers, laundry additives, and in-tank toilet bowl sanitizers.
   - 99.999% in the number of each type of bacteria tested (within 30 seconds) on most food-contact surfaces.\(^4\) Food-contact sanitizers are used in sanitizing rinses for surfaces such as dishes and cooking utensils, and in eating and drinking establishments.

3. **Disinfecting** – destroys or irreversibly inactivates infectious or other undesirable microbes, but not necessarily the spores (reproductive bodies similar to plant seeds) of bacteria and fungi. The number of microbes killed during a disinfecting process will vary, depending on the specific chemical and how it is used.
References


3. Environmental Protection Agency, Pesticides: Regulating Pesticides, “What Are Antimicrobial Pesticides?” Available at: https://www.epa.gov/pesticide-registration/what-are-antimicrobial-pesticides#:~:text=Antimicrobial%20pesticides%20are%20substances%20or%20inanimate%20objects%20and%20surfaces.&text=More%20than%204000%20antimicrobial%20products%20are%20sold%20in%20the%20marketplace.

Chapter 3.C. Managing Surfaces for Infection Control

Introduction

This section discusses key criteria that must be considered when determining whether to disinfect a surface for microbe control.

- Know whether a surface is porous or nonporous. Manufacturers design their antimicrobial products, and the Environmental Protection Agency (EPA) registers them based on surface and use criteria. These different types of surfaces require different types of products and methodology for microbe management.
- Determine whether it is likely that the surface will come in contact with broken skin or mucous membranes. If a surface is contaminated with microbes, but no one is touching it, what would be the point of disinfecting it?
- Consider whether the surface is a type that would allow for the removal of most of the microbes with the use of a high-quality microfiber mops and cloths and a (third-party certified) all-purpose cleaning product to the level of 99% deemed acceptable for the protection of public health, or whether a disinfectant (to kill virtually everything except spores) is needed on those surfaces. See Chapter 3.B. Choosing the Right Level of Microbe Control and Chapter 6.C. Using Microfiber Cloths and Mops for Infection Control.

Types of Surfaces

There are two types of surfaces, nonporous and porous, that must be taken into consideration when selecting infection-control strategies and products:

- Nonporous surfaces are categorized as food-contact or non-food-contact surfaces.
- Porous surfaces are further categorized as carpet, laundry, or other such surfaces.

Please note that sanitizers are registered by the EPA to be used on specified surfaces. The differences are as follows:\textsuperscript{1}

- \textit{Food-contact sanitizers (sanitizing rinses)} are used on surfaces that would come into contact with food. These sanitizers are considered a final rinse. No water rinse following application is allowed.
- \textit{Non-food-contact sanitizers} are used to reduce numbers of bacteria on surfaces that would not come into contact with food.
- \textit{Some products are designed to act as both a sanitizer and a disinfectant}, depending on length of the contact and/or the concentration specified on the label. Many disinfectants that have claims for use on food-contact surfaces must be rinsed with potable water.

\textsuperscript{b} Refers to \textbf{cleaning} products that have been certified by EPA’s Safer Choice, Green Seal™ or UL ECOLOGO®, organizations that develop standards and provide independent third-party certification of products for environmental and human health criteria. The EPA’s Safer Choice and Green Seal certify disinfectants that meet their standards for health and safety.
Surface Management Based on Type of Surface and Extent of Skin Contact

- **Nonporous surfaces** are smooth, non-penetrable surfaces such as floors, walls, and desks that do not allow gases or fluids through.

  These surfaces can be cleaned on a routine basis, with a high-quality microfiber cloth or mop and an all-purpose cleaning product that has been third-party certified as environmentally preferable, to reduce the number of microbes and to eliminate the conditions microbes need to thrive (dirt, oils, and moisture).

  Nonporous surfaces do not need to be disinfected on a routine basis unless there is blood, body fluids, vomit, or feces on these surfaces, or if required by law. When there is an outbreak of an infectious disease, and the surface is touched by a variety of hands, the frequency of cleaning will need to be increased.

  - Floors: Clean with a microfiber mop and a neutral floor cleaner during spring, summer, and fall, and a floor cleaner designed to remove salt in winter. Routine disinfection of floors is unwarranted. Studies have demonstrated that disinfection of floors offers no advantage over regular cleaning and has minimal or no impact on the occurrence of infections. In addition, newly cleaned floors become rapidly re-contaminated from airborne microbes and those transferred from shoes.²

  - Walls: Do not need to be disinfected on a routine basis.

- **High-touch surfaces**: Need to be cleaned more frequently with microfiber and an all-purpose cleaner and disinfected during an infectious disease outbreak such as COVID-19. Please see *Appendix E. Common High-Touch Points by Location* for an extensive list of common high touch areas in every type of space. See *Appendix F: EPA’s Initiatives During the Pandemic, Including How to Use List N* for searching for disinfectants effective against SARS-CoV-2.

- **Porous surfaces** contain pores that allow fluids and gases to move through them. Porous materials can harbor microbes and also make it harder for antimicrobials to come into contact with the microbes.

  - Types of antimicrobials approved for porous surfaces:
    - Until recently the EPA only approved sanitizers for this purpose.
    - With the appearance of COVID-19, they have included disinfectants for porous surfaces on List N. The types of porous surfaces that disinfectants are approved for on List N include:
      - Laundry
      - Presoak for laundry
      - Hydrogen Peroxide Vapor for use in conjunction with VHP generator
  
  - The types of porous surfaces to be treated with sanitizers and/or disinfectants include:
    - Carpet - Carpet is a porous material that can provide an ideal environment for the growth of some types of microbes.⁴ The moisture and nutrient material that can accumulate in carpet combines to form optimal conditions for some types of microbes to thrive.
Any areas that are treated must be dried within 24 to 48 hours to prevent mold growth. Carpet should not be used in areas where there is a high risk of water damage or blood-related incidents, or if necessary, modular carpet tiles may be used that can be replaced if needed. If carpet needs to be treated:

- use an EPA-registered disinfectant or carpet sanitizer for porous surfaces, or
- use steam cleaning/vapor technologies that sanitize carpets without added chemicals.

### Laundry

- Treating Blood Borne Pathogens - items contaminated with blood can be washed. They should be washed separately using an EPA-registered disinfectant laundry product or disinfectant presoak.

#### SARS-CoV-2

- The WHO recommends that laundry that is contaminated or potentially contaminated with SARS-CoV-2 be washed at the warmest available water setting, between 140–194°F.
- A non-laundry related study published in the Lancet Microbe suggests that SARS-CoV-2 is highly sensitive to heat. Tests to determine this found that when the temperature was increased to 158°F, the virus became inactive within 5 minutes.

### General Cleaning

- **Sponges and dishcloths** are not recommended due to the cross-contamination risk and the fact that they can provide an ideal medium for microbial growth. The findings of a study by the University of Arizona on bacteria that were found on cellulose sponges and dishcloths concluded that these items may be an important source of bacterial contamination of surfaces, hands, and foods in home kitchens.
- Microfiber cloths are an alternative to sponges due to their ability to remove microbes and the conditions they need to thrive and to inhibit microbial growth within their fibers. See *Chapter 6.C. Using Microfiber Cloths and Mops for Infection Control.*

---


Consider the Surface Before, During, and After Disinfecting

- **Compatibility of product with surface** – Always check the product label for compatibility because some products can permanently damage surfaces, such as the use of bleach is corrosive on a metal surface.

- **Orientation of surface (horizontal or vertical)** – Consider what application process and equipment would work the best to keep the surface wet long enough to meet the required contact time period.

- **Final treatment of the surface (rinsed, wiped off, or air dried)** – Always read labels for instructions. There are several issues to consider when determining whether to rinse off the disinfectant or sanitizer:
  
  - Regulatory requirements: Disinfectants and sanitizers have rinse and no-rinse requirements that may depend on their end use.
  
  - Toxic residue: Product residue left on a surface may be hazardous when it comes in contact with skin. Children have acquired rashes after sitting on a toilet seat that was not rinsed. Rinse all touchable surfaces when the label states that rinsing is required.

References


Chapter 3.D. Dispensing Disinfectants

Introduction
Dispensing concentrated products through a dispensing system provides a number of opportunities to improve safety and conserve resources by (1) minimizing waste through accurate dilution rates and the use of concentrates, (2) preventing exposures and spills from product concentrates, and (3) improving efficacy due to accurate dilutions.

The ideal situation is to have a dispensing station that can dispense the disinfectant at the correct concentration. Product vendors will often provide dispensing equipment at no cost if sufficient product is purchased from them.

Preparing to Dispense Products

- **Select the proper dilution rate for the task.** Each disinfectant has a concentration that maximizes its ability to disinfect and for which it has been tested and approved by the EPA. The manufacturer cannot guarantee the effectiveness of the product if it is not diluted according to the rate specified on the label. Adding more of the concentrate to the mixture will not necessarily cause the disinfectant to react more quickly or effectively. In fact, improper dilution of a disinfectant can increase the toxicity, the risk of injury, damage to equipment, contamination of drinking water sources, and the cost. Following the manufacturers’ directions for the lowest concentration of disinfectant achieves the highest level of disinfection.

- **Mix only the amount needed.** Some disinfectants lose their effectiveness and must be disposed of within a specified amount of time after mixing. An example is a diluted bleach solution that must be disposed of within 24 hours if not used.

Dispensing Products

- **Without a dispensing station**
  - Use a measuring device and funnel, nozzle, or spigot for dispensing fluids from bulk containers to reduce the chance of spills and overflows. Consider using a ready-to-use product, such as a spray bottle or wipe in certain situations.
  - Thoroughly wash and rinse dispensing equipment after use.
  - Dilute and mix the product in a well-ventilated space.

- **With a non-plumbed dispensing station**
  - These systems use a metered dispensing system that can ensure that only the metered dose of the concentrate is dispensed. The user must then add water separately to the product in the container.
  - Thoroughly wash and rinse dispensing equipment after use.
  - Dilute and mix the product in a well-ventilated space.
• *With a plumbed dispensing station*
  
  o Calibrate dispensing equipment carefully and often, at least every time a new container of disinfectant is opened. Check the equipment for leaks and malfunctions when calibrating. To prevent waste, calibrate equipment using water instead of the chemical product.
  
  o Use pumps and spigots to decrease the likelihood of spills and contact with skin.
  
  o Measure concentrates before adding them to the dilution tank.
Chapter 3.E. Labeling Secondary Containers

Introduction
Secondary or portable containers are those into which chemical products are dispensed and often diluted from an original container or dispensing station. Typically, custodial staff fill trigger spray containers of each product from a dispensing station and put them on a cleaning cart.

When labels are not supplied, fall off or are illegible, these spray bottles are often haphazardly labeled with markers or not labeled at all. They inadequately labeled containers are often found on the cleaning cart or in rooms throughout the building if left by the custodian or distributed to teachers. This practice becomes an accident waiting to happen. In the case of exposure, there is no health and safety information, and the chemical is essentially an unknown.

Vendors can provide labels for spray bottles with all the required product information.

Regulatory Requirements for Labeling Secondary Containers
Antimicrobial products are categorized as both a pesticide and a hazardous product and are regulated under two different laws by two different federal agencies. The following information clarifies each agency’s regulatory jurisdiction over the content of a pesticide’s product health and safety information:

1. Regulated as an Antimicrobial Pesticide – The United States Environmental Protection Agency (EPA) specifies content requirements for antimicrobial pesticide labels under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA).

EPA refers to secondary containers as “service containers” and as “secondary containers.”

They are similar, but there are some minor differences, and different terms are used in different settings:

- A secondary container is used to apply and/or store an EPA-registered pesticide that is neither sold nor distributed. Secondary containers are most commonly used in institutional settings for concentrated products that are diluted prior to use.
- A service container is temporarily filled with an EPA-registered pesticide and used at a site where the pesticide is applied by the applicator.

EPA does not require secondary containers or service containers to be labeled. However, the product applicator is responsible for following the requirements on the label and complying with other relevant requirements in FIFRA and other statutes.

IMPORTANT: FIFRA labels approved by EPA pre-empt OSHA’s label requirements.


---

OSHA refers to secondary containers as “secondary containers,” and the label posted on secondary containers as a “workplace label.”

**IMPORTANT** – The Massachusetts Department of Labor Standards (DLS) enforces OSHA for the public sector, including schools, in Massachusetts.

### Requirements for Label Content for Secondary Container Under Each Regulation

1. **EPA under FIFRA**

   EPA requires a pesticide’s **primary** label (the label on the original container) to serve as the user's guide to applying pesticides to minimize risk and maximize efficacy. The label provides information about how to handle and use pesticide products safely and legally. Pesticide labels are legally enforceable, and all of them carry the statement: “It is a violation of federal law to use this product in a manner inconsistent with its labeling.”

   Although EPA does not require labels on **secondary** containers of antimicrobial products, EPA notes that OSHA requirements may apply (but does not clarify which requirements). EPA does recommend that the user identify the material in the secondary in the event of a spill to ensure that adequate information is available in case of medical or environmental emergency.

   EPA recommends that product applicators provide the following information on secondary container labels for diluted antimicrobial products:

   - Product name and EPA registration number.
   - Name and percentage of active ingredient. EPA provides the following options for listing the percentage of the active ingredient in the diluted product:

     "The percentage of active ingredient listed on the secondary container may be the same as that declared on the pesticide product (for the concentrate), or if known, the percentage of active ingredient in the end-use dilution."

   Takeaway point:
   Products at the “ready to use” dilution may appear more hazardous than they really are because EPA allows manufacturers to use safety data and precautionary statements on the secondary label based on the full concentrate. It may have the same information as the primary label. Also, EPA does not allow a reduced signal word even if the diluted product is less hazardous than the concentrate.

---

\[f\] Note that EPA does not recommend that other elements of the FIFRA label, such as directions for use, should be included.


\[i\] EPA – response to Label Questions - Should the percentage of active ingredient listed be adjusted to reflect the diluted product? If not, could you provide some information as to why the concentrated product ingredient listing should be reflected on the label of the secondary container? LC09-0275 (05/22/09), [https://www.epa.gov/pesticide-labels/pesticide-labeling-questions-answers#logos](https://www.epa.gov/pesticide-labels/pesticide-labeling-questions-answers#logos).
• Signal word and precautionary statements (including First Aid statements) from the registered label (for the concentrate), unless (1) the registrant has acute toxicity data supporting lesser precautionary statements for the diluted product, and (2) alternate directions for the diluted product are indicated on the product label.

The secondary container may have reduced precautionary language (if supported by dilution-specific acute toxicity data), but not a reduced signal word.

• If the product in the container is diluted, it should be followed by the phrase: “The product in this container is diluted as directed on the pesticide product label.”

• The statement: “Follow the directions for use on the pesticide label when applying this product.”


The standard requires that secondary containers with hazardous products be labeled with a “Workplace Label” and must “provide either all of the required information that is on the label from the chemical manufacturer or the product identifier and words, pictures, symbols or a combination thereof, which in combination with other information immediately available to employees, provide specific information regarding the hazards of the chemicals.”

Preprinted “Workplace Label” for spray bottles may be obtained from the distributor or manufacturer. When they are not available, employers can make their own label with the required information.

IMPORTANT: OSHA Hazard Communication

Standard labels are not required when using products regulated by other agencies as noted in the regulations cited below:

1910.1200(b)(5) - This section does not require labeling of the following chemicals:

1910.1200(b)(5)(i) - Any pesticide as such term is defined in the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. 136 et seq.), when subject to the labeling requirements of that Act and labeling regulations issued under that Act by the Environmental Protection Agency.

Regulatory Clarification:
The Massachusetts Department of Labor Standards has clarified that aside from EPA FIFRA superseding OSHA Hazard Communication labeling requirements, all other requirements of OSHA Hazard Communication Standard apply.

Summary Recommendations

When labels for secondary containers are not available, employers can create their own label. The information recommended by EPA under FIFRA was geared towards manufacturers for when they make labels for secondary containers and/or for diluted products. End users can use these recommendations to create a secondary label that helps the end user (who may not have access to the original label information) to use the product correctly and as safely as possible.
Please see *Appendix H: Templates for Labeling Secondary Containers of Disinfectants and Sanitizers*. These templates have provided space and prompts to enter the recommended FIFRA information. These templates can be further customized by resizing them on the computer or copier.

Although the Hazard Communication Standard label requirements do not apply to antimicrobial products, EPA does **allow** use of GHS symbols from the Hazard Communication Standard on an antimicrobial product label:

- The hazard pictograms are not required.
- The hazard pictograms are allowed to be used on a primary label.\(^j\)

They serve as a valuable “at a glance” source of hazard information for the end user.

The EPA does not clearly allow--or prohibit--the use of two other hazard rating systems, the National Fire Protection Association (NFPA) and Hazardous Materials Information Systems (HMIS). For detailed information on these systems, see *Appendix K: Disinfectants - Comparing Information on Pesticide Labels and SDSs*.

\(^j\) EPA, [https://www.epa.gov/pesticide-labels/pesticide-labeling-questions-answers](https://www.epa.gov/pesticide-labels/pesticide-labeling-questions-answers):  
Question - Will the Agency allow the use of the GHS explosiveness symbol and the GHS flammability symbol on pesticide labeling? Is use of these symbols limited to NAFTA labels? (LC08-0162; 5/15/08)  
Answer - The Agency will allow the use of the GHS (Globally Harmonized System for Hazard Communication) explosiveness symbol and the GHS flammability symbol on pesticide labeling and it is not limited to NAFTA labels. 40 CFR 156.78 requires warning statements on the flammability or explosive characteristics of pesticide products meeting listed criteria. These statements, as applicable, must remain on labels that choose to in addition use the GHS symbols. Further, 40 CFR 156.78(d)(3) requires a flammability symbol specifically for total release fogger products and offers an example symbol. The GHS flammability symbol is equivalent and may replace the example provided. GHS symbols may be added by a label amendment and may not be added through notification.
Label Templates
Label templates have been created and designed to enable the end user with prompts to fill in the recommended information. See Appendix H: Templates for Labeling Secondary Containers of Disinfectants and Sanitizers. One set of label templates contains the GHS pictograms and the NFPA and HMIS rating system information, and one set does not.

NFPA Hazard Rating System

HMIS Hazard Rating System
Chapter 3.F. Precleaning Surfaces and a Discussion on Using Disinfectant/Cleaners

Introduction

The cleaning step prior to disinfecting and sanitizing is often skipped for several reasons, including time constraints, a lack of understanding of the role cleaning has in preparing the surface, how materials on the surface can affect product efficacy, and the requirement for the disinfectant to be in contact with the microbes for a specified amount of time to kill them. This document and Chapter 3.G. Identifying Factors That Can Compromise Disinfectant Efficacy provide the reasons why cleaning first makes a difference in efficacy.

The information provided here is to clarify the differences between the product types, when each may be appropriate to use, and what the potential health and efficacy issues are.

Preparing the Surface for Disinfection

- **Why preclean?**
  - For a disinfectant to be effective at killing microbes, all dirt and debris must first be removed from the surface so that the disinfectant can come into contact with the microbes and be absorbed. Soil renders disinfectants less effective because it can hide the microbes, absorb the disinfectant ingredients, and change the chemical nature of the disinfectant.¹
  - Disinfectants cannot penetrate biofilm. Biofilm develops on wet surfaces over time as bacteria “communicate and colonize with other microbes.”¹ The biofilm protects itself with a tough, thick matrix that must be broken down to make the microbes vulnerable. The best way to do this is to brush or scrub with microfiber the surface to which the biofilm is attached.¹ Another way to penetrate the biofilm is to use heat from a steam vapor device.²
    
    Key locations for a biofilm to form are those areas that are wet on a regular basis, such as (1) plumbing under the rims of toilets and urinals, in sinks, and in distribution pipes; and (2) wet areas that surround these locations, such as backsplashes, drain areas, and so forth.

- **Can I use the same product to clean and disinfect?**
  
  This is not recommended. It is always best to clean first with a detergent and then disinfect with a disinfectant.

  - Disinfectant/cleaner products – Although cleaners do not disinfect and disinfectants do not clean, there are products that are designed and registered by the EPA to clean and disinfect. They contain both a disinfectant and a detergent cleaning agent. All surfaces need to be cleaned first. Two types of products are available:
    
    - **One-step** cleaner/disinfectants work on surfaces with only a *moderate* amount of organic soil. They can be labeled as a one-step cleaner/disinfectant that is “effective in the presence of 5% body fluids”; however, measuring 5% organic matter or body fluids may be difficult. To reduce the use of hazardous products, use an all-purpose cleaner for the first step.
■ **Two-step** cleaner/disinfectants are not “effective in the presence of 5% body fluids” and must be labeled and used only as a two-step process—that is, the product must be used twice, once to clean and once to disinfect.

○ All other disinfectants require that surfaces be precleaned using a detergent (an all-purpose cleaner) until they are free of dirt, grease, oil, and organic substances such as blood. Detergents disperse and remove organic materials and dirt from surfaces, reducing surface tension while increasing the penetrating ability of water. Proper cleaning with high-quality microfiber and a detergent will remove up to 99% or more of infectious material and render the surface visibly clean.

○ Because the cleaning step does not require a disinfectant, it is recommended to use two different products (one to clean and one to disinfect) to reduce the amount of toxic disinfectant used.

• **How will the use of microfiber assist in the disinfection process?**

○ High-quality microfiber cloths and mop heads serve several roles in preparing a surface to be disinfected. In addition to soaking up moisture and removing the nutrients that microbes need to survive, high-quality microfiber with dense fibers can remove microbes and bacterial spores.1 (See also Chapter 6.C. Using Microfiber Cloths and Mops for Infection Control.)

---

**References**


Chapter 3.G. Identifying Factors That Compromise Disinfectant Efficacy

Introduction

There are many conditions that can affect how well a disinfectant works to kill microbes. Product-specific guidelines are located on a product’s label. A manufacturer can guarantee the effectiveness of its product only if the product’s instructions are followed.

The National Cleaning for Healthier Schools and Infection Control Workgroup has consistently observed that in practice, the lack of awareness of how disinfectants work leads to poor practices that result in inadequate disinfection and unnecessary exposure to disinfectants. Ultimately, it also leads to a false sense of security that the microbes have been killed.

Efficacy Criteria

The following factors can reduce the effectiveness of a disinfectant and should be kept in mind when selecting and using products:

- *Type of microbe to be killed.* Each disinfectant has unique properties that target specific microbes. The EPA registers each disinfectant on the basis of the target microbe(s) it is proven to kill. This information can be found on the disinfectant’s label.
  

- *Material on the surface to be disinfected.* One of the biggest mistakes in disinfecting practices is not cleaning a surface prior to disinfecting. The following materials could affect a disinfectant’s efficacy and must be removed prior to disinfecting:
  
  - Protein-containing material (e.g., food, blood). These materials may absorb and inactivate some disinfectants.
  - Organic matter and soaps. The presence of organic matter and other compounds such as soaps left on the surface due to inadequate washing and rinsing may neutralize some disinfectants. An increase in pH improves the antimicrobial activity of some disinfectants (e.g., quaternary ammonium compounds [QACs]), but decreases the antimicrobial activity of others (e.g., hypochlorite [bleach]).

- *Cross-contamination issues.* If disinfecting floors, solutions of disinfectant should be changed for each room where disinfectants are used. See Chapter 3.H. Preventing Cross-Contamination for details on the potential for and prevention of cross-contamination. The most effective way to prevent cross-contamination when using a mop and bucket system is using a split bucket or a charging bucket system.

- *The length of time the disinfectant sits in the bucket.* When a solution of disinfectant is used on several rooms over a period of time, efficacy is reduced.

- *Concentration of product.* It is important to choose the proper chemical concentration that is best suited for each disinfection situation. The product is guaranteed by the manufacturer only when used at the concentration listed on the label. Disinfecting
requirements for routine tasks and special-event tasks such as a blood spill may require
different strengths of the same product, or another product altogether.

- **Contact time (also known as kill time or dwell time).** Contact time is the amount of time
  that the product must be in contact with the microbes to kill them. Contact time is
  specified on the product label and varies from product to product. If the product is not left
  on the surface for a sufficient amount of time, the manufacturer cannot guarantee that the
  product will work effectively. This is one of the most common mistakes staff members
  make when using disinfectants.

- **Appropriate temperature.** The disinfectant must be stored at the correct temperature to
  maintain its viability and to ensure effective action when it is used. Improper
  temperatures can degrade a product during storage.

- **Compatibility of the product and the surfaces it is used on.** Not all products are
  compatible with all surfaces, and using a product that is incompatible can damage the
  surface. For example, bleach can corrode metal surfaces, and scrubbing with bleach or
  corrosive (extremely high or low pH) products can remove some coatings on walls or
  floors. Floor finishes can be damaged or dulled by a disinfectant’s pH. Chemical damage
  is irreversible and can be costly to repair. In most cases, floors do not need to be
  disinfected.

- **Water hardness.** Some disinfectants, particularly the older formulations of quaternary
  compounds, do not work well in hard water. The newest quaternary compounds,
  however, work fairly well in hard water; hence, a quaternary compound formula label
  might read “effective in 400 parts per million (ppm) hard water.”

---

**References**


**Resources**

   (www.managemen.com).

2. W.A. Rutala, D.J. Weber, and the Healthcare Infection Control Practices Advisory Committee,
   “Centers for Disease Control and Prevention Guideline for Disinfection and Sterilization in

   Microbiology 509 at the Ohio State University.”
Chapter 3.H. Preventing Cross-Contamination

Introduction

Cross-contamination is the transfer of infectious microbes from one surface, object, or person to another. Preventing this transfer can help minimize the surfaces that need to be cleaned or disinfected for infection control. It is also counterproductive to what a cleaning program is trying to achieve.

Preventing cross-contamination begins with an understanding of where microbes live (a reservoir), how they multiply, and how they move from location to location. See Chapter 2. The Science of Infection Control for information on how this “transmission” process works.

This document provides some common cross-contamination scenarios in schools and several strategies and work practices to prevent this from happening.

What are the common reservoirs of microbes that serve as sources of cross-contamination in schools, and what strategies can be used to eliminate them?

- **Reservoir:** A used cleaning cloth or mop head, especially if left soaking in dirty solutions.¹
  - **Strategies:**
    - Launder cloths and mop heads after use and allow them to dry before reuse to minimize the degree of contamination.
    - Replace soiled cloths and mop heads with clean items each time a bucket of disinfectant is emptied and replaced with fresh, clean solution.¹

- **Reservoir:** A solution of disinfectants, especially if the working solution is prepared in a dirty container, stored for long periods of time, or prepared incorrectly. Gram-negative bacilli (e.g., *Pseudomonas* species and *Serratia marcescens*) have been detected in solutions of some disinfectants (e.g., phenolics and QACs).¹
  - **Strategies:**
    - Prepare disinfectant and detergent solutions in clean containers.
    - Make sufficient cleaning solution for daily cleaning, discard any remaining solution, and dry out the container.
    - Dispose of used solutions immediately.

- **Reservoir:** Contaminated hands or gloves.
  - **Strategies** (in order of preference):
    - Wear and wash chemical-resistant gloves each time a mop head or cleaning cloth is changed for a new surface, or when the disinfectant solution is changed.
    - Wear and change disposable chemical-resistant gloves each time a mop head or cleaning cloth is changed for a new surface, or when disinfectant solution is changed.
Wash hands each time a mop head or cleaning cloth is changed for a new surface, or when the disinfectant solution is changed. (If skin exposure is likely, however, chemical-resistant gloves should be worn.)

What tools can be used to prevent cross-contamination?

- **Bathroom plumbing appliances and dispensers:**
  - Sink-faucet handles present one of the greatest risks of cross-contamination in the restroom. Touch-free toilets and faucets eliminate the possibility of making contact with potentially harmful microbes.
  - Touch-free dispensers in the bathroom allow users to touch only the soap or towel they need.

- **Facility equipment:**
  - Entryway walk-off mats trap pollutants such as dust, spores, and allergens before they enter the building and help to keep entryways clean.
  - Hands-free trash cans eliminate touching surfaces.

- **Cleaning and disinfecting equipment:**
  - Mop systems – use systems that require a new mop head or pad for each room. One common system uses a “charging bucket” that contains fresh solution to wet a stack of pads that are used to replace used mop heads. Used mop heads are collected in a separate container.
  - Buckets – use dual-buckets (AKA split buckets) that have separate dirty/clean water compartments.
  - Vacuums – use high-efficiency filtration equipment to prevent the introduction or spread of particulates that may carry microbes into the air while vacuuming.
  - Mops and cloths – use microfiber cloths and mops to capture more dirt and microbes than with paper or cloth towels. See Chapter 6.C. Using Microfiber Cloths and Mops for Infection Control for more information.

Microfiber cloths can either prevent or cause cross-contamination depending on how they are used. The most effective way to prevent cross-contamination is to fold the cloth so that a new side is used for each new surface or when the cloth becomes loaded with soil.
The illustration below is an example of one company’s use of the “Eight-Fold” method:

- **No-touch cleaning equipment** – this equipment uses automatic chemical metering and injection, an indoor pressure washer, and a wet vacuum to spray down spaces with a cleaning product, then rinse and vacuum the dirty water. If needed, disinfectants can be applied using a spray bottle or other disinfection application equipment. This system eliminates the practice of dipping a dirty mop or cloth into a container of solution.

An independent study on long-term cost savings conducted by John Walker, president of ManageMen and founder of Janitor University, found that no-touch cleaning equipment reduces restroom cleaning times by as much as 66%.\(^1\) Savings are realized on the product and on labor because these systems use a smaller amount of chemicals and take less time.

- **Color-coded equipment (cloths and mops):**
  - The color-coded system uses different color cloths for different types of spaces. For example, it prevents accidentally reusing a cloth or mop that has been used to clean a bathroom in a kitchen.

Source: Rubbermaid - [https://www.rubbermaidcommercial.com/resource-center/0a1bf96b7165e962e90cb14648c9462d/Cross_Contamination_Prevention/](https://www.rubbermaidcommercial.com/resource-center/0a1bf96b7165e962e90cb14648c9462d/Cross_Contamination_Prevention/)
Some facilities managers and building service contractors devise their own color combinations to meet their specific needs, whereas others use the industry-standard color-coding system:

- red for high-risk areas such as toilets and urinals
- yellow for low-risk restroom areas including sinks and mirrors
- blue for all-purpose cleaning (dusting, window cleaning, wiping desks, etc.) in other areas of a facility
- green for food-service areas

Some strategies for transitioning to a color-coded system:

- Post a color-coding chart in an accessible area such as by the time clock, in the locker room, on the cleaning cart, in utility closets, or in other areas.
- Have enough quantity of each color to prevent employees from using another color (e.g., a red cloth if they run out of blue ones).
- For color-blind employees, an accommodation can be made by writing on cloths and mops with permanent markers. Several coding systems can be used: “U/T” for urinals and toilets, “S” for sinks and mirrors, and so forth; or “R” for red, “Y” for yellow, and so forth.

Excerpts from case studies of successful or challenging transitions:

- San Diego State University switched to color-coded mops in 1991. Before the change, the cleaning crew used the same mops for every task, "so there was no way to tell, other than perhaps by smell, where a mop had been used," says Johnny Eaddy, Assistant Director of Physical Plant, Business, and Financial Affairs.
- Some employees may have trouble adjusting to the system of laundering and reusing color-coded products. “After using disposable rags for so long, cleaners may not always remember to throw the cloth in the laundry hamper rather than the trash can.”
- Custodians can also be assigned tasks based on the color systems. “Our bathroom [cleaning staff] only gets the right colors,” says Jimmy McKiernan, Director of Operations for First Quality Maintenance in New York. “We’re trying to take the guesswork out of it so there’s no way for [them] to mess up.”
- Custodians at Lynchburg City Schools in Virginia use a specific mop for every task: green for general cleaning, blue for restrooms, white for blood, and pink for stripper.
Practices to Prevent Cross-Contamination⁴

- **Personal protection:**
  - As a friendly reminder, post hand-washing posters throughout buildings to reinforce the importance of clean hands for staff and building occupants. Tell staff to avoid touching their face, skin, or hair with cleaning cloths.
  - Have staff wear chemical-resistant gloves. After removing gloves, custodians should wash their hands with soap and water for 20 seconds.

- **Restrooms:**
  - Ensure that towel dispensers are dispensing properly. When users reach into a dispenser to unclog towels, they contaminate other towels for future users.
  - Install towel dispensers away from sink-splash zones to prevent contamination.

- **Custodial closets:**
  - Keep closets organized and clean so that microbes do not attach themselves to cleaning equipment and spread throughout the building.
  - Segregate tools to prevent them from touching each other. For example, items used to clean a restroom should not be side-by-side with those used in a kitchen.
  - Clean touch points on custodial equipment (e.g., custodial carts, product automatic dilution and dispensing machines, spray bottles and handles on product applicators) when custodians have finished using them for the day.

References


Chapter 3. I. Storing Disinfectants

Introduction
Disinfectants are usually stored with other cleaning products. This scenario can pose serious safety risks because some disinfectants have ingredients that are very reactive with other chemicals. Products such as bleach can form a toxic gas when mixed with ammonia.

This problem is prevalent in almost all schools, even in those that ban products brought from home. A look under the sink in almost any elementary classroom will reveal hazardous cleaning and disinfectant products stored haphazardly, unsecured, and in dangerous combinations. These common scenarios are accidents waiting to happen.

Disinfectants are pesticides and are not appropriate to store in a classroom where there is no proper secured storage equipment and no designated and trained staff to use them. The recommendations in this section are designed to protect the staff and students in the classroom and the custodial and kitchen staff who use these products as part of their work.

Also of concern is the way that products are stored on custodial carts for use throughout the facility. It is essential that custodians handling these products understand which product combinations are compatible for storage on their carts and in their custodial closets to prevent reactions between incompatible products.

Managing Stock
- Use products on a first-in-first-out basis to reduce the chance of material deteriorating in storage.

Container Management (see also Chapter 3.E. Labeling Secondary Containers)
- Keep containers closed when not in use.
- Minimize the transfer of disinfectants from container to container.
- Store disinfectants in original containers, called “primary” containers, whenever possible.

Ensure that all “secondary” containers (e.g., spray bottles) are correctly labeled with the contents and percentage concentration information. See Appendix H: Templates for Labeling Secondary Containers of Disinfectants and Sanitizers for customizable label templates.

Storage Locations and Conditions
- **Security** – Store disinfectants in a secure location out of the reach of students. Examples are custodial closets and designated product storage areas, not classrooms if possible. If disinfectants must be stored in classrooms, follow all directions below and locate in a cabinet that is either secured or out of reach of the students.
- **Location** – Store disinfectants off the floor and on shelves located below eye level. Some disinfectants are corrosive and can cause severe eye damage and blindness if spilled into the eyes when retrieving off a shelf.
- **Environmental Conditions** – Store containers in temperature-controlled and well-ventilated storage areas. This can prevent the buildup of chemical vapors.
Ensuring Product Viability:
- Some disinfectants (e.g., bleach) lose stability quickly after either being prepared for use or stored for long periods, especially in the presence of heat or light. To maximize product stability, store products in a dark, cool location.
- Check the expiration date of disinfectants, surface sanitizers and hand sanitizers.

Preventing Hazardous Reactions Between Products Stored – Store products in compatible hazard categories and maintain a distance between those that are not compatible to prevent a hazardous reaction. Check the disinfectants’ SDSs for specific storage compatibility guidelines. In general, hazardous products are separated into the following four hazard categories for storage:
1. Flammables (e.g., alcohol-based products)
2. Oxidizers (e.g., bleach, hydrogen peroxide-based products)
3. Corrosive bases (e.g., QACs)
4. Corrosive acids (e.g., citric acid– or lactic acid–based disinfectants)

Preventing Fires – Ensure that flammable liquids (e.g., alcohol-based hand sanitizers, disinfectants) are stored properly. Flammable liquids evaporate at room temperature and pose a respiratory exposure and a fire risk.

The Massachusetts Fire Code 527 CMR 1.00 governs the storage of flammable liquids based on the types and amounts. The addition of large quantities of hand sanitizer during the pandemic may require a permit or a license from your local fire department. The State Fire Marshal provides a bulletin on requirements for hand sanitizer at the following link: https://www.mass.gov/doc/hand-sanitizer-fire-prevention/download. This bulletin provides guidance on location of dispensers and permit requirements.

Examples of regulatory requirements:
- Some flammable liquids require storage in a flammables cabinet when they exceed a certain quantity.
- Flammable liquids and oxidizers (e.g., bleach) are required to be stored in separately because of effect that oxidizers can have when they come in contact with a
combustible or flammable substance. The reaction will depend on the concentration and stability of the oxidizer. In case of a fire, oxidizers can:

- speed up the development of a fire and make it more intense,
- cause substances that do not normally burn readily in air to burn rapidly, and
- cause combustible materials to burn spontaneously without the presence of obvious ignition sources such as a spark or flame.

Spill Control and Inspection

- Prepare for an incident by stocking spill clean-up supplies, including absorbents, tools, personal protective equipment, etc.
- Clean up spills immediately. See the product SDS from the product distributor/manufacturer and the product label for spill-response guidelines.
- Use drip pans under spouts to catch and contain drips.
- Check containers regularly for leaks, breaks, rust, or other corrosion. If a leak or break occurs, transfer the product to another properly labeled compatible container.

Storage - Product Compatibility

- Store disinfectant and cleaning products by hazard categories to prevent hazardous reactions. Common disinfectant ingredients are sorted into these hazard categories:

  **Acids** – lactic acid, citric acid, hydrogen peroxide, Peroxyacetic Acid, some alcohol based products

  **Bases** – quaternary compounds, some alcohol based products are slightly above corrosive

  **Flammables** – alcohol (quantities may require a flammables cabinet)

  **Oxidizers** – bleach, hydrogen peroxide, hypochlorous acid

- Store disinfectants in compatible containers, on compatible shelving, and with compatible products as specified on the product’s SDS and label. These precautions are particularly important for storing bleach and quaternary compounds because they can corrode metal containers and shelving, causing the shelving to collapse.

---

k Canadian Center for Occupational Health and Safety, https://www.ccohs.ca/oshanswers/chemicals/oxidizing/oxidizing_hazards.html#:~:text=Oxidizing%20materials%20can%3A,without%20the%20presence%20of%20obvious.
Chapter 3.J. Disposing of Disinfectant and Biological Waste

Introduction
This section addresses the following types of waste:

1. Biological waste (a biohazard) that is produced from cleaning up an incident
2. Used disinfectant solution
3. Chemical waste (a chemical hazard) that results from disposal of a disinfectant product concentrate or diluted solution

This section does not address waste generated from management of COVID-19. PPE, tissues, etc. are not regulated under regulatory definitions of biological or hazardous waste. It is still important to manage this type of waste carefully.

It is important to understand and follow the disposal instructions on the disinfectant’s label. Because disinfectants are designed to kill microbes, the disposal of undiluted disinfectants may adversely affect a wastewater treatment plant (WWTP) or septic system that relies on biological digestion of waste by beneficial microbes. These beneficial microbes may be killed by the disinfectants. The handling and disposal of some biohazardous waste is regulated and must be managed by the guidelines referred to in Appendix A.4. Regulatory Categories and Definitions of Waste.

The chemical residue left in a container may also pose a hazard, and the label may provide requirements for “triple rinse” before disposal. Also, concentrated disinfectants are a regulated hazardous waste and must be managed by the guidelines referred to in Appendix A.4. Regulatory Categories and Definitions of Waste.

Disposal of Solid Waste
The following items can be disposed of in the trash. A safe practice is to double-bag these wastes and dispose of them immediately in the Dumpster.

- Small bandages such as Band-Aids™ are generally NOT considered biohazardous because they do not release blood.
- Sanitary napkins are generally NOT considered biohazardous because they do not release blood.
- Diapers are NOT considered hazardous waste unless there is visible blood.
- Other body fluids without visible blood are NOT considered hazardous waste.

Disposal of Biohazardous Waste

- Blood spill waste
  
  Free flowing blood must be placed in a red biohazard bag with the biohazard symbol.
  
  o Designate an area for biohazardous storage and pickup.
  
  o The transport of infectious waste is regulated by local Boards of Health, the Massachusetts Department of Telecommunications and Energy or state agencies, and by the U.S. Department of Transportation, and must be done by a licensed agency.
If the blood is not free flowing, it can be disposed of as solid waste.
  
  - A safe practice is to double-bag it and dispose of it immediately in the Dumpster.

- **Sharps and sharps disposal containers**
  
  - Store sharps with points down in a rigid, puncture-proof sharps container.
  
  - Bring the sharps container to the spill site to prevent having to carry contaminated sharps through the building.
  
  - Dispose of the sharps container when three-fourths full.
  
  - Check with the local Health Department, Solid Waste District or Department of Public Works (DPW) for disposal requirements and options.

### Disposal of Hazardous Waste

Concentrated disinfectant that has expired or is designated for disposal may be considered hazardous waste. The local WWTP, DPW, the Massachusetts Department of Environmental Protection (MassDEP), or other appropriate agencies can provide instructions for safe and legal disposal. Concentrates poured down the drain may kill populations of microbes in septic tanks and in WWTPs that are designed to use the microbes to break down waste, thus interfering with these biological processes. MassDEP requires hazardous waste to be disposed of as follows:


- A container of a hazardous product is considered empty if it has an inch or less of product in it and can be disposed of as trash. Although a legal option is to close the lid, double-bag the container, and dispose of it immediately in the Dumpster, a best practice would be to bring the product that remains in the container to a municipal hazardous waste collection site for safe disposal. One exception is if the product is designated as **acutely hazardous waste** (extremely toxic or reactive and with a Hazard Code H) which must always be disposed of as hazardous waste.

---

**Sources**


Chapter 3.K. Taking Precautions: Using Personal Protective Equipment

Introduction

Disinfectants are antimicrobial pesticides, and exposure to them can and should be prevented. Consider using less-toxic products and processes that have fewer requirements for personal protective equipment (PPE) and other safety measures.

The OSHA Hazard Communication Standard requires employers to provide training to their employees on the use of required PPE. These PPE requirements are listed on the product label and on the product’s SDS. If the SDS provides only general information on the type of PPE required (e.g., protective glove), contact the manufacturer listed on the SDS to request more specific information as to exactly what type of glove materials or respirator cartridge is required.

In some circumstances, one type of PPE can protect you from more than one hazard. One example is using PPE to protect hands from biological hazards when cleaning up waste from an incident involving blood, vomit, or feces. In addition to the barrier protection that gloves provide for the biological hazard, an important consideration is to also protect hands from the chemicals used to disinfect the surface after the spill is removed. Thus, nitrile chemical-resistant gloves can be used for both purposes. Ready-made spill kits for blood clean-up may need to be supplemented if they include only barrier gloves and not chemical-resistant gloves for using the disinfectant.

Why Wear PPE?

Cleaning, sanitizing, and disinfecting products can pose several health and safety hazards. Some examples:

- Some disinfectants have an extremely high pH and are corrosive to skin, eyes, and mucous membranes, and can cause skin burns, permanent eye damage and blindness. They can also cause occupational asthma and trigger asthma reactions.
- Disinfectants can be absorbed through the skin into the bloodstream, where they travel throughout the body and into target organs where they can cause health impacts.
What types of PPE are available to protect employees when using cleaning, sanitizing, and disinfecting products?

<table>
<thead>
<tr>
<th>Type</th>
<th>Specifications</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Respirator</strong></td>
<td>The type of mask needed is determined by the chemical being used. Dust, particulate, and surgical masks do not prevent a product’s chemical vapors from penetrating the mask. Chemical vapors require a mask material or cartridge designed to prevent penetration of vapors.</td>
<td>The mask should fit well, without any leaks. Use of a respirator requires a “fit test” to ensure that it fits correctly. It also requires the School District to have a respirator program, a medical exam for each employee who wears a respirator, etc. A template for a respirator program to help you develop this program is available on the Department of Labor Standards website: <a href="https://www.mass.gov/doc/respiratory-program">https://www.mass.gov/doc/respiratory-program</a></td>
</tr>
<tr>
<td><strong>Splash Goggles</strong></td>
<td>Goggles are tight-fitting eye protection that completely covers the eyes, eye sockets, and the facial area immediately surrounding the eyes. They provide protection from impact, dust, and splashes. There are two types: 1. Chemical splash goggles 2. Safety glasses for dust and particulates</td>
<td>Some goggles will fit over corrective lenses. Some goggles are designed to be used as both chemical splash goggles and safety impact resistant glasses.</td>
</tr>
<tr>
<td><strong>Gloves</strong></td>
<td>Criteria to select chemical-resistant gloves: 1. Type of chemicals being handled 2. Nature of contact (total immersion, splash, etc.) 3. Duration of contact 4. Area requiring protection (hand only, forearm, arm) 5. Size and comfort</td>
<td>Gloves have a “break-through” time, at which point they are no longer protective. Disposable gloves are thinner than reusable gloves, and it must be determined whether they can withstand immersion in a chemical for any length of time. Do not reuse disposable gloves.</td>
</tr>
<tr>
<td>Type</td>
<td>Specifications</td>
<td>Comments</td>
</tr>
<tr>
<td>------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Boots</td>
<td>Chemically resistant depending on the type of chemical being used.</td>
<td>Some chemicals can penetrate certain footwear materials.</td>
</tr>
<tr>
<td></td>
<td>Slip resistant.</td>
<td>Also, some safety footwear is designed to protect from more than one hazard. An example is a safety shoe that is worn in food service where it must be:</td>
</tr>
<tr>
<td></td>
<td>Cut resistant.</td>
<td>• slip resistant because of wet and greasy floors,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• cut proof because of knifes used in food prep, and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• chemical resistant due to the dispensing of corrosive sanitizers.</td>
</tr>
<tr>
<td>Apron</td>
<td>Chemically resistant depending on the type of chemical being used.</td>
<td>There are some materials that are resistant to a number of chemicals. Work with a vendor to select a material that protects against the maximum possible number of chemical hazards that you work with.</td>
</tr>
</tbody>
</table>
What activities require use of PPE?

Conduct a PPE Assessment and consult the product’s SDS to determine requirements. As an example of a PPE Assessment, the following PPE Assessment template is modified and shortened from a two-page template from the Massachusetts Department of Labor Standards (DLS) to only include PPE required for cleaning and other custodial maintenance products in schools. Several types of PPE assessment templates, including the one for schools, are available at https://www.mass.gov/service-details/safety-programs-for-the-public-sector. Schools can modify the template on the DLS website for use in other school departments.

<table>
<thead>
<tr>
<th>Task</th>
<th>Safety glasses</th>
<th>Goggles</th>
<th>Gloves</th>
<th>Disposable N95 Masks</th>
<th>Ear plugs</th>
<th>Closed-toe shoes</th>
<th>Slip-resistant Overboots</th>
<th>Fall protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleaning floors, cleaning bathrooms, cleaning classrooms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cleaning science labs, (student does not handle open containers of science chemicals)</td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cleaning blood spills, vomit, feces, or urine</td>
<td>✔️ Disposable</td>
<td></td>
<td></td>
<td>as needed for odor</td>
<td></td>
<td></td>
<td></td>
<td>✔️</td>
</tr>
<tr>
<td>Mix cleaning products in janitor closet</td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Floor machine</td>
<td>✔️ as needed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✔️</td>
</tr>
<tr>
<td>Bring trash to dumpster</td>
<td>✔️ as needed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Floor stripping with a product that has a corrosive pH</td>
<td>✔️</td>
<td></td>
<td></td>
<td>Nitrile or neoprene</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Floor treatment with a product that is neutral pH</td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pickup syringes left in fields, playgrounds, etc.</td>
<td>✔️ Puncture resistant</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

When should PPE be worn?

<table>
<thead>
<tr>
<th>If an employee could…</th>
<th>then…</th>
</tr>
</thead>
<tbody>
<tr>
<td>have contact with infectious materials and hazardous chemicals</td>
<td>Chemical-resistant gloves are required (nitrile can be used for most products if it is not submerged into a chemical concentrate for a prolonged period)</td>
</tr>
<tr>
<td>be splashed in the face</td>
<td>a mask and/or face shield is required</td>
</tr>
<tr>
<td>be splashed on the body</td>
<td>a chemical resistant apron is required</td>
</tr>
<tr>
<td>step in it and track it around</td>
<td>foot protection is required</td>
</tr>
</tbody>
</table>
What type of training on PPE should the school provide to employees?
Employers are required to train each employee who must use PPE on the following:

- When PPE is necessary
- What kind of PPE is necessary
- How to properly put on, adjust, wear, and take off PPE
- Limitations of PPE
- Proper care, maintenance, useful life, and disposal of PPE

How should employees maintain PPE?

- Check the equipment for damage before and after use.
- Clean reusable PPE after every use in accordance with manufacturer’s instructions.
- Use disposable PPE only once. Throw it away when compromised and after use.
- Store PPE in a clean place. Respirator cartridges must be stored in a sealed bag to prevent them from absorbing contaminants while in storage.
- Avoid contaminating the skin when taking off PPE.
- Try not to contaminate items and surfaces with contaminated PPE.
- Inform a supervisor of the need to repair or replace PPE.

What information would be helpful to provide in an at-a-glance format to employees?

Due to the complexity of reviewing, interpreting, and remembering important guidance on an SDS, it can be helpful to lift out the key information from the SDS and label to complete and post or provide the following chart to employees. This chart can used as a training exercise in a Hazard Communication training and can also help with comparing the health and safety hazards of products. It is not a replacement for providing or having employees review the SDSs.

Headings include product name, product type, pH of concentrated product (as the concentrate may require PPE that the diluted solution may not), pH of the diluted product (if applicable), health, flammability, and reactivity from the HMIS and NFPA rating systems (which may not always be available on the SDS), PPE required and storage requirements.

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Product Type</th>
<th>pH Concentrated Product</th>
<th>pH Diluted Product</th>
<th>NFPA and HMIS</th>
<th>Eyewear</th>
<th>Gloves</th>
<th>Apron</th>
<th>Storage Groupings and Shelf Material*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Goggles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The example below is an excerpt from a completed chart from a food service department that had to coordinate storage of their antimicrobials with their other cleaning products.
Sources


   (Authors’ note: The law has changed for the public sector compliance requirements with the Massachusetts Right to Know law. The public sector must now follow OSHA’s Hazard Communication Standard instead of the Right to Know Law. On March 9, 2018, Governor Baker signed a bill that amends M.G.L. chapter 149 §6 ½. The law was updated to clarify employee safety requirements in public sector workplaces and is enforced by the Department of Labor Standards (DLS). Another change since the initial publication of this handbook is the Division of Occupational Safety is now named the Massachusetts Department of Labor Standards.)


Introduction

Some antimicrobial products require the provision of an emergency eyewash facility to provide a fifteen-minute flush.

A school’s protocol should address the location, selection, installation, maintenance and testing of emergency eyewash and shower equipment. To minimize the number of emergency eyewash stations required:

- Use products that do not require their use, such as water-based (nonflammable) and neutral pH (noncorrosive) products.
- Implement engineering controls to reduce the potential for exposure; for example, the use of closed or automatic chemical-dispensing systems, splash guards, or long-handled spraying and cleaning tools.
- Centralize facilities for storing and dispensing concentrated flammable and corrosive products.

If an eyewash station is not available in the area where the concentrated disinfectant is dispensed, a diluted, a ready-to-use disinfectant product may be a better choice (if it does not require the use of an eyewash or PPE).

Plumbed Emergency Wash Stations: Eyewash and Emergency Deluge Shower

- **Regulatory citations**
  - For corrosives: OSHA Emergency Eyewash and Showers 29 CFR Part 1910.151(c)
  - For corrosives and flammables: 527 CMR 1.00: Massachusetts Comprehensive Fire Safety Code

- **General requirements for emergency wash stations**

  This equipment should be installed and operational prior to staff and student use, handling, and storage of hazardous materials.¹


  The following items are just some of the key requirements:
  - Location – The station should be located within approximately fifty feet or a ten-second walk of the hazard and be easily accessible.¹
  - Water temperature – should be kept between 70°F and 90°F.¹ Please note that the ANSI standard range is between 60°F and 100°F.
  - Signage – should be posted that indicates the location of each type of equipment, “Emergency Shower” and/or “Emergency Eyewash.” Each sign should be at least 70...
square inches and printed in contrasting colors such as red and white or green and white.\textsuperscript{1} It must be kept unobstructed to ensure that it is always visible.

- **Alarm** – When possible, the emergency wash system should trigger an alarm when activated to alert other people that there is an emergency.
- **Hands-Free** – The system should have a mechanism that enables it to stay on, allowing the hands to be free for cleaning off chemicals.
- **Testing** – Staff should activate equipment weekly to help prevent any buildup of rust and/or scale.

- **Deluge shower additional requirements**
  - Water flow should be 30 gallons per minute.\textsuperscript{1}
  - Equipment should be always available, with the pull chain easily accessible.

- **Eyewash station additional requirements**
  - The station should treat both eyes at the same time.
  - Must provide a continuous flow of 0.4 gallons per minute for 15 minutes.\textsuperscript{1}
  - There are three types:
    1. Plumbed (best option): there are standalone units that are typically installed as part of the room construction or when a space is renovated or converted. There are also attachments available for converting existing faucets to an eyewash. They allow for continued use of the faucet until the eyewash is needed. They are a very affordable alternative. Evaluate these attachments to be sure they are ANSI rated.
    2. Gravity-fed (portable): no plumbed unit with a 15-minute flush. May require solution to be changed due to the potential for the water to become contaminated. Some unit provide a preservative to be used with water to create a solution. Some units are sealed and have a longer shelf life. All solutions must be monitored for the expiration date.
    3. Handheld (portable): no plumbed unit with a 3-minute flush. This option is not a substitute for the required 15-minute flush. They can be used to minimize damage before accessing a plumbed eyewash station. In addition, the water in portable eyewashes can become contaminated and must be replaced.\textsuperscript{2}

**References**


Chapter 3.M. Assigning Roles and Responsibilities and Educating School Staff

**Introduction**

After the school district has developed protocols, it needs to select the person(s) responsible for each aspect of the infection-control program. Staff members should receive training for their own responsibilities as well as know what the other staff members’ designated responsibilities are. This practice will enable them to contact a trained staff person with the proper supplies and knowledge to do the assigned task. In addition to training, it is helpful for staff members to have written materials and reminders such as guidance documents, posters, and memos to reinforce policies and procedures.

The following section provides some suggested roles and responsibilities that can be assigned to school personnel so that they may participate appropriately in the infection-control program. These roles and responsibilities may be customized for each school or district.

**Post written procedures for disinfectant use**

- Identify locations for posting the procedures.
- Post guidelines and posters.
- Develop a system to revise the procedures and update staff when conditions, equipment, and products change, and when there is a new infectious disease.

**Determine roles and responsibilities of staff and custodians**

Every school district will have its own systems. In general, the Workgroup has observed the following designations of responsibilities within the school system:

<table>
<thead>
<tr>
<th>Department/Staff</th>
<th>Policy</th>
<th>Training</th>
<th>Purchasing*</th>
<th>Use</th>
<th>Incident Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration</td>
<td>Assign roles and responsibilities</td>
<td>Ensure that a training program is in place</td>
<td>Approve purchasing policy and criteria</td>
<td>Review reports</td>
<td></td>
</tr>
<tr>
<td>Facility Manager</td>
<td>Assign custodial roles and responsibilities</td>
<td>Organize training for custodians and possibly coordinate training with other departments</td>
<td>Participate in developing purchasing criteria, vendor selection, product ordering and distribution of PPE, cleaning, and disinfecting products, BBP spill kits and equipment for syringe pickup</td>
<td>Oversee custodial adherence to protocols</td>
<td>Disposal of spill waste Follow-up to exposures to chemicals and BBPs</td>
</tr>
<tr>
<td>Department/Staff</td>
<td>Policy</td>
<td>Training</td>
<td>Purchasing*</td>
<td>Use</td>
<td>Incident Response</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-------------------------------------------------</td>
<td>----------------------------------------------</td>
<td>--------------------------------</td>
<td>---------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Custodian</td>
<td>Implement policy</td>
<td>Attend training</td>
<td>Inventory supplies (PPE, cleaning supplies, spill kits, etc.)</td>
<td>Use products routinely and for incidents</td>
<td>Secure site, clean up, and complete report</td>
</tr>
<tr>
<td>Athletics Director</td>
<td>Assign and oversee staff roles and responsibilities</td>
<td>Organize training</td>
<td>Order disinfectant</td>
<td>Oversee staff use</td>
<td>Secure site, clean up or call custodian to clean up, and submit report</td>
</tr>
<tr>
<td>Nursing Department Director</td>
<td>Oversee nurse roles and responsibilities, and coordinate policy with an Exposure Control Plan</td>
<td>Organize nurse training as part of BBP, infection control, or orientation training</td>
<td>Participate in developing purchasing criteria, product selection and ordering</td>
<td>Oversee nurse use and information dissemination to school staff</td>
<td>Oversee nurse response</td>
</tr>
<tr>
<td>Nurses</td>
<td>Implement policy</td>
<td>Attend training</td>
<td>Inventory supplies (PPE, disinfectants, spill kits)</td>
<td>Use products routinely and for incidents</td>
<td>Provide medical assistance and follow up BBP exposure</td>
</tr>
<tr>
<td>Food Service Staff</td>
<td>Assign and oversee staff roles and responsibilities</td>
<td>Organize training — independently or as part of other food-service training</td>
<td>Participate in developing purchasing criteria, vendor selection, and product ordering and distribution</td>
<td>Director: oversee staff use</td>
<td>Secure site, clean up or call custodian to clean up, and submit report</td>
</tr>
<tr>
<td>Transportation Staff</td>
<td>Assign and oversee staff roles and responsibilities</td>
<td>Organize training, either independently or as part of other transportation training</td>
<td>Order and distribute BBP spill kits</td>
<td>Director: follow up BBP exposure</td>
<td></td>
</tr>
<tr>
<td>Human Resources</td>
<td>Follow workers compensation requirements and any union contract language</td>
<td>May review training required or provided as part of a claim</td>
<td>Use disinfectant for incidents, and routine cleaning and disinfection of the buses</td>
<td>Driver: secure site, clean up, and submit report</td>
<td>Other personnel: clean and disinfect buses</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Other personnel: clean and disinfect buses</td>
<td></td>
</tr>
</tbody>
</table>

* Determine whether all disinfectants will be ordered through one department or whether each department will order its own disinfectant. If the Facilities Department has a dispensing station, consider using it to provide products for all departments who can use the same formulation.
Determine who is responsible for daily and special-incident disinfection and sanitization tasks

The list below provides a brief sampling:

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Staff Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Throughout the day</td>
<td>Typically, staff members perform sanitization/disinfection tasks that are required throughout the day.</td>
</tr>
<tr>
<td></td>
<td>• Nurses – disinfect after use of equipment and in between patient visits</td>
</tr>
<tr>
<td></td>
<td>• Food service – sanitize as part of the food preparation and clean-up routine</td>
</tr>
<tr>
<td></td>
<td>• Preschool teachers – use antimicrobials after diapering, for mouthed toys, etc.</td>
</tr>
<tr>
<td></td>
<td>• Special education department – use antimicrobials after diapering, for mouthed toys and equipment, floor mats and therapeutics</td>
</tr>
<tr>
<td></td>
<td>• Athletics department – use antimicrobials on wrestling mats to prevent transmission of MRSA</td>
</tr>
<tr>
<td></td>
<td>• Custodians – use antimicrobials in showers to prevent fungal and bacterial infections</td>
</tr>
<tr>
<td>Once a day</td>
<td>• Custodians – disinfect toilet seats and handles, handles on doors and product dispensers, shower floors and handles, etc.</td>
</tr>
<tr>
<td>Special circumstances</td>
<td>Disinfectants are generally used for special circumstances.</td>
</tr>
<tr>
<td></td>
<td>• Nurses – blood spill, vomit</td>
</tr>
<tr>
<td></td>
<td>• Food service – blood spill</td>
</tr>
<tr>
<td></td>
<td>• Preschool/classroom teachers – toileting accident, blood spill, vomit</td>
</tr>
<tr>
<td></td>
<td>• Custodians – blood spill, toileting accidents, vomit</td>
</tr>
<tr>
<td></td>
<td>• Bus driver – blood spill, toileting accidents, vomit</td>
</tr>
<tr>
<td></td>
<td>• Athletics – blood spill, toileting accidents, vomit</td>
</tr>
</tbody>
</table>

Work with departments to determine what each department’s needs are and help problem solve the challenges they face when implementing protocols

Due to the expansion of infection control activities throughout all school departments during the pandemic, the following documents were designed to provide department specific guidance for departments to customize:

*Appendix D: Cleaning and Disinfecting by School Department Staff*

*Appendix E: Common High-Touch Points by Location*
Sources


