

Cleaning and Low-Level Disinfection in School Settings

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Key Points

- Cleaning and Disinfection, terminology and basics
- Selection of Products
- Program Development
- Emerging Technology: “No Touch” Methods

Disclaimer

Every attempt has been made to provide an unbiased, balanced presentation.

This topic however, lends itself to specific products to be discussed.

Name brands have changed to reflect generic names when possible.

Clean, Sanitize, or Disinfect?

Action	What does it do?	Example of when to do it
Cleaning	Cleaning removes dirt and organic matter from surfaces using soap or detergents. *Removes Germs*	Every time, it is the necessary first step to any cleaning/ disinfection process
Sanitizing	Sanitizing kills bacteria on surfaces using chemicals. It is not intended to kill viruses. *Lowers the number of germs*	Food contact surfaces
Disinfecting	Disinfecting kills viruses and bacteria on surfaces using chemicals. *Kills the germs*	High touch surfaces, surfaces contaminated by blood and body fluid

EPA What's the difference between products that disinfect, sanitize, and clean surfaces?

<https://www.epa.gov/coronavirus/whats-difference-between-products-disinfect-sanitize-and-clean-surfaces>

Cleaning



- **Cleaning is the necessary first step of any disinfection process.**
- Cleaning removes organic matter, salts, and visible soils, all of which interfere with microbial inactivation.
- **The physical action of scrubbing with detergents and surfactants and rinsing with water removes substantial numbers of microorganisms.**
- If a surface is not cleaned first, the success of the disinfection process can be compromised.
- **Removal of all visible blood and inorganic and organic matter can be as critical as the germicidal activity of the disinfecting agent.**
- In some environments, surfaces that cannot be easily cleaned adequately, should be protected with barriers.

Disinfection: mechanism of action

- Oxidation- disrupt the cell wall of bacteria, resulting in the loss of structure, cell lysis and death (example chlorine)
- Denaturation-molecules break down the protein cell walls and then the cells collapse/lose function (example- alcohol)
- Surface active agents- impact cell walls and membranes by positive surface charge (example quats)

Disinfection requirements

- Surface is clean and free of gross soil
- Appropriate concentration of active ingredient/ dilution
- Adequate application/ surface saturation
- Sufficient time for the agent to kill organisms that are present (a.k.a Contact Time)

More about Contact Time

Sometimes called “dwell time,” this is the amount of time a disinfectant needs to sit on a surface, without being wiped away or disturbed, to effectively kill germs.

How to Read a Disinfectant Label

Read the entire label.
The label is the law!

Note: Below is an **example** of information that can be found on a disinfectant label

Active Ingredients: What are the main disinfecting chemicals?

EPA Registration Number: U.S. laws require that all disinfectants be registered with EPA.

Directions for Use (Instructions for Use): Where should the disinfectant be used? What germs does the disinfectant kill? What types of surfaces can the disinfectant be used on? How do I properly use the disinfectant?

Contact Time: How long does the surface have to stay wet with the disinfectant to kill germs?

Signal Words (Caution, Warning, Danger): How risky is this disinfectant if it is swallowed, inhaled, or absorbed through the skin?

Precautionary Statements: How do I use this disinfectant safely? Do I need PPE?

First Aid: What should I do if I get the disinfectant in my eyes or mouth, on my skin, or if I breathe it in?

Storage & Disposal: How should the disinfectant be stored? How should I dispose of expired disinfectant? What should I do with the container?

ACTIVE INGREDIENTS:
Alkyl (60% C14, 30% C16, 5% C12, 5% C18)
Dimethyl Benzyl Ammonium Chloride.....10.0%

OTHER INGREDIENTS:.....90.0%

TOTAL:.....100.0%

EPA REG NO. 55555-55-55555

CAUTION

Directions for Use

INSTRUCTIONS FOR USE:
It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

For Disinfection of Healthcare Organisms:
Staphylococcus aureus,
Pseudomonas aeruginosa.

To Disinfect Hard, Nonporous Surfaces:
Pre-wash surface.
Mop or wipe with disinfectant solution.
Allow solution to stay wet on surface for at least 10 minutes.
Rinse well and air dry.

PRECAUTIONARY STATEMENTS:
Hazardous to humans and domestic animals. Wear gloves and eye protection.

CAUSES MODERATE EYE IRRITATION. Avoid contact with eyes, skin or clothing. Wash thoroughly with soap and water after handling. Avoid contact with foods.

FIRST AID: IF IN EYES: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.
IF ON SKIN OR CLOTHING: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes.

POISON CONTROL: Call a Poison Control Center (1-866-366-5048) or doctor for treatment advice.

STORAGE AND DISPOSAL: Store this product in a cool, dry area away from direct sunlight and heat. When not in use keep center cap of lid closed to prevent moisture loss. Nonrefillable container. Do not reuse or refill this container.

EXP MM-DD-YYYY
E 55555 55555

Cleaning, followed by disinfection

Spray-wipe-spray

If using liquid disinfectant:

1. User sprays the surface with the disinfectant
2. Wipe it using a disposable towel to clean the surface
3. Followed with another “spray” to disinfect the surface (allowing contact time to disinfect)

Wipe-discard-wipe

If using disposable disinfectant wipes:

1. User uses one wipe to clean the surface
2. discards the wipe,
3. Use a second wipe to disinfect the surface.

**** Note Disinfectant products should not be used as cleaners unless the label indicates the product is suitable for such use.**

Cleaning: Bucket immersion or open bucket method



- Bucket is pre-filled with disinfectant solution (mixed to manufacturer's instructions for use), usually with a filling station.
 - Clean cleaning cloths are placed in the bucket to soak
 - The object or surface is cleaned with sufficient saturation that the disinfectant stays on the surface, wet for the prescribed contact time.
- ✓ Wipes are only removed from the bucket, never double dipped
 - ✓ Dirty rag bag is needed on the ES cart
 - ✓ Change rags as needed to ensure saturation

[Environmental Services Cleaning Guidebook.pdf \(mnhospitals.org\)](https://www.mnhospitals.org/files/2016/08/Environmental_Services_Cleaning_Guidebook.pdf)

[Nebraska ASAP Environmental Cleaning in Healthcare, part 1 setting up the cart](#)

Reusable cleaning cloths

- Single use, then 'rag bag' (no double dipping)
- Microfiber is preferred
- Sponges should not be used
- Between uses, should be laundered in hot water, without bleach or fabric softener
 - Adhere to manufacturers' instructions for specific direction
- Most manufacturers recommend low heat for drying
- Do NOT dry any other cloths, rags, towels or other clothing with microfibers

Cleaning and Disinfectant Safety

Follow these important safety guidelines when using chemical disinfectants:

- Open doors and windows and use fans or HVAC (heating, ventilation, and air conditioning) settings to increase air circulation in the area.
- Wear the recommended protective equipment (for example, gloves or goggles) to protect your skin and eyes from potential splashes
- If the product instructions tell you to dilute the product with water, use water at room temperature (unless the label says otherwise)
- Clearly label all cleaning or disinfection solutions.
- Store and use chemicals out of the reach of children and animals.
- Do not mix products or chemicals with each other as this could be hazardous and change the chemical properties.
- Do not eat or drink near the chemicals. These products can cause serious harm.
- Immediately after disinfecting, wash your hands with soap and water for 20 seconds.

Food surfaces

Due to the complexity of food safety, defer to ServSafe Food Handler trained colleagues for kitchen and café cleaning strategies. Partner, don't ignore.

- A cleaning detergent that removes dirt and allergenic protein matter, and high quality microfiber cloths/mops should be used
- Sponges are not recommended due to their potential to spread contamination).
- Recommended cleaning schedule: Clean after each use, before the next group arrives

USDA ServSafe Food Handler Program

<https://professionalstandards.fns.usda.gov/content/servsafe%C2%AE-food-handler-program>

CLEANING AND DISINFECTION PROTOCOLS FOR SCHOOLS Air & Water SCIENCES Environmental

https://www.smcoe.org/assets/files/Alert_FIL/AWS%20School%20Protocol%20for%20Cleaning%20and%20Disinfection.pdf

Selecting products



Selection of Disinfectants

Considerations

- Speed of disinfection (Dwell Time/ Contact Time)
- Cleaning ability
- Personnel health and safety
- Cost
- Surface compatibility/ instructions for use for the surface
- Application method (wipes, bucket immersion, pour bottles, and sprays)

Rutala, W., and Weber, D. Disinfectants used for environmental disinfection and new room decontamination technology. AJIC Vol 41, Issue 5, Supplement, S36-S41, May 01, 2013

<https://doi.org/10.1016/j.ajic.2012.11.006>

Disinfectant	Advantages	Disadvantages
Chlorine (a.k.a. bleach solutions)	EPA registered, low incidence of toxicity, reduces biofilms of surfaces, sporicidal at specific concentrations	Discoloration of fabrics, inactivated by organic matter, toxic when mixed with ammonia
Quaternary ammonium compounds (a.k.a 'quats')	EPA registered, surface compatible, active against many bacteria, enveloped viruses, and fungi	Not sporicidal, not effective against non-enveloped viruses, water hardness & cotton can make it less microbiocidal
Improved hydrogen peroxide	EPA registered, non staining, surface compatible, excellent coverage of organisms, benign for environment, often sporicidal	expensive
Phenolics	EPA registered, active against many bacteria, enveloped viruses, and fungi, inexpensive	Not sporicidal, tissue irritant
Alcohol	Good organism coverage, easy to use, used to disinfect small surfaces such as rubber stoppers on medication vials	Not EPA registered, not sporicidal, no detergent or cleaning properties

Dispensing Stations vs. Ready to Use

Dispensing Stations

- Dilution can vary over time, so validation process important to measure effectiveness
- Cost effective, mixing as needed at point of use
- Chemical distributed in concentrate form, higher yield.
Potential splash risk, must use PPE (gloves, goggles)

Ready to Use

- Comes pre-mixed, dilution is always to manufacturer's instructions for use
- Costly on per-use scale
- Requires significant amount of storage

Program Development



Policy Development

Operating Procedures

- What surfaces are cleaned versus sanitized versus disinfected?
- Disinfectant must be changed after (x) rooms
- After an 'sick' room, equipment must be wiped down & disinfectant refreshed
- Disposable versus reusable mop heads and cleaning cloths
- Orientation and training
- Communication strategies

Policy Development

Employee Development

Employee Education

1. Education is initiated in new employee orientation.
2. Education within the department of environmental services includes training on:
 - standard precautions
 - transmission based precautions
 - handwashing technique including hand sanitizers
 - handling and disposing of biohazardous and regular waste
 - proper use of germicidal detergents including dilution, appropriate containers, proper labeling and expiration dates
 - cleaning patient rooms
 - cleaning specialized and critical care areas
 - using personal protective equipment.
 - training annually on blood-borne pathogens.
3. The department monitors annual compliance of the Bloodborne Pathogen training through the department Safety Compliance Report. Written documentation is kept on all training given to each employee in addition to the yearly training. Additional employee training may be given as needed on an individual basis.

Excerpt provided by a previous presenter, example of facility policy statement

Development of a Training Program

- Develop a check list of important items, specific to the building location
- Orientation
- Training
- Evaluation of performance

Creation of a School Cleaning Checklist

- Main Entrance, hallways, and lobbies
- Classrooms and Offices
- Restrooms
- Gym & Fitness Facilities
- Kitchen & Break Rooms

High Touch Surfaces

Surfaces that people frequently touch with their hands, which are therefore easily contaminated with germs.

Typically, should be cleaned and disinfected daily









During periods of high infection rates, ideal to increase (2-3 times daily) or in between student uses.

Communal areas	Door handles, stair railings, bannisters, light switches
Bathroom facilities	Toilets, flush handles, toilet roll dispensers, sinks, sink handles, door handles
Work surfaces	Desks, keyboards, mice, phones
Classrooms	Door handles, sink handles, tablets, desk tops, keyboards, toys
Nurses' Office	Desk, cot, chairs including handles, door handles, devices

Training Resource

Environmental Cleaning in Healthcare
Nebraska ASAP - 5 / 8

↺ ↻ ⋮

-  Environmental Cleaning in Healthcare: Introduction
Nebraska ASAP
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-  Environmental Cleaning in Healthcare Part 6: Clean Patient...
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-  Environmental Cleaning in Healthcare Part 7: Clean and...
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Nebraska ASAP and Nebraska ICAP are funded by the Nebraska DHHS HAI/AR program through a CDC grant. Training videos are free and do not endorse any specific product.

Nebraska ICAP & ASAP Environmental Cleaning in Healthcare, 8 training videos. Access the playlist at https://www.youtube.com/playlist?list=PLUK2nSFZhL9k-a1mc_ksZeTvDUa5he9Q or search “Nebraska ASAP Environmental Cleaning in Healthcare – YouTube”

Training Resources



[Germs in Blood](#)



[Germs on Wet Surfaces](#)



[Germs in the Gut](#)

“No Touch” Methods for Disinfection



More about “No Touch” methods

- Whole room disinfection units
- Supplement standard surface cleaning and disinfection, but do not replace it. Physical cleaning of dirt and debris is still needed
- Only could be used outside school hours, because the students cannot be present during use
- Especially helpful in instances where low-level disinfectants have reduced efficacy (such as *C. diff* spores)
- No residue
- Decontaminate all exposed surfaces in the room
- Expensive

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HP Systems for Room Decon

- “HP” is used to refer to hydrogen peroxide vapor, aerosolized dry mist, and vaporized hydrogen peroxide
- Studies have demonstrated the ability of HP systems to almost eliminate MRSA, VRE, M tuberculosis, spores, viruses, and multidrug-resistant gram negative bacilli
- Requires significant turn-over time

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Questions?



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