

Cleaning and Disinfecting During an Outbreak



*A child-care center in Dane County, Wisconsin had three outbreaks of *Giardia lamblia* in a 19 month period. After the first outbreak a public health nurse provided prevention and hygiene education. However, no change was made to cleaning practices of toys. Even with improved control measures, two additional outbreaks of *Giardia* occurred at the same facility in the following 17 months.*

Public Health Reasons

Children are particularly vulnerable to the rapid spread of infectious diseases for several reasons. Young children and infants (under 12 months old) have a natural curiosity that leads to frequently handling objects and surfaces, and putting their hands and objects in their mouths. During an outbreak, the facility's normal cleaning and disinfecting procedures must be increased in extent and frequency. For example, in an *Acinetobacter baumannii* outbreak, Denton et al. found a significant correlation between the number of positive environmental sites and the number of individuals infected with *A. baumannii*. When environmental contamination was high, the number of infected individuals was also high, and failure to follow strict cleaning protocols tended to make the outbreak worse.

High-touch items, restrooms, and diaper-changing areas are the most likely places for contamination, so they must be frequently cleaned and disinfected. In a review of multiple norovirus outbreaks, Matthews et al. showed that just being in a close quartered space (like a child-care setting) during an outbreak is a risk factor for acquiring the virus, and that the spread of virus often occurs through environmental contamination. For example, an outbreak of noroviruses was linked to unclean computer keyboards and mice even after the implementation of interventions, including cleaning of all shared environmental surfaces with a chlorine bleach solution. As well, an investigation of a Florida *Shigella* outbreak in multiple child-care facilities found the most important risk factor for illness to be having a diaper changed. Fabric-covered furniture, carpets, and toys must be cleaned, as well. During the investigation of a norovirus outbreak, Cheesbrough et al. found 6 of 144 environmental swabs were positive. Of the six, five positive samples were from carpet that had already been cleaned by shampooing followed by vacuuming. Fleming and Randle showed that even in a pediatric intensive care unit, 85% of toys had viable bacteria on them.

Practices

NOTE: There are three levels of cleaning and sanitizing/disinfecting. In increasing rigor, they are routine cleaning, vomit/fecal episode cleaning, and outbreak cleaning. This section covers the third level, cleaning during an outbreak. The following methods must be used in addition to routine cleaning and vomit/fecal episode cleaning.

When an outbreak of gastrointestinal illness has been identified (a cluster of two or more children/staff members showing symptoms), the facility must heighten cleaning and sanitation protocols. Since it may take several days for confirmation from the local health department, these practices should be put into action immediately after a suspected outbreak has been identified. If there is vomit or fecal matter, clean it up immediately. (Refer to the “Vomiting and Fecal Episodes” fact sheet for detailed cleaning methods of various surfaces.)

Cleaning and Disinfecting

- Use the procedures, such as how to scrub sinks and clean floors, outlined in these fact sheets: “Cleaning and Disinfecting Restrooms”, “Cleaning and Disinfecting High-touch Surfaces”, “Cleaning Housekeeping Surfaces”. The following is a brief overview:
 - clean surfaces with warm water and a detergent to remove soil
 - rinse surfaces with warm water to remove cleaning products and suspended debris
 - apply enough disinfecting solution to thoroughly cover the surface
 - let the solution stand for the contact time given on the label
 - let the surface air dry before using
- With these procedures, use the recommended cleaning solutions in the table below.
- Food preparation/food contact areas must be washed, rinsed, and sanitized using standard protocol (See “Cleaning and Sanitizing Food Contact Surfaces” fact sheet).

Recommended Cleaning Dilutions for Bleach during an Outbreak (Adapted from SCDHEC)

Surface	Cleaning Method	How to Make (1 cup = 240ml)	Strength (parts per million)
porous surfaces, such as wood floors, or surfaces visibly soiled with vomit/feces	chlorine bleach*	1 1/2 cup bleach in 1 gallon water	5000ppm (1:10 dilution)
non-porous surfaces Examples: handrails, tile floors, counter-tops, sinks, toilets, and doorknobs	chlorine bleach*	1/3 cup bleach in 1 gallon water	1000ppm (1:50 dilution)
food-contact items and items children commonly use in mouthing Examples: cutting boards and teething rings	chlorine bleach* OR dishwasher at 170°F (77°C)	1 Tbsp. bleach in 1 gallon water	200ppm (1:250 dilution)
carpet & upholstered fabrics	hot water and detergent or steam clean (<i>never dry vacuum if there has been a fecal matter or vomit episode</i>)	N/A	N/A

**Bleach solution must: contain 5.25% sodium hypochlorite, be prepared fresh daily, and have 10-20 minute surface contact time. Use unopened bleach for outbreak-related disinfecting (open bottles lose effect after 30 days). EPA-registered disinfectants may also be used, but the effectiveness in outbreaks has not been evaluated.*

When Cleaning and Disinfecting the Facility:

- Wear protective masks and heavy-duty gloves.
- Prepare fresh bleach solutions for use within 24 hours because bleach will evaporate and lose its activity.
- While chemicals are being applied, use appropriate ventilation in areas being disinfected.
- For chemicals, use a pour or pump bottle that does not produce aerosols, instead of a spray bottle. This reduces the respiratory irritation that can be caused by aerosols.
- Never enter the foodservice area with items soiled by vomit or fecal matter.
- Clean areas from the lowest incident rate/likelihood of contamination (classroom with no vomit or fecal incidents and hallways) to the highest (bathrooms and classrooms where multiple children have vomited).

Items to Clean and Disinfect

NOTE: While all recommendations state to increase cleaning and disinfecting during an outbreak, there is no universal standard for the number of times that a facility should clean per day during an outbreak. However, the DeKalb County Board of Health (Georgia) recommends increasing the cleaning of bathrooms to once every hour during high frequency use and the cleaning of high-touch surfaces to once every two hours during high frequency use. Administrators and staff members of the facility must form a group that will decide how to increase cleaning. They must consider the highest traffic times in restrooms and other areas in order to determine how often to clean each area.

- Give particular attention to the areas of the greatest likely environmental contamination, such as bathrooms and high-touch surfaces.
- Increase the frequency of bathroom and toilet cleaning, especially high touch areas, including faucets, door handles, toilet handles, and light switches.
- Launder bedding, linens, toys, and fabrics. (See “Cleaning High-touch Surfaces” fact sheet).

Items to Clean and Disinfect by Room Type* (adapted from DHEC)

NOTE: Fabrics cannot be disinfected, so they must be sanitized. All hard surfaces must be disinfected.

Kitchen/Food Areas	Bathroom	Classrooms	Offices	Hallways/other
<ul style="list-style-type: none"> • cafeteria tables and chairs • countertops • doorknobs • floors-hard surfaces/wood • food contact surfaces • light switches • paper towel/napkin dispensers • push doors • salt and pepper shakers • sink hardware • soap dispensers • tabletops 	<ul style="list-style-type: none"> • bathroom stalls • countertops • doorknobs • floors-hard surfaces/wood • handrails • light switches • paper towel/napkin dispenser • sink hardware • sinks • soap dispensers • toilets • water fountains 	<ul style="list-style-type: none"> • books • carpets • chairs • computer keyboards and mice • countertops • diaper changing pads • diaper changing tables • doorknobs • floors- hard surfaces/wood • games • hard toys • light switches • mats • paper towel/napkin dispensers • pillows • plush toys • rugs • sink hardware • sinks • soap dispensers • tabletops/desktops • water fountains 	<ul style="list-style-type: none"> • carpets • chairs • common telephones • computer keyboards and mice • countertops • doorknobs • floors- hard surfaces/wood • light switches • rugs • shared office equipment • tabletops/desktops • water fountains 	<ul style="list-style-type: none"> • carpets • diaper-changing pads • diaper-changing tables • doorknobs • floors- hard surfaces/wood • handrails • light switches • playground equipment • rugs • water fountains

** This is not an all-inclusive list. There may be other items in the facility that need to be cleaned and disinfected. Any shared items, high-touch items, and items that have been or likely have been contaminated by vomit or fecal matter must be cleaned and disinfected.*

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