



## **BEST PRACTICES FOR CLEANING & DISINFECTION FOR SCHOOLS**

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DOH School Environmental Health and Safety Fall Webinar

November 17, 2021

# Washington State Department of Health School Environmental Health & Safety Program

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## **Our Mission**

To protect and improve the  
Environmental Health and Safety  
condition of schools in Washington state.



# DOH K-12 Guidance

Guidance	Guidance Themes and Updates
<b>K-12 Requirements</b>	<ul style="list-style-type: none"><li>• Update in progress: Technical updates, additional information on recent mask and vaccine requirements</li></ul>
<b>K-12 Supplemental Recommendations</b>	<ul style="list-style-type: none"><li>• Testing guidance (Test to Stay protocol)</li><li>• Case investigation/contact tracing toolkit</li><li>• Additional in-school mitigation strategies</li></ul>
<b>Child Care, Youth Development, Day Camps</b>	<ul style="list-style-type: none"><li>• Update: Alignment with K-12 Supplemental Recommendations</li></ul>
<b>Preventing Transmission of SARS-CoV-2 During Aerosol Generating and Other Procedures</b>	<ul style="list-style-type: none"><li>• Update: Health care recommendations for AGPs including procedures conducted in school nurse offices</li></ul>

# Guidance Location

Guidance can be found on the DOH [COVID-19 Resources and Recommendations](#) page

**Updated** Preventing Transmission of SARS-CoV-2 During Aerosol Generating and Other Procedures



**New** K-12 Supplemental Recommendations



**New** Case Investigation/Contact Tracing Toolkit



Schools and Child Care

**General**

- [Behavioral Health Resources and Recommendations](#)
- [Infection Control for Aerosol Generating Procedures \(PDF\)](#)
- [Recognizing and Reporting Child Abuse and Neglect in Online Education Settings \(PDF\)](#)
- [Safe Drinking Water in Re-opening School Buildings](#)
- [Symptom Evaluation and Management Flow Chart \(PDF\)](#) [Additional languages](#)
- [Vaccine Toolkit for Schools \(Word\)](#)
- [Ventilation and Air Quality for Reducing Transmission of COVID-19 \(PDF\)](#)

**Child Care, Youth Development, and Day Camps**

- [Child Care, Youth Development, and Day Camps During COVID-19 \(PDF\)](#) [Additional languages](#)
- [COVID-19 Vaccination Requirement FAQ for Child Care, Early Learning, and Youth Development Providers \(PDF\)](#) [Additional languages](#)

**K-12 Schools**

- [COVID-19 Vaccination Requirement for K-12 School Employees: Frequently Asked Questions \(OSPI\)](#)
- [K-12 Schools 2021-2022 Requirements \(PDF\)](#)
- [K-12 Schools 2021-2022 Supplemental Considerations to Mitigate COVID-19 Transmission \(PDF\)](#)

**K-12 Schools Contact Tracing and Case Investigation Toolkit**

- [Classroom Closure Letter Template \(Word\)](#)
- [Facility Closure Letter Template \(Word\)](#)
- [General Parent Guardian COVID19 Notification Call Script Template \(Word\)](#)
- [General Parent Guardian COVID-19 Notification Letter Template \(Word\)](#)
- [Modified Quarantine \(Test to Stay\) Exposure Notification Letter Template \(Word\)](#)
- [Parent Guardian Exposure Notification Call Key Points \(Word\)](#)
- [School Case and Close Contact Reporting Line List Template \(Excel\)](#)
- [Unvaccinated Staff Exposure Notification Letter Template \(Word\)](#)
- [Unvaccinated Student Exposure Notification Letter Template \(Word\)](#)
- [Vaccinated Staff Exposure Notification Letter Template \(Word\)](#)
- [Vaccinated Student Exposure Notification Letter Template \(Word\)](#)

# K-12 COVID-19 Requirements for Summer 2021 and the 2021-2022 School Year

## Summary of August 10, 2021 Changes

- Requirements for K-12 extracurricular sports has been added.
- Requirements for K-12 co-curricular and extracurricular performing arts activities has been added.
- Updated recommendations for fully vaccinated individuals identified as close contacts of a person with confirmed COVID-19 in alignment with updated CDC guidance.

## Summary of July 28, 2021 Changes

- Updates in this version reflect recently released CDC recommendations and seek to achieve two primary goals:
  - Minimize transmission of COVID-19 among students and staff in K-12 schools and to their families and broader community.
  - Maximize in-person instruction.
- Vaccination and face coverings/masks are the most effective tools to prevent transmission of COVID-19.
- All staff and students must continue to wear face coverings/masks, regardless of vaccination status.
- Physical distancing requirements have been updated to support provision of full time in-person instruction.
- Information on how schools should “layer” mitigation strategies for the best outcome is provided.
- Quarantine protocols have been updated to reduce student exclusions from instruction.
- Expanded information on diagnostic and screening testing is provided.
- Updated links to relevant L&I orders are provided.
- General alignment updates to COVID-19 language are made.
- Extra- and Co-Curricular requirements will be published in early August.

# Supplemental Considerations to Mitigate COVID-19 Transmission in K-12 Schools

## Introduction

**This guidance provides additional information on optional strategies schools may take to further reduce transmission risks to student and staff from COVID-19. These are not requirements.** See the DOH [K-12 School 2021-2022 Requirements](#) document and Governor's [K-12 Schools Proclamation](#) for information on requirements for K-12 schools for the 2021-2022 school year.

These optional strategies are intended for public and/or private schools serving kindergarten through 12<sup>th</sup> grade (K-12). They are based on existing science, expert public health opinion, and stakeholder feedback. This guidance uses information from the Centers for Disease Control and Prevention's [Guidance for COVID-19 Prevention in K-12 Schools](#).

DOH encourages schools to coordinate with their local school board and the local health department for any decisions related to the optional strategies outlined herein.

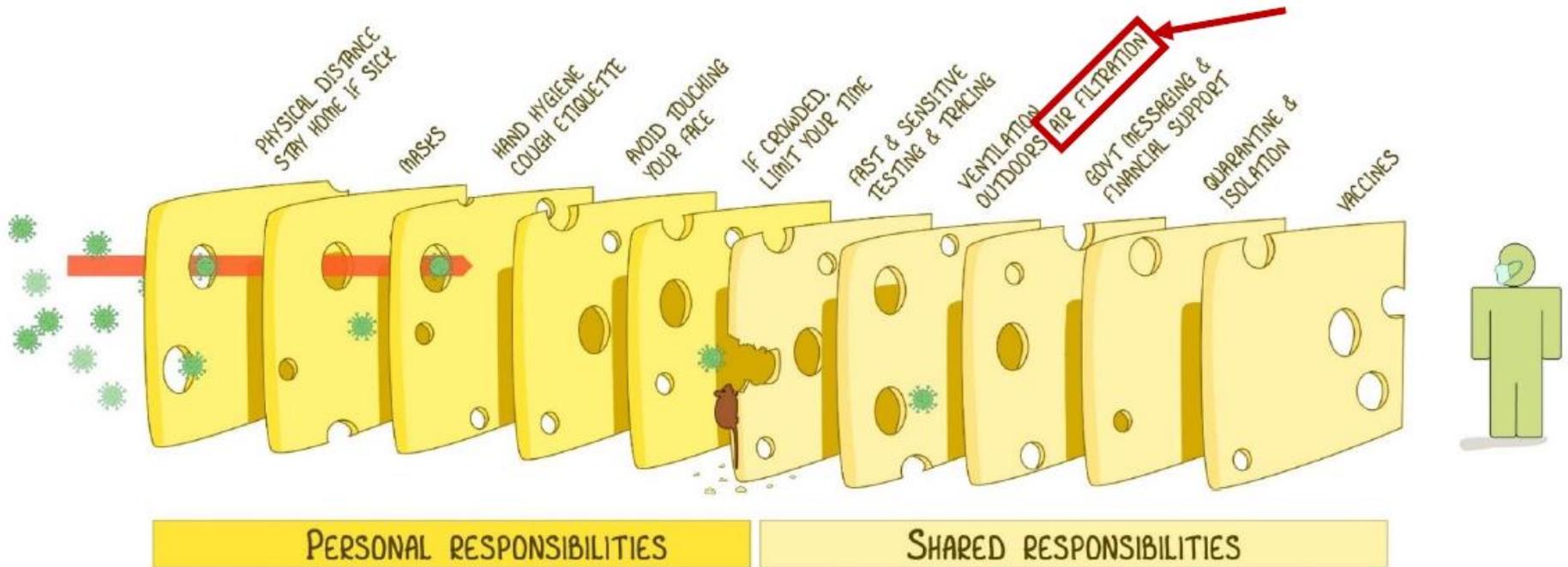
Successfully using these recommendations relies on communication between schools and local public health authorities. Some of this communication may include private information that falls under the Family Educational Rights and Privacy Act. FERPA allows schools to share personally identifiable information with local public health without consent when responding to a health emergency. Read more about [FERPA](#).

The purpose of this document is to provide school districts ideas for implementation at the start of the school year. These recommendations are intended to be supplemental to the K-12 School 2021-22 Requirements.

# Need for Layered Risk Reduction

## THE SWISS CHEESE RESPIRATORY VIRUS PANDEMIC DEFENCE

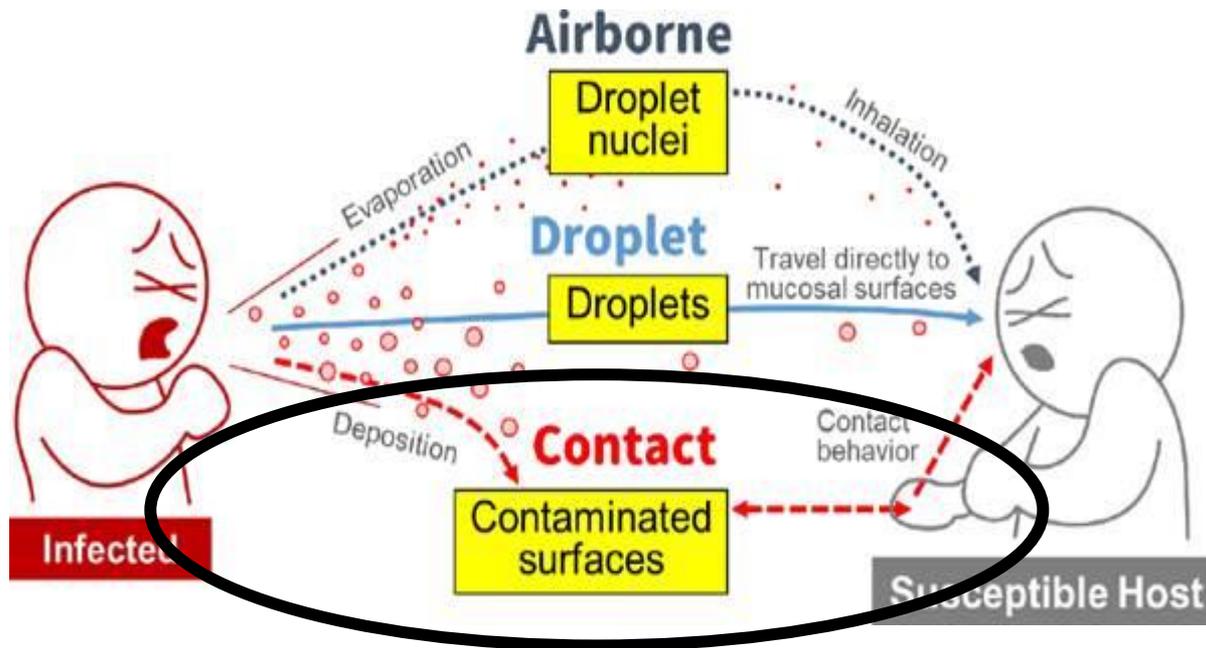
RECOGNISING THAT NO SINGLE INTERVENTION IS PERFECT AT PREVENTING SPREAD



EACH INTERVENTION (LAYER) HAS IMPERFECTIONS (HOLES).  
MULTIPLE LAYERS IMPROVE SUCCESS.

IAN M MACKAY  
VIRIOLOGYDOWNUNDER.COM  
WITH THANKS TO JODY LANARD, KATHERINE ARDEN & THE UNI OF QLD  
BASED ON THE SWISS CHEESE MODEL OF ACCIDENT CAUSATION, BY JAMES T REASON, 1990  
VERSION 3.0  
UPDATE: 24oct2020

# How Do Viral Particles Spread?



Modes of Transmission from Exhaled Pathogens (adapted from leaflet of the Office of the Prime Minister and the Ministry of Health, Labor and Welfare of Japan (2020))

# Prevention – Everyone’s Job!

- Wash your hands with plain soap and water – often!
- Cover your cough or sneeze.
- Avoid touching your eyes, nose, or mouth.
- Stay out of spit zones.
- Get vaccinations.
- Good ventilation.
- Stay home when ill.
- Support Public Health.

I have used this slide for many years in presentations.  
It’s the basics!



# Basics for COVID Prevention

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- Get vaccinated!!!!
- Stay home when sick
- Self-isolate for 14 days if you've been around someone with COVID-19 for more than 15 minutes, closer than 6'
- Wash hands frequently with plain soap and water (especially before touching face)
- **Wear a cloth face covering**
- **Keep 6 feet between people**
- Maximize outside air, reduce air recirculation, increase filtration to a MERV 13, reduce occupancy
- Stay outside as much as possible
- Clean frequently touched surfaces

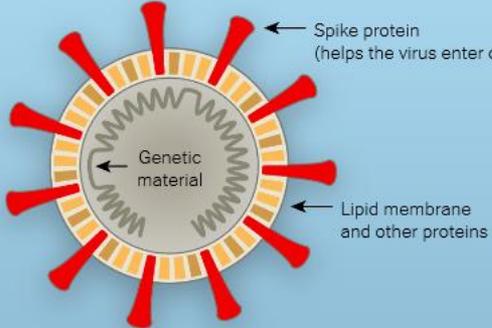


# Soap

- Fragrance Free
- Dye Free
- Scrub for 20 seconds
- NO antibacterial soaps



**THE CORONAVIRUS** has a membrane of oily lipid molecules, which is studded with proteins that help the virus infect cells.

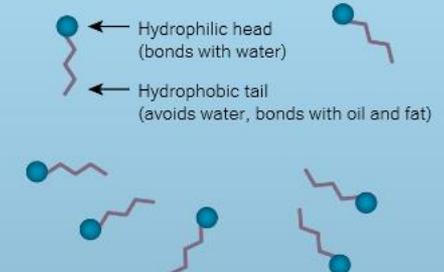


← Spike protein (helps the virus enter cells)

← Genetic material

← Lipid membrane and other proteins

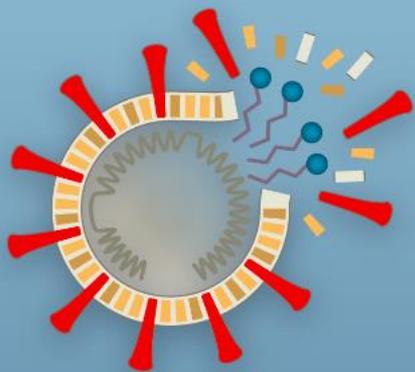
**SOAP MOLECULES** have a hybrid structure, with a head that bonds to water and a tail that avoids it.



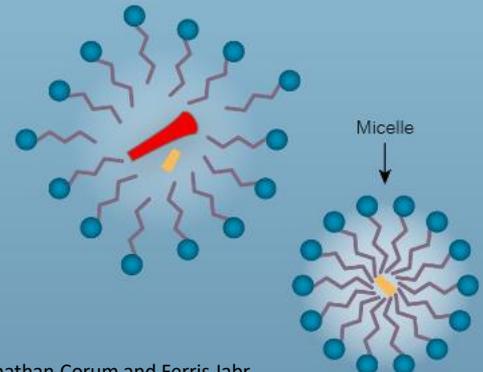
← Hydrophilic head (bonds with water)

← Hydrophobic tail (avoids water, bonds with oil and fat)

**SOAP DESTROYS THE VIRUS** when the water-shunning tails of the soap molecules wedge themselves into the lipid membrane and pry it apart.



**SOAP TRAPS DIRT** and fragments of the destroyed virus in tiny bubbles called micelles, which wash away in water.



← Micelle

By Jonathan Corum and Ferris Jabr

# Wash with Soap and Water

**Make time for handwashing!!!!**

- **When coming inside from playing**
- **After going to the bathroom**
- **Before preparing food**
- **Before eating**
- **After touching animals**
  
- **Remove oils/dirt/feces**
- **Remove lead/pesticides**
  
- If you absolutely do not have access to soap and water – scrub with an unscented baby wipe and then use an alcohol-based hand sanitizer.



# Hand Sanitizer

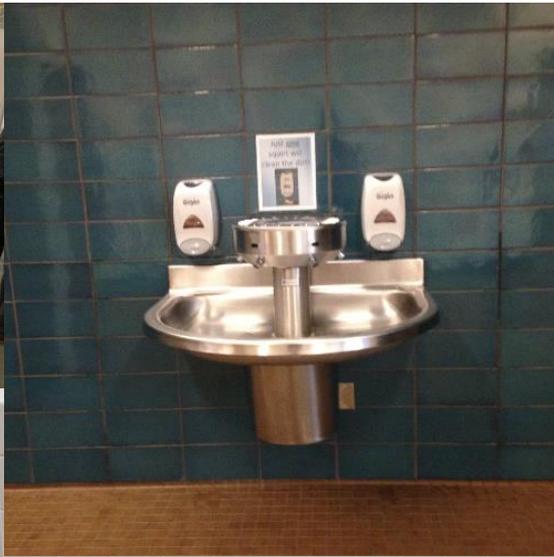
- Not a substitute for hand washing
- Not effective on dirty hands
- At least 60% alcohol (isopropyl or ethyl)
- Hands should stay wet for 20+ seconds
- Not considered effective on non-enveloped viruses or spores
- Flammable / poison
- **Fragrance free**
- Be careful of dangerous products (methanol, 1-propanol)
  - <https://www.fda.gov/drugs/drug-safety-and-availability/fda-updates-hand-sanitizers-consumers-should-not-use>
- Not recommended:
  - Benzalkonium chloride, “quat” based / non-alcohol / “natural”



CDC: Show Me the Science:

<http://www.cdc.gov/handwashing/show-me-the-science-hand-sanitizer.html>

# Sinks, Sinks, and more Sinks



# Local School Credits Handwashing Stations with Drop in Absences

**Lake Charles, Louisiana**

**Posted: Nov 21, 2014 3:50 AM PST , By Britney Glaser,  
KPLCtv.com**



# Electric Hand Dryers

“Modern hand dryers are much worse than paper towels when it comes to spreading germs, according to new research. Airborne germ counts were 27 times higher around jet air dryers in comparison with the air around paper towel dispensers.”

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“jet-air” and warm air dryers studied



E.L. Best, P. Parnell, M.H. Wilcox. **Microbiological comparison of hand-drying methods: the potential for contamination of the environment, user, and bystander.** *Journal of Hospital Infection*, 2014.

# Cleaning and Disinfecting

[K-12 Schools Requirements 2021-2022 \(wa.gov\)](#)

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Schools should have infection control plans updated to reflect what is known about COVID-19.

These are basic cleaning definitions:

- Cleaning removes germs, dirt, food, body fluids, and other material.
- Sanitizing reduces germs on surfaces to safe levels.
- Disinfecting kills germs on surfaces of a clean object.

The U.S. Environmental Protection Agency (EPA) regulates sanitizer and disinfectant chemicals. If you sanitize or disinfect without cleaning first, it will reduce how well these chemicals work and may leave more germs on the surface.

# Cleaning and Disinfecting (Continued)

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Current CDC guidance for cleaning and disinfection for COVID-19 states that disinfectants should be registered by the EPA for use against COVID-19. Refer to List N: Disinfectants for Use Against SARS-CoV-2 (COVID-19). The University of Washington has a handout with options for safer cleaning and disinfecting products that work well against COVID-19. Additional information can be found at the DOH COVID-19 website. Another resource for standard infection control and school cleaning is available on the Toxics Use Reduction Institute website.

Clean and disinfect frequently touched surfaces each night after students leave and when someone is sick in the room (vomit, blood, feces, urine). When disinfecting surfaces, always follow the disinfectant instructions on the label.

# Cleaning and Disinfecting (Continued)

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Do not use ionization, fogging, fumigation, or wide-area spraying to control the spread of COVID-19. These methods are not effective, do not clean contaminated surfaces, and are hazardous to human health. The EPA has approved the use of electrostatic sprayers with some disinfectants. If the electrostatic application is not listed on the label, it is not an approved application method. Surfaces still need to be cleaned first and then the disinfectant applied to the surface for the required wet time. Use the large droplet setting to avoid misting as much as possible. Do not use for wide-area spraying.

## Cleaning and Disinfecting

**The following is supplemental information based on current public health recommendations. See the Cleaning and Disinfecting section of the [K-12 COVID-19 Requirements for the 2021-2022 School Year](#) for requirements. Schools must follow all regular cleaning and food code requirements.**

If you use a bleach and water mixture for disinfection, mix it at a concentration of 4 teaspoons of 6% bleach per quart (or liter) of cool water or 5 tablespoons of 6% bleach per gallon (or 4L) of cool water (1,000 parts per million). Thoroughly clean surfaces with soap and water and remove the soap with water before applying the bleach solution. Keep the surface wet for with bleach solution at least one minute. An emergency eye wash station is required at the location where bleach is mixed from concentrate.

Find more information about cleaning, disinfecting, and choosing safer cleaning products on the [DOH COVID-19 website](#). Clean and disinfect high-touch surfaces like doorknobs, faucet handles, check-in counters, and restrooms. In general, cleaning once a day is enough to sufficiently remove potential virus that may be on surfaces. Use alcohol wipes or 70% isopropyl alcohol to clean keyboards and electronics. Wash hands after you clean. Outdoor areas generally require normal routine cleaning and do not require disinfection. Drinking fountains and bottle fillers do not need to be disabled, but buttons or levers should be cleaned regularly.

## [Supplemental Considerations to Mitigate COVID-19 Transmission in K-12 Schools \(wa.gov\)](https://www.wa.gov)

- Use disinfectants in a ventilated space. Heavy use of disinfectant products should be done when children are not present. The facility should have enough time to air out before individuals return.
- Use the proper concentration of disinfectant.
- Preclean surfaces before applying disinfectant.
- Keep the disinfectant on the surface for the required amount of wet contact time.
- Follow the product label warnings and instructions for PPE such as gloves, eye protection, and ventilation.
- Keep all chemicals out of reach of children. Children under 18 years of age cannot use EPA registered sanitizers and disinfectants, including disinfectant wipes.
  
- Facilities must have a Safety Data Sheet (SDS) for each chemical used in the facility.
- Parents, teachers, and staff should not supply disinfectants and sanitizers.
- Use alcohol wipes or 70% isopropyl alcohol to clean keyboards and electronics.

Outdoor areas, like playgrounds in schools and parks, do not require disinfection unless contaminated with vomit, blood, or feces.

## Bus Transportation

**School bus transportation is considered public transportation and is subject to mask requirements by [federal order](#). Please see CDC's [Requirements for Face Masks on Public Transportation](#) for more information.**

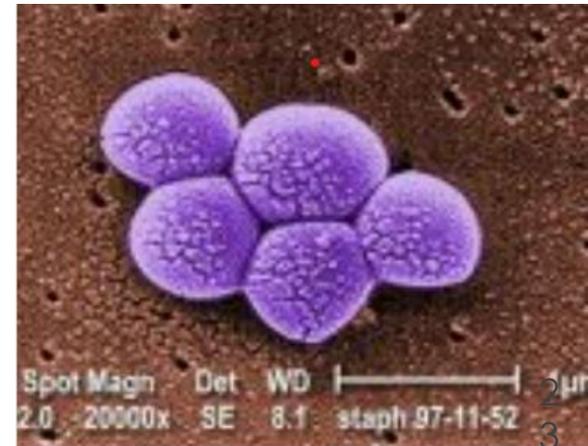
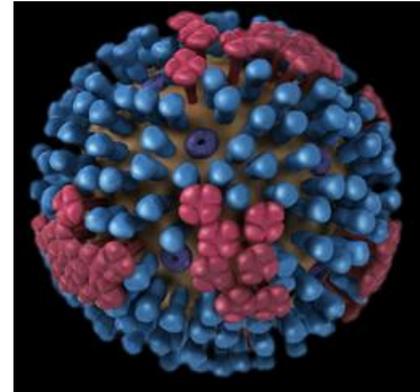
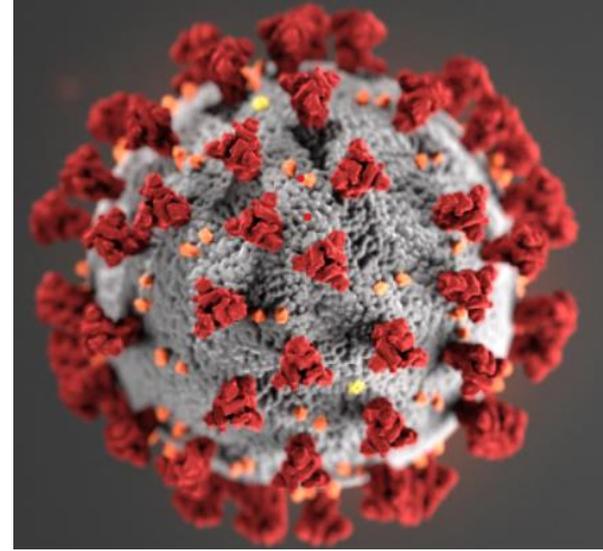
Optional strategies to further reduce SARS-CoV-2 transmission during school transportation include:

- Keeping riders as far apart as possible on the bus.
- Consider limiting occupancy.
- Use assigned seating.
- Seat students with household members or members of their school classroom/group/cohort.
- Maximize ventilation on the bus—open windows and roof vents whenever safe to do so.
- Clean and disinfect frequently touched surfaces, including the tops and backs of seats at the end of the day. Use an EPA registered product and follow the manufacturer's instructions for use. Do not fog/mist the bus with disinfectant. Leave windows open to air out the bus after runs and cleaning.
- Encourage walking or biking where safe.
- Encourage students to wash or sanitize hands when they leave their home or classroom before boarding the bus.

# Pathogens in Schools

(Short List)

- Respiratory
  - Influenza
  - Measles
  - *Pertussis* (Whooping Cough)
  - COVID-19
- Athletics – skin pathogens
  - MRSA  
*Methicillin Resistant Staphylococcus aureus*
- Fecal/Vomit-Oral
  - Norovirus
  - *Clostridium difficile* (C. diff)
  - *Salmonella*



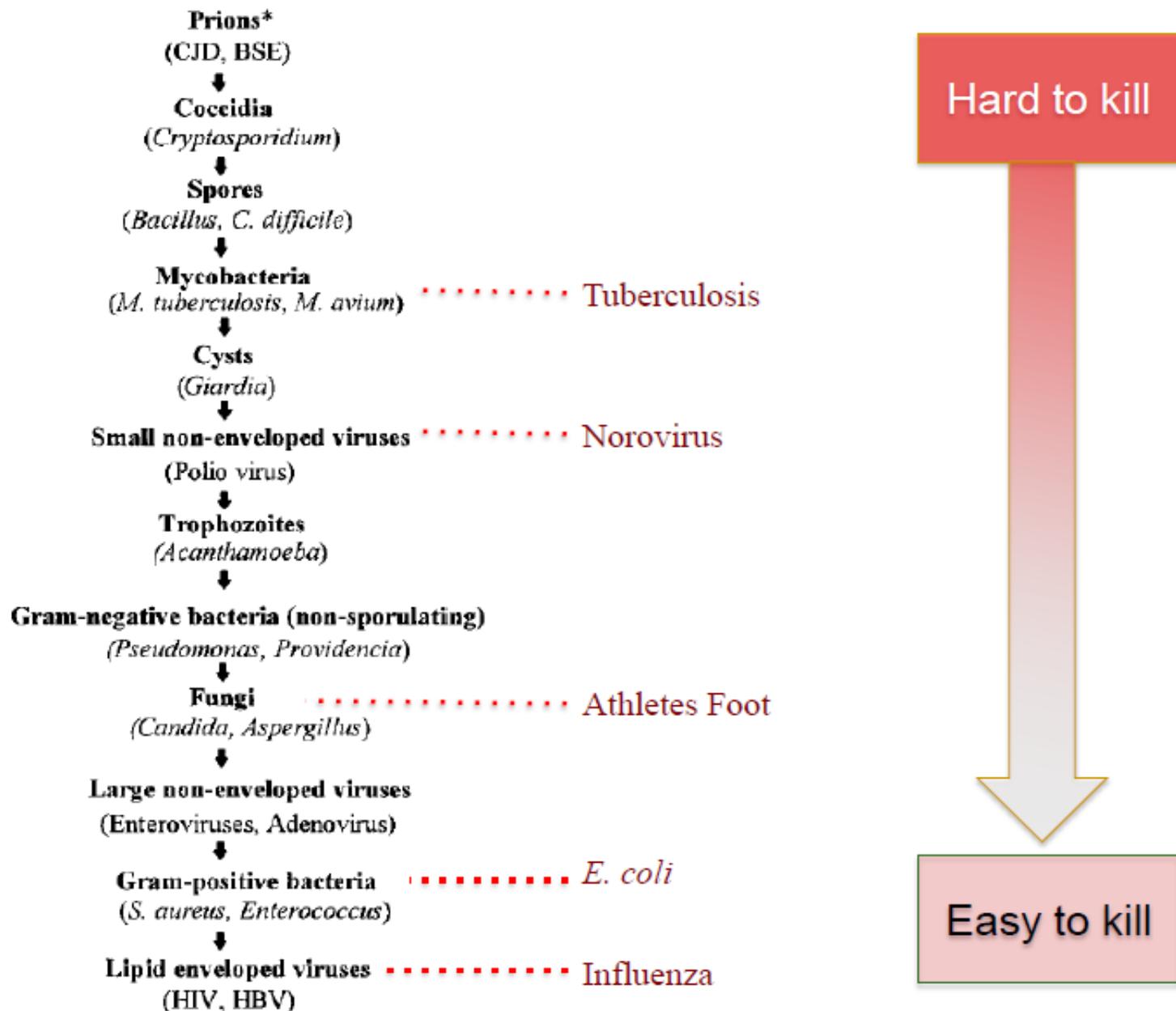


FIG. 1. Descending order of resistance to antiseptics and disinfectants. The asterisk indicates that the conclusions are not yet universally agreed upon.

## Characteristics of Selected Disinfectants

This table provides general information for each disinfectant chemical classes. Antimicrobial activity may vary with formulation and concentration. Always read and follow the product label for proper preparation and application directions.

Disinfectant Category	Alcohols	Alkalis	Aldehydes	Oxidizing Agents			Phenols	Quaternary Ammonium Compounds
				Halogens: Chlorine	Halogens: Iodine	Peroxygen Compounds		
<b>Common Active Ingredients</b>	• ethanol • isopropanol	• calcium hydroxide • sodium carbonate • calcium oxide	• formaldehyde • glutaraldehyde • ortho-phthalaldehyde	• sodium hypochlorite (bleach) • calcium hypochlorite • chlorine dioxide	• providone-iodine	• hydrogen peroxide/accelerated HP • peracetic acid • potassium peroxymonosulfate	• ortho-phenylphenol • orthobenzylpara-chlorophenol	• benzalkonium chloride • alkyldimethyl ammonium chloride
<b>Sample Trade Names*</b>			Synergize®	Clorox®, Wysiwash®		Rescue®, Oxy-Sept 333®, Virkon-S®	One-Stroke Environ®, Pheno-Tek II®, Tek-Tro®, Lyso®	Roccal-D®, DiQuat®, D-256®
<b>Mechanism of Action</b>	Precipitates proteins; denatures lipids	Alters pH through hydroxyl ions; fat saponification	Denatures proteins; alkylates nucleic acids	Denatures proteins	Denatures proteins	Denature proteins and lipids	Denatures proteins; disrupts cell wall	Denatures proteins; binds phospholipids of cell membrane
<b>Characteristics</b>	<ul style="list-style-type: none"> <li>Fast acting</li> <li>Rapid evaporation</li> <li>Leaves no residue</li> <li>Can swell or harden rubber and plastics</li> </ul>	<ul style="list-style-type: none"> <li>Slow acting</li> <li>Affected by pH</li> <li>Best at high temps</li> <li>Corrosive to metals</li> <li>Severe skin burns; mucous membrane irritation</li> <li>Environmental hazard</li> </ul>	<ul style="list-style-type: none"> <li>Slow acting</li> <li>Affected by pH and temperature</li> <li>Irritation of skin/mucous membrane</li> <li>Only use in well ventilated areas</li> <li>Pungent odor</li> <li>Noncorrosive</li> </ul>	<ul style="list-style-type: none"> <li>Fast acting</li> <li>Affected by pH</li> <li>Frequent application</li> <li>Inactivated by UV radiation</li> <li>Corrodes metals, rubber, fabrics,</li> <li>Mucous membrane irritation</li> </ul>	<ul style="list-style-type: none"> <li>Stable in storage</li> <li>Affected by pH</li> <li>Requires frequent application</li> <li>Corrosive</li> <li>Stains clothes and treated surfaces</li> </ul>	<ul style="list-style-type: none"> <li>Fast acting</li> <li>May damage some metals (e.g., lead, copper, brass, zinc)</li> <li>Powdered form may cause mucous membrane irritation</li> <li>Low toxicity at lower concentrations</li> <li>Environmentally friendly</li> </ul>	<ul style="list-style-type: none"> <li>Can leave residual film on surfaces</li> <li>Can damage rubber, plastic; non-corrosive</li> <li>Stable in storage</li> <li>Irritation to skin and eyes</li> </ul>	<ul style="list-style-type: none"> <li>Stable in storage</li> <li>Best at neutral or alkaline pH</li> <li>Effective at high temps</li> <li>High concentrations corrosive to metals</li> <li>Irritation to skin, eyes, and respiratory tract</li> </ul>
<b>Precautions</b>	Flammable	Very caustic	Carcinogenic	Toxic gas released if mixed with strong acids or ammonia			May be toxic to animals, especially cats and pigs	
<b>Bactericidal</b>	+	+	+	+	+	+	+	+
<b>Virucidal</b>	± <sup>a</sup>	+	±	+	+	+	+	+ Enveloped
<b>Fungicidal</b>	+	+	+	+	+	±	+	+
<b>Tuberculocidal</b>	+	±	+	+	+	±	+	—
<b>Sporicidal</b>	—	+	+	+	±	+	—	+
<b>Factors Affecting Effectiveness</b>	Inactivated by organic matter	Variable	Inactivated by organic matter, hard water, soaps and detergents	Rapidly inactivated by organic matter	Rapidly inactivated by organic matter	Effective in presence of organic matter, hard water, soaps, and detergents	Effective in presence of organic matter, hard water, soaps, and detergents	Inactivated by organic matter, hard water, soaps and anionic detergents

+ = effective; ± = variable or limited activity; — = not effective

a - slow acting against nonenveloped viruses (e.g., norovirus)

\*DISCLAIMER: The use of trade names serves only as examples and does not in any way signify endorsement of a particular product.

REFERENCES: Fraise AP, Lambert PA et al. (eds). *Russell, Hugo & Ayliffe's Principles and Practice of Disinfection, Preservation and Sterilization*, 5th ed. 2013. Ames, IA: Wiley-Blackwell; McDonnell GE. *Antisepsis, Disinfection, and Sterilization: Types, Action, and Resistance*. 2007. ASM Press, Washington DC. Rutala WA, Weber DJ, Healthcare Infection Control Practices Advisory Committee (HICPAC). 2008. Guideline for disinfection and sterilization in healthcare facilities. Available at: [http://www.cdc.gov/hicpac/Disinfection\\_Sterilization/toc.html](http://www.cdc.gov/hicpac/Disinfection_Sterilization/toc.html); Quinn PJ, Markey FC et al. (eds). *Veterinary Microbiology and Microbial Disease*. 2nd ed. 2011. West Sussex, UK: Wiley-Blackwell, pp 851-889.



the Center for  
Food Security  
& Public Health  
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**Use the right disinfectant for the situation!!!**

Guidance can be found here:  
<https://www.cfsph.iastate.edu/Disinfection/Assets/Disinfection101.pdf>

[https://www.aaha.org/globalassets/02-guidelines/infection-control/characteristics\\_of\\_selected\\_disinfectants\\_2010-2018-08\\_aahavers.pdf](https://www.aaha.org/globalassets/02-guidelines/infection-control/characteristics_of_selected_disinfectants_2010-2018-08_aahavers.pdf)

# Schools Need An Infection Control Plan

- Clear Protocol
- Independent third-party certified cleaning products
  - Ingredients not known to contribute to asthma, cancer, respiratory irritation, liver and kidney disease
- EPA registered sanitizers-disinfectants
- Best practices & procedures
- Cleaning equipment designed to reduce the amount of chemicals required
  - Walk-off mats, HEPA filters, microfiber, etc.
- Training programs – infection control, Hazardous Communication, PPE, reading labels, safety data sheets
  - Nitrile gloves, chemical splash goggles

# Infection Control Handbook for Schools

**Edition 2**



## **Primary Authors**

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Carol Westinghouse

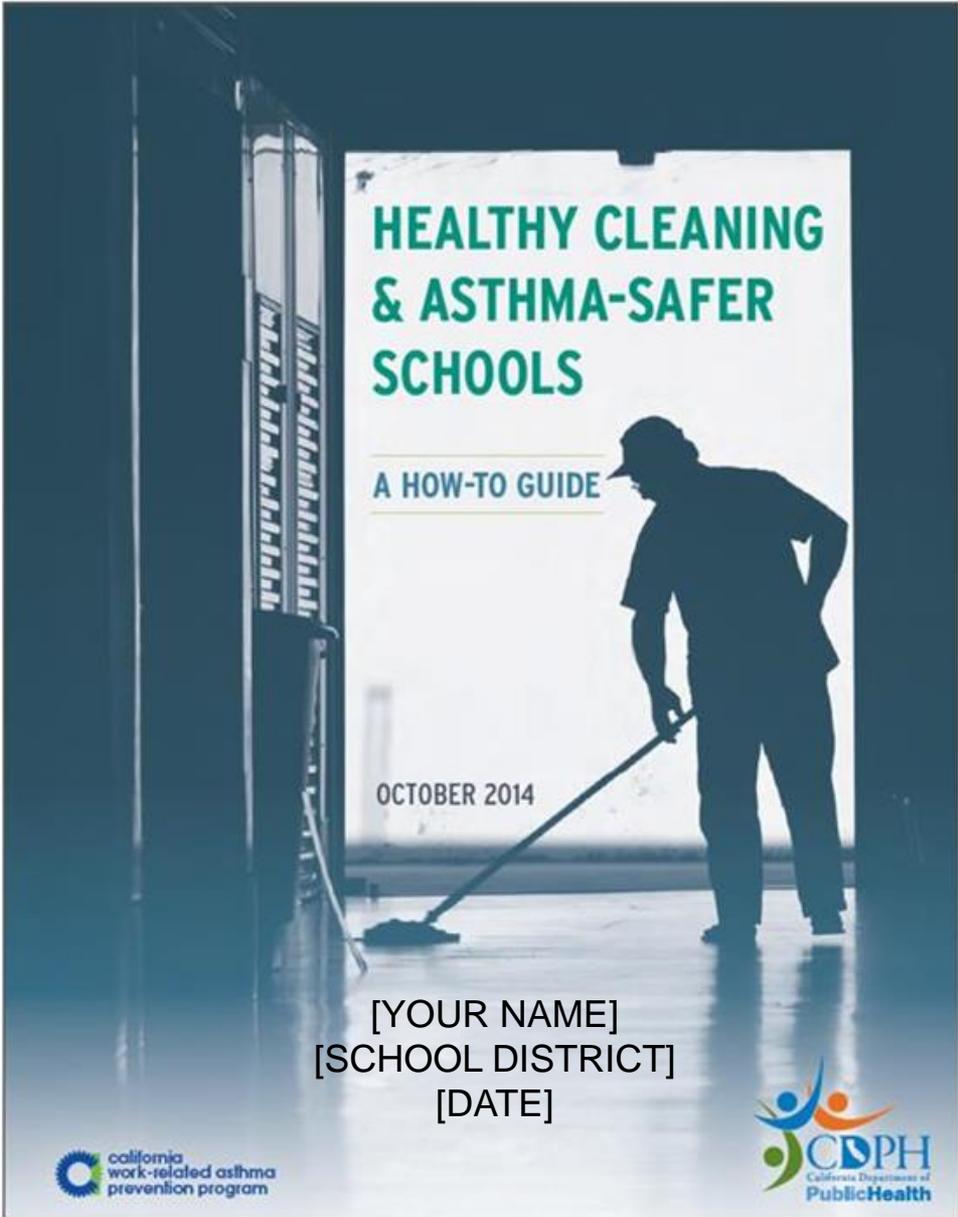
## **Acknowledgements**

The authors gratefully acknowledge the members of the National Cleaning for Healthier Schools and Infection Control Workgroup for their participation in a series of monthly conference calls that resulted in the 2010 Handbook. Special thanks to the Toxics Use Reduction Institute team, Victoria Leonard, and our contributors and reviewers for the 2020-2021 update.

## **Funding**

This report was prepared with funding from and in collaboration with the Toxics Use Reduction Institute (TURI) at the University of Massachusetts Lowell in 2010 and 2020-2021.

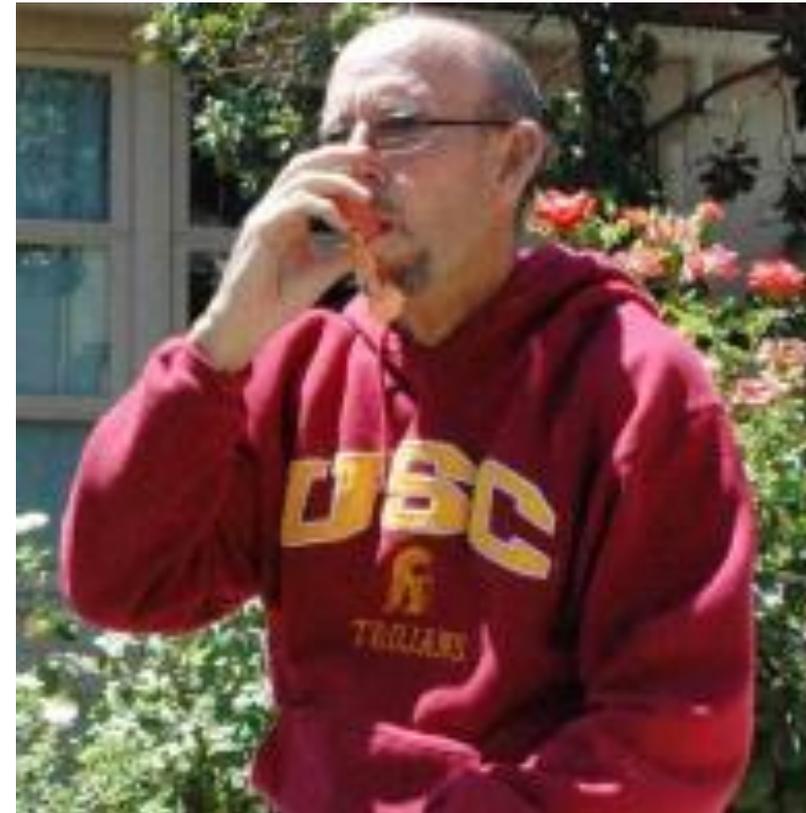
Staff and students deserve to work and learn in a safe and healthy school environment, and they can, since safer cleaning products and methods exist.



# Work -Related Asthma

New asthma from work  
or

Asthma gets worse while at work



# Asthma-Safer Cleaning

- Update and maintain equipment
- Ventilate adequately and regularly change air filters
- Air fresheners not asthma-safer
- **Clean has no scent**



# Asthma-Safer Cleaning

- Disinfect only when necessary
- Don't disinfect floors--no greater health protection
- High-risk areas to possibly disinfect: athletic departments, bathrooms, cafeterias, child care areas, kitchens, nurse health rooms



# Learning and Productivity

Asthma: leading cause of school absences for a chronic illness

Hospital care cost \$193 million for asthma in 2005-2007 in California

Schools lose money each day a student is absent

Lower academic achievement

Lower productivity among workers, more sick days



# Solution: Cleaning for Asthma-Safe Schools

Protects custodians, staff, children's health

Improves indoor air quality

Reduces environmental harm



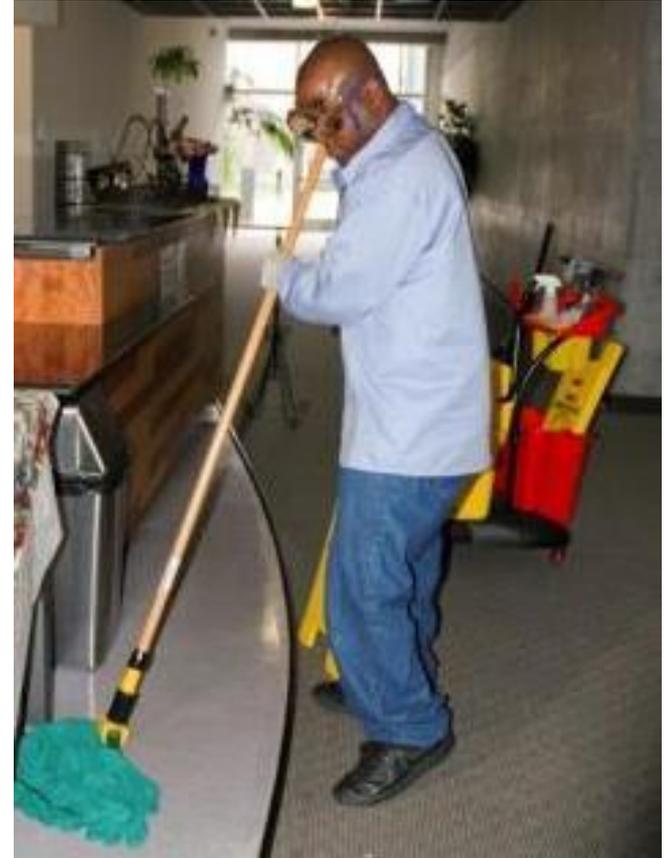
# Steps

1. Create team
2. Train team on asthma-safer cleaning
3. Inventory products
4. Select certified products to test
5. Arrange vendor presentations, select vendors
6. Test and evaluate products
7. Share your successes, set district policies



# Outcomes

- Custodians: experts in district
- Leaders become knowledgeable about healthier products
  - “Let’s pick a different product. This one has asthmagens.”
- Less absenteeism
- Reduce cleaning budgets
- Serve as a model of success



# Successes

Cost-savings

New equipment

Healthier environments

Reduced absenteeism

Fewer injuries

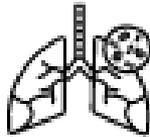


***“Green products can clean just as well or better than some of the products we used that were not labeled or considered “green.” –Livermore School District***

# Why Promote safer Cleaning/Disinfection?

## Health Impacts:

- Asthma, allergies, respiratory issues
- Skin, eyes, nose, throat irritation
- Headaches
- Disrupt hormones
- Cancer risk



## Benefits of Safer Products:

- Improved Indoor Air Quality
- Better Health
- Higher Attendance
- Academic Improvement
- Reduce Asthma
- Reduce Sensitization
- Improved Environment
- Reduced Exposure to Toxics



# Choosing Products

(not disinfectants/sanitizers)



## Third Party Certified

- Independent verification of product safety and performance.
- [Green Seal](#)
- [UL GREENGUARD](#)
- EPA (Fragrance-free) [Safer Choice](https://www.epa.gov/saferchoice)  
(<https://www.epa.gov/saferchoice>)
  - ▶ Neutral pH
  - ▶ Low hazard rating
  - ▶ Use only when and where needed
  - ▶ Meets or exceeds the California VOC requirements
  - ▶ Avoid:
    - ▶ phosphates, dye, fragrance, butyl cellusolve, nonylphenol ethoxylate



# NIOSH

## Work-related Asthma: Occupational Exposures Cleaning Services

- **Acetic acid**
- Acids
- Ammonia (ammonium hydroxide)
- Biocides
- **Bleach (sodium hypochlorite)**
- Chloramines
- Formaldehyde
- Glutaraldehyde
- **Quaternary ammonium compounds (e.g., benzalkonium chloride)**
- **Spray products**

<https://www.cdc.gov/niosh/topics/asthma/exposures.html>

# Clean – Sanitize – Disinfect?

- **Cleaners, Soaps, Detergents**

- Remove dirt/organics and most germs.
- **Always clean before sanitizing or disinfecting – dirt and oils prevent sanitizers and disinfectants from reaching/killing germs.**
- Soap/water/microfiber cloths
- Scrub to remove biofilms



- **Sanitizers**

- Reduce germs on surfaces – 99.9%.
- Kitchens/food prep/childcare
- Do not leave harmful residues
- Cannot claim killing viruses or fungi

- **Disinfectants**

- Destroy 99.99% of microbial life, bacteria, viruses, but not necessarily spores. Various levels.
- Cannot disinfect a dirty surface!



# Cleaning and/or Disinfecting ?

- High-risk areas
  - Athletics
  - Bathrooms
  - Health rooms
  - Cafeterias/Kitchens (sanitizers)
  - High touch surfaces
    - Door handles
    - Faucets
    - Keyboards
    - Railings
    - Phones
    - Drinking Fountains
- Floors—not usually
- Where someone is ill – vomit/blood/feces



# Cleaning and Disinfecting Procedures

- *Cleaning* refers to the removal of dirt and impurities, including germs, from surfaces. Cleaning alone does not kill germs. But by removing the germs, it decreases their number and therefore any risk of spreading infection.
- *Disinfecting* works by using chemicals to kill germs on surfaces. This process does not necessarily clean dirty surfaces or remove germs. But killing germs remaining on a surface after cleaning further reduces any risk of spreading infection.
- Third party certified (Green Seal, EPA Fragrance-free Safer Choice) “green” cleaners
- Disinfecting with an Environmental Protection Agency (EPA) disinfectant registered for use against the novel coronavirus - see [List N: Disinfectants for Use Against SARS-CoV-2](#).
- EPA’s Design for the Environment antimicrobial pesticide (safer disinfectants) program such as those based on hydrogen peroxide or alcohol.

# Disinfection

- CLEAN FIRST
- Use the proper concentration of disinfectant.
  - Do not mix chemicals!
  - Check expiration dates.
  - Read the label!
- Allow the required wet contact time.
- Follow the product label hazard warnings and instructions for personal protective equipment (PPE) such as gloves, eye protection, and adequate ventilation.
- Use disinfectants in a **well-ventilated space and not around children.**
- Obtain the Safety Data Sheet (SDS).
- Parents, teachers and staff should **not** supply disinfectants and sanitizers.
- Keyboards and other sensitive electronics: Use alcohol wipes. Wash hands before and after use and do not touch your face while using. Do not assume they are sterile.

## Cleaning and Disinfection Protocol

### **Remove all grossly visible debris.**

The presence of gross contamination or organic material, especially feces, will inactivate most disinfectants.

### **Wash the area or item with water and detergent.**

### **Thoroughly rinse the cleaned area to remove any detergent residue.**

Some disinfectants may be inactivated by detergents; therefore, it is very important to rinse well after washing the area or item.

### **Allow the area to dry completely.**

### **Select and apply an appropriate, effective disinfectant.**

### **Allow the proper contact time!**

This is one of the most overlooked steps!!  
Contact time may vary depending on the disinfectant selected, but is usually at least 10 minutes. Consult the product label.

### **Thoroughly rinse away any residual disinfectant and allow the area or item to dry.**

# Microfiber

- The most effective type of cloth to use for cleaning and removing dirt and microorganisms
- Little to no cleaning chemicals
- Less effort, absorbent, durable
- Prevent injuries, illnesses
- Avoid cross-contamination
  - 8 fold method
- Simple to clean- wash and dry, on-site or laundering service

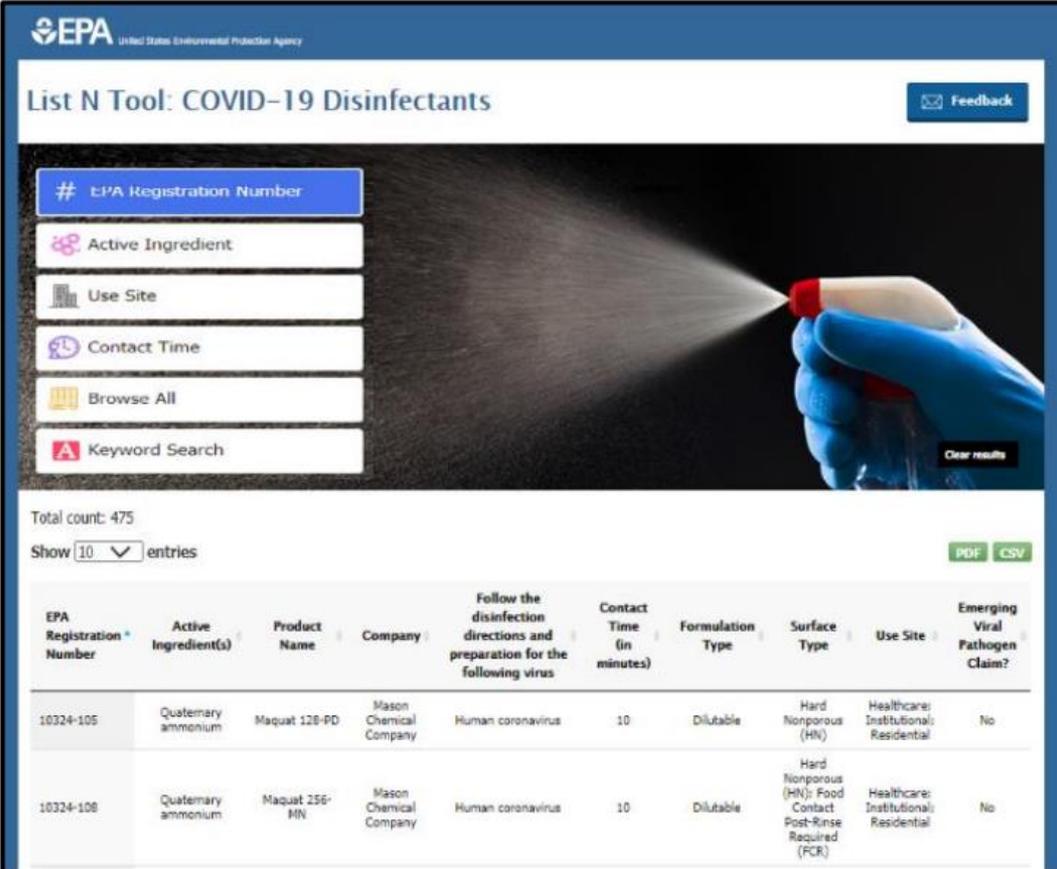


# Using the EPA's List N for Emerging Pathogens

To find products on List N, there is a search box.

Some key topics to search by:

- Active ingredients (e.g., DFE list)
- Contact time
- Type of application equipment



**EPA** United States Environmental Protection Agency

## List N Tool: COVID-19 Disinfectants

Feedback

# EPA Registration Number

Active Ingredient

Use Site

Contact Time

Browse All

Keyword Search

Total count: 475

Show 10 entries

PDF CSV

EPA Registration Number	Active Ingredient(s)	Product Name	Company	Follow the disinfection directions and preparation for the following virus	Contact Time (in minutes)	Formulation Type	Surface Type	Use Site	Emerging Viral Pathogen Claim?
10324-105	Quaternary ammonium	Maquat 128-PD	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard Nonporous (HN)	Healthcare; Institutional; Residential	No
10324-106	Quaternary ammonium	Maquat 256-MN	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard Nonporous (HN); Food Contact Post-Rinse Required (FCR)	Healthcare; Institutional; Residential	No

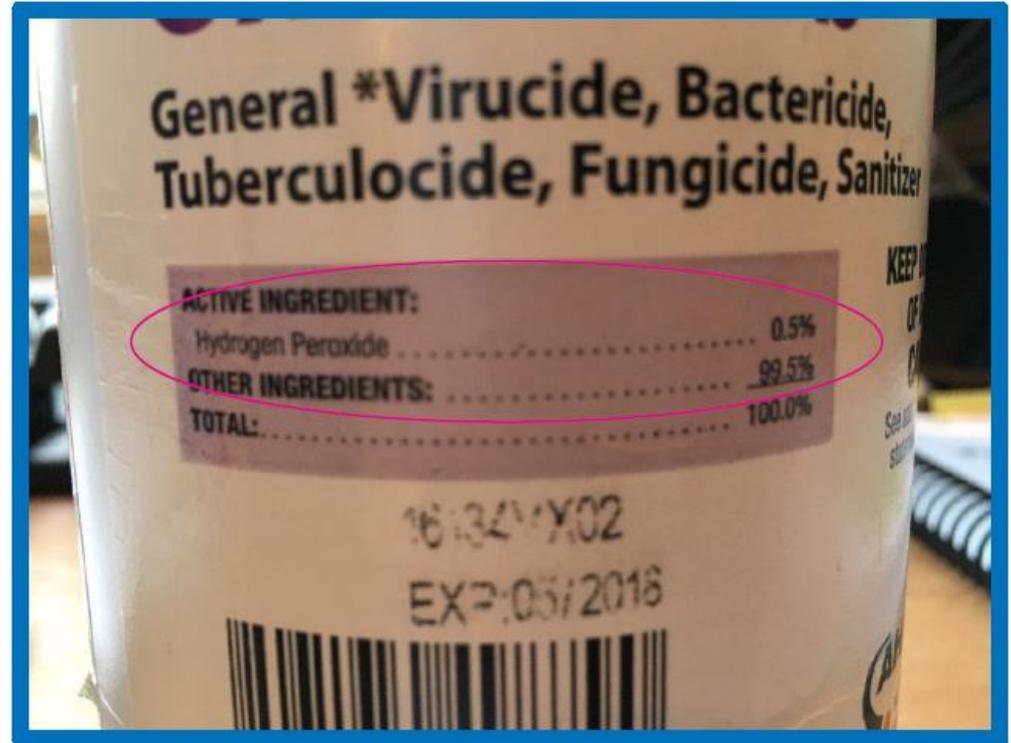
[Safer Cleaning and Disinfecting in Schools \(turi.org\)](https://www.turi.org)

# Questions to Ask Vendors When Selecting Disinfectants

- **When will the product be available?**
- **Is the product on EPA's List N?**
- **What is the EPA Registration number?**
- **Is the active ingredient on the EPA DFE list?**
- **What are the product hazards?**
- **What is the dilution rate for COVID-19?**
- **What is the contact time for COVID-19?**
- **What PPE and ventilation is required?**
- **What applicator equipment can the product be used with per the label?**

Product Name	Grams per tablet	Number tablets to make a gallon	Grams per gallon (g per tab x # tabs)	PPM for COVID 19	Dwell time
Effersan	4.0 grams	4	16 grams per gallon	1,150 PPM	5 minutes
ViroTab	6.55 grams	2	13.1 grams per gallon	1,076 ppm	10 minutes
		8	52.4 grams per gallon	4,306 ppm	1 minute
Clearon EZ Bleach	5.0 grams	2.5	12.5 grams per gallon	958 ppm (383.2 ppm per tab)	10 minute
		Or use 3 tabs so don't have to split one	15 grams per gallon	Only requires 958 ppm, but with 3 tabs it will be 1,149.6 ppm	10 minute

An example of how the same exact formulation can have different product names, come in different sizes and concentrations, require different dilution rates, and have different contact times.



# The Label is the Law

**IT IS A VIOLATION OF FEDERAL LAW TO USE THIS PRODUCT IN A MANNER INCONSISTENT WITH ITS LABELING.**

**DIRECTIONS FOR USE:**

**TO CLEAN:** Wipe surface clean with **this product**. Let air dry.

**TO SANITIZE:** Use to sanitize/deodorize hard, nonporous surfaces. Wet for 30 seconds. Let surface dry.

**TO DISINFECT (AND DEODORIZE):** Use to disinfect hard, nonporous surface to remain visibly wet for 4 minutes. Let surface dry. For mats, crates, cabs and wheels.]

For surfaces that may come in contact with food, a potable liquid, or other substances, use this product in a manner consistent with its labeling. **This is not a baby wipe.** Do not flush into the human body, either into or in contact with the blood stream or membranes but does not ordinarily penetrate intact mucous membranes but which does not ordinarily penetrate the blood barrier or otherwise enter normally sterile areas of the body. This product may be used to pre-clean or decontaminate critical or semi-critical medical devices prior to sterilization or high level disinfection.

**For Use as a One-Step Cleaner/Disinfectant:** Pre-clean heavily soiled areas. Pull towelette from dispenser (canister) and wipe hard, non-porous environmental surfaces. All surfaces must remain visibly wet for 1 minute. Use a 5 minute contact time for Tuberculosis. Use a 10 minute contact time for fungi. Allow to air dry or rinse with potable water if necessary.

**NOTE:** All food contact surfaces must be rinsed with potable water. Do not use on glassware, utensils, or dishes.

**NOTE:** When cleaning floors position wet-floor signs and materials. Promptly clean up spills.

Co. EPA Reg. No. 5813-50.  
09. 111767.012E3

Only products with EPA registration numbers should be used. This number indicates the product has been reviewed by the EPA and poses minimal risk to animals, people and the environment when used in accordance with their label.

EPA Reg. No.  
1658 – XX



EPA Est. No.  
16XX – MO – 1

# PRODUCT X

**Disinfect-Cleaner-Sanitizer-Fungicide-Mildewstat-Virucide™-Deodorizer for Hospitals, Institutional and Industrial Use**  
Effective in hard water up to 400 ppm hardness (calculated as CaCO3) in the presence of 5% serum contamination

**ACTIVE INGREDIENTS:**

Octyl decyl dimethyl ammonium chloride.....	1.650%
Dioctyl dimethyl ammonium chloride.....	0.825%
Didecyl dimethyl ammonium chloride.....	0.825%
Alkyl (C14, 50%, C12, 40%, C16, 10%) Dimethyl benzyl ammonium chloride.....	2.200%
<b>INERT INGREDIENTS:</b> .....	94.500%
<b>TOTAL:</b> .....	100.000%

KEEP OUT OF REACH OF CHILDREN

## DANGER HAZARD TO HUMANS AND DOMESTIC ANIMALS

**PRECAUTIONARY STATEMENTS**

**CORROSIVE:** Causes severe eye and skin damage. Do not get into eyes, on skin or clothing. Wear goggles or face shield and rubber gloves when handling Product X. Harmful or fatal if swallowed. Wash thoroughly with soap and water after handling.

**ENVIRONMENTAL HAZARDS:** This product is toxic to fish. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. For guidance contact your State Water Board or Regional Office of the EPA.

**PHYSICAL AND CHEMICAL HAZARDS:** Do not use or store near heat or open flame.

**STATEMENT OF PRACTICAL TREATMENT:** In case of contact, immediately flush eyes or skin with plenty of water for at least 20 minutes. For eyes, call a physician. Remove and wash contaminated clothing before reuse. If ingested, call a physician immediately.

**NOTE TO PHYSICIAN:** Probable mucosal damage may contraindicate the use of gastric lavage.

Manufactured by  
Company Y Chemical Company, Sometown, Somestate 12345

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

**DIRECTIONS FOR USE**

Product X is a germicide, soapless cleaner and deodorant which is effective in water up to 400 ppm hardness in the presence of organic soil (5% serum). When used as directed, will not harm tile, terrazo, resilient flooring, concrete, painted or varnished wood, glass or metals.

**FOR USE IN VETERINARY CLINICS, ANIMAL CARE FACILITIES, LIVESTOCK FACILITIES AND ANIMAL QUARANTINE AREAS**

Apply Product X to walls, floors and other hard (inanimate) non-porous surfaces with a cloth, mop or mechanical spray device so as to thoroughly wet surfaces. Prepare a fresh solution daily or when use solution becomes visibly dirty.

**Disinfection –** To disinfect hard surfaces, use 1 fluid ounce of Product X per gallon of water. Apply by immersion, flushing solution over treated surfaces with a mop, sponge or cloth to thoroughly wet surfaces. Allow treated surfaces to remain moist for at least 15 minutes before wiping or rinsing. Product X will disinfect hard non-porous surfaces in veterinary clinics, animal care facilities, livestock facilities and animal quarantine areas. For heavily soiled areas, a preliminary cleaning is required.

**2 oz. gallon use-level.** The activity of Product X has been evaluated in the presence of 5% serum and 400 ppm hard water by the AOAC use dilution test and found to be effective against a broad spectrum of gram negative and gram positive organisms as represented by:

Pseudomonas aeruginosa	Pasteurella multocida
Enterobacter aerogenes	Enterococcus faecium
Staphylococcus aureus	Streptococcus faecalis
Salmonella choleraesuis	Shigella dysenteriae
Escherichia coli	Brevibacterium ammoniagenes
Streptococcus pyogenes	Salmonella typhi
Klebsiella pneumoniae	Serratia marcescens
Streptococcus agalactiae	Actinomyces pyogenes

**Boot bath:** Use 1.5 fluid ounces per gallon in boot baths. Change solution daily and anytime it becomes visibly soiled. Use a bristle brush to clean soil from boots before disinfecting with Product X.  
**Disinfecting trucks and farm vehicles:** Clean and rinse vehicles and disinfect with 1 fluid ounce per gallon of Product X. If desired, rinse after 12 minutes contact or leave unrinsed. Do not use Product X on vaccination equipment, needles or diluent bottles as the residual germicide may render the vaccines ineffective.

**Sanitizing-Non-Food Contact Surfaces** (such as floors, walls, tables, etc.). At 1 oz. per 2% gallon use-level, Product X is an effective sanitizer against Staphylococcus aureus and Klebsiella pneumoniae on hard porous and non-porous environmental surfaces. Treated surfaces must remain wet for 60 seconds.

Some products may have multiple uses (i.e., cleaning versus disinfection) and require different dilutions and contact times for such actions.

This section describes what disease organism the product controls, as well as where, how and when to use it.

Specialty applications for the product (i.e., boot baths, vehicle disinfection) will also be listed.

This section will describe the hazards related to humans and animals when using this product. It recommends personal protective gear that should be worn, what effects it will have on the environment and treatment information should it be splashed into the eyes or ingested.



IOWA STATE UNIVERSITY®

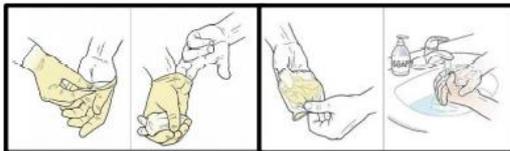
# Safely and Effectively Disinfect

- ***Spray product onto cloth whenever possible - unless directed by label to spray on surface.***



PUR:ONE is also effective as a Healthcare disinfectant for bloodborne viruses (HIV-1, **Hepatitis A Virus**, Hepatitis B Virus and Hepatitis C Virus) when used at a level of **4306 ppm** available chlorine disinfectant solution with a **1 minute contact time**, in 5% organic soil load.

- ***Follow label directions for “contact time” - the length of time it is required to be wet on the surface. It is different for each product.***
- ***Rinse high touch surfaces - if required on the label. Any residue may be hazardous when it comes in contact with skin.***



- ***Wash hands – after removing gloves.***

Developed by Lynn Rose

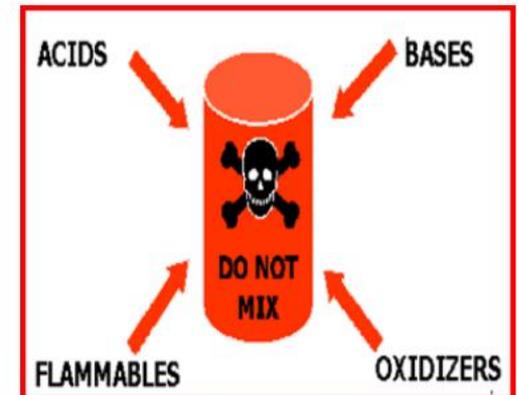
[Safer Cleaning and Disinfecting in Schools \(turi.org\)](http://turi.org)

# How to Prevent a Beirut Incident in Your School!

Store disinfectant by hazard categories to prevent hazardous reactions.

Common disinfectant ingredients come in the following 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
- Oxidizers – bleach, hydrogen peroxide, hypochlorous acid



<b>Top Shelf – on any type material and with any product, except for MP 32</b>	
• EcoSuds – Pot & Pan Detergent	• No Rinse Sanitizer
<b>Second Shelf Down – on a plastic, painted wood or painted metal</b>	
• Converge - Automatic Dishwasher Detergent	• Bon Ami - Powdered Cleanser
• Oven & Grill - Appliance Cleaner	• Steramine - Sanitizer Tablets
• Brisk - Laundry Detergent	
<b>Third Shelf Down – on plastic, painted wood or painted metal</b>	
• EcoScale - Descaler	• EcoRinse - Rinse Aide
<b>Bottom Shelf – or store alone on a non-wood shelf (use plastic or painted metal)</b>	
• MP 32 - All-Purpose Cleaner	

Sample shelf storage plan based on chemical compatibility.

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[Safer Cleaning and Disinfecting in Schools \(turi.org\)](http://turi.org)

# Addressing Electronics During the Pandemic

- **Laptops returned to IT from teachers and students:**

- may contain and need to be treated for pests (e.g. bedbugs, cockroaches)
- need to be cleaned and disinfected for germs

- **Considerations**

- Not all pests can be treated the same.
- There are both chemical (safe and hazardous) and non-chemical solutions to kill pests.
- Any solution must prevent damage to the laptop and exposure to staff.
- Manufacturers provide information on their websites on products and procedures to use for all components.
  - Microsoft (<https://support.microsoft.com/en-us/help/4023504/surface-clean-and-care-for-your-surface>)
  - Apple (<https://support.apple.com/en-us/HT204172>)
  - Chromebooks (<https://chromeunboxed.com/5-steps-how-to-clean-disinfect-chromebook-prevent-coronavirus-spread-covid19/>)



[Safer Cleaning and Disinfecting in Schools \(turi.org\)](https://www.turi.org)

# Addressing Electronics During the Pandemic

- Use keyboard covers for electronics, as they are easier to clean and disinfect.
- Alcohol keyboards:
  - Use a product from EPA List N approved for SARS-CoV-2
  - Alcohol and alcohol wipes should have at least 70% isopropyl alcohol
    - It must stay wet long enough for the “contact time”, but not so wet that it damages the electronics
    - May need to be reapplied.



Source Photos - HP Business PC & Print, Devices Cleaning Guidance  
Helping Businesses Address Coronavirus

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[Safer Cleaning and Disinfecting in Schools \(turi.org\)](https://www.turi.org)

Footer for some or all the pages.

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## Safer Products and Practices for Disinfecting and Sanitizing Surfaces

San Francisco Department of the Environment 2014 (alcohol products not on the market)

**Table 1. Summary of Health and Environmental Attributes of 11 Active Ingredients Commonly Found in Surface Disinfectants and Non-food Contact Sanitizers**

ACTIVE INGREDIENT	CANCER	REPRODUCTIVE TOXICITY	ASTHMA	SKIN SENSITIZATION	AQUATIC TOXICITY	PERSISTENCE
Caprylic Acid	No	No	No	No	Med acute	Low
Citric Acid	No	No	No	No	None	Low
Hydrogen Peroxide	No <sup>1</sup>	No	No	No	High acute	Low
Lactic Acid	No	No	No	No	None	Low
Ortho-Phenylphenol (OPP)	Known	Suspected	No	No	Very high acute	Low
Peroxyacetic Acid (PAA)	No	No	Yes	No	Very high acute	Low
Pine Oil	No <sup>2</sup>	No	No <sup>3</sup>	Yes	None	Low
Quaternary Ammonium Chloride Compounds (Quats)	No	Suspected	Yes	One compound <sup>4</sup>	High acute, med	Very High
Silver	No	No	No	No	High acute	Very High
Sodium Hypochlorite (Chlorine Bleach)	No	No	Yes	No	Very high acute	Low
Thymol	No	No <sup>5</sup>	No	Yes	High acute	Low

# Quaternary Ammonia Compounds

- Benzalkonium chloride, alkyl dimethyl benzyl ammonium chlorides, etc.
- Skin, respiratory irritation
- Asthmagen
- Potential reproductive toxicity
- The overuse of quats and bleach can promote antibacterial resistant bacteria
- Aquatic toxicity

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6316403/#:~:text=Antibiotic%20resistance%20may%20occur%20after,with%20a%20proven%20health%20benefit.>

”

# Bleach

- Disinfectant, NOT a cleaner
- Asthma/respiratory hazard
- Skin and extreme eye hazard
- Corrosive
- Make a fresh solution daily
- Always use in a well-ventilated area
- Never mix with ammonia, acids, or anything!
- Always wear gloves and eye protection
- Always have an emergency eye wash station
  - DOSH Directive 13.0 July 15, 2011



# Chlorine Chemistry

**XCl + H<sub>2</sub>O → HOCl + By-product** (specific to the type of chlorine)

HOCl (hypochlorous acid)  $\xrightarrow{\text{pH}}$  H<sup>+</sup> + OCl<sup>-</sup> (hypochlorite ion)

HOCl + OCl<sup>-</sup> = Free Chlorine → Active Available Disinfectants

At pH 6.0: ~97% HOCl

pH 7.5: ~50% of each

pH 8.5: ~9% HOCl

HOCl ~60x-100x more effective  
than OCl<sup>-</sup> at killing microorganisms

**NaOCl** – Sodium Hypochlorite (Bleach – 10-12% available chlorine)

NaOCl + H<sub>2</sub>O → HOCl + Na<sup>+</sup> + OH<sup>-</sup> (pH ~9-14)

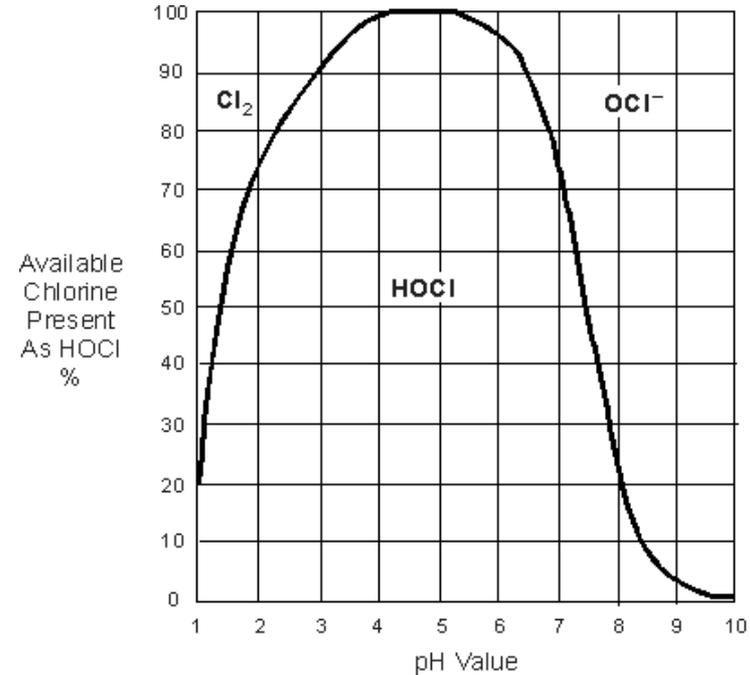
**Sodium Dichloroiso-cyanurate** (organic stabilized chlorine form)

- 50% of the “total” available chlorine is present as “free” available chlorine
- The remainder is “combined” in the form of mono – or dichloroiso-cyanurate
- pH 6-7

On-site Generation – from NaCl or Sodium Dichlor tablets

# Other Options

- Hypochlorous Acid (HOCl)
  - Dominant active ingredient when operated in pH range of 4-6
    - Other ranges will have mixture of chemicals
- TURI testing looking at potential Cl<sub>2</sub> exposure during usage



**Table 1. Percentages of HOCl and OCl<sup>-</sup>**

pH	32°F		68°F	
	% HOCl	% OCl <sup>-</sup>	% HOCl	% OCl <sup>-</sup>
4	100.0	0.0	100.0	0.0
5	100.0	0.0	97.7	2.3
6	98.2	1.8	96.8	3.2
7	83.3	16.7	75.2	24.8
8	32.2	67.8	23.2	76.8
9	4.5	95.5	2.9	97.1
10	0.5	99.5	0.3	99.7
11	0.05	99.95	0.03	99.97

[09 08 21 Safer Disinfectant Use Mini Webinar Series: Disinfecting Devices and Best Practices - YouTube](#)

<https://www.wcponline.com/wp-content/uploads/2009/06/28-30-1.png>



## Hazard Alert: Rubbing/Isopropyl Alcohol can be Hazardous to Workers' Health and Safety

COVID-19 created the need to wipe down and disinfect all surfaces touched by people in the workplace. Isopropyl or rubbing alcohol is a common chemical found in most disinfecting wipes and sprays. When workers breathe in the fumes in high concentrations or over a long period of time, it can make them sick.



[Read about two Washington workers](#) overexposed to hazardous amounts of isopropyl alcohol and how you can prevent it from happening in your workplace.

Available in [English](#), [Spanish](#), [Russian](#), [Vietnamese](#), [Cambodian](#), [Chinese Simplified](#), [Chinese Traditional](#), [Korean](#) and [Somali](#). Find a list of previous alerts at <https://lni.wa.gov/safety-health/preventing-injuries-illnesses/hazardalerts>.

If you would like assistance with your Hazard Communication Plan or help measuring workers' personal exposures to chemicals, please contact [your local L&I safety & health consultant](#).

# Choose Safer Disinfectants

## EPA's Design for the Environment



- Safer Antimicrobial Pesticide Project
- The DfE logo on an EPA-authorized antimicrobial pesticide label means that the product:
  - Is in the least-hazardous classes (III & IV) of EPA's acute toxicity)
  - Is unlikely to have carcinogenic or endocrine disruptor properties
  - Is unlikely to cause developmental, reproductive, mutagenic, or neurotoxicity issues
  - All ingredients reviewed
  - Does not require the use of agency mandated PPE
  - Has no unresolved efficacy failures
  - Has no unresolved compliance/enforcement actions

[Design for the Environment Logo for Antimicrobial Pesticide Products | US EPA](#)

# Active Ingredients to Look For or Avoid

Safer Ingredients for Asthma	Ingredients that may cause respiratory irritation/Asthma
Hydrogen Peroxide	Quaternary ammonium compounds (alkyl dimethyl benzyl ammonium chloride, benzalkonium chloride, lauryl dimethyl benzyl ammonium chloride, dodecyl dimethyl ammonium chloride)
Lactic Acid	Bleach (sodium hypochlorite)
Citric Acid	Acetic Acid (found in vinegar)
Ethyl Alcohol/Isopropyl Alcohol	Thymol (skin sensitizer, suspected asthmagen)
	Glutaraldehyde
	Peracetic acid (peroxyacetic acid)

# WA State Janitorial Supplies Contract

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## Cleaning Products – Master Contract #00812

- **Benefits**
  - Extremely competitive pricing
    - Maximizes collective buying reduces cost by 1/3
  - Exclusively environmentally friendly products
    - Safer and healthier products
  - 1,631 state approved organizations
    - Stable supply chain
  - \$50min purchase, statewide delivery, work with distributor
- **Eligibility**
  - State and local governments
  - Higher education, Tribal entities, Nonprofits

Contract: <https://apps.des.wa.gov/DESContracts/Home/ContractSummary/00812>

Signatory Requirements: <https://www.des.wa.gov/services/contracting-purchasing/purchasing/master-contracts-usage-agreement>

# No Foggers



# No Spraying/Fogging Chemicals Into the Air

EPA does not recommend use of fumigation or wide-area spraying to control COVID-19. The Centers for Disease Control and Prevention (CDC) recommends that you clean contaminated surfaces with liquid products, such as those provided on [List N](#), to prevent the spread of disease. [Read CDC's recommendations.](#) Fumigation and wide-area spraying are not appropriate tools for cleaning contaminated surfaces.



In indoor spaces, routine application of disinfectants to environmental surfaces by spraying or fogging (also known as fumigation or misting) is not recommended for COVID-19.

Spraying individuals with disinfectants (such as in a tunnel, cabinet, or chamber) **is not recommended under any circumstances.** This could be physically and psychologically harmful and would not reduce an infected person's ability to spread the virus through droplets or contact. Moreover, spraying individuals with chlorine and other toxic chemicals could result in eye and skin irritation, bronchospasm due to inhalation, and gastrointestinal effects such as nausea and vomiting. WHO



# Electrostatic Sprayers – caution!

- EPA requires the listing of any approved application equipment (e.g., electrostatic sprayers) on the label. If the electrostatic application is not listed on the label, it is not an approved application method and will not provide information on proper respiratory protection.
- There are electrostatic sprayers that products are registered to use with - BUT surfaces still need to be cleaned first and then the disinfectant applied for the required wet time.
- **N95 filtering respirators are likely required** when applying any disinfectant via electrostatic spray gun. Depending on the vapor pressure, chemical-specific cartridges may be required.
- Large droplets to avoid misting as much as possible.
- High touch surfaces, **not every surface in a room.**
- Indiscriminate spraying – violating the law (the label is the law), and causing asthma, skin, eye, and respiratory irritation, wasting toxic chemicals and not reducing the transmission of COVID

# Disinfecting Wipes

- Choose safer disinfecting wipes – **alcohol or hydrogen peroxide**
- **“Keep out of the reach of children” – under 18 years of age**
- Use according to the label
- Not for use on skin!
  - There are hand wipes for skin – baby wipes, etc.
    - Choose fragrance-free.
    - Increasingly wipes with alcohol are available – check the label!
- Clean first
- **Required wet time** – these should be very wet and there is potential splash/eye exposure

# Using Disinfecting Wipes at School



## What disinfectants can be used on hard surfaces to kill the virus that causes COVID-19?

Antimicrobial Pesticides



- Disinfectants – approved by EPA to be effective against specific viruses.
- EPA List N for Emerging Pathogens – lists disinfectants for use for COVID-19 on surfaces.

See fact sheet "Choosing Safer Disinfectants" from the EPA List N.

## What are disinfectant wipes?



- Disposable material soaked in disinfectant.

While wipes are convenient, if used incorrectly, they can spread germs, give a false sense of security that surfaces are disinfected, and cause unnecessary exposures.

## What should wipes not be used for?



- They are NOT handwipes or baby wipes, and should NOT be used on skin.
- They should NOT be used on produce, or have contact with food.

## How can I safely and effectively use wipes?



1. Protect hands - put on chemical resistant gloves, even if label doesn't mention it.
2. Wash and rinse surface to enable disinfectant to be in direct contact with germs.
3. Shake wipe container with lid securely on to wet wipes with any liquid that settled.
4. Disinfectants only work when wet! Use enough wipes to keep surface wet for the "contact time" listed on label, which can vary by product and type of germ. Use wipe(s) *only once on one surface* to prevent spreading germs around.
5. Rinse surface if it will be in contact with skin or food, and label directs you to do so.

## Who can use wipes in school?

- Only adults should use disinfecting wipes.
- Children under 18 should NOT use wipes.



## Where can I get more information?


[www.informedgreensolutions.org](http://www.informedgreensolutions.org)  
 Poster funded by: Toxics Use Reduction Institute, UMass, Lowell  
  


Sources: NPIC, 1.800.858.7378, npic@ace.orst.edu  
 Health News, 6/3/08 Study Antibacterial wipes can spread superbugs, Michael Kahn

Using Disinfecting Wipes / Safer Cleaning and Disinfection for Schools / COVID-19: Safely Clean & Disinfect / Cleaning Laboratory / Our Work / TURI - Toxics Use Reduction Institute

or all the pages.

# Restrooms

- Clean/disinfect bathroom at least daily.
- Soap and paper towel dispensers full.
- Tempered (85°-105°F) water for handwashing.
- Maximize exhaust ventilation.

WAC 246-366-060: “Adequate, conveniently located toilet and handwashing facilities shall be provided for students and employees.



# Norovirus

- **24-48 hour incubation period**
- **Sudden onset vomiting, diarrhea , cramping**
- **Low-grade fever**
- **Symptoms last 1-2 days**
- **Viruses in stool and vomit**
- **Can shed virus for days to 2 weeks after symptoms gone**
- **Highly contagious (as little as 10 virus particles can cause illness)**
- **Lives for days on surfaces, where it can be “picked up” by others**

# Vomit Events in School

## Preparedness

- Identify disinfection products sufficient to inactivate norovirus, consider hard and soft surfaces
- Include a training program for clean-up employees, building maintenance, janitorial, and other affected staff.
- Ready personal protective equipment (PPE).

## 25' Radius

- People are kept out of the actual “spill” area
- Initial cleaning of gross visible contamination to minimize spread (including disinfectant and/or absorbent).
- Any uncovered food in the immediate area must be discarded.

## Report & Monitor

- Notify local health of absenteeism and/or if possibly linked to kitchen service
- Cleaning and disinfection tools and equipment from food preparation, storage and handling areas.
- Monitor clean-up employees for symptoms for 72 hours.

# Sporicide / Noro / EV D68 / Hanta

- Blood spills, diarrheal stools, rodent droppings 5000 ppm bleach
- Surfaces must be cleaned with soap and water first
- Usual 1:10 solution - 1 part bleach to 9 parts water
  - 6.25 %: 1 1/2 cups bleach/1 gallon water
  - 8.25 % bleach, (1:9) - 1 1/4 cups bleach/1 gallon water
  - Wet contact time - diarrheal stools: 5+ minutes
  - Wet contact time - Noroviruses: 1+ minute
  - Wet contact time - rodent droppings: 10 minutes
    - ◆ See WSDOH [Hantavirus](#) webpage for specifics.
- This is an extremely concentrated bleach solution. Protect eyes, skin, and clothing during preparation and use. Keep the area well ventilated.

# Fungi/Ringworm/Athlete's Foot

- 1) Clean thoroughly with soap and water to remove all organic material.
  - 2) Apply chlorine bleach solution with a concentration of 2400 ppm (see below), leaving the surface wet for ten minutes or a 3600 ppm bleach solution staying wet for five minutes.
  - 3) Rinse with clean water.
  - Fungus can be difficult to eliminate. Where persistent, multiple applications of bleach at a concentration of 5000 ppm, with drying in between, may be necessary to kill.
- OR
- Use an EPA registered disinfectant where the label indicates it is effective against fungi.

# MRSA

## (Methicillin-Resistant Staphylococcus aureus)

- Type of “staph” infection
- Often causes skin infections
- Resistant to (not killed by) penicillin
- Treatable with appropriate antibiotic
- Lives on surfaces for days – at least 70!



# Athletic Areas / MRSA

- Intact surfaces.
- Routine schedules for cleaning & disinfecting.
- All hard surfaces that may contact skin at least daily.
- EPA-approved disinfectant.
- Keep soap dispensers full – fragrance free, NOT antibiotic soap.
- Have separate cleaning mops (preferably micro-fiber) and buckets for athletic areas.

# What is a Pesticide Device?

Pesticides are commonly thought of as chemicals. But we also have a role in regulating devices used to control pests. How a device might be regulated, however, depends on the device's specific design and function and whether it is used with a pesticide. A pesticide device is:

- An instrument or contrivance (other than a firearm) that is used to destroy, repel, trap or mitigate (lessen the severity of) any pest such as insects, weeds, rodents, certain other animals, birds, mold/mildew, bacteria and viruses.

Note: Medical instruments or machines used to kill pests in or on living humans or animals are regulated by the Food and Drug Administration.

# EPA-Regulated Disinfecting Devices

- Instrument used to destroy bacteria and viruses
  - Works by physical means
    - Electricity, light, mechanics or heat
    - <https://www.epa.gov/safepestcontrol/pesticide-devices-guide-consumers#1>
- Do not require registration
  - But are regulated to prevent “false or misleading claims”
    - Manufacturer must have scientific data to support the claims

[09 08 21 Safer Disinfectant Use Mini Webinar Series: Disinfecting Devices and Best Practices - YouTube](#)

# Other Options

- Superheated steam vapor device
  - Very effective for cleaning and rapid sanitizing/disinfecting
    - Harder-to-kill viruses, such as canine parvovirus
    - Similar human coronavirus, such as coronavirus 229E
      - Kill rates 99.99% under 10 seconds
      - Expected to be effective on Sars-CoV-2 according to the EPA
  - They are not conventional "steam" cleaners or pressure washers
    - They are devices that use only a little water and a little electricity to clean, disinfect, and deodorize most surface

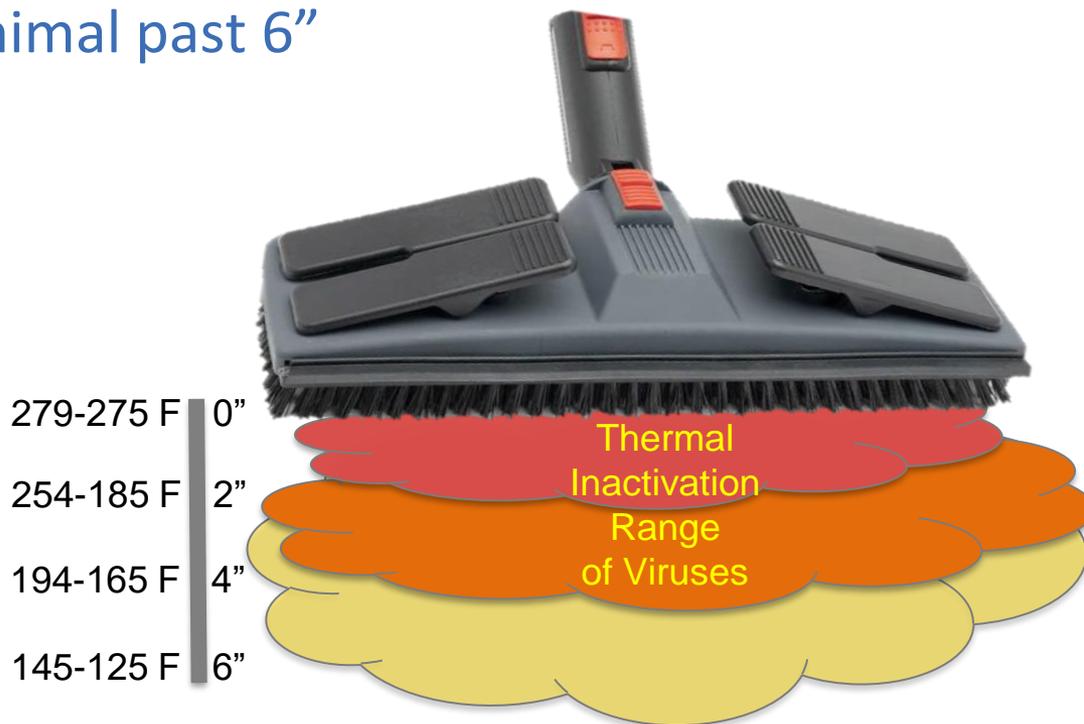


[09 08 21 Safer Disinfectant Use Mini Webinar Series: Disinfecting Devices and Best Practices - YouTube](#)

# High temperature steam

- Temperature cools off the further from the device
- Need to keep close to surface to work best
- Risk of injury is minimal past 6"

[09 08 21 Safer Disinfectant Use Mini Webinar Series: Disinfecting Devices and Best Practices - YouTube](#)





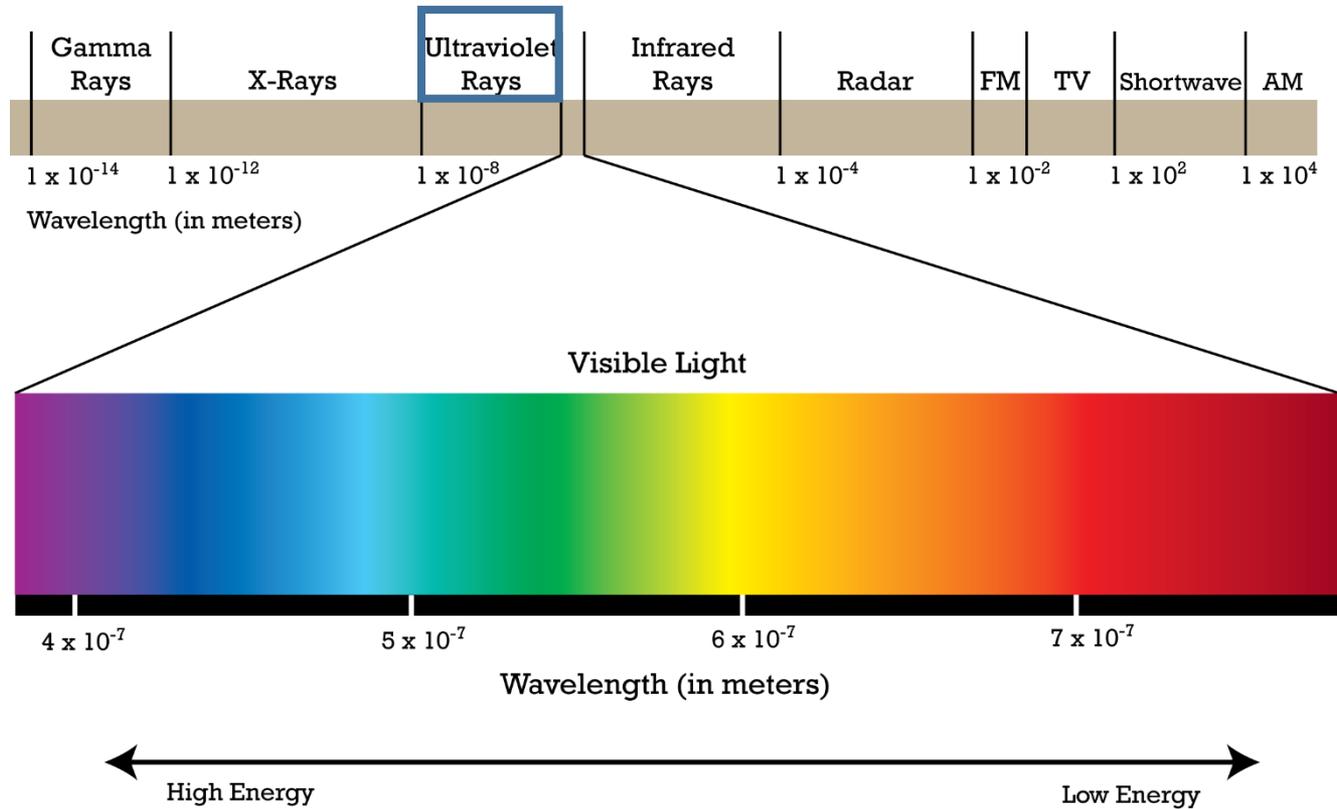
## ULTRAVIOLET LIGHT DISINFECTION OVERVIEW

# Outline of Presentation

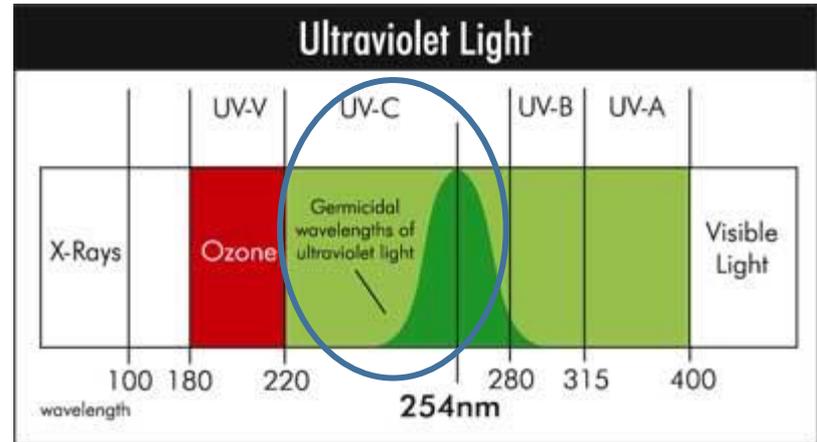
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- Electromagnetic Spectrum
- Ultraviolet Light Disinfection
- UVC Disinfection Systems
  - Air Disinfection
    - Upper Room UVGI
    - HVAC in-duct System
  - Surface Disinfection
    - Portable Units
    - UV Wands
    - HVAC systems

# Electromagnetic Spectrum



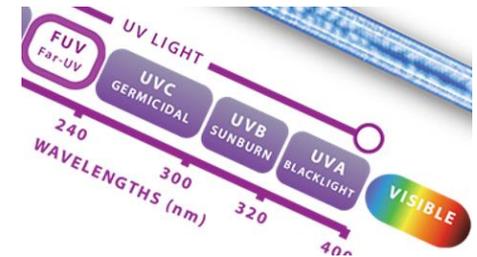
# Ultraviolet Light Disinfection



- Referred to as Germicidal UV (GUV)
- Refers to using ultraviolet radiant energy to inactivate bacterial, mold spores, fungi, or viruses
- UVC wavelengths are most effective
- UVB can be effective at shorter wavelengths
- UVA is not considered effective

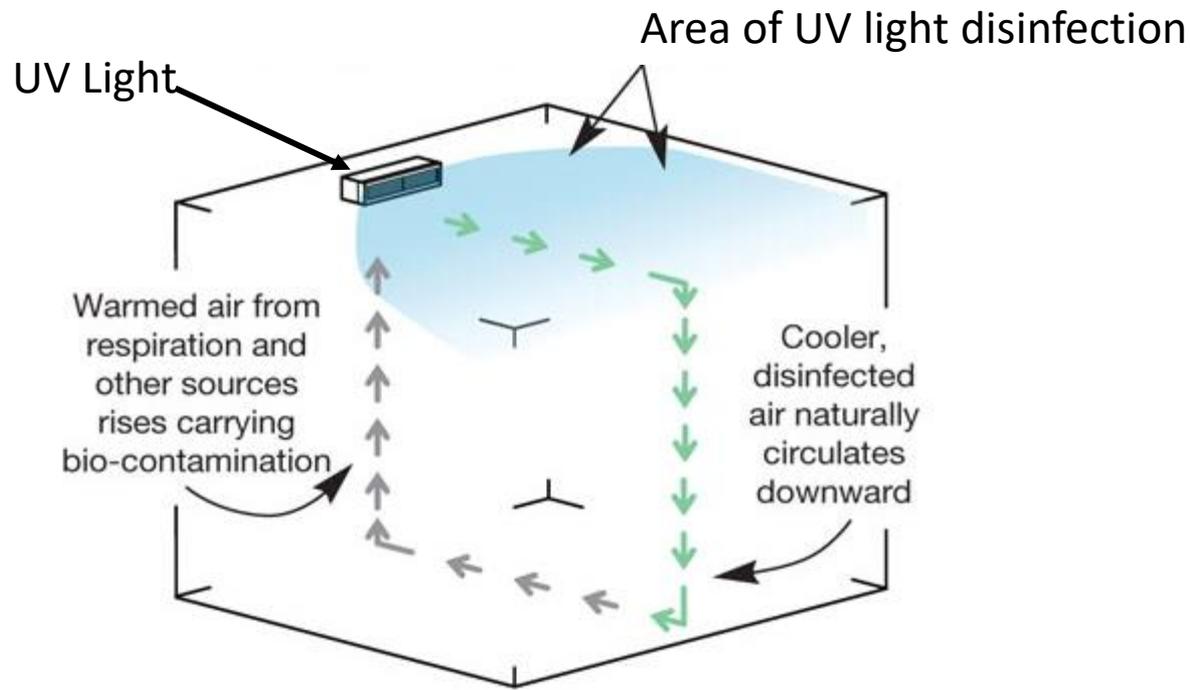
# Ultraviolet Light Disinfection

- Damages DNA and RNA by causing mutations that prevent replication
- UVC spectrum is most effective
  - Most lamps emit radiation at 254 nm which is hazardous to eyes and skin
  - Lamp wavelengths in Far UVC (205-230 nm) currently being studied as less hazardous option
  - Some UVC systems can produce ozone
- Dependent on dose
  - Distance from surface
  - Duration of exposure
- Applications for Air and Surface Disinfection



# Air Disinfection: Upper Room Ultraviolet Germicidal Irradiation (UVGI)

## How it Works



# Air Disinfection: Upper Room Ultraviolet Germicidal Irradiation (UVGI)

## Considerations

- Kills germs, but does NOT remove particles
- Potentially more effective with a ceiling fan installed
- Most appropriate where ventilation and air filtration are difficult to achieve
- Costs include:
  - UV light fixture (~ \$1100)
  - Wiring for Installation
  - Periodic inspection and maintenance
    - Can be done internally with radiometer or dosimetry card
  - Installation of fan, if used (~ \$400.)
  - Replacement of UV bulb- annual (~ \$150)

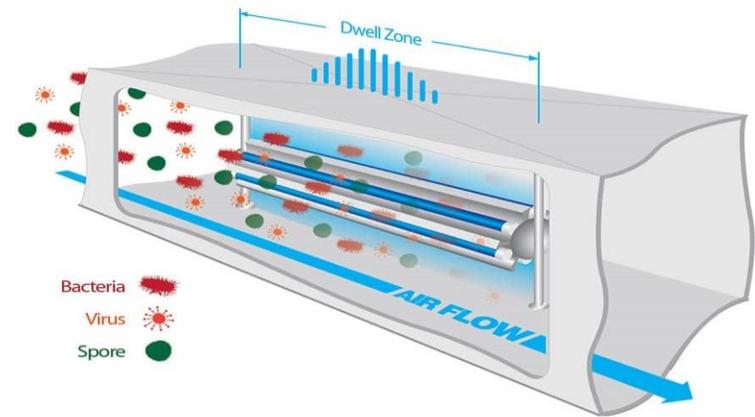
# Air Disinfection: Upper Room Ultraviolet Germicidal Irradiation (UVGI)

## Safety Considerations

- Direct exposure to the UVGI lamp can harm eyes and skin
- Need to work with a reputable manufacturer and building engineer to install
- Need to follow recommended maintenance and bulb replacement schedule (maintenance needs to shut off light before accessing system)
- UVGI bulbs contain mercury- need to follow EPA guidance for safe handling and disposal if broken
- UV dose should be monitored regularly

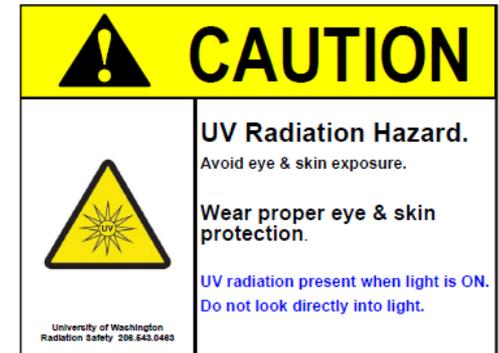
# Air Disinfection: HVAC In-Duct System

- UV lights are placed inside HVAC units or ducts
- Requires an increased dose of UV
- Requires mechanical filtration (highest MERV filter possible)
- Limited information on what is effective

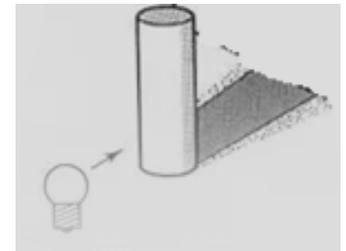


<https://www.puravent.co.uk/blog/post/in-duct-uv-c-air-purification-a-beginners-guide>

# Surface Disinfection: Portable Units



- Frequently used in hospitals
- Requires pre-cleaning
- Need to leave room while in use- eye and skin hazard
- Need to reposition to hit shadows
- Only effective for non-porous surfaces
- Can degrade certain materials such as plastics and dyed textiles



# Surface Disinfection: Portable Wands

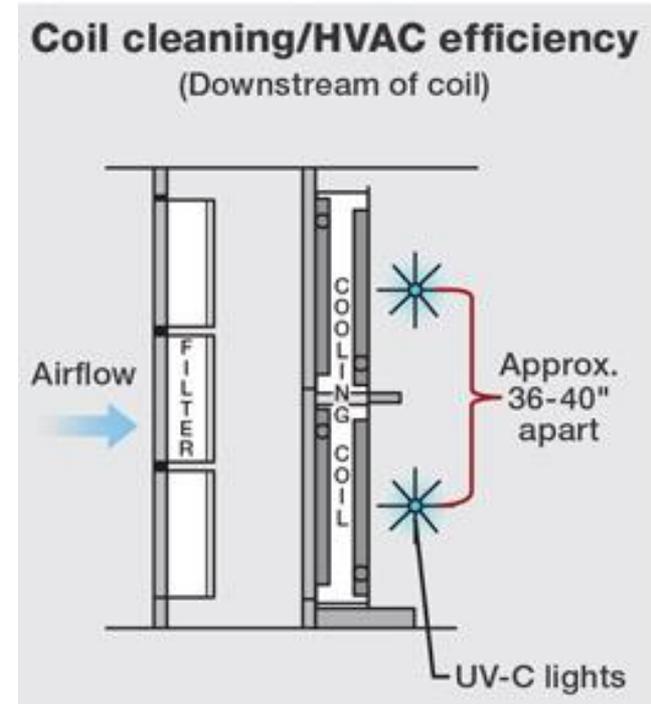
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- Effectiveness depends on wavelength
- Low energy - must be held to surface for several seconds
- Pre-cleaning required
- Can be eye hazard



# Surface Disinfection: HVAC In-Duct

- Banks of UV-lights inside HVAC system focused on:
  - Cooling coils
  - Drain pans
  - Other wetted surfaces
- Lower UV radiance required than air treatment in HVAC ducts because longer exposure times are possible
- Sometimes placed in portable HEPA air cleaners (not effective)



Source: ASHRAE Epidemic Task Force: Filtration and Disinfection, 10-20-2020 Update [ashrae-filtration\\_disinfection-c19-guidance.pdf](#)

# Ultraviolet Light Disinfection – Some Take Home Messages

- Air disinfection systems require specialized installation and maintenance
- Pre-cleaning is required for surface disinfection
- Most systems present eye and skin hazards
- Consider side-by-side with other available options

# Selected Resources

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ASHRAE Epidemic Task Force: Filtration and Disinfection,  
10-20-2020 Update [ashrae-filtration\\_disinfection-c19-guidance.pdf](#)

Illuminating Engineering Society. IES Committee Report: Germicidal Ultraviolet (GUV)-  
Frequently Asked Questions. IES CR-2-20-V1.  
<https://media.ies.org/docs/standards/IES-CR-2-20-V1-6d.pdf>

# Supplemental Materials

# Special Concerns

- **Cake toilet deodorizers**
  - paradichlorobenzene
- **Citrus & Terpene Solvents**
  - D-Limonene
- **Nano Technology**
  - nano-silver
- **“Air Fresheners”**
- **Ozone generators**
- **Fragrances**
- **Anti-microbial soaps**
  - Triclosan / Triclocarban



# Healthy Air Quality in Schools - Tips for Administrators, Custodians, and Teachers



## Healthy Air Quality in Schools

Achieving healthy air quality in schools takes administrators, custodians, and teachers working together. Good ventilation and source control of pollutants means healthy indoor air quality.

### General Tips

- Teachers and staff need to know who to contact for indoor air quality concerns in the school.
- There should be a written school or district indoor environmental quality plan that includes indoor air quality and integrated pest management.
- Notify school or district indoor air quality contact or maintenance staff if you detect odors or dust from locations such as shops, copy rooms, science labs, laminators, locker rooms, graphic arts, custodial supply rooms, storage areas, combustion equipment, kitchens, or bus exhaust. Document your concerns.
- Immediately report any water leaks, water stains, damp materials, or unusual odors (such as musty or moldy smells) to maintenance staff.
- Maintenance staff should respond to water leaks and moisture problems within 24 hours.
- Relative humidity levels between 30 and 50 percent are better for health. Low relative humidity leads to dry eyes and respiratory irritation. High relative humidity allows dust mites to grow and promotes condensation.
- Dispose of food wastes promptly in covered containers.

### Ventilation

- Operate the ventilation system continually when the school is in use, including during custodial work. Supply at least 15 cubic feet per minute per person of fresh outside air whenever the school is in use. See [WSU Energy Program's Good Ventilation is Essential for a Healthy and Efficient Building \(PDF\)](#). ([www.energy.wsu.edu/Portals/0/Documents/Good\\_Ventilation\\_is\\_Essential.pdf](http://www.energy.wsu.edu/Portals/0/Documents/Good_Ventilation_is_Essential.pdf)).
- An occupied room is considered to be receiving the minimum amount of fresh air when indoor carbon dioxide (CO<sub>2</sub>) levels are approximately 700 parts per million (ppm) over outside ambient CO<sub>2</sub> levels. See [WSU Energy Program's Measuring Carbon Dioxide Inside Buildings \(PDF\)](#). ([www.energy.wsu.edu/Portals/0/Documents/Measuring\\_CO2\\_Inside\\_Buildings-Jan2013.pdf](http://www.energy.wsu.edu/Portals/0/Documents/Measuring_CO2_Inside_Buildings-Jan2013.pdf)).
- Maintain three feet of clearance around unit ventilators and do not put items on top of them to block airflow.
- Change ventilation filters regularly. Use the highest rated, deepest pleat filters the system can accommodate.
- Check to make sure that supply air diffusers, exhaust, and return grills are not blocked. They should be clean and dry.
- Don't turn off unit ventilators – ask maintenance staff to repair noisy units, control temperatures, and control drafts.
- Monitor windows – they should not show condensation except on the very coldest of days.
- Don't allow vehicle idling on school property.
- Maintenance staff should follow integrated pest management strategies. Don't use pesticides in the building.

### Control Asthma Triggers

#### Reduce Animal Allergens, including Dust Mites

- Animals shouldn't be classroom residents and should only come to school for educational purposes.
- Use integrated pest management practices to prevent cockroach and rodent infestations.
- Store food in tightly sealed containers.
- Seal all cracks and crevices.
- Grate all foundation and roof ventilation.
- Use barriers to discourage birds roosting.
- Wash stuffed animals and blankets in hot water every two weeks, or remove them.

### Control Dust

- All outside doors should have large entry mat barriers (walk-off mats) outside and just inside the door. The mats should provide at least four to seven footfalls.
- Maintain cleanable surfaces and avoid clutter. Put loose items into plastic boxes with lids that can be wet-wiped.
- Damp-wipe surfaces weekly with a micro-fiber cloth.
- Don't hang items from the ceiling T-bars without special clips to prevent fraying fiberglass. Remove or clean items when dusty.
- Discourage clutter by removing as many unnecessary dust-collecting items as possible.
- Use pre-mixed and pre-wetted clay art supplies whenever possible to reduce dusts.
- Replace fabric upholstered furniture with furniture easily dusted.
- Remove area rugs that cannot be regularly cleaned and that trap dirt and moisture.

### Reduce Chemicals

- Don't use permanent, solvent-based or scented pens, markers, and board cleaners. Use water-based, unscented, crayon-based, or low-odor items.
- Don't use room deodorizing sprays, plug-ins, scented candle warmers, scented reeds, candles, incense, therapeutic oils, or potpourris.
- Don't use urinal cakes in bathrooms.
- Avoid spray adhesives, contact cement, and volatile paints. If spray adhesives are necessary, use hexane and toluene-free products. Wear solvent-resistant gloves. Spray in an area with local exhaust ventilation and away from children. See [King County's Selecting Safer Art Adhesives](#) ([www.hazwastehelp.org/publications/publications\\_detail.aspx?DocID=z%2F70%2F2BLUUM%3d](http://www.hazwastehelp.org/publications/publications_detail.aspx?DocID=z%2F70%2F2BLUUM%3d)).
- Don't bring chemicals, cleaners, or disinfectants from home. Use only those provided by the school or district.
- Never use air-cleaning devices that generate ozone. Ozone is a respiratory irritant.
- Discourage the use of perfumes, colognes, body sprays and other strongly scented personal care products.
- Hazardous chemicals in laboratories, chemical storages, shops, art rooms, and any other areas need to be properly stored and managed to prevent air contamination.

### Carpet Care

- Whenever possible, don't allow food or beverages in classrooms. If possible, vacuum daily (when children are not present). Use a vacuum with a HEPA (high efficiency particulate air) filter – or use HEPA vacuum bags. Having both is even better.
- Avoid use of area rugs. They can trap moisture and dirt under them. Clean carpets thoroughly with truck-mounted hot water and steam extraction once or twice per year.
  - Spot treat carpet as needed first.
  - Use the minimum amount necessary of low-odor and low-sudsing carpet shampoo.
  - All shampoo and cleaner needs to be thoroughly extracted until the water runs clean.
  - Carpet should dry thoroughly within 24 to 48 hours after cleaning.

### Resources

- [School Environmental Health and Safety, Department of Health](#) ([www.doh.wa.gov/schoolenvironment](http://www.doh.wa.gov/schoolenvironment))
- [School Indoor Air Quality Best Management Practices Manual, 2003 \(PDF\)](#) ([www.doh.wa.gov/Documents/Pubs/333-044.pdf](http://www.doh.wa.gov/Documents/Pubs/333-044.pdf))
- [Integrated Pest Management for Schools, WSU](#) (<http://schoolipm.wsu.edu/>)
- [Creating Healthy Indoor Environments in Schools, EPA](#) ([www.epa.gov/iaq/schools/index.html](http://www.epa.gov/iaq/schools/index.html))
- [Taking Asthma Care To School, Washington Asthma Initiative \(PDF\)](#) (<http://waasthma.org/wp-content/uploads/2014/05/AMES2014Final.pdf>)
- [Art Hazards, King County Local Hazardous Waste Management Program](#) (<http://hazwastehelp.org/ChemToxPesticides/artchemicals.aspx>)



## Cleaning for Health in the Classroom Best Practices for Teachers

School Environmental Health and Safety Program

School custodial staff is responsible for cleaning schools. Some teachers choose to do additional cleaning. Here is how to ensure those efforts tackle dirt and germs safely and effectively.

### Teach good handwashing habits - the #1 way to keep germs from spreading.

Use plain soap and water for handwashing – before eating, after using the bathroom, after recess, etc. Antibacterial soap is not recommended. Use plain fragrance-free soap. When there is no access to a sink, as on a field trip, alcohol-based (at least 60% alcohol, dye-free and fragrance-free) hand sanitizer or alcohol-based sanitizer wipes can be used. Hand sanitizers are not a substitute for handwashing. They are not effective when hands are dirty or greasy.

#### Cleaning for Health benefits all

- Lowers absenteeism
- Increases productivity
- Improves indoor air quality
- Reduces asthma and allergy triggers

#### Good to know:

- Kids are more vulnerable to chemical exposures.
- Many common cleaning products have ingredients that can harm health, especially the lungs.

### Know the difference between Cleaning, Sanitizing, and Disinfecting.

#### Use the right product for the task:

- **CLEANING** removes dirt and most germs. Use soap and water. A third party certified green cleaner is preferred. In the classroom, cleaning is the focus.
- **SANITIZING** reduces germs to safe levels, for example in food service environments. Food code regulations have specific requirements for sanitizers in the cafeteria and kitchen.
- **DISINFECTING** kills most germs, depending on the type of chemical, and only when used as directed on the label.
- In schools, custodial staff use disinfectants and sanitizers regularly only in high-risk areas – nurse’s office, bathrooms, cafeterias, kitchens, drinking fountains, sink and door handles, and athletic facilities; preferably, when students are not present. Overuse does not provide any additional protection and can expose students and staff to harmful chemicals.

### Teachers can rely on basic *cleaning* to remove dirt and germs in the classroom.

If staff, besides trained custodial staff, needs to assist with classroom cleaning, they should use a school or district provided basic cleaner. A third party certified green cleaner is preferred.

- Custodial staff can make a simple all-purpose cleaner for classrooms. Mix one teaspoon of fragrance-free dish soap in a spray bottle filled with water. Spray on surface and scrub with paper towels or a microfiber cloth. Rinse and wipe dry to remove any residue.
- Microfiber cleaning cloths improve cleaning – the removal of dirt and germs. Dampened with water they are great dust removers. With soap and water, they remove most germs.
- Disinfecting is the responsibility of school custodial staff. They are trained to use disinfectants in a safe and effective manner and to clean up potentially infectious materials and body fluid spills – blood, vomit, feces, and urine. Contact your custodian or school nurse if students are ill and your classroom needs cleaning and disinfection. If teachers use disinfectants, the district must provide training and supply the appropriate cleaner and sanitizer or disinfectant.

Students should never use disinfectants. Disinfectant wipes should not be used to clean hands. This includes Clorox wipes.

#### If students are helping:

- They should only use soap and water.
- Fragrance-free baby wipes could be used for quick cleaning.
- Most store-bought cleaning products are not safe for children to use.

## Cleaning for Health in the Classroom Frequently Asked Questions

School and Indoor Air Quality Program



### How does cleaning reduce germs?

Cleaning works by removing dirt and organic matter that contains and protects germs. Soap breaks down oils and allows dirt, contaminants, and germs to be more easily removed. Cleaning with soap, water, and a microfiber cloth will remove most germs.

### Why is handwashing better than hand sanitizer?

Soap and rubbing hands together under running water removes oil, dirt, and harmful surface germs. Hand sanitizer does not remove dirt in which germs hide and only kills a few easy-to-kill ones.

### Why use plain soap for handwashing?

Antibacterial ingredients, in particular triclosan and quaternary ammonia compounds (quats), only kill a few types of germs and are unnecessary when washing hands. It doesn’t matter if germs are alive or dead when they are washed down the drain.

### What about non-alcohol hand sanitizers?

The U.S. Centers for Disease Control and Prevention only recommends hand sanitizers with at least 60% alcohol. Non-alcohol ones are even less effective than alcohol hand sanitizers.

### How does this guidance affect fall classroom supply request lists?

#### Okay to Request

- Fragrance-free baby wipes.
- Paper towels (recycled content preferred).

#### DO NOT Request

- Disinfecting wipes.
- Non-alcohol-based hand sanitizer.

### What are the issues with disinfecting wipes?

- Disinfecting wipes are often overused. They are not appropriate for general cleaning when an all-purpose cleaner or soap and water would suffice.
- Disinfecting wipes (e.g. Clorox, Lysol) usually contain quats and fragrance chemicals. These ingredients can trigger asthma and are associated with adverse health effects.
- Disinfectants can give a false sense of security because when they are not used exactly to label instructions, they don’t work properly. Most disinfecting wipes require the surface to be cleaned first, and then remain visibly wet 4-10 minutes (dwell time) to be effective, requiring multiple wipes.

### Why is it important to use fragrance-free products in school?

Fragrance is one of the most frequently identified allergens, can irritate the respiratory system, cause headaches, and exacerbate asthma.

### What’s so great about microfiber cloths?

Their split fibers create more surface area and are superior for removing dust, dirt, and germs. They are reusable and can be laundered or washed by hand.

### Why should teachers not bring common cleaning products (including bleach) from home into the classroom?

- Some common cleaning products are dangerous when mixed. Never mix bleach with ammonia, acids, or other disinfectants. An example: Comet, containing bleach, would react with Windex, which contains ammonia, to form poisonous vapors.
- Common household cleaners and disinfectants may not be appropriate for schools and may cause allergic reactions or have other health impacts.
- Schools and districts must have a Safety Data Sheet for each chemical used in the school.



## Healthy Air for Healthy Schools

### Use Only:

- Approved chemicals, cleaners, or disinfectants provided by the school or district. Never bring in products from home.
- Fragrance-free soap and water or fragrance-free baby wipes to clean surfaces. Disinfection is for trained custodians with approved effective products.
- Pens, markers, and board cleaners that are water-based, unscented, crayon, or low-odor.
- Spray paints and spray glues where there is mechanical exhaust ventilation.

### Avoid Products That Reduce Air Quality — Do Not Use:

- Room deodorizing sprays, plug-ins, scented candle warmers, scented reeds, candles, incense, essential oils, or potpourris.
- Air-cleaning devices that generate ozone or are called "ionizers" – ozone is a respiratory irritant.
- Perfumes, colognes, body sprays and other strongly scented personal care products.
- Permanent, solvent-based, or scented pens, markers, and board cleaners.
- Disinfectant wipes.
- Urinal cakes.
- Rubber cement or spray adhesives with hexane or toluene.



Using classroom products that are free of airborne irritants means healthy indoor air quality!

- > Eliminate unnecessary chemicals.
- > Reduce asthma and headaches.
- > Increase attendance and performance!

Learn more at [www.doh.wa.gov/schoolenvironment](http://www.doh.wa.gov/schoolenvironment)



DOH 333-243 August 2019

For people with disabilities, this document is available on request in other formats. Call 1-800-525-0127 (TDD/TTY call 711).

# Resources - Safer Disinfectants



## Safer Cleaning, Sanitizing and Disinfecting Strategies to Reduce and Prevent COVID-19 Transmission

Proper cleaning and disinfecting are important for reducing the spread of COVID-19. This fact sheet provides best practices for cleaning, sanitizing and disinfecting surfaces to prevent the spread of disease while minimizing harmful chemical exposures. These practices focus on the workplace, however they can be applied in any setting. Consult the U.S. Centers for Disease Control and Prevention and the U.S. National Institute for Occupational Health and Safety for the most current information.

Remember, when possible for handwashing and cleaning surfaces, soap and water is always the best option.

### Why are we talking about safer practices?

 Hazardous chemicals are common in cleaning, sanitizing and disinfecting products.

People using these products, and people in the spaces where they are used, can get sick or develop illnesses, including asthma. Others harm reproductive health or may cause cancer if too much exposure occurs. Some damage skin or other body systems. For example, custodians using cleaning products and disinfectants are most likely to get work-related asthma. Four out of five workers with job-related asthma in the U.S. were in areas during, or right after, cleaning was done.<sup>1</sup>

 Safer options are available

Look for Safer Choice, Green Seal®, Ecologo® and Design for the Environment (DfE) labels on products.



These labels are on environmentally preferable cleaning products and disinfectants that have a lesser or reduced effect on human health and the environment. These labels have strict requirements and can help you avoid chemicals that have negative impacts.

### Key Terms

#### Cleaner

Removes germs, dirt, and impurities from surfaces or objects. Works by using soap/detergent, water and friction to physically remove dirt and germs from surfaces. Cleaning before disinfecting reduces spreading infection more than disinfecting alone.

#### Sanitizer

Reduces germs on surfaces to levels considered safe for public health (usually 99.99%). Products must be EPA registered.

#### Disinfectant

Destroys almost all infectious germs, when used as the label directs on a surface. No effect on dirt, soil, or dust. Should be used where required by law, in high-risk and high-touch areas, or in case of infectious disease. Products must be EPA registered.

### SAFER DISINFECTANTS ON EPA'S LIST OF RECOMMENDED ANTIMICROBIAL PRODUCTS FOR USE AGAINST NOVEL HUMAN CORONA VIRUS

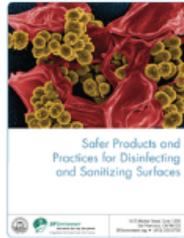
Responsible Purchasing Network

March 2020

Because there is an urgent need for clear and consistent information about cleaning, disinfecting and sanitizing practices that are most likely to remove and kill COVID-19, it is critically important for all of us to follow the guidance issued by the US Environmental Protection Agency (EPA) and CDC.

The US Environmental Protection Agency (EPA) has published – and [List N: EPA's Registered Antimicrobial Products for Use Against Novel Coronavirus SARS-CoV-2, the Cause of COVID-19](#). List N includes over 350 EPA-registered disinfecting products that, according to EPA "have qualified under [its] [emerging viral pathogen program](#) for use against SARS-CoV-2, a coronavirus that causes COVID-19. Coronaviruses are enveloped viruses, meaning they are one of the easiest types of viruses to kill with the appropriate disinfectant product."

The Responsible Purchasing Network has identified and is promoting products on EPA's List N that are the safest from the perspective of protecting human health and the environment from toxic risks because they contain only antimicrobial ingredients (such as hydrogen peroxide, ethanol, or citric acid) that are not known to cause occupational asthma or cancer. These surface disinfectants can often replace chlorine bleach or quaternary ammonium chloride compounds, which have been linked to these adverse human health effects.



EPA's List N includes several of the safer hydrogen peroxide-based "safer" surface disinfectants that are recommended in San Francisco's [Safer Products and Practices for Disinfecting and Sanitizing Surfaces](#) report, which RPN helped to develop. These include, but are not limited to:

- [Clorox Commercial Solutions® Hydrogen Peroxide Disinfecting Cleaner](#) and [Clorox Healthcare Hydrogen Peroxide Cleaner Disinfectant \(EPA Registration No. 67619-24\)](#) a ready-to-use liquid with efficacy against a wide array of bacteria and viruses (including Human Coronavirus) with a 1-minute contact time.
- [Clorox Commercial Solutions® Hydrogen Peroxide Cleaner Disinfectant Wipes](#) and [Clorox Healthcare Hydrogen Peroxide Cleaner Disinfectant Wipes \(EPA Registration No. 67619-25\)](#), which have efficacy against a wide array of bacteria and viruses (including Human Coronavirus) with a 1-minute contact time.



# 6 Steps for Safe & Effective Disinfectant Use



## Step 1: Check that your product is EPA-approved

Find the EPA registration number on the product. Then, check to see if it is on EPA's list of approved disinfectants at: [epa.gov/listn](https://www.epa.gov/listn)



## Step 2: Read the directions

Follow the product's directions. Check "use sites" and "surface types" to see where you can use the product. Read the "precautionary statements."

## Step 3: Pre-clean the surface

Make sure to wash the surface with soap and water if the directions mention pre-cleaning or if the surface is visibly dirty.



## Step 4: Follow the contact time

You can find the contact time in the directions. The surface should remain wet the whole time to ensure the product is effective.

## Step 5: Wear gloves and wash your hands

For disposable gloves, discard them after each cleaning. For reusable gloves, dedicate a pair to disinfecting COVID-19. Wash your hands after removing the gloves.



## Step 6: Lock it up

Keep lids tightly closed and store out of reach of children.

[Six Steps for Safe & Effective Disinfectant Use \(epa.gov\)](https://www.epa.gov)

# CLEANING AND DISINFECTING

## Best Practices During the COVID-19 Pandemic

Good Idea	Be Careful	Don't Do It
<p><b>Follow CDC, State, and Local Public Health Guidelines</b></p> <p>According to the Centers for Disease Control and Prevention (CDC), COVID-19 is mainly spread through the air. The risk of getting the virus by touching a contaminated surface is thought to be low.</p> 	<p><b>Be Careful Using Disinfectants Around People with Asthma</b></p> <p>Disinfectants can trigger an asthma attack. If you have asthma, you may need to take extra precautions like avoiding areas where people are cleaning and disinfecting or making sure the space is well ventilated.</p> 	<p><b>Don't Ask Children or Students to Apply Disinfectants</b></p> <p>Disinfectants are powerful tools for controlling the spread of disease, and they can harm kid's health if used or stored incorrectly. Children and students should not apply disinfectants, and they should be kept out of children's reach.</p> 
<p><b>Clean Surfaces with Soap and Water</b></p> <p>Normal routine cleaning with soap and water lowers the risk of spreading COVID-19 by removing germs and dirt from surfaces. In most situations, cleaning is enough to reduce risk.</p> 	<p><b>Be Careful with Fogging, Fumigating, and Wide-Area or Electrostatic Spraying</b></p> <p>Make sure your product's label includes directions for the application method. Follow all directions, including precautions. If a product isn't labeled for these application methods, using it that way might be risky or ineffective.</p> 	<p><b>Don't Ignore the Label Directions</b></p> <p>If you don't follow the label directions, disinfectant products may be ineffective or unsafe. Do not apply disinfectants to skin, pets or food. Do not dilute disinfectants or mix them with other chemicals unless the label tells you to. Don't think that twice the amount will do twice the job.</p>  
<p><b>Use EPA-Registered Disinfectants According to Label Directions</b></p> <p>Disinfectants further lower the risk of spreading COVID-19 by using chemicals to kill germs. Use disinfectants on high-touch surfaces when you know or suspect someone around you is sick with COVID-19.</p>	<p><b>Be Careful With UV Lights or Ozone Generators</b></p> <p>UV lights or ozone generators may be risky or ineffective. EPA cannot verify if or when it is appropriate to use these devices. Check out the guidance at: <a href="https://www.epa.gov/xHckJ">go.usa.gov/xHckJ</a></p> 	<p><b>Don't Use Unregistered Disinfectants</b></p> <p>If a product says that it kills SARS-CoV-2 (COVID-19), but it doesn't have an EPA registration number, it may not be safe or effective. Federal law requires disinfectants to be registered with EPA.</p> 

### US EPA - Cleaning and Disinfecting Best Practices During the COVID-19 Pandemic



# Guidelines for Cleaning, Disinfecting, and Handling Body Fluids in School – Appendix 8

## *OSPI Infectious Disease Control Guide for School Staff 2014*

- A. Standard Precautions
- B. General Precautions
- C. Hand Washing Procedures
- D. Use of Gloves
- E. Contaminated Needles, Broken Glass, or Other Sharp Items
- F. Cardiopulmonary Resuscitation
- G. General Housekeeping Practices
- H. Disinfectants
- I. Procedures for Cleaning and Disinfection of Hard Surfaces
- J. Blood or Body Fluid Spills
- K. Cleaning up vomit
- L. Athletics
- M. Procedures for Cleaning and Disinfection of Carpets/Rugs
- N. Disposal of Blood-Containing Materials
- O. Procedures for Cleaning and Disinfection of Cleaning Equipment
- P. Procedures for Cleaning and Disinfection of Clothing and Linens soiled with Body Fluids
- Q. Signs and Labels
- R. Cleaning and Disinfecting Musical Mouth Instruments

# Resources

- Coronavirus Response Resources from ASHRAE and Others: <https://www.ashrae.org/technical-resources/resources>
  - ASHRAE EPIDEMIC TASK FORCE *Core Recommendations for Reducing Airborne Infectious Aerosol Exposure*  
<https://www.ashrae.org/file%20library/technical%20resources/covid-19/core-recommendations-for-reducing-airborne-infectious-aerosol-exposure.pdf>
- EPA Ventilation and Coronavirus  
<https://www.epa.gov/coronavirus/ventilation-and-coronavirus-covid-19>
- NIST online tool for comparing impacts of ventilation, filtration, etc., on indoor aerosols: <https://www.nist.gov/services-resources/software/fatima>
- Schoen, L.J. (2020) *Guidance for Building Operations During COVID-19 Pandemic*, ASHRAE Journal, 62 (5), 72–74. *Do no harm. Good ventilation is good practice. Excellent time to check system, review O&M practice*

# Resources

- Why Soap Works

<https://www.nytimes.com/2020/03/13/health/soap-coronavirus-handwashing-germs.html>

- Safer Cleaning, Sanitizing and Disinfecting Strategies to Reduce and Prevent COVID-19 Transmission, UWDEOHS

[https://osha.washington.edu/sites/default/files/documents/FactSheet\\_Cleaning\\_Final\\_UWDEOHS\\_0.pdf](https://osha.washington.edu/sites/default/files/documents/FactSheet_Cleaning_Final_UWDEOHS_0.pdf)

- Safer Disinfectants on EPA's List of Recommended Antimicrobial Products for use against Novel Human Corona Virus, Responsible Purchasing Network

[https://osha.washington.edu/sites/default/files/documents/Updated%20Safer%20Disinfectants%20List\\_March%2026%2C%202020.pdf](https://osha.washington.edu/sites/default/files/documents/Updated%20Safer%20Disinfectants%20List_March%2026%2C%202020.pdf)

- Cleaning for Asthma-Safe Schools (CLASS), CDPH

<https://www.cdph.ca.gov/Programs/CCDCPHP/DEODC/OHB/WRAPP/Pages/CLASS.aspx>

- *Cleaning for Healthier Schools – Infection Control Handbook*  
**Informed Green Solutions - Cleaning for Safer Environments**

- Characteristics of Selected Disinfectants

<http://www.cfsph.iastate.edu/Disinfection/Assets/CharacteristicsSelectedDisinfectants.pdf>

- *Safer Products and Practices for Disinfecting*, 2014, SFDE, RPN

[http://www.sfenvironment.org/sites/default/files/fliers/files/sfe\\_th\\_safer\\_products\\_and\\_practices\\_for\\_disinfecting.pdf](http://www.sfenvironment.org/sites/default/files/fliers/files/sfe_th_safer_products_and_practices_for_disinfecting.pdf)

# Perfumed, Fragranced, & Scented

- Added fragrances can trigger asthma attacks, allergies, sensitization.
  - People on the autism spectrum particularly impacted.
- Eye, skin, and respiratory irritation.
- “Fragrance” – a thousand components.
  - **Limonene**, **pinenes**, acetone, ethanol, camphor, benzyl alcohol, ethyl acetate, **benzene**, **formaldehyde**, 1,4-dioxane, methylene chloride, acetaldehyde, synthetic musks, **phthalates**, etc.
- A primary source of IA and OA pollutants.
- Look for “fragrance-free,” not “unscented”.



- New Fragrance-Free Toolkit from UCLA  
<https://csw.ucla.edu/about/fragrance-free/>



# How Fragrance Harms our Health

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We can inhale or absorb toxic fragrance chemicals into our bodies from fragranced products used in our homes and in public spaces. These exposures can have an impact on our health, including:

- **Skin allergies** to fragrance are well documented in scientific literature. 2-11% of the general population experience skin allergies to fragrance.
- **Both asthma and COPD** symptoms can be made worse by fragrance exposure.
- **Neurological impacts** such as migraines have been associated with fragrance. In the U.S. these types of reactions are quite common. In a national survey, **over 34% of respondents in the U.S. reported health problems**, such as migraine headaches and respiratory difficulties, in response to exposure to fragranced products.
- **Reproductive concerns** from exposure to certain fragrance chemicals include birth defects, premature birth, decreases in fertility and other effects.

<https://www.womensvoices.org/beyondthelabel/health-hazards-in-scented-cleaning-products/>

# Research Study

Fragranced consumer products: exposures and effects from emissions, Anne Steinemann

Air Qual Atmos Health, 20 October 2016

- 35% of population reported health problems
  - Half disabled
- 15% have lost workdays or a job due to exposure in the workplace
- 20% would leave quickly if fragranced products
- 50%+ would prefer fragrance-free public places – hotels, airlines, healthcare, work
- 53% support fragrance-free workplace policies
  - 20% opposed
- 18% unable/reluctant to use public toilets due to scented sprays
- 14% unable/reluctant to wash hands with fragranced soap

# Essential Oils / Natural Air Fresheners

- All air fresheners tested – even those advertised as “natural,” “green,” “organic,” or with essential oils – emitted chemicals classified as toxic or hazardous, including some with no safe exposure level.  
**Hidden Hazards in Air Fresheners and Deodorizers**  
<http://www.drsteinemann.com/Resources/Air%20Freshener%20Fact%20Sheet.pdf>
- Persistent exposure to lavender products is associated with premature breast development in girls, according to new research by NIEHS scientists.
  - The findings also reveal that chemicals in lavender oil and tea tree oil are potential endocrine disruptors...  
[https://factor.niehs.nih.gov/2019/9/feature/3-feature-lavender/index.htm?utm\\_source=efactor-newsletter&utm\\_medium=email&utm\\_campaign=efactor-newsletter-2019-September](https://factor.niehs.nih.gov/2019/9/feature/3-feature-lavender/index.htm?utm_source=efactor-newsletter&utm_medium=email&utm_campaign=efactor-newsletter-2019-September)
- Not okay in schools/public places
- Sensitization reactions/asthma
- Respiratory, eye, skin irritation, headaches
- No diffusers, plug-ins, Sensei, candles, etc.
- Particulates/oils spread throughout room

# California DPH Occupational Health Watch January 2021

- Fragrance ingredients such as those found in perfumes, essential oils, air fresheners, and cleaning products can cause and trigger asthma. Fragrance products are used in many California workplaces and have been associated with over 350 cases of work-related asthma investigated by the Occupational Health Branch.
- To help California workers and employers address fragrances and work-related asthma, WRAPP created a [web page](#) dedicated to this issue. It features publications in multiple languages, a model fragrance-free workplace policy, and resources to find products that do not contain fragrances.

## *Resources*

- [Volatile chemical emissions from car air fresheners](#) (Journal article abstract)
- [Volatile chemical emissions from essential oils with therapeutic claims](#) (Journal article abstract)
- [Work-Related Asthma Fragrance Web Page](#)
- [Work-Related Asthma Prevention Program](#)

# Asthma-Safer Cleaning and Disinfecting Update - CaDPH

- [Work-Related Asthma, Cleaning Products, and Disinfectants](#) – OHB web page

[Reminders for Using Disinfectants at Schools and Child Cares \(PDF\)](#) | [Spanish](#) – California Department of Pesticide regulation InfoSheet

[Fragrances and Work-Related Asthma](#) – OHB web page

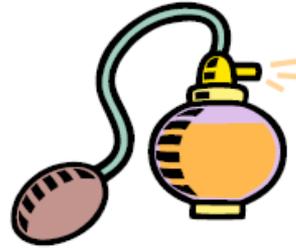
[Cleaning for Asthma-Safe Schools \(CLASS\)](#) – OHB web page

[Work-Related Asthma Prevention Program \(WRAPP\)](#) – OHB website

# Finding Products Without Fragrances

- [New York State's Green Cleaning Program](#) keeps a list of asthma-safer cleaning products without fragrance: (Under Product Category, choose "cleaning products." Click the "No" button next to the "Prefer products with fragrance" question)
- Some cleaning products have earned the [U.S. EPA's Safer Choice Fragrance-Free Label](#).
- The [Canadian Center for Occupational Health and Safety web page](#) includes steps for implementing a fragrance-free policy in the workplace.

WE SHARE THE AIR



**No  
Scents is  
Good  
Sense!**



Scented products contain hazardous chemicals which can cause serious problems for many people, especially those with asthma, allergies or sensitivities to chemicals.

### **EFFECTS OF SCENTED PRODUCTS FACTS:**

- Scented products can cause a variety of health problems such as, but not limited to, sore throat, runny nose, sinus congestion, wheezing, shortness of breath, headache, mental confusion, inability to concentrate, flushing, irritability, nausea, or muscle pain.

**The PSESD strives to ensure the safety and comfort of staff and visitors by encouraging a fragrance-controlled environment. We support a healthful environment for our staff members, clients and visitors. For the comfort and health of all, the PSESD discourages the use by employees and visitors of scents and fragrant products.**



# Disinfecting for SARS-CoV-2

## What Does that Look Like?

Jason Marshall, ScD  
Toxics Use Reduction Institute  
University of Massachusetts Lowell

[09 08 21 Safer Disinfectant Use Mini Webinar Series:  
Disinfecting Devices and Best Practices - YouTube](#)





*Making Massachusetts a safer place to live and work*

## **Family Martial Arts Center Kicks Out Harmful Disinfecting Chemicals While Defending Against COVID-19**



[https://www.turi.org/content/download/13598/207121/file/Casestudy.FamilyMartialArtsCenter\\_disinfectant.Jun2021.pdf](https://www.turi.org/content/download/13598/207121/file/Casestudy.FamilyMartialArtsCenter_disinfectant.Jun2021.pdf)

# Basics of Electrolyzed Water Systems

- Electrical charge passes through salt (NaCl) and water solution
- Sodium separates from chloride
- Chloride is negatively charged => attracted to the positive side of the electrical charge bonds with oxygen and hydrogen from the water
  - Converted from  $\text{Cl}^-$  to HOCl
    - known as hypochlorous acid
- Vinegar (acidic) is the key to getting just the right pH
  - Without the right pH, will get a solution that is mostly bleach (sodium hypochlorite)
  - Lower the pH and hypochlorite converts to hypochlorous acid

[09 08 21 Safer Disinfectant Use Mini Webinar Series: Disinfecting Devices and Best Practices - YouTube](#)

# Other Options

- Aqueous Ozone

- A product of water and air in the presence of an electrical charge

- Generation of ozone in water (1)
- Oxidation - attacking organism/soils (2-3)
- Return to oxygen (4)



- Aqueous ozone is not stable for long periods of time

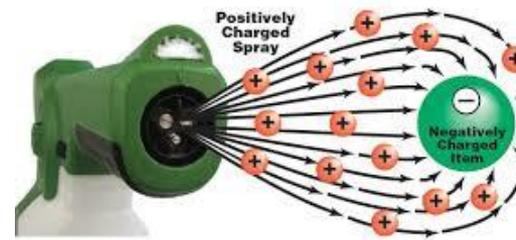
- Some units add stabilizers to extend activity

- TURI testing will look at potential O<sub>3</sub> exposure during generation and usage

[09 08 21 Safer Disinfectant Use Mini Webinar Series: Disinfecting Devices and Best Practices - YouTube](#)

# Methods of Application

- Wipe on
- Immerse into solution
- Spray bottle
- Electrostatic sprayer
- Fogger
- Mister

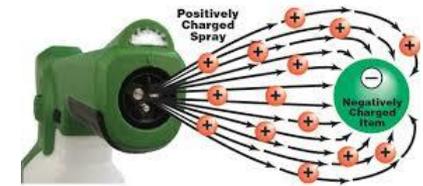


[09 08 21 Safer Disinfectant Use Mini Webinar Series: Disinfecting Devices and Best Practices - YouTube](#)

# Safety Still Matters

- Use as Directed
  - CLEAN FIRST still applies
  - Recommended concentration
  - Appropriate dwell time
  - Proper PPE
- Disinfectant product's safety and effectiveness may change based on how it is used
- Need EPA approval to add delivery method
  - Electrostatic, fogger, misting

# Electrostatic Sprayers



- Most electrostatic sprayers generate charged particles
  - Charged particles stick to these surfaces
  - Particles repel each other and have a better chance to stick to something else
- Electrostatic devices may interfere with sensitive medical devices such as pacemakers, defibrillators, or similar devices
- Do not operate cordless sprayer in explosive atmospheres

[09 08 21 Safer Disinfectant Use Mini Webinar Series: Disinfecting Devices and Best Practices - YouTube](#)

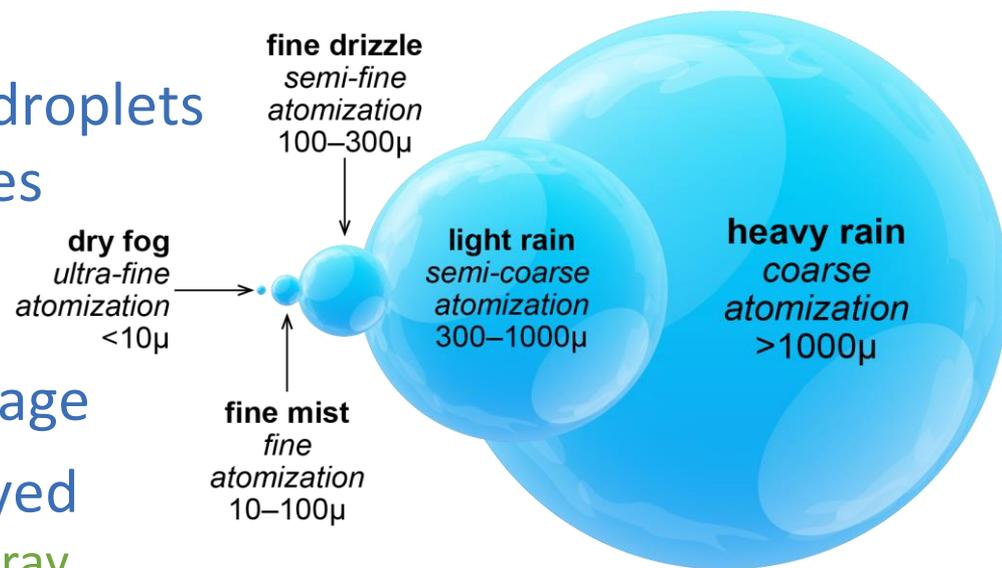
# Electrostatic Sprayers

- Limited information on electrostatic spray systems vs. conventional spray systems to inactivate SARS-CoV-2
  - General studies showing both effective on certain pathogens on variety of surfaces
    - Electrostatic sprayer systems are more efficient than manual application for delivery times
- Electrostatic spray systems
  - Best suited for disinfection of pre-cleaned surfaces
  - Lack the benefit of manual removal of debris and microorganisms

[09 08 21 Safer Disinfectant Use Mini Webinar Series: Disinfecting Devices and Best Practices - YouTube](#)

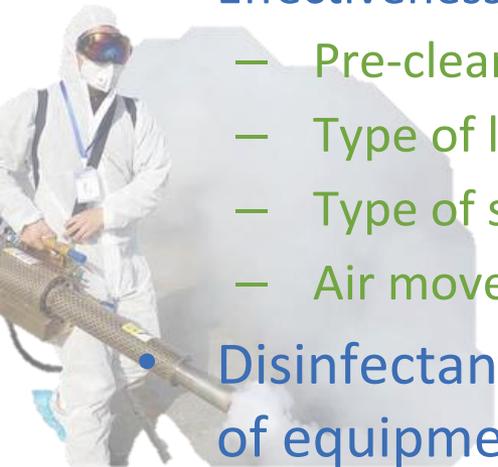
# Foggers and Misters

- System delivers very small droplets
- Passively deposit on surfaces
  - Based on direction of spray
  - Rely on effect of gravity
- May result in uneven coverage
- Reentry times may be delayed
  - Compared to electrostatic spray
- Practical difference between foggers and misters
  - Foggers are used to introduce fog like cloud (10 microns)
  - Misters form rainy environment, produce little droplets (200 microns)
    - Fog floats, Mist falls



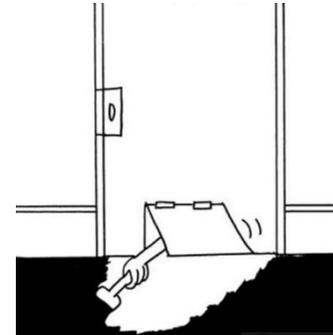
# Foggers and Air Cleaning

- Vaporized disinfectants are able to remain airborne for longer period of time compared to micro-condensation aerosols
  - Possibly providing both air and surface disinfection
    - Aerosolized disinfectants have been found to be able to reduce the number of airborne microorganisms
- Effectiveness of each of these technologies depends on:
  - Pre-cleaning practices, organic load
  - Type of liquid sanitizer or disinfectant
  - Type of surface, size of space, location of the fogging apparatus
  - Air movement, relative humidity
- Disinfectants can damage materials on the inside and outside of equipment
  - Excess liquid getting inside equipment can also cause damage



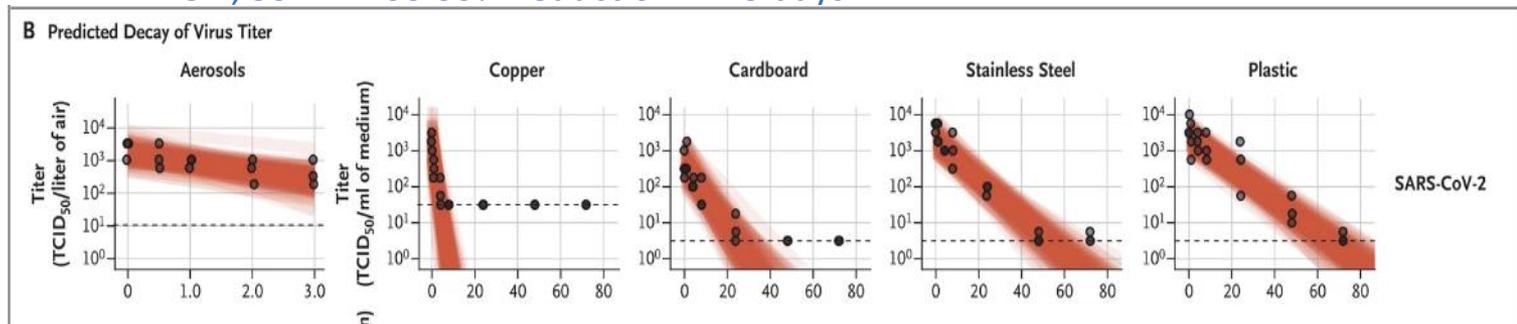
# For All Types of Disinfectant Applicators

- Use as much ventilation as possible
  - Turn on the HVAC
  - Opening a window
- Spray disinfectant when no one is present in the space
- Start the farthest area in the space to the door exit
- Spray disinfectant on all targeted surfaces (not in air) until the surface is visibly wet
- Leave the area for the length of the contact time required on the label for the surfaces to dry
- Allow reentry when all surfaces are dry and there are no chemicals in air



# When to Disinfect

- Virus has limited life span on surfaces
  - <https://www.dhs.gov/science-and-technology/sars-calculator>
  - Viral survival on surfaces is driven by temperature, relative humidity (RH), and organic load
  - Higher Temp and RH the faster virus decays
    - 75 F, 55 RH = 99.99% reduction in ~5 days



<https://www.nejm.org/doi/full/10.1056/NEJMc2004973>

- Unoccupied spaces won't have virus to kill
- Disinfecting every space all the time is not practical

# Why are Cleaning and Hand Washing Important?

## Transference rates

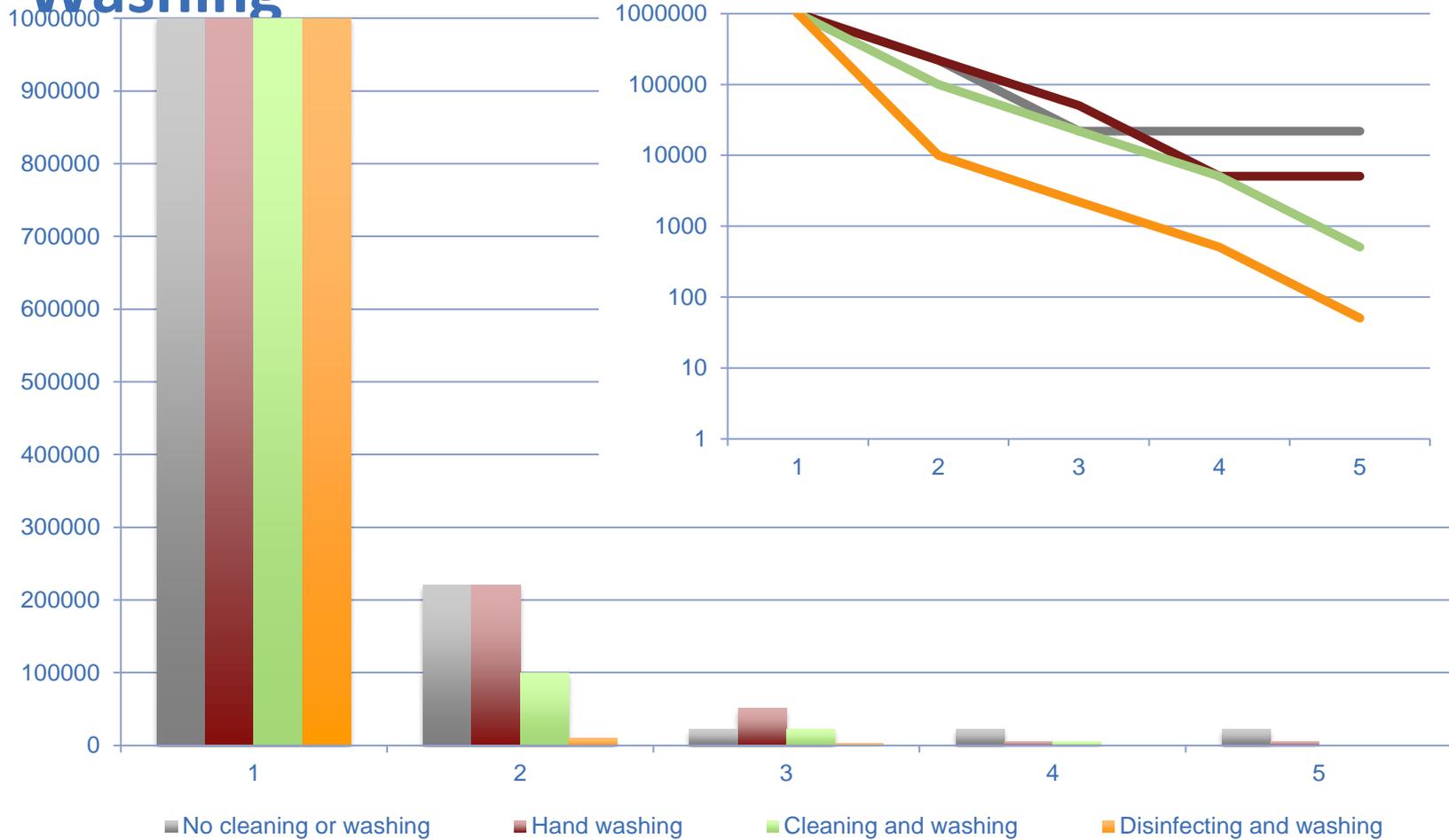
- No cleaning/disinfecting
  - Nonporous surface transference to hand
    - 5% low end
    - 22% high end
  - Hand to mouth, eye, nose transference
    - 10% estimated
- Cleaning control measures
  - For surface cleaned with all purpose cleaner with 90% reduction of virus
  - Hand washing removal rate of 77% from hand concentration



# End of the Line vs. Upfront Cleaning

- 1,000,000 virus organisms
  - 22% transferred from surface to hand
    - 220,000 organisms on hand
      - Eek, I'm scared. Are you?
  - 10% transferred from hand to eye/mouth/nose
    - 22,000
- Good news: 97.8 % reduction
- Bad news: Not good enough
- What if we washed our hands?
  - 77% reduction for washing
    - 50,600
  - 10% transferred to face
    - 5,060
  - Now we are at 99.49% reduction
    - And we never cleaned the surface
- With a 90% cleaning removal rate, and hand washing:
  - 99.99% reduction
  - 4 log reduction without disinfection
- Initial 99.9% low end disinfection level, cleaning and hand washing:
  - 6 log reduction

# Benefits of Cleaning, Disinfecting and Hand Washing



# What Does This All Mean?

- Surface most likely will not start with high number of viable virus organisms
- Virus viability decreases overtime on a surface
- What level of virus can still cause infection
  - Not known but estimates are that a few hundred is enough
- Achieve reduction of virus from surfaces without harsh disinfecting chemicals
- You still can't disinfect a dirty surface
  - Cleaning
  - Disinfecting
  - Hand washing

# Safer Disinfectant Use Mini Webinar Series

A collaboration between ACMT and PEHSU



Beginning in December 2020, the American College of Medical Toxicology (ACMT) and [Pediatric Environmental Health Specialty Unit \(PEHSU\)](#) will be co-hosting a joint mini webinar series predominantly focusing on safer disinfectant use in the new world of COVID-19.

The PEHSU program hosts a regularly scheduled series of scientific webinars. Their purpose is to provide a forum for regular discourse on scientific issues and to facilitate the development of educational material that will be made available on-demand to a wider audience and as part of their educational products offering.

The "Safer Disinfectant Use" mini webinar series will qualify for Continuing Education (CE) for healthcare professionals through the Centers for Disease Control. Instructions for claiming CE will be provided upon completion of the webinar. For those interested in obtaining CE for this series, please visit the [PEHSU National Classroom Webinars page](#).

## [ACMT - Safer Disinfectant Use Webinars](#)

## [COVID-19 Webinar: Navigating the Landscape of COVID-19 Transmission and Exposure Reduction – YouTube](#) November 3, 2021

Excellent webinar on ventilation and filtration

# Summary of Disinfectants

	Quaternary Ammonium	Sodium Hypochlorite (Bleach)	Hydrogen Peroxide
Acute Exposure	Dermal irritant Caustic (Hi conc) RADS?	Gastroesophageal Ocular Dermal RADS	Irritant Large volumes of O2 generated from concentrate
Chronic Repetitive Exposure - Cancer	Animal studies without increased cancers	IARC Group 3 Byproducts? Group 2B	None expected/ IARC Group 3
Chronic Repetitive Exposure - Others	Dermal Asthma exacerbation	Dermal Asthma exacerbation	Bleaching of skin
Sensitizer/Asthma	Association	Association	None
Genotoxicity Reproductive Toxicity	In extremely high repeated doses	None	None
Other Concerns	Environmental persistence	None	None

# So What Disinfectant Agent is “Best” for Your Use?

- Benefit/Risk Assessment
  - Cleaning and disinfectant process
  - Disinfectant chemical class

American Journal of Infection Control 47 (2019) 82–91



Contents lists available at [ScienceDirect](#)

American Journal of Infection Control

journal homepage: [www.ajicjournal.org](http://www.ajicjournal.org)



State of the Science Review

Do we know how best to disinfect child care sites in the United States? A review of available disinfectant efficacy data and health risks of the major disinfectant classes



Stephanie M. Holm MD, MPH<sup>a,b,c</sup>, Victoria Leonard RN, PhD<sup>d</sup>, Timur Durrani MD, MPH<sup>a,d,e</sup>, Mark D. Miller MD, MPH<sup>a,d</sup>

Holm, M.S., Leonard, V., Durrani, T., Miller, D.M. (2019). Do we know how best to disinfect child care sites in the United States? A review of available disinfectant efficacy data and health risks of the major disinfectant classes. *American Journal of Infection Control*. 47(1) 82-91. <https://doi.org/10.1016/j.ajic.2018.06.013>.

## Summary Points

- The role of disinfectants has been greatly accentuated by the pandemic
- The best disinfectant for a given purpose may vary with the setting
- The disinfection process involves proper cleaning prior to use of chemical disinfectants
- Education of health care professionals and the public on the safe use of disinfectants remains essential
- Potential toxicity from the repetitive use of some of these chemicals (sensitizer vs irritant effects) is concerning
- Preventing chemical exposures when possible remains the best strategy



## New Video Released

Watch our 8 Minute Video on the Importance of  
Filtration in Schools



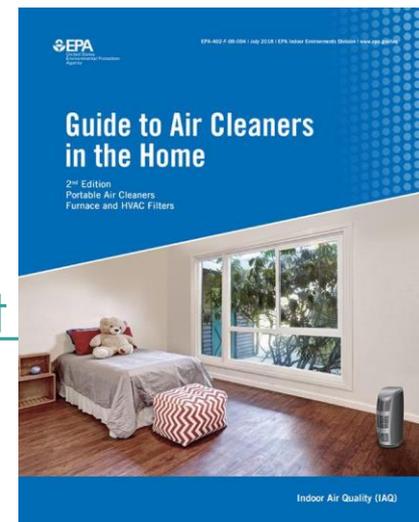
[The Importance of Filtration In Schools - YouTube](#)

[Importance of Ventilation in Schools - YouTube](#)

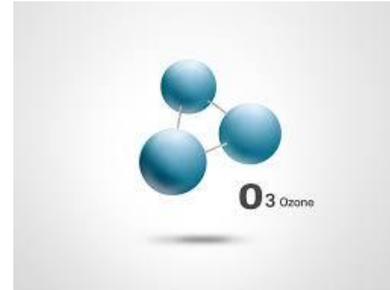
Children spend a large portion of their day indoors at school. Ensuring adequate filtration and ventilation in classrooms is essential and will help support the health and productivity of students and teachers.

# Portable Air Cleaners

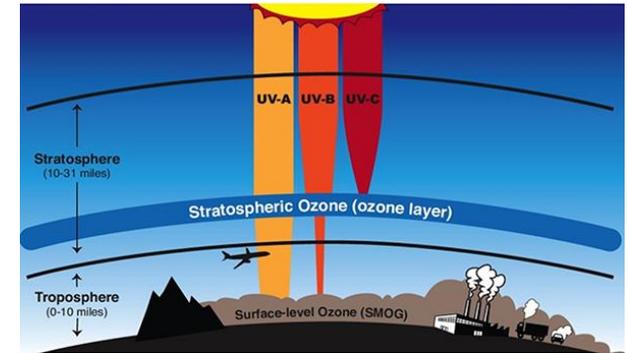
- The CADR rating is made at the highest running speed, so consider oversizing it to reduce noise.
  - Maximum 45 dBA ambient noise in classrooms with mechanical running
- **Do not use ozone generators, electrostatic precipitators, plasma, UV, ionizers, or negative ion air purifiers because they can produce harmful by-products and are not necessary.**
- Look for a unit that is California Air Resources Board Certified to not produce ozone, a respiratory irritant
  - <https://ww2.arb.ca.gov/our-work/programs/air-cleaners-ozone-products/air-cleaner-information-consumers>
- EPA Air Cleaners and Air Filters in the Home
  - <https://www.epa.gov/indoor-air-quality-iaq/air-cleaners-and-air-filters-home>
- Association of Home Appliance Manufacturers
  - <https://www.ahamdir.com/room-air-cleaners/#>
- [Selection and Use of Portable Air Cleaners to Protect Exposure to SARS-CoV-2 \(nih.gov\)](https://www.nih.gov/health-topics/portable-air-cleaners)



# Ozone concerns



- Ozone (O<sub>3</sub>) is a reactive gas
- Harmful for human respiratory tract
- Safe levels below 10 ppb



- **AVOID** ionization or oxidation (may generate harmful ozone).
- Purchase technologies that have been **third party verified**.



An excellent presentation

[Navigating the Landscape of Air Cleaning Technologies for COVID-19 - YouTube](#)

(Slides 34, 49,50 from this presentation.)



**Please join us for EPA's next Indoor Air Quality Science Webinar**

## **Navigating the Landscape of Air Cleaning Technologies for COVID-19**

With guest speakers Brent Stephens, Ph.D., Illinois Institute of Technology and Elliott Gall, Ph.D., Portland State University



**Date**  
Wednesday, June  
16, 2021

**Time**  
1:00 – 3:00 P.M. EDT



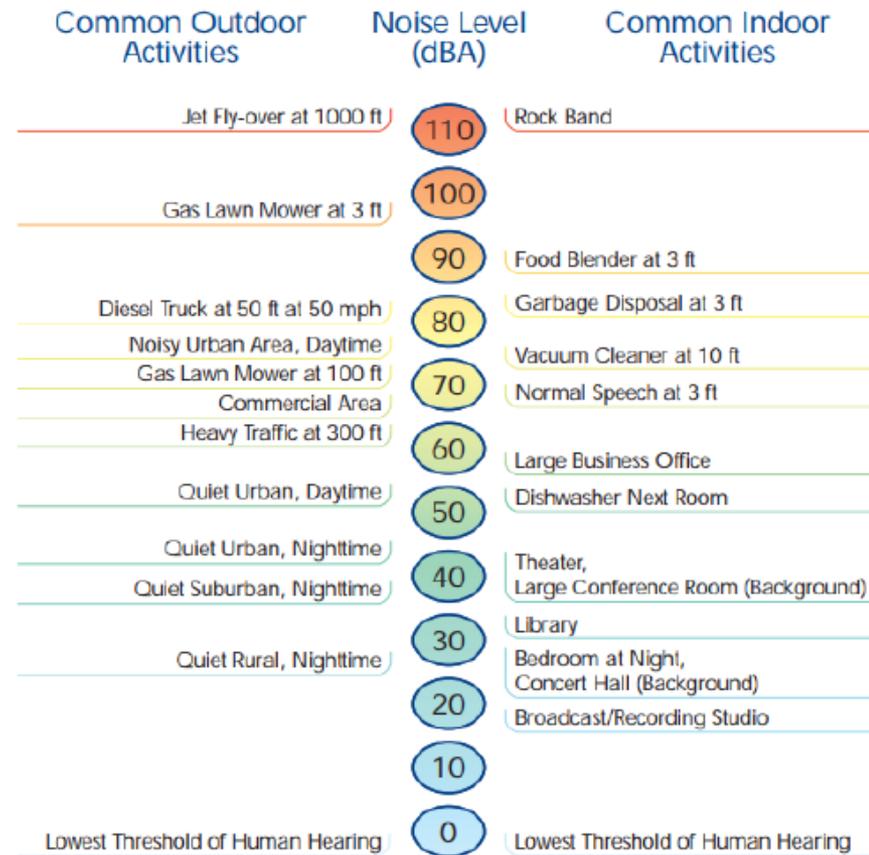
# Noise Affects Use of Portable Air Cleaners

- Portable air cleaners are often used less frequently over time.
  - Some studies have noted/speculated that may be because of noise.

Sulser et al. 2009 *Int Arch All Immunol*;  
Batterman et al. 2012 *Indoor Air*

- EPA maintains that interference and annoyance occurs at indoor noise levels above 45 dBA.\*

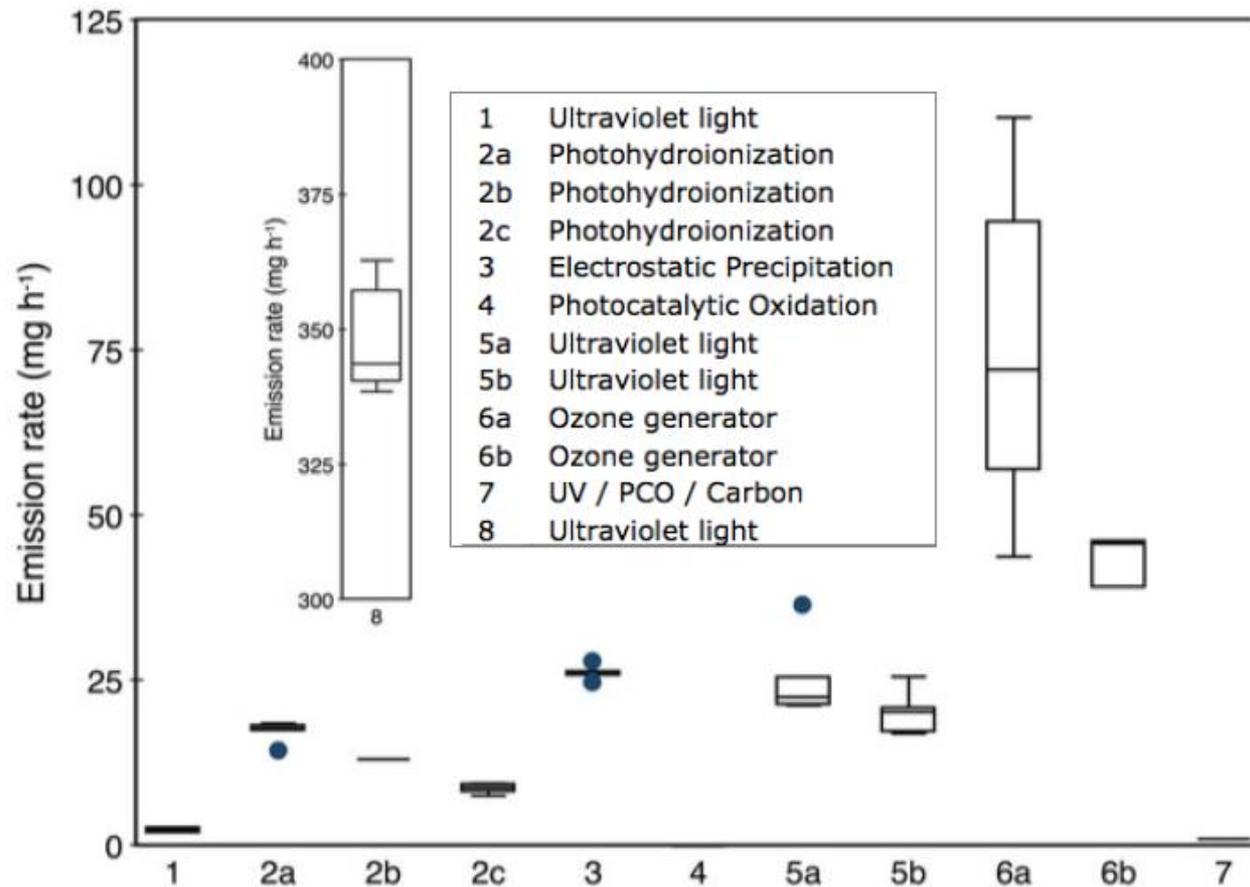
- Many portable air cleaners exceed this threshold.
  - But quantified noise is not used as a standardized performance factor in the United States and is not routinely available on product packaging.



[www.dot.ca.gov/dist2/projects/sixer/loud.pdf](http://www.dot.ca.gov/dist2/projects/sixer/loud.pdf)

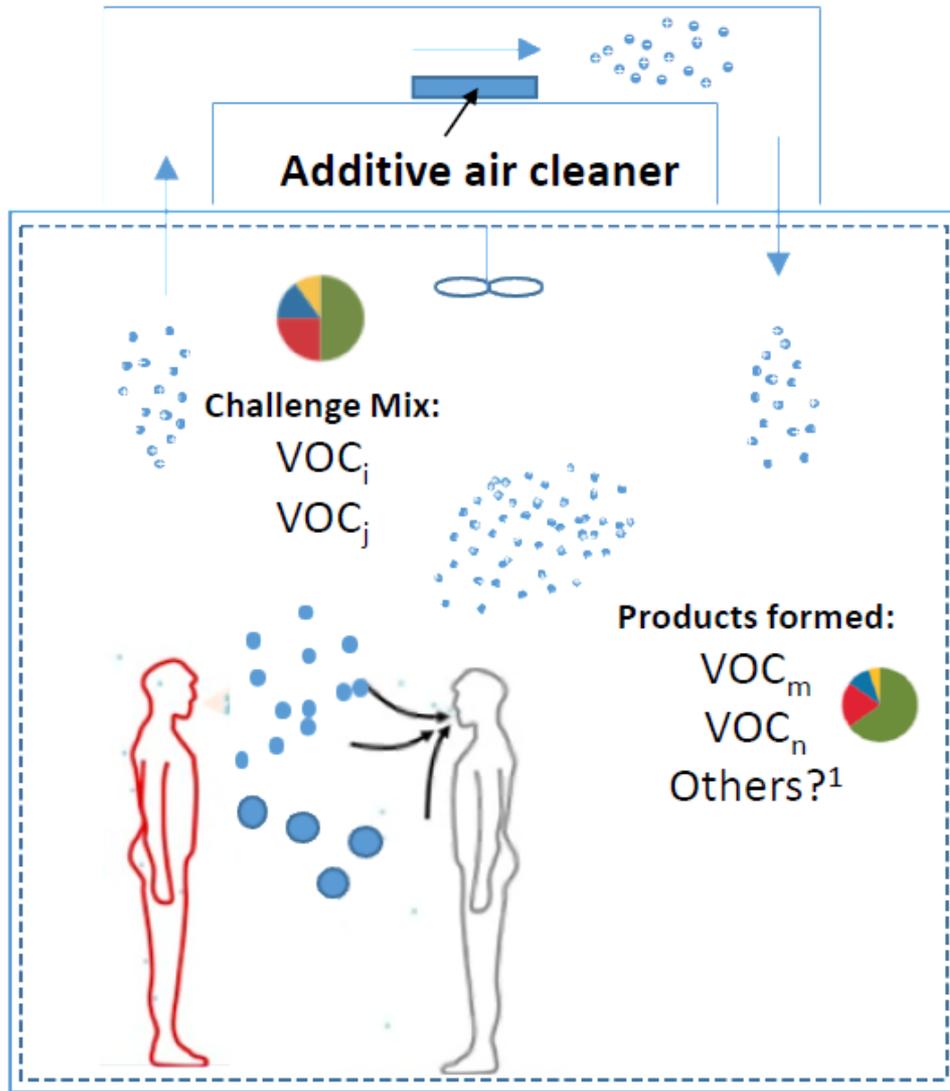
# Ozone Emissions From Electronic Air Cleaners

- Some electronic air cleaners emit ozone ( $O_3$ ) during operation.<sup>1</sup>
  - Ensure products meet UL 2998 standard (<5 ppb  $O_3$  in chamber)

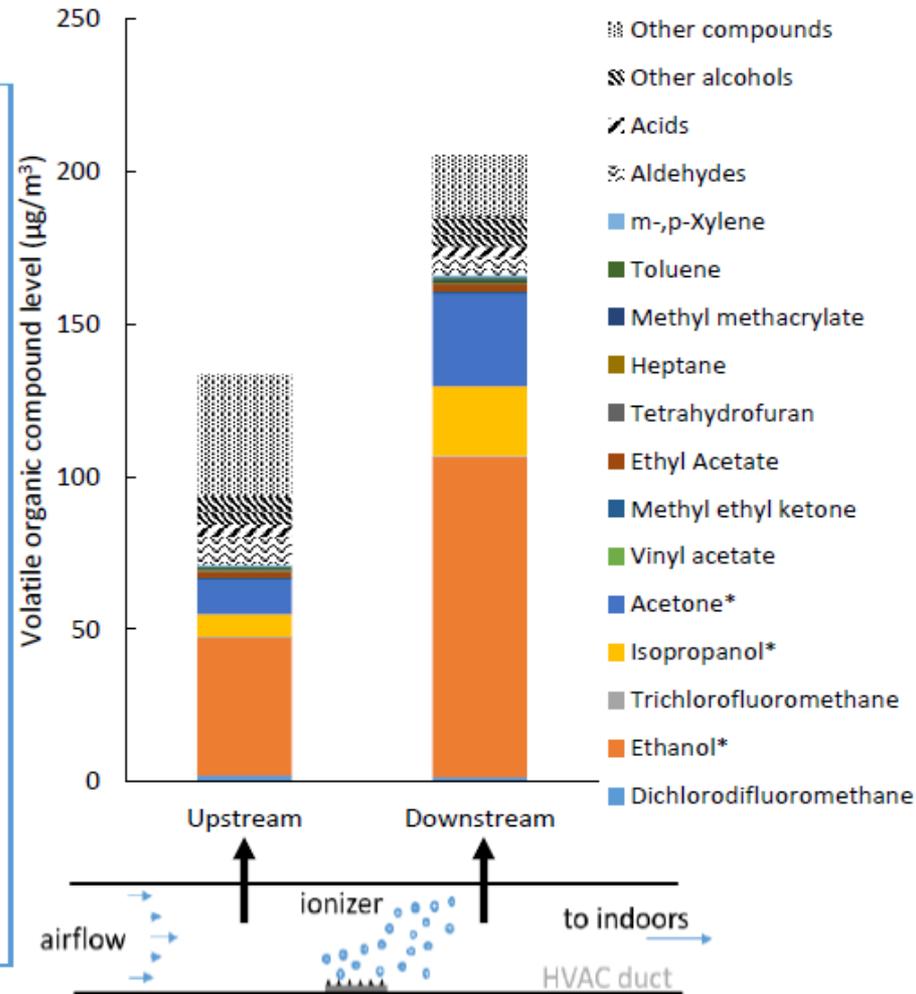


<sup>1</sup>Morrison et al., 2014 CARB Report "In-duct air cleaning devices: Ozone emission rates and test methodology"

# Potential for Byproduct Formation



Example of byproduct measurements<sup>2</sup>



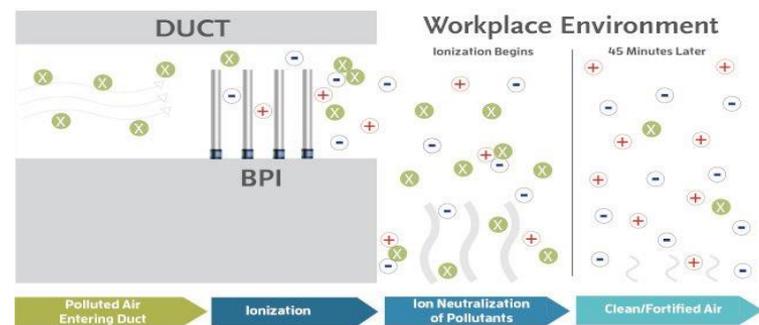
<sup>1</sup>Liu et al. 2020, *Indoor Air* 31:220-228; <sup>2</sup>Zeng et al. 2021, *Building and Environment* 195:107750

# Bipolar Ionization/Corona Discharge/Needlepoint Ionization/Plasma Ion Generators/Other

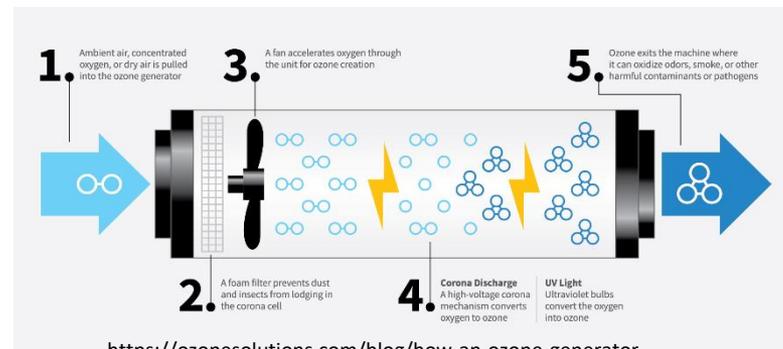
- Use reactive oxygen species (ROS) or reactive ions (ozone, hydroxyl radicals, superoxide anions).
- Charged ions react with contaminants and germs in air.
- ASHRAE Statement:
  - Convincing scientifically-rigorous, peer-reviewed studies do not currently exist on these emerging technologies; manufacturer data should be carefully considered.
  - Systems may emit ozone, some at high levels. Manufacturers are likely to have ozone generation test data.
- Zhang et al. 2021 paper, other papers

■ Some Portable HEPA Air Cleaners use these technologies!

■ [Air Cleaners, HVAC Filters, and Coronavirus \(COVID-19\) | US EPA](#)



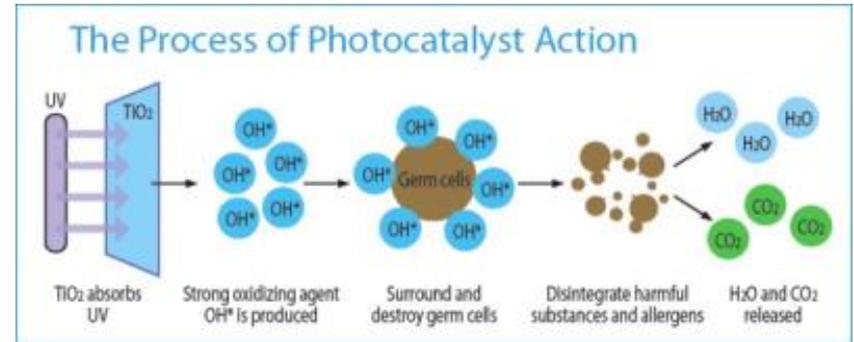
<https://www.csemag.com/articles/covid-19-and-the-impacts-to-the-workplace/>



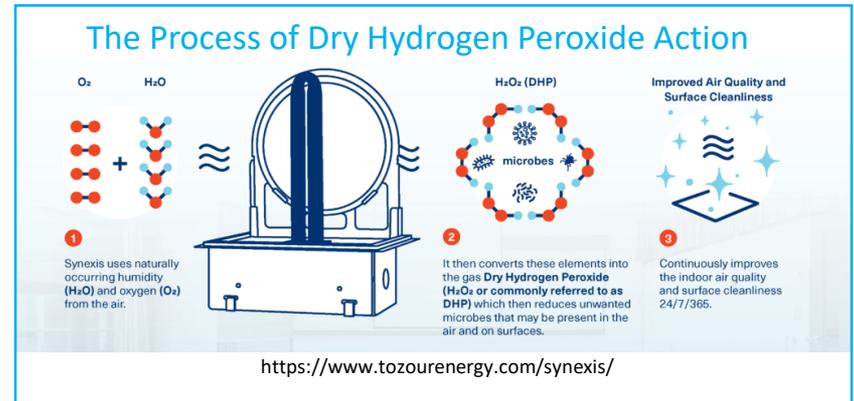
<https://ozonesolutions.com/blog/how-an-ozone-generator-works/>

# Photocatalytic Oxidation (PCO) and Dry Hydrogen Peroxide

- PCO uses UV light and a metal oxide ( $\text{TiO}_2$ )
- Some units claim disinfection by  $\text{H}_2\text{O}_2$  gases formed
- Causes redox reaction of gases that destroy microbes
- By product formation possible
- ASHRAE statement:
  - Some air cleaners using PCO remove harmful contaminants to levels below limits for reducing health risks set by recognized cognizant authorities.
  - Some are ineffective in reducing concentrations significantly; manufacturer data should be considered carefully.



<https://sciencedatacloud.wordpress.com/2013/11/22/photocatalyst-technology/>



<https://www.tozouenergy.com/synexis/>



Thank you for joining us in February for our webinar: [\*A National Conversation on Indoor Air & K-12 Schools During the COVID-19 Pandemic.\*](#)

Today, the Johns Hopkins Center for Health Security at the Bloomberg School of Public Health released a new report calling on kindergarten through 12th grade (K-12) school administrators to urgently invest in ways to provide healthy air in schools to increase safety during the COVID-19 pandemic and potential future respiratory disease outbreaks, as well as to improve student learning.



[Tips to Improve Indoor Ventilation in K-12 Schools to Help Reduce COVID-19 Transmission \(centerforhealthsecurity.org\)](#)

The new report, [\*School Ventilation: A Vital Tool to Reduce COVID-19 Spread\*](#), reviews how improvements in building ventilation can reduce the risks of disease transmission. The report also summarizes current ventilation guidelines for K-12 schools and shares the results of an analysis finding that ventilation improvements are a cost-effective public health measure compared to enhanced (“deep”) cleaning that focuses on surfaces.

“School systems should use only proven technologies for improving indoor air quality: appropriate ventilation, HEPA filtration, or ultraviolet germicidal irradiation. They should not use chemical foggers or any “air cleaner” other than filtration and ultraviolet germicidal irradiation. School systems should not use unproven technologies such as ozone generators, ionization, plasma, and air disinfection with chemical foggers and sprays. The effect of these cleaning methods on children has not been tested and may be detrimental to their health. The primary aim for improving air quality should be to remove contaminants and impurities from the air and not to introduce new substances into the air.”

[20210526-school-ventilation.pdf](https://www.cdc.gov/20210526-school-ventilation.pdf)  
([centerforhealthsecurity.org](https://www.cdc.gov/centerforhealthsecurity.org))

# Schools For Health – How School Buildings Influence Student Health, Thinking and Performance



Schools For Health

For Health Menu 

[Home](#) [COVID-19 Reopening Strategies](#) [COVID-19 FAQs](#) [Relevant Research](#)

## SCHOOLS



**HEALTHY BUILDINGS**  
FOR HEALTH  **HARVARD T.H. CHAN**  
SCHOOL OF PUBLIC HEALTH

How School Buildings Influence Student Health, Thinking and Performance



**HARVARD T.H. CHAN**  
SCHOOL OF PUBLIC HEALTH



# COVID-19 + SCHOOLS: WHAT TO KNOW



**SCHOOLS  
FOR HEALTH**

How School Buildings Influence  
Students' Health, Learning and  
Performance

**HARVARD T.H. CHAN  
SCHOOL OF PUBLIC HEALTH**

**5-step guide to checking ventilation  
rates in classrooms**

Joseph Allen, Jack Szempler, Emily Ames, Jesse Costello-Laurent  
Harvard Healthy Buildings program | [www.forthhealth.org](http://www.forthhealth.org)



**COVID-19 REPORT**

**RISK REDUCTION  
STRATEGIES FOR  
REOPENING SCHOOLS**

**READ THE REPORT**



**COVID-19 TOOLS**

**CALCULATORS FOR THE  
CLASSROOM**

**SEE ALL TOOLS**

**VENTILATION GUIDE**

**5 STEP GUIDE TO  
CHECKING VENTILATION  
RATES IN CLASSROOMS**

**DOWNLOAD THE GUIDE**

**COVID-19 REPORT**

**RISK REDUCTION  
STRATEGIES FOR  
REOPENING SCHOOLS**

**READ THE REPORT**

**COVID-19 TOOLS**

**CALCULATORS FOR THE  
CLASSROOM**

**SEE ALL TOOLS**

## COVID-19 + SCHOOLS: RESEARCH AND NEWS



**Washington Post: Schools finally have  
the road map they need to fully reopen**

[View Article](#)



**Washington Post: Don't let covid-19  
keep kids from playing sports**

[View Article](#)



**Updates to the Risk Reduction Strategies  
For Reopening Schools Report**

[View Article](#)

Type	Title	Description
Handbook for Schools	Infection Control Handbook for Schools, 2021	Informed Green Solutions was funded by a TURI Community grant to develop this handbook to help schools safely disinfect.
Poster	Chain of SARS CoV 2 Transmission	Graphic overview of how the virus can be transmitted
Poster	Breaking the Chain of Transmission	Graphic overview of strategies for preventing COVID 19
Poster	Using Disinfecting Wipes	Graphic description of how best to use disinfecting wipes
Poster	Choosing Safer Disinfectants	Graphic overview designed for product selection
Template	High-Touch Points	Word and image depiction of high-touch points within a school
Guide	How to Use EPA List N	Practical support for navigating List N
Guide	Cleaning and Disinfecting by School Department	Suggested protocols by department for both custodial and other staff that might be cleaning
Guide	Comparing Health and Safety Information for SDSs and Antimicrobial Pesticide Labels	Guidance and examples for comparing the different information provided on the two different sources of information for ingredients and use



## SAFER CLEANING AND DISINFECTION FOR SCHOOLS

[Safer Cleaning and Disinfection for Schools / COVID-19: Safely Clean & Disinfect / Cleaning Laboratory / Our Work / TURI - TURI - Toxics Use Reduction Institute](#)

# Infection Control Handbook for Schools

**Edition 2**



## **Primary Authors**

Lynn Rose  
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## **Acknowledgements**

The authors gratefully acknowledge the members of the National Cleaning for Healthier Schools and Infection Control Workgroup for their participation in a series of monthly conference calls that resulted in the 2010 Handbook. Special thanks to the Toxics Use Reduction Institute team, Victoria Leonard, and our contributors and reviewers for the 2020-2021 update.

## **Funding**

This report was prepared with funding from and in collaboration with the Toxics Use Reduction Institute (TURI) at the University of Massachusetts Lowell in 2010 and 2020-2021.

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**Appendix G: Disinfectant Application Equipment**

**Appendix H: Templates for Labeling Secondary Containers**

**Appendix I: Use of Disinfectant Wipes, Poster**

**Appendix J: Choosing Safer Disinfectants, Poster**

**Appendix K: Disinfectants - Comparing Information on Pesticide Labels and SDSs**

**Appendix L: Resources**



# EPA's Safer Choice Program

March 2021

# Benefits of Safer Choice Certification



- Safer Choice-certified products—customers don't just get safer products, they influence the entire supply chain.
- Leverages EPA's up-to-date scientific expertise and access to confidential information.
  - Excluding lists of known “problematic” chemicals is only the first step.
  - Ingredients in Safer Choice-certified products must be safer.
  - Every chemical ingredient is evaluated. Even those present at low levels. Even impurities.
- Customers also get these benefits from Safer Choice-certified products:
  - Ingredient disclosure for every product
  - About 100 fragrance-free products – an EPA certification to help those with allergy or sensitization concerns

# What does the Safer Choice label mean?



- Verification by a trusted government agency that products contain only safer chemical ingredients and that they:
  - Are safer for families, pets, communities, and the environment
  - Meet verified performance standards
  - Fragrance free offerings: Only federal certification/verification of “fragrance free” claims
- An appealing label that customers can trust
  - Facilitates rapid decision-making



# A Family of Labels



Optional Label for  
Industrial &  
Institutional Use



Fragrance-Free  
Label

# Safer Choice Product Types



- **Household & Facility Cleaning**
  - All-Purpose Cleaners, Appliance Cleaners & Rinse Aids
  - Automatic Dishwasher Products
  - Carpet Cleaners & Floor Care Products
  - Degreasers
  - Dish Detergents & Soaps
  - Granite/Stone/Wood/Leather Cleaners
  - Kitchen/Countertop Cleaners
  - Laundry Detergents, Fabric Softeners & Pre-Treaters
  - Odor Removers
  - Pet Care Products
  - Toilet Bowl Cleaners
  - Tub/Tile Cleaners
  - Window/Glass Cleaners
- **Health & Beauty**
  - Hand Soaps
- **Automotive & Outdoor**
  - Aircraft Cleaning Products
  - Athletic Field Paint
  - Car Care Products
  - Deicers
  - Dust Control Products
  - HVAC Maintenance
  - Marine/RV Cleaners
  - Outdoor Furniture Cleaners
  - Parts Washers
- **FIFRA Disinfectants**
  - (Certified under DfE)

# The Standard Behind the Safer Choice Label

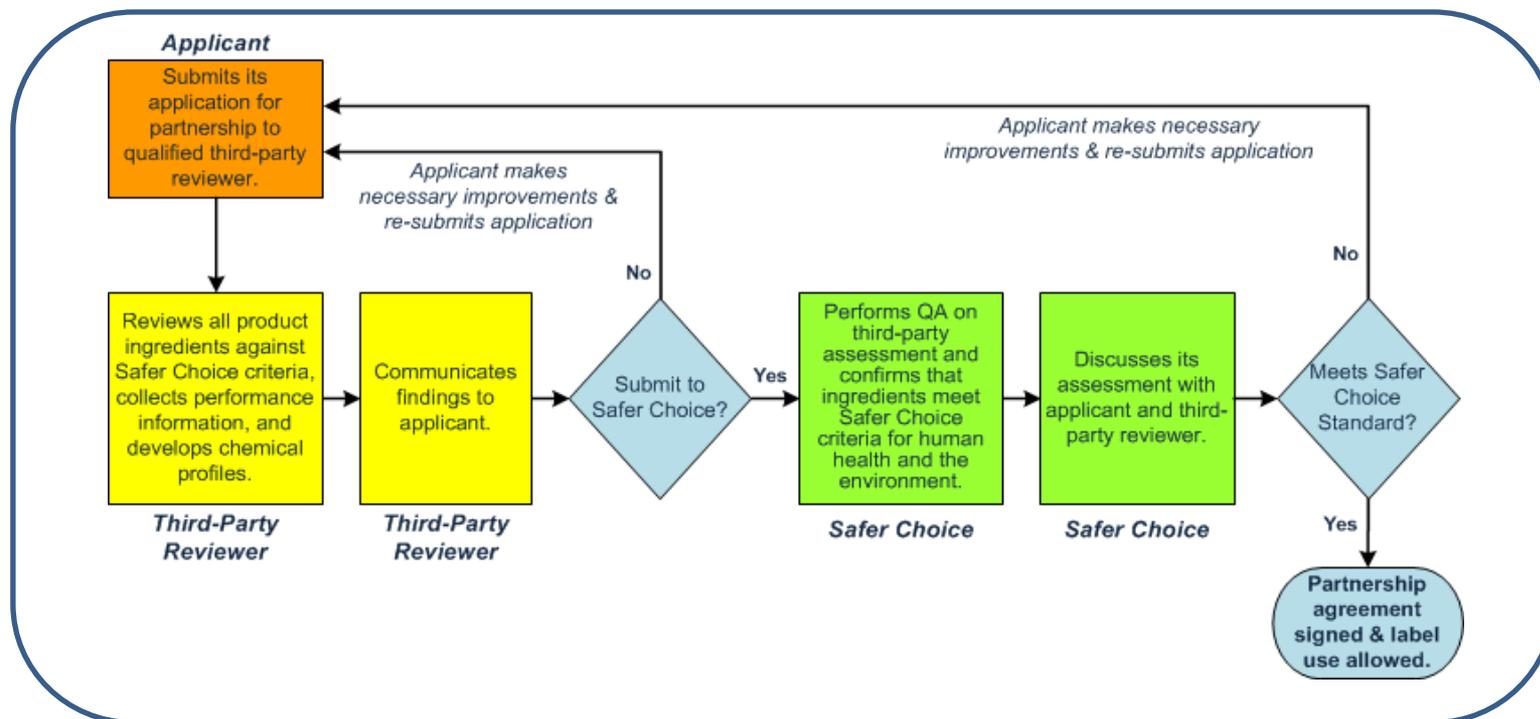


*To use the label products must:*

- Meet the Safer Choice Standard
  - Every chemical ingredient is reviewed for human health and environmental safety
  - Product level requirements include: performance, packaging, and ingredient disclosure
- Be covered under a Partnership Agreement between the manufacturer and EPA
  - Renewed every 3 years
- Undergo annual audits

<http://www.epa.gov/saferchoice/standard>

# Safer Choice Product Review & Audits are Leveraged through Qualified Third Parties



**Third-Party Reviewers:** Gradient  
NSF International  
ToxServices LLC

**EPA Safer Choice has final review and grants certification**

# Safer Chemical Ingredients List (SCIL)



[www.epa.gov/saferchoice/safer-ingredients](http://www.epa.gov/saferchoice/safer-ingredients)

- Living list of almost **1,000** safer chemicals that meet EPA's Safer Chemical Criteria
- Continually expanding
- Uses
  - Research whether proposed formulations might be eligible for Safer Choice
  - Sustainable chemistry measure for products not carrying the Safer Choice label
  - Highlight innovation and meet demand for safer chemicals

## Safer Chemical Ingredients List

- The listed chemicals are safer alternatives, grouped by their [functional-use class](#).†
- Chemicals are marked as a  [green circle](#),  [green half-circle](#),  [yellow triangle](#), or  [grey square](#).‡
- This list includes many of the chemicals evaluated through the Safer Choice Program. It does not include confidential chemicals. There may be chemicals not included in this list that are also safer.
- Some of the chemicals listed in these functional use classes may not be on the [TSCA inventory](#) and therefore may not be authorized/allowed for TSCA uses. Persons considering TSCA uses for these substances should engage in appropriate diligence to ascertain whether such use is authorized.

◆ Please Select: [All Functional Use Classes](#)

[www.epa.gov/saferchoice/safer-ingredients](http://www.epa.gov/saferchoice/safer-ingredients)

◆ or Select a Functional Use Class:

- [Antimicrobial Actives](#)
- [Chelating Agents](#)
- [Colorants](#)
- [Defoamers](#)
- [Emollients](#)
- [Enzymes and Enzyme Stabilizers](#)
- [Fragrances](#)
- [Oxidants and Oxidant Stabilizers](#)
- [Polymers](#)
- [Preservatives and Antioxidants](#)
- [Processing Aids and Additives](#)
- [Skin Conditioning Agents](#)
- [Solvents](#)
- [Specialized Industrial Chemicals](#)
- [Surfactants](#)
- [Uncategorized](#)

**Functional Use Classes**

◆ Search: Name  or CAS RN

← **Search by Name or CAS #**

# Safer Chemical Ingredients List

## Color Codes



-  **Green circle** - low hazard based on experimental or modeled data.
-  **Green half-circle** - expected to be of low hazard based on experimental or modeled data. Additional data would strengthen our confidence in the chemical's status
-  **Yellow triangle** - met Safer Choice criteria for its functional ingredient class, but has some hazard profile issues.

# Ingredient Review Process (cont.)



## Steps for data retrieval and estimation:

1. Full literature review including toxicology and chemistry studies
2. Identification of analogs, metabolites, and potential degradation products
3. When experimental data is not available for a chemical:
  - Model predictions: EPA's EPISuite, ECOSAR, & OncoLogic
  - Read across from analog chemicals

Modeling information can be found at: <https://www.epa.gov/sustainable-futures>

# Acute Mammalian Toxicity Criteria Example



For acute mammalian toxicity, data must demonstrate that chemical toxicity thresholds are above cutoff values

<b>Route (units)</b>	<b>Median Lethal Dose/Concentration</b>
Oral, LD50 (mg/kg bw)	2,000
Dermal, LD50 (mg/kg bw)	2,000
Inhalation, LC50 (vapor/gas) (mg/L)	20
Inhalation, LC50 (dust/mist/fumes) (mg/L)	5

# Safer Choice Environmental Criteria Example



Acute Aquatic Toxicity (L/E/IC50 Value) <sup>1</sup>	Rate of Biodegradation
≤1 ppm	May be acceptable if biodegradation <sup>2</sup> occurs within a 10-day window without products of concern <sup>3</sup>
>1 ppm and ≤10 ppm	Biodegradation <sup>2</sup> occurs within a 10-day window without products of concern <sup>3</sup>
>10 ppm	Biodegradation <sup>2</sup> occurs within 28 days without products of concern <sup>3</sup>

1. In general, there is a predictable relationship between acute aquatic toxicity and chronic aquatic toxicity for organic chemicals (i.e., chemicals that have high acute aquatic toxicity also have high chronic aquatic toxicity). Since acute aquatic toxicity data are more readily available, the Safer Choice Criteria use these data to screen chemicals that may be toxic to aquatic life (see Sections 5.9 and 6.8 of the [Safer Choice Master Criteria for Safer Ingredients](#)).

2. Generally, >60% mineralization (to CO<sub>2</sub> and water) in 28 days (see Sections 5.9 and 6.8 of the [Safer Choice Master Criteria for Safer Ingredients](#)).

3. Products of concern are compounds with high acute aquatic toxicity (L/E/IC50 =10 ppm) and a slow rate of biodegradation (greater than 28 days).

# DfE-Certified Disinfectants Overview



- Eight active ingredients currently allowed:

- Citric acid
- Hydrogen peroxide
- L-Lactic acid
- Ethanol
- Isopropanol
- Peroxyacetic acid
- Sodium bisulfate
- Chitosan

# DfE-Certified Products



- **New:** EPA has updated the list of DfE-certified products to be user-friendly and searchable.  
[www.epa.gov/pesticide-labels/dfe-certified-disinfectants](http://www.epa.gov/pesticide-labels/dfe-certified-disinfectants)
- **34** sanitizers/disinfectants certified
  - 11 primary product registrations
  - 23 supplemental distributor registrations
- Product sectors include:
  - All-Purpose Cleaners
  - Toilet Bowl Cleaners
  - Tub/Tile Cleaners
  - Wipes

Note: if the primary product is not approved for the DfE logo, then the supplemental distributor could not support the DfE logo on their label

# Safer Choice

## DfE-Certified Disinfectants

[Browse the list of DfE-certified disinfectants.](#)



Look for the Label!



EN ESPAÑOL

Safer Choice helps consumers, businesses, and purchasers find products that perform and contain ingredients that are safer for human health and the environment. Safer Choice is an EPA Pollution Prevention (PP) program, which includes practices that reduce, eliminate,

# DfE-Certified Disinfectants

The Design for the Environment (DfE) label helps consumers and purchasers find antimicrobial products, like disinfectants and sanitizers, that have been reviewed by EPA and found to meet both the pesticide registration requirements and the [standard for DfE-certified products](#). These products contain ingredients that have been reviewed for both human health and environmental fate. Learn more about the [DfE label for antimicrobial pesticide products](#), including information on how to obtain this certification for your products.



The following products have been qualified to display the DfE logo on the product label. Inclusion on this list does not constitute an endorsement by EPA.

## Search DfE-Certified Disinfectants

EPA Reg. Number, Product, or Company

Product Type



Active Ingredient



Home or Business Use



Show only:

[Disinfectants for use against the coronavirus SARS-CoV-2 \(COVID-19\)](#)

Show  entries

Previous

1

2

Next

EPA Reg. Number	Product	Company	Sector	Type	Active Ingredient
<a href="#">84368-1</a>	UrthPRO	UrthTech, LLC	Both	Other	Ethanol
<a href="#">74550-0</a>	<a href="#">EPA 74550-0</a>	<a href="#">EPA 74550-0</a>	Both	All-	Hydrogen

## Search DfE-Certified Disinfectants

EPA Reg. Number, Product, or Company

Product Type

Active Ingredient

Home or Business Use

Show only:

Disinfectants for use against the coronavirus SARS-CoV-2 (COVID-19)<sup>[1]</sup>

DfE-certified products  
also on List N

Show  entries

Previous

1

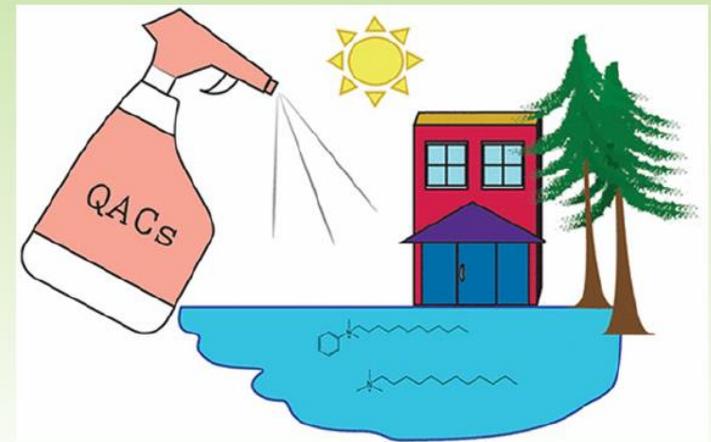
Next

EPA Reg. Number	Product	Company	Sector	Type	Active Ingredient
<a href="#">84368-1</a>	UrthPRO	UrthTech, LLC	Both	Other	Ethanol
<a href="#">84368-1-84150</a>	PURELL Professional Surface Disinfectant	GOJO Industries, Inc.	Business	Other	Ethanol
<a href="#">84368-1-84150</a>	PURELL Professional Food Service Surface Sanitizer	GOJO Industries, Inc.	Business	Other	Ethanol
<a href="#">84368-1-84150</a>	PURELL Healthcare Surface Disinfectant	GOJO Industries, Inc.	Business	Other	Ethanol
<a href="#">777-126</a>	Lysol Brand Kills 99.9% of Viruses & Bacteria "Power & Free" Multi-Purpose Cleaner w/ Hydrogen Peroxide Citrus Sparkle Zest	Reckitt-Benckiser	Home	All-Purpose Cleaners	Hydrogen Peroxide
<a href="#">34810-37-92388</a>	Lemi Shine Disinfecting Wipes	Envirocon Technologies, Inc.	Home	All-Purpose Cleaners	Citric Acid
<a href="#">34810-35-82206</a>	ECOS PRO Multi-Surface Disinfectant & Sanitizer, fresh citrus	US Nonwovens	Business	All-Purpose Cleaners	Citric Acid
<a href="#">34810-37-82206</a>	ECOS Multi-Purpose Disinfectant Wipes, fresh citrus	US Nonwovens	Home	All-Purpose Cleaners	Citric Acid
<a href="#">34810-35-</a>	ECOS Multi-Purpose Disinfectant & Sanitizer, fresh citrus	US Nonwovens	Home	All-Purpose	Citric Acid



► Increased use of disinfectants has impacts on human health but also on the environment. For example:

- Half of all disinfectants on EPA's List N (disinfectants believed to be effective against SARS CoV-2) were quaternary ammonium compounds in June, 2020.
- These compounds
  - are released during manufacture and after use into surface waters,
  - break down slowly,
  - are toxic to aquatic organisms.



Hora PI, Pati SG, McNamara PJ, Arnold WA. Increased Use of Quaternary Ammonium Compounds during the SARS-CoV-2 Pandemic and Beyond: Consideration of Environmental Implications. *Environmental science & technology letters*. 2020;7(9):622-31

# Which disinfection application methods should you choose?

- ▶ Apply ready to use or diluted disinfectant with a microfiber cloth, sponge, mop, or autoscrubber.
- ▶ Disinfecting wipes: make sure surface remains glistening wet for the required contact time.



- ▶ These are the safest ways to apply disinfectants. They produce the least aerosolized particles in the air.
- ▶ When aerosolized particles are in the air:
  - we breathe them.
  - they react with other chemicals in the air and we end up with the unintended chemical consequences.
    - These have not been adequately studied!
  - They land on surfaces where they dry and then flake off into dust.

# Which disinfection application methods should you choose?

- ▶ **Electrostatic sprayers apply a positive charge** to disinfectants as they pass through a sprayer nozzle.
  - Charged droplets repel one another, look for neutral surfaces which they stick to and wrap around to coat all sides.
  - Provide a more uniform coating of disinfectant on sprayed objects.

- ▶ Use only List N products approved for use with electrostatic sprayers.
- ▶ Verify on the product label and follow specific application instructions, including required contact times and PPE
- ▶ Wear the personal protective equipment (PPE) listed on the product label or SDS.
- ▶ At a minimum, the following PPE should be worn while using an electrostatic sprayer:
  - Protective clothing: disposable gown, Tyvek coveralls or lab coat
  - Chemical goggles (non-vented)
  - Face shield (if splash or spray to face possible)
  - Disposable gloves (nitrile  $\geq$  5 mil)
  - Respiratory protection

University of Washington, Environmental Health and Safety, (2021) "Electrostatic Sprayers"  
<https://ehs.washington.edu/system/files/resources/electrostatic-sprayers-focus-sheet.pdf>



# Which disinfection application methods should you choose?

## Issues with electrostatic sprayers:

- Many of the disinfectants used with ESs are QUATS (irritate lungs and linked to reproductive harms in animals)
- You still have to clean surfaces first. This is often overlooked when describing the advantages of sprayers.
- The room has to be empty. It's not clear how long the disinfectant remains in the air (depends on how many air changes/hour your ventilation can achieve).
- Spraying is often indiscriminate-backpacks, furniture etc.
- Is sufficient disinfectant applied to surfaces to stay glistening wet for the required contact time?
- If not rinsed, QUATS dry on surfaces and flake off into dust which young children ingest.
- We don't know what the unintended consequences are of sending an electric current through liquid antimicrobial disinfectants and then spraying indoor environments.
- Precautionary Principle!

## ▶ Issues with Electrolyzed water

- When HOCL evaporates out of a solution it becomes a *gas*. It reacts with
  - other indoor gases,
  - light,
  - surfaces,
  - airborne particles,
  - *the lining of your lungs or skin,*to form by products that are harmful to our health.
- There is concern among scientists about the health effects of exposure to HOCl gas itself, but also to the daughter products of its chemical reactions which have not been well studied,

- ▶ Foggers/misters depend on gravity to deliver disinfectant to surfaces.

- ▶ Foggers should never be used.
  - Surfaces still have to be pre-cleaned.
  - Delivery to surfaces may be uneven and contact time, and therefore disinfection, may not be achieved.
  - They invite indiscriminate use of disinfectants indoors.
  - They pose health risks to the applicator and they do not accomplish anything that you can't accomplish by using conventional application methods.
  - Foggers may cause permanent damage to electronic equipment.

- When ozone is infused in water, it becomes aqueous ozone. It is an effective cleaner and it also destroys organisms by damaging their internal structures and cell walls.
- Some aqueous ozone devices make disinfecting claims, others claim to be sanitizers. They claim effectiveness against a large number of bacteria and viruses including E coli and salmonella.
- In some device tests, aqueous ozone does not kill SARS CoV-2.
- Aqueous ozone breaks down into oxygen and water. It leaves no residue and does not have to be rinsed.

## Issues with Aqueous Ozone

- Ozone in its *gaseous* form is very toxic to humans. Do not spray aqueous ozone in the air.
- Health effects of gaseous ozone include respiratory symptoms, reduced lung function, and airway inflammation.
- People with asthma are especially susceptible to gaseous ozone exposure.

## Dry steam vapor technology:

- Very effective for cleaning and rapid sanitizing/disinfecting.
- Approved for most surfaces, including food contact surfaces.
- Unfortunately, still very expensive.
- Doesn't technically meet many state licensing requirements that ECE facilities use a "hospital grade disinfectant."
- EPA registers, but does not evaluate effectiveness of, devices marketed as effective for disinfecting.

Research shows microfiber and steam were as effective as disinfectant at controlling an outbreak of norovirus.



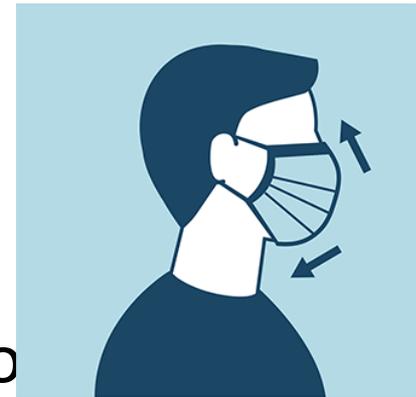
Courtesy of Advanced Vapor Technology

# Masking Tips for Parents

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**Choose a mask with the following components:**

- At least two woven layers of washable, breathable fabric
- Ear Loops
- Fits over nose and mouth with no gaps at the side
- A moldable nose bridge if possible- this helps keep the mask up



# Masking Tips for Parents

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## Washing Cloth Masks:

- Can be placed in washing machine with other laundry

**Most Important Point: Model Good Practice!**



Resources:

DOH K-12 School Masking Guidance: [DOH's Guidance on Cloth Face Coverings](#)

CDC Masking Graphics: <https://www.cdc.gov/coronavirus/2019-ncov/your-health/effective-masks.html>

# Tool Lending Library

Smart Buildings Center, NW Energy Efficiency Council (NEEC)

<https://www.smartbuildingscenter.org/tool-library/>

Lending “library” of diagnostic tools.

CO, CO<sub>2</sub>, data loggers, power meters, lighting loggers, infrared cameras, liquid and air flow measurement devices, etc.

Free of charge. Shipping or pick up Tues-Thurs 9-4.

Guidance on how to use/interpret data.

Library of videos and application notes.

[Tool-library@smartbuildingscenter.org](mailto:Tool-library@smartbuildingscenter.org)

206-538-0685

You can subscribe for updates.





# THANK YOU!

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**Get Vaccinated Please!**

Resources available:

[www.doh.wa.gov/schoolenvironment](http://www.doh.wa.gov/schoolenvironment)

Join my list serve for timely information!

