



## **DOH UPDATES: COVID-19 DISINFECTION & THE NEW VENTILATION/FILTRATION GUIDANCE**

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# 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.





# COVID-19 Situation Today

It's constantly changing –check the website for current guidance:

DOH: [2019 Novel Coronavirus Outbreak \(COVID-19\)](#)

- **Resources and Recommendations**

- **Schools and Childcare**

- [Symptom Evaluation and Management in Schools and Childcare \(PDF\)](#)
    - [Fall Guidance, K-12 \(PDF\)](#) - updated 9/2/2020 (also in [Spanish](#))
      - [Decision Tree K-12 \(PDF\)](#) (also in [Spanish](#))
    - [Office of Superintendent of Public Instruction \(OSPI\) Guidance](#)
    - [OSPI Dashboard](#)
    - [Promoting Healthy Practices during COVID-19: Meals and Snacks \(PDF\)](#) (also available in [Spanish](#) and [Somali](#))

- **Business and Workers**

- [Guidance for \*Legionella\* and Building Water System Closures \(PDF\)](#)
    - [Safe Cleaning and Disinfection Guidance for Public Spaces \(PDF\)](#)
    - [Food Workers and Food Establishments](#)
    - [Water Recreation Facilities](#)

- **You and Your Family**

- [Mandatory Mask Guidance \(PDF\)](#) | [Additional languages available](#)
    - [How to make a homemade mask.](#) (Department of Labor and Industries)
    - [Cloth face covering effectiveness - infographic \(PDF\)](#) | [Additional languages available](#)

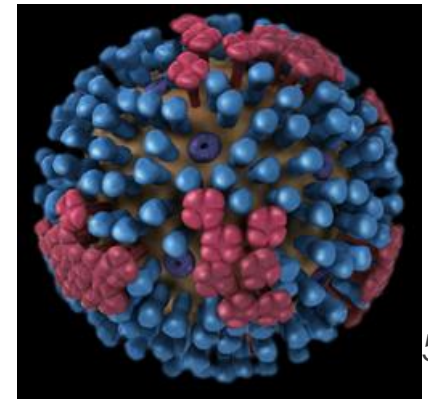
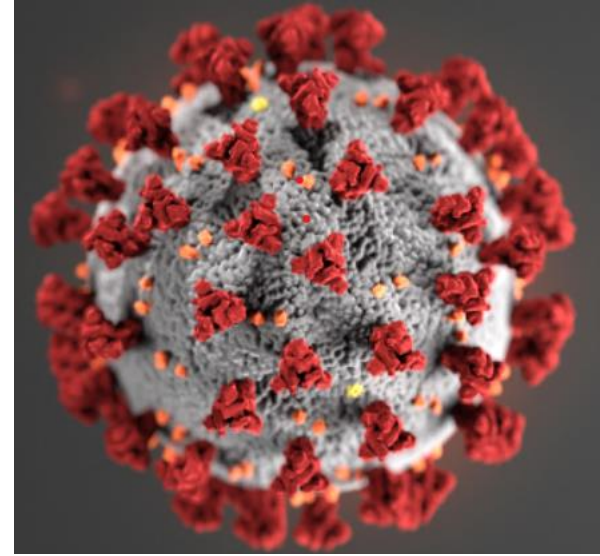
# Spreading Germs

- Foodborne
- Waterborne
- Person-to-Person
- Airborne
- Droplet transmission
- Contaminated surfaces

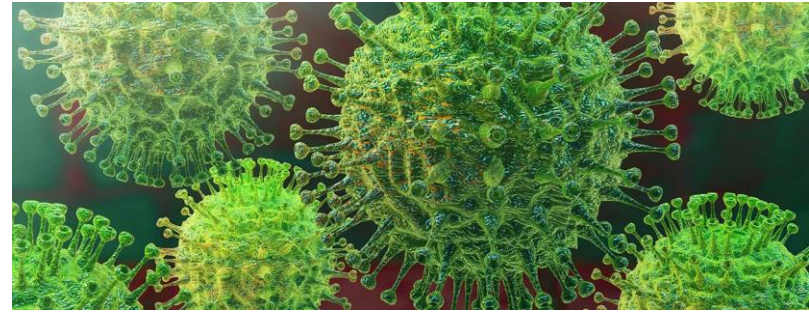


# Microorganisms

- Influenza
- Measles
- *Pertussis* (Whooping Cough)
- COVID-19
- MRSA  
*Methicillin Resistant Staphylococcus aureus*
- Norovirus
- *Clostridium difficile* (C. diff)



# SARS-CoV-2



- SARS-CoV-2 – the virus that causes the disease COVID-19
  - (the novel human coronavirus)
- May float in the air about 3 hours (1-2 hours viable maybe)
- May live on plastic and stainless steel up to 72 hours
- Copper – dead after 4 hours
- Cardboard – dead after 24 hours
- **Unknown how infectious over these time periods**
  - <https://www.nih.gov/news-events/news-releases/new-coronavirus-stable-hours-surfaces>
  - <https://www.nejm.org/doi/full/10.1056/NEJMc2004973>

# 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 (physical distancing 6+ feet).
- Get vaccinations.
- Good ventilation.
- Stay home when ill.
- Support Public Health.





# Basics for COVID Prevention

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- 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 and disinfect frequently touched surfaces



# Cloth Face Coverings

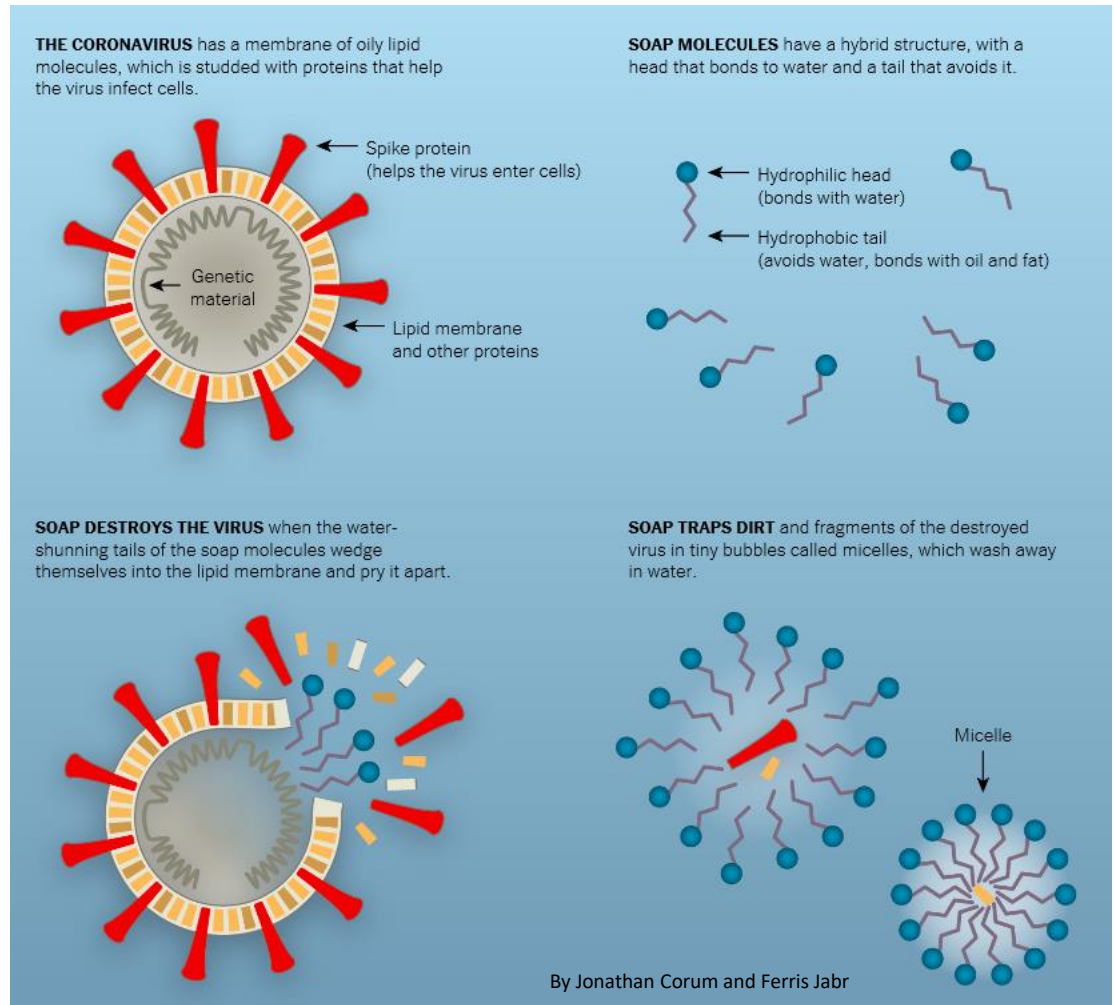
- Required for staff and students in all public spaces, except where specific exceptions are made based on age, development, or disability.
- All students, volunteers, or guests must wear cloth face coverings or acceptable alternative at school when indoors.
- Schools should provide face coverings for staff and students if they do not have their own.
- For staff, cloth facial coverings must be worn by every individual (except as described below) not working alone at the location unless their exposure dictates a higher level of protection under Department of Labor & Industries safety and health rules and guidance.

# Cloth Face Coverings

- Cloth face coverings should not be worn by:
  - Those with a disability that prevents them from comfortably wearing or removing a face covering.
  - Those with certain respiratory conditions or trouble breathing.
  - Those who are deaf or hard of hearing, and those who provide instruction to such people, and use facial and mouth movements as part of communication.
  - Those advised by a medical, legal, or behavioral health professional that wearing a face covering may pose a risk to that person.
- In rare circumstances when a cloth face covering cannot be worn, students and staff may use a clear face covering or a face shield with a drape as an alternative to a cloth face covering. If used, face shields should extend below the chin, to the ears, and have no gap at the forehead.
- Younger students must be supervised when wearing a face covering or face shield and may need help putting them on, taking them off, and getting used to wearing them.
- Even when cloth face coverings are worn, continue practicing physical distancing.
- Students may remove face coverings to eat and drink and when they go outdoors for recess, physical education, or other outside activities when they can be physically distanced. If students need a “mask break” take them outside or to a large, well ventilated room where there is sufficient space to ensure more than six feet of physical distance between people.
- As for all assistance provided by staff to students who have special needs, the school is responsible for providing appropriate PPE available.

# Soap

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





# Hand Sanitizer

- Not a substitute for hand washing
- Not effective on dirty hands
- At least 60% alcohol (isopropyl or ethyl)
  - Not over 70%
- 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**





# Wash with Soap and Water

- When coming inside from playing
- After going to the bathroom
- Before preparing food
- Before eating
- After touching animals



# 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



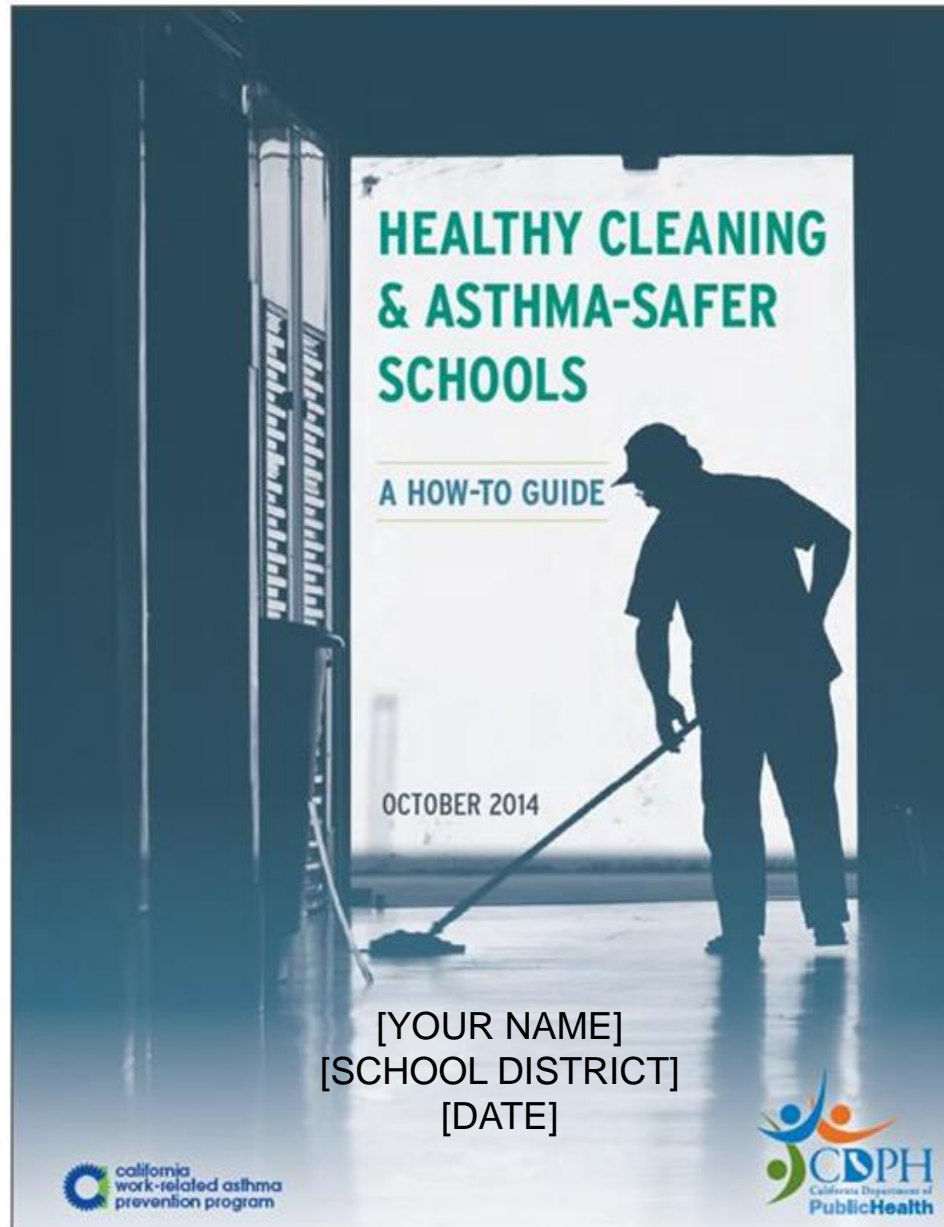
E.L. Best, P. Parnell, M.H. Wilcox. **Microbiological comparison of hand-drying methods: the potential for contamination of the environment, user, and bystander.** *Journal of Hospital Infection*, 2014.

# 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

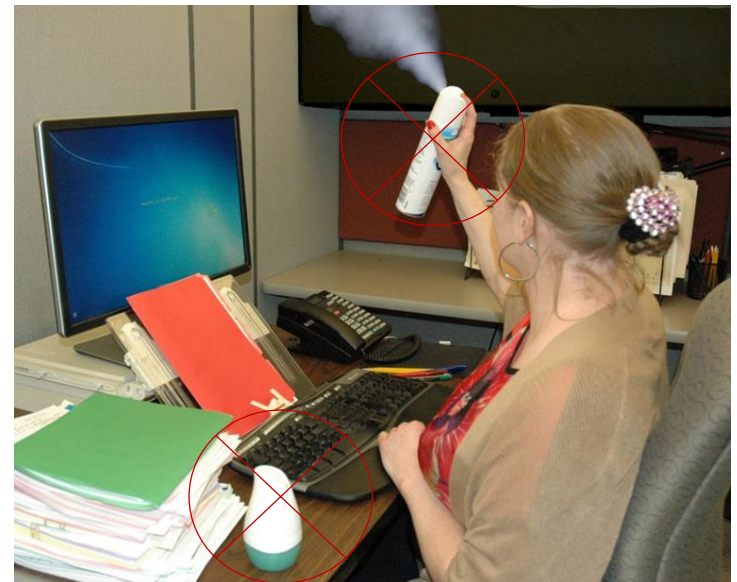
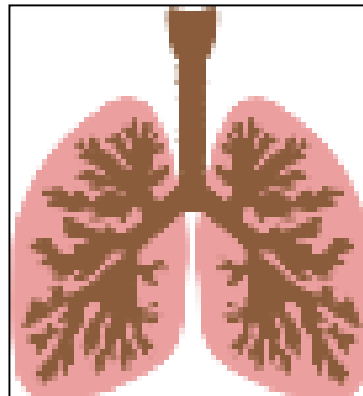


Staff and students deserve to work and learn in a safe and healthy school environment, and they can, since safer cleaning products and methods exist.



# Health Hazards of Cleaning and Disinfecting Products

- Causing asthma and making it worse
- Irritating skin, eyes, nose, throat, causing headaches
- Disrupting or acting like hormones
- Cancer risk



# Cleaning Products and Work-Related Asthma, 10 Year Update

- The percentage of WRA cases from exposure to cleaning products from 1998 to 2012 was unchanged from 1993 to 1997 indicating that **continued and additional prevention efforts are needed to reduce unnecessary use, identify safer products, and implement safer work processes.**
- the highest percentage, (30.7%) of cases worked in Hospitals, followed by **Educational Services**, similar to the results from 1993 to 1997
- three most common occupations among adults with WRA associated with cleaning products were **building cleaning workers (20.3%)**; registered nurses (14.1%); and nursing, psychiatric, and home health aides (5.3%), similar to the results from 1993 to 1997
- The top three exposures for all WRA classification types were cleaning materials or household general purpose cleaners that were not specified (31.2%), floor strippers or waxes (15.8%), and bleach (12.3%). Disinfectant cleaners were the next most common exposure for all WRA classification types, except for cases classified as RADS, where improper cleaning product mixtures (such as bleach plus acid, or bleach plus ammonia, which react to produce chlorine gas and chloramine vapors, respectively) were reported most frequently (14.2%).
- Studies have identified an increased risk of developing asthma with both the frequency of use and the method of application (eg, as a spray vs as a wipe) of cleaning agents.
- The increased use of disinfectants as part of building maintenance has led to best practice recommendations to use them only when necessary, for example, in situations where they are proven to reduce the occurrence of infectious diseases or when required by regulations.
- One reason for these best practice recommendations is to reduce the risk of WRA from exposure to disinfectants.

# NIOSH

## Work-related Asthma: Occupational Exposures Cleaning Services

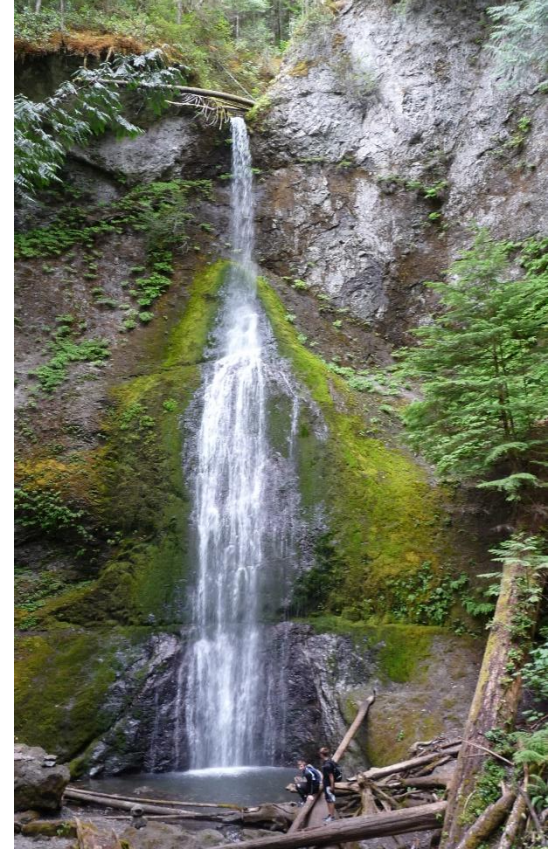
- **Acetic acid**
- Acids
- Ammonia (ammonium hydroxide)
- Biocides
- **Bleach (sodium hypochlorite)**
- Chloramines
- Formaldehyde
- Glutaraldehyde
- **Quaternary ammonium compounds (e.g., benzalkonium chloride)**
- **Spray products**

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



# Why Green?

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



**Green Cleaning** for schools protects public health without harming the health of staff, building occupants and the environment. The best way to reduce cleaning chemical exposures for students and staff is to implement a cleaning for healthy schools program.

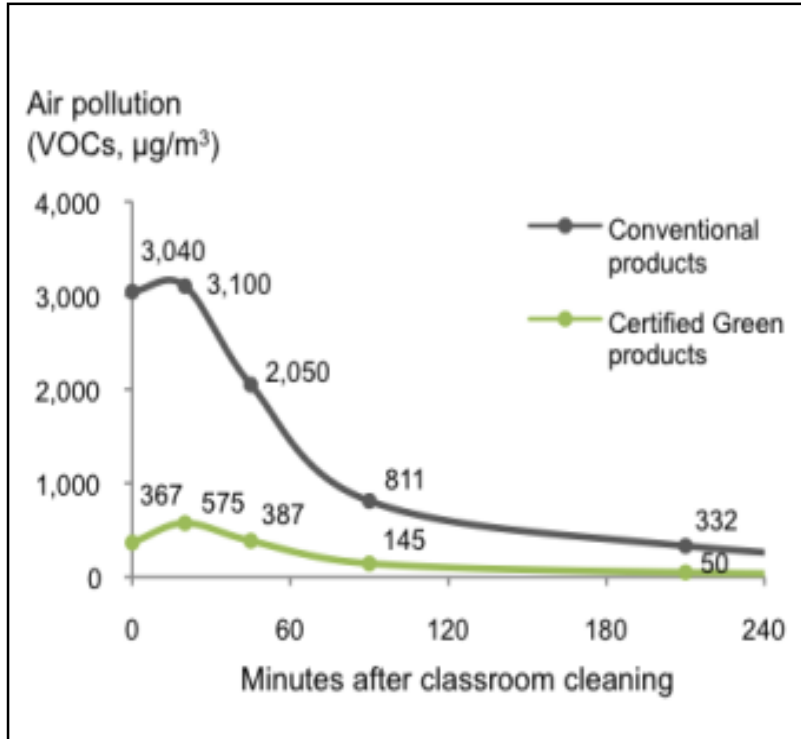


*National Association of School Nurses*

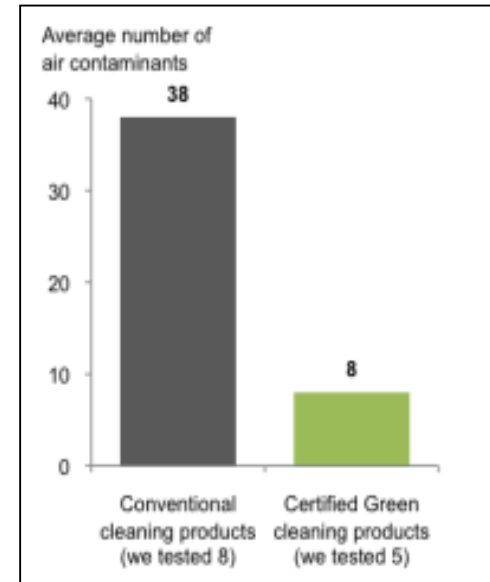
[www.cleaningforhealthyschools.org/documents/NASN\\_poster\\_greencleaning.pdf](http://www.cleaningforhealthyschools.org/documents/NASN_poster_greencleaning.pdf)



# Greener School Cleaning Supplies = Fresh Air + Healthier Schools



Green cleaning releases  
less air pollution



Green general purpose  
cleaners had fewer air  
contaminants

# Greenwashing

- ▶ Selling you a “green” product that isn’t actually green.
- ▶ Third-party certified groups make sure products meet criteria to reduce risks to health and the environment.



Advertising and labels not always reliable

# Greenwashing



Front of Bottle



Back of Bottle

Company's self-declared green products may not be safer or healthier



# Choosing Products



## Third Party Certified

- Green Seal

- UL GREENGUARD

- EPA (Fragrance-free) Safer Choice  
(<https://www.epa.gov/saferchoice>)

- ▶ Neutral pH
- ▶ Low hazard rating
- ▶ Use only when and where needed
- ▶ Meets or exceeds the California VOC requirements
- ▶ Just Say No To:
  - ▶ phosphates, dye, fragrance, butyl cellusolve, nonylphenol ethoxylate



# Clean – Sanitize – Disinfect?

- **Cleaners, Soaps, Detergents**
  - Remove dirt/organics and most germs.



## TO BE DONE AFTER THOROUGH CLEANING:

- **Sanitizers**
  - Reduce germs on surfaces – 99.9%.
- **Disinfectants**
  - Destroy or inactivate germs and prevent them from growing.





## Disinfectants and Understanding Their Labels



Effectiveness Claim

Active Ingredients List

Keep Out of Reach of Children

Signal Word



## Disinfectants and Understanding Their Labels

**Effectiveness** →

**Special Instruction** →

**Use Sites** →

**Special Instruction** →

Acinetobacter baumannii MDR • Acinetobacter calcoaceticus • Acinetobacter haemolyticus • Bordetella pertussis (whooping cough) • Burkholderia cepacia • Citrobacter freundii • Corynebacterium diphtheriae • Corynebacterium xerosis • Cronobacter sakazakii (Pre-cleaned surfaces) • Enterobacter aerogenes MDR • Enterobacter cloacae • Enterococcus faecalis • Enterococcus faecalis - Vancomycin Resistant (VRE) ATCC No. 51775 • Enterococcus faecium VRE • MDR • Escherichia coli • Escherichia coli 0157:H7\*\* (food poisoning) • Escherichia coli 0104:H21 • Escherichia coli 045:H7 • Escherichia coli 0111:H8 • Escherichia coli ESBL • Haemophilus influenzae • Klebsiella oxytoca • Klebsiella pneumoniae • Klebsiella pneumoniae NDM-1 positive • Klebsiella pneumoniae Carbapenem resistant • Klebsiella pneumoniae ESBL • Listeria monocytogenes ATCC No. 19117 • Micrococcus luteus (Pre-cleaned surfaces) • Neisseria elongata • Pasteurella multocida • Proteus mirabilis • Proteus vulgaris • Pseudomonas aeruginosa • Pseudomonas putida • Salmonella enterica (food poisoning) • Salmonella enterica serovar enteritidis • Salmonella enterica serovar paratyphi • Salmonella enterica serovar typhi • Salmonella enteritidis • Serratia marcescens • Shigella dysenteriae • Shigella flexneri • Shigella sonnei • Staphylococcus aureus\*\* (Skin infections) • Staphylococcus aureus - Methicillin resistant (HA-MRSA) • Staphylococcus aureus - CA-MRSA USA-300 • Staphylococcus aureus - CA-MRSA USA-400 • Staphylococcus epidermidis • Staphylococcus haemolyticus • Staphylococcus hominis • Staphylococcus saprophyticus • Streptococcus agalactiae • Streptococcus pneumoniae PRSP • Streptococcus pyogenes (Strep) • Avian Influenza A Virus (H1N1) A/Malaysia/302/54\*\*\* • Avian Influenza A Virus (H2N2) • Avian Influenza A Virus (H5N1) • Coxsackie Type B3 Virus (Hand, Foot and Mouth Disease) • Cyromegalovirus • Duck Hepatitis B Virus • Hantavirus • Hepatitis C Virus (HCV) • EBV - surrogate • Herpes Simplex Virus Type 1 • Herpes Simplex Virus Type 2 • Human Coronavirus • Influenza A Virus (New Caledonia/20/99) • Influenza B Virus (Strain B/Hong Kong/572) •

**10 minute contact time:** Acinetobacter baumannii • Adenovirus 2 • Enterococcus faecalis - Vancomycin Resistant (VRE) ATCC No. 51299 • Feline Calicivirus (Norovirus (Stomach Flu)) • Fusarium solani • Hepatitis A Virus • Listeria monocytogenes ATCC No. 19115 • Mycobacterium bovis BCG (Quant tuberculosis) • Penicillium chrysogenum ATCC No. 9178 • Salmonella enterica serovar paratyphi B

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This product meets AODAC Germicidal Spray Product Test standards for hospital aerosol disinfectants. GERMICIDAL, FUNGICIDAL, TUBERCULOCIDAL, VIRUCIDAL† Kills the source of mold allergens.†† This product deodorizes by killing bacteria that cause odors. Ordinary, non-germicidal sprays can't do this.

**Intended for use only in:**

• Ambulances	• Clinics	• Dental Offices	• Hotel/Motel	• Nurseries	• Physicians Offices	• Schools
• Blood Banks	• Colleges	• Health Clubs	• Laboratories	• Nursing Homes	• Restaurants	• Veterinary Offices
• Cafeterias	• Day Care Centers	• Hospitals	• Military Installations	• Pharmacies	• Restrooms	• Waiting Rooms

This product disinfects and sanitizes the following surfaces:

• Bathroom surfaces	• Door handles	• Floors	• Patient Chairs	• Shower Areas	• Telephones
• Bed Frames	• Dressing parts	• Faucets	• Plastic Toys	• Sinks	• Windowsills
• Counters	• Drinking Fountains	• Glazed Porcelain	• Portable Toilets	• Sports Equipment	• Wheelchairs
• Changing Tables	• Examination tables	• Linen carts	• Salad Bar Sneeze Guards	• Stainless Steel*	• Whirlpool Interior

† Follow directions for Toys under Directions for Use - rinsing application required. \*Non-Medical or Fixture

This product is not for use on critical & semi-critical medical devices or medical equipment surfaces.

**KILLS HUMAN IMMUNODEFICIENCY VIRUS TYPE 1 (HIV-1) (AIDS VIRUS) AND Hepatitis B Virus (HBV) ON PRE-CLEANED ENVIRONMENTAL SURFACES PREVIOUSLY SOILED WITH BLOOD/BODY FLUIDS** in health care settings or other settings in which there is an expected likelihood of soiling of inanimate surfaces/objects with blood or body fluids; and in which the surfaces/objects likely to be soiled with blood or body fluids can be associated with the potential for transmission of HIV-1 (associated with AIDS) and Hepatitis B Virus (HBV).

**SPECIAL INSTRUCTIONS FOR CLEANING AND DECONTAMINATING SURFACES PREVIOUSLY SOILED WITH BLOOD/BODY FLUIDS:**

• **CONTACT TIME:** Allow surface/object to remain wet for 30 seconds for HIV-1 and HBV. For other organisms, surfaces must remain wet for 3 minutes. For Norovirus and Mycobacterium bovis BCG (Quant tuberculosis) surfaces must remain wet for 10 minutes.

**DISPOSAL OF INFECTIOUS MATERIALS:** Blood and other body fluids must be absorbed and disposed of according to local regulations for infectious waste disposal.





## Disinfectants and Understanding Their Labels

fluids can be associated with the potential for transmission of HIV-1 (associated with AIDS) and Hepatitis B Virus (HBV).

### **SPECIAL INSTRUCTIONS FOR CLEANING AND DECONTAMINATION AGAINST HIV-1 AND HBV ON SURFACES/OBJECTS SOILED WITH BLOOD/ BODY FLUIDS:**

- **PERSONAL PROTECTION:** When handling items soiled with blood or body fluids, use disposable latex gloves, gowns, masks and eye coverings.
- **CLEANING PROCEDURES:** Blood and other body fluids must be thoroughly cleaned from surfaces and objects before application of this product.
- **CONTACT TIME:** Allow surface/object to remain wet for 30 seconds for HIV-1 and HBV. For other organisms, surfaces must remain wet for 3 minutes. For Norovirus and Mycobacterium bovis BCG (Quant tuberculosis) surfaces must remain wet for 10 minutes.
- **DISPOSAL OF INFECTIOUS MATERIALS:** Blood and other body fluids must be autoclaved and disposed of according to local regulations for infectious waste disposal.

**DIRECTIONS FOR USE:** It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Read the entire label before using the product. Pre-clean surfaces prior to use. Hold can upright 6" to 8" from surface. Spray 3 to 4 seconds until covered with mist.

- **To Deodorize:** Spray on surfaces as needed.
- **To Sanitize:** Surfaces must remain wet for 10 seconds then allow to air dry.
- **To Disinfect:** Surfaces must remain wet for 3 minutes then allow to air dry. For Norovirus and Mycobacterium bovis BCG (Quant tuberculosis) surfaces must remain wet for 10 minutes then allow to air dry.
- **Rinse toys and food contact surfaces with potable water after use.**
- **For Tuberculocidal activity,** this product is effective in 10 minutes at 20°C (68°F) on surfaces that have been thoroughly cleaned prior to application.
- **To Control and Prevent Mold & Mildew:** Apply to pre-cleaned surface. Allow to remain wet for 3 minutes. Let air dry. Repeat applications in weekly intervals or when mold and mildew growth appears.

Do not use on polished wood, painted surfaces, leather, rayon fabrics, or acrylic plastics.



# Disinfectants and Understanding Their Labels

## PRECAUTIONARY STATEMENTS HAZARDS TO HUMANS AND DOMESTIC ANIMALS.

**WARNING:** Causes substantial but temporary eye injury. Do not get in eyes or on clothing. Harmful if absorbed through skin. Harmful if inhaled. Avoid contact with skin. Avoid breathing vapor or spray mist. Wear goggles or face shield, long sleeved shirt, long pants, socks, shoes and chemical-resistant gloves made of any waterproof material. Remove and wash contaminated clothing before reuse. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco or using the toilet.

## ENVIRONMENTAL HAZARDS

\* This product is toxic to fish and aquatic invertebrates. Do not apply directly to water, or to areas where surface water is present, or to inter-tidal areas below the mean high water mark. See Directions for Use for additional precautions and requirements.

## PHYSICAL OR CHEMICAL HAZARDS

Flammable. Keep away from heat and open flame.

## PERSONAL PROTECTIVE EQUIPMENT (PPE)

- Some materials that are chemically-resistant to this product are barrier laminate, butyl, nitrile, neoprene, polyvinyl chloride (PVC), or Viton. For more options, follow the instructions for category C on the chemical resistant category chart.
- Applicators and other handlers must wear: Long sleeve shirts and long pants and shoes plus socks.

## USER SAFETY REQUIREMENTS

- Follow manufacturer's instructions for cleaning /maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.
- Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them.

## USER SAFETY RECOMMENDATIONS

- User should wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- User should remove clothing PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Users should remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon



## Disinfectants and Understanding Their Labels

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- EPA List N Disinfectants for Coronavirus (COVID-19)
  - <https://www.epa.gov/pesticide-registration/list-n-advanced-search-page-disinfectants-coronavirus-covid-19/>
- EPA Pesticide Product Label System (PPLS)
  - : <https://iaspub.epa.gov/apex/pesticides/f?p=PPLS:1>
- NPIC Product Research Online (NPRO)
  - <http://npic.orst.edu/NPRO>
- EPA Design for the Environment (Antimicrobials)
  - <https://www.epa.gov/pesticide-labels/design-environment-logo-antimicrobial-pesticide-products>

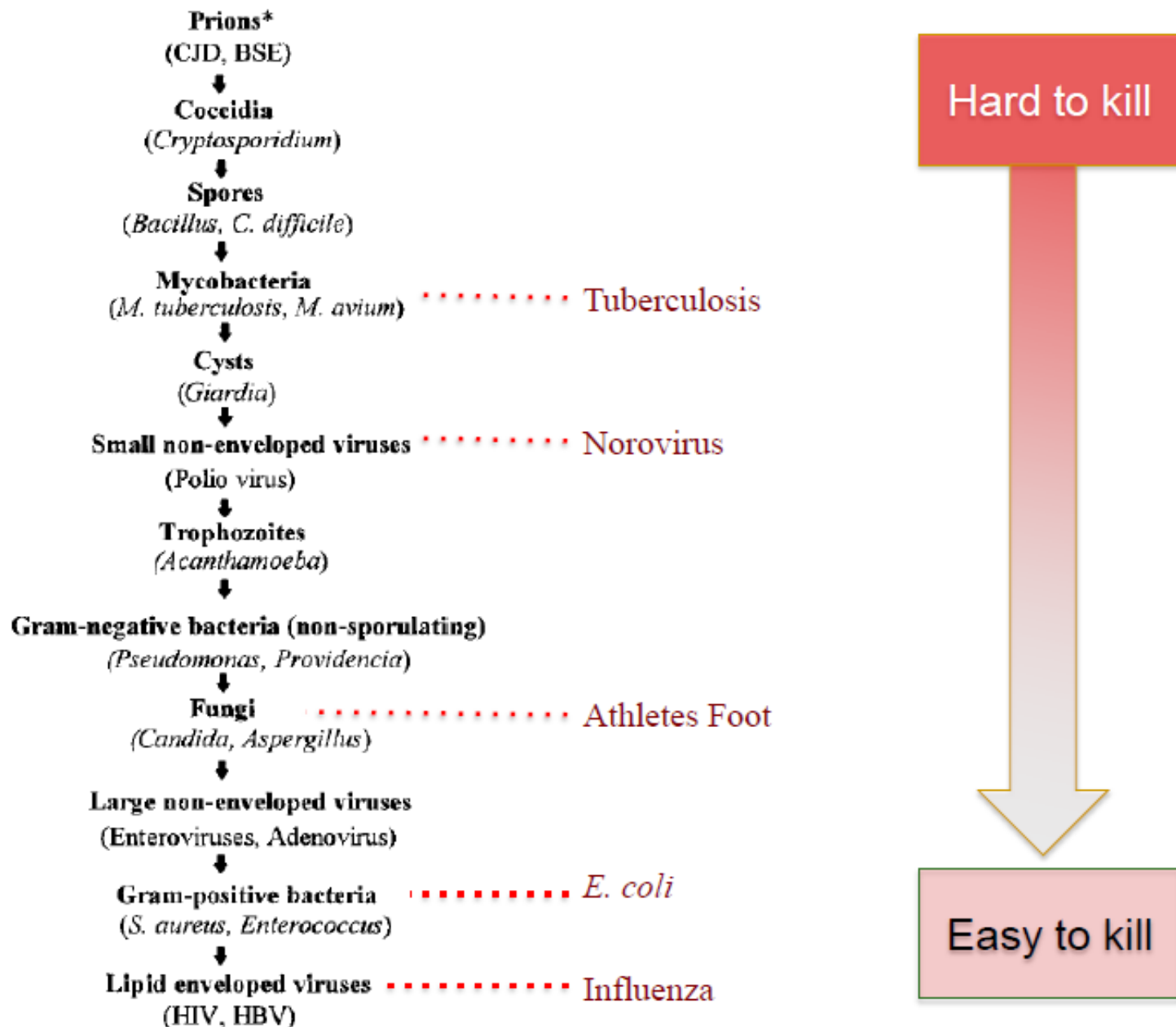


FIG. 1. Descending order of resistance to antiseptics and disinfectants. The asterisk indicates that the conclusions are not yet universally agreed upon.



# Characteristics of Selected Disinfectants

FOR MORE INFORMATION, SEE THE 'DISINFECTION 101' DOCUMENT AT [www.cfsph.iastate.edu](http://www.cfsph.iastate.edu)

Disinfectant Category	Alcohols	Aldehydes	Biguanides	Halogens: Hypochlorites	Halogens: Iodine Compounds	Oxidizing Agents	Phenols	Quaternary Ammonium Compounds (QAC)
Sample Trade Names	Ethyl alcohol Isopropyl alcohol	Formaldehyde Glutaraldehyde	Chlorhexidine Nolvasan® Virosan®	Bleach	Betadine® Providone®	Hydrogen peroxide Peracetic acid Virkon S® Oxy-Sept 333®	One-Stroke Environ® Pheno-Tek II® Tek-Trol®	Roccal® Diquat® D-256®
Mechanism of Action	•Precipitates proteins •Denatures lipids	•Denatures proteins •Alkylates nucleic acids	•Alters membrane permeability	•Denatures proteins	•Denatures proteins	•Denature proteins and lipids	• Denatures proteins • Alters cell wall permeability	• Denatures proteins • Binds phospholipids of cell membrane
Advantages	•Fast acting •Leaves no residue	•Broad spectrum	•Broad spectrum	•Broad spectrum •Short contact time •Inexpensive	•Stable in storage •Relatively safe	•Broad spectrum	• Good efficacy with organic material • Non-corrosive • Stable in storage	• Stable in storage • Non-irritating to skin • Effective at high temperatures and high pH (9-10)
Disadvantages	•Rapid evaporation •Flammable	•Carcinogenic •Mucous membranes and tissue irritation •Only use in well ventilated areas	•Only functions in limited pH range (5-7) •Toxic to fish (environmental concern)	•Inactivated by sunlight •Requires frequent application •Corrodes metals •Mucous membrane and tissue irritation	•Inactivated by QACs •Requires frequent application •Corrosive •Stains clothes and treated surfaces	•Damaging to some metals	• Can cause skin and eye irritation	
Precautions	Flammable	Carcinogenic		Never mix with acids; toxic chlorine gas will be released			May be toxic to animals, especially cats and pigs	
Vegetative Bacteria	Effective	Effective	Effective	Effective	Effective	Effective	Effective	YES—Gram Positive Limited—Gram Negative
Mycobacteria	Effective	Effective	Variable	Effective	Limited	Effective	Variable	Variable
Enveloped Viruses	Effective	Effective	Limited	Effective	Effective	Effective	Effective	Variable
Non-enveloped Viruses	Variable	Effective	Limited	Effective	Limited	Effective	Variable	Not Effective
Spores	Not Effective	Effective	Not Effective	Variable	Limited	Variable	Not Effective	Not Effective
Fungi	Effective	Effective	Limited	Effective	Effective	Variable	Variable	Variable
Efficacy with Organic Matter	Reduced	Reduced	?	Rapidly reduced	Rapidly reduced	Variable	Effective	Inactivated
Efficacy with Hard Water	?	Reduced	?	Effective	?	?	Effective	Inactivated
Efficacy with Soap/Detergents	?	Reduced	Inactivated	Inactivated	Effective	?	Effective	Inactivated

? Information not found

DISCLAIMER: The use of trade names does not in any way signify endorsement of a particular product.

For additional product names, please consult the most recent Compendium of Veterinary Products.

REFERENCES: Linton AH, Hugo WB, Russel AD. Disinfection in Veterinary and Farm Practice. 1987. Blackwell Scientific Publications; Oxford, England;

Quinn PJ, Markey BK. Disinfection and Disease Prevention in Veterinary Medicine, In: Block SS, ed., Disinfection, Sterilization and Preservation.

5th edition. 2001. Lippincott, Williams and Wilkins: Philadelphia.

# Safer Products and Practices for Disinfecting and Sanitizing Surfaces

San Francisco Department of the Environment 2014

**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 SENSITI-ZATION	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



# 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

# Disinfectants

## Asthma-Safer Ingredients

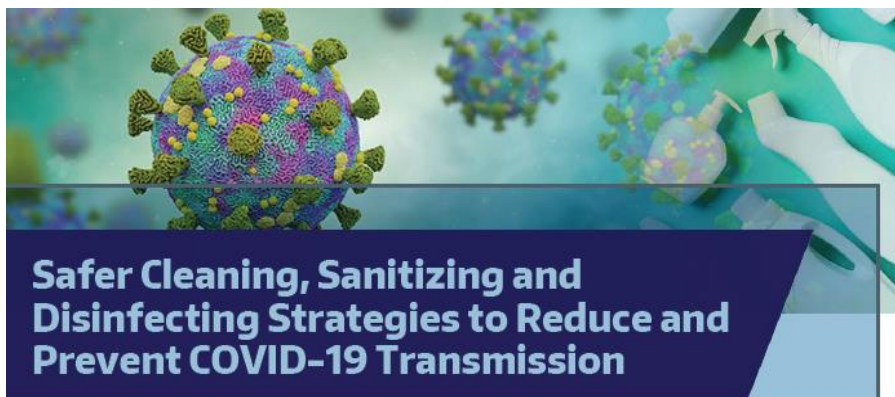
- **Hydrogen Peroxide**
- Lactic Acid
- Citric Acid
- **Alcohol-ethyl alcohol, isopropyl alcohol**

## Ingredients that may Cause Asthma

- **Quaternary ammonium compounds** include alkyl dimethyl benzyl ammonium chloride, benzalkonium chloride, lauryl dimethyl benzyl ammonium chloride, didecyl dimethyl ammonium chloride
- **Bleach** (sodium hypochlorite)
- **Acetic acid** (found in vinegar)
- **Thymol** (skin sensitizer, suspected asthmagen)
- Glutaraldehyde
- **Peracetic acid** (peroxyacetic acid)



# Resources - Safer Disinfectants



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®, Ecolabel® 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.





# Bleach

- Disinfectant, NOT a cleaner
- Make a fresh solution daily
- Never mix with ammonia or acid products
- Use gloves, ventilation, eye protection
- Emergency Eye Wash
  - DOSH Directive 13.0 July 15, 2011



<http://www.ini.wa.gov/Safety/Rules/Policies/PDFs/DD1300.pdf>

# Chlorine Chemistry

**$XCl + H_2O \rightarrow HOCl + \text{By-product}$**  (specific to the type of chlorine)

$HOCl$  (hypochlorous acid)  $\xrightarrow{\text{pH}}$   $H^+ + OCl^-$  (hypochlorite ion)

$HOCl + OCl^- = \text{Free Chlorine} \rightarrow \text{Active Available Disinfectants}$

At pH 6.0: ~97%  $HOCl$

pH 7.5: ~50% of each

pH 8.5: ~9%  $HOCl$

$HOCl$  ~60x-100x more effective  
than  $OCl^-$  at killing microorganisms

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

$NaOCl + H_2O \rightarrow HOCl + Na^+ + OH^-$  (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

# 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

- Use the proper concentration of disinfectant.
- 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.

# Thymol (Botanical) Disinfectant

- Each day between 11:15-12:30 or so, the building is fogged with BioEsque Solutions by two people using a green “gun” that emits a fog of the chemical into the air.
- Staff members walk down the hallways fogging and enter/fog classrooms as they move forward.
- Sometimes staff members have been unable to get out of the fogging areas in time and have been exposed to the spray
- At or around 6:00 pm, the building is again fogged with disinfectant.
- Absorbed onto carpet/walls/soft surfaces – off-gas
- Headaches
- Respiratory symptoms
- Shortness of breath
- Tingling/numbness - tongue



# Thymol

- *Danger!* According to the **harmonized classification and labelling** (CLP00) approved by the European Union, this substance causes severe skin burns and eye damage, is toxic to aquatic life with long lasting effects and is harmful if swallowed.
- **Additionally**, the classification provided by companies to ECHA in **REACH registrations** identifies that this substance causes serious eye irritation and causes skin irritation.
- <https://echa.europa.eu/substance-information/-/substanceinfo/100.001.768>
- The product is only approved “TO CLEAN via fogging.” If a distributor product is making claims that this product is effective as a disinfectant via fogging, then the claims are different than what the Agency has approved on the primary product’s label. If a customer opts to apply this product via fogging, then the surfaces must be clean/disinfected after as the label directs to ensure that microorganisms listed on the label are mitigated.

# 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



# No Spraying/Fogging Chemicals Into the Air



# electrostatic sprayers

- 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. [EPA is expediting review](#) of products to include new application methods such as electrostatic spray.
- 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.
- They are going to be violating law and causing asthma, skin, eye, and respiratory irritation, wasting toxic chemicals and not reducing the transmission of COVID with indiscriminate spraying.

# surface coatings

- Tape apparently imbedded with nanosilver
- “patented, environmentally user-friendly, transparent, multifunctional, flexible coating” of silver, tantalum, and zirconium nanoparticles - liquid precursor that “could be applied in ambient conditions and hardens without the need for external heating or curing procedures.”
- Copper
- DOH/EPA/CDC are not recommending – though EPA might investigate further. **These coatings do not eliminate the need for cleaning and disinfection with EPA approved products for high touch surfaces in doors.**
- Issues:
  - No reason to think they will effect transmission
  - Dirt/oils will protect organisms
  - Surfaces shouldn't be assumed to be sterile
  - Outdoors is not a good environment for viruses
  - No third party independent certification that they will actually make a difference in transmission.
  - Potential long-term human health or environmental consequences
  - Will the chemicals come off on skin or hands, be ingested, or accumulate in the environment?



# 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!
- Clean first
- Required wet time

## Bus Transportation

There are several guidelines to prevent COVID during school transportation.

- Keep riders as far apart as possible on the bus. Consider how to reduce occupancy and increase space on the bus through scheduling and using additional busses.
  - Require assigned seating.
  - If possible, seat students with household members or members of their school group/cohort.
  - Maximize outside air flow and keep windows open as much as possible.
  - Encourage walking or biking where safe.
  - Have caregivers drive students to school, if possible.
  - Riders and staff members must wear a cloth face coverings or acceptable alternatives.
  - Encourage students to wash or sanitize hands when they leave their home or classroom immediately before boarding the bus.
  - Clean and disinfect frequently touched surfaces, including the tops and backs of seats. Use an EPA registered product and follow the manufacturer's instructions for use.
-

# Cleaning and/or Disinfecting ?

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



# Restrooms

- Clean/disinfect bathroom at least daily.
- Soap and paper towel dispensers full.
- Tempered (85°-105°F) water.
- WAC 246-366-060: “Adequate, conveniently located toilet and handwashing facilities shall be provided for students and employees.”

# Outdoor Areas

- Outdoor areas, like playgrounds in schools and parks, generally require normal routine cleaning, but do not require disinfection.
  - Do not spray disinfectant on outdoor playgrounds—it is not an efficient use of supplies and is not proven to reduce risk of COVID-19 to the public.
  - High-touch surfaces made of plastic or metal, such as grab bars and railings, should be cleaned routinely.
  - Cleaning and disinfection of wooden surfaces (play structures, benches, tables) or groundcovers (mulch, sand) is not recommended.



# Water Systems

- CDC: To minimize the risk of [Legionnaire's disease](#) and other diseases associated with water, [take steps](#) to ensure that all water systems and features (e.g., sink faucets, drinking fountains, decorative fountains) are safe to use after a prolonged facility shutdown. Drinking fountains should be cleaned and sanitized, but encourage staff and students to bring their own water to minimize use and touching of water fountains.

DOH: [Safe Cleaning and Disinfection Guidance for Public Spaces \(PDF\)](#)

- Public drinking fountains and bottle fillers  
Clean and disinfect the button or lever. Public drinking water supplies are safe. Clean and disinfect surfaces and buttons. Consider posting signage that includes:
  - Do not place your mouth on the spout of the fountain or allow your water bottle to contact the nozzle when refilling.
  - Allow water to flow for 10 seconds to allow fresh, clean water to come through prior to drinking.
  - If the fountain has a button or lever, clean before and after use, or use your elbow. Wash or sanitize your hands after use.
- **Prior to re-occupancy follow DOH/CDC building flushing guidance. Flush all emergency showers and eye washes.**

# Say NO....

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



# Indoor Air Quality Principals

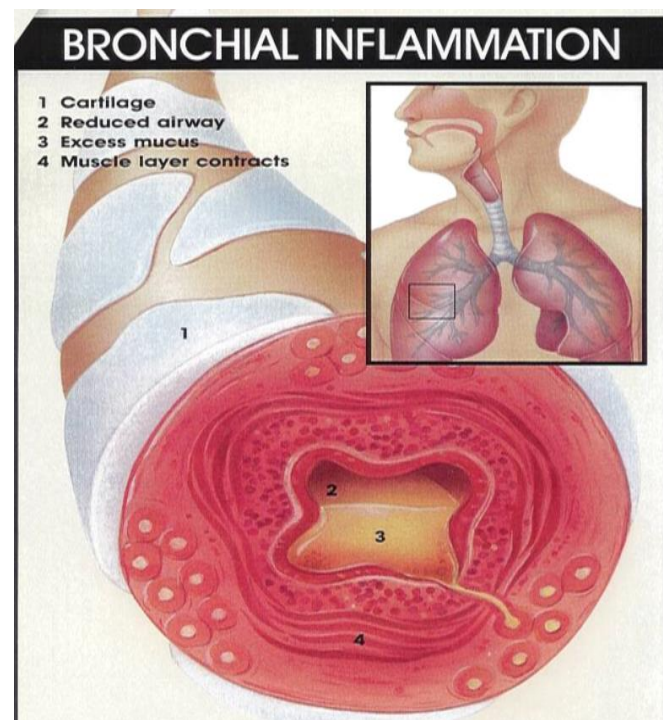
- **Source Control**
- **Ventilation**
- “If there is a pile of manure in the room, do not try to remove the odor by ventilation. Remove the pile of manure.”

Max Joseph Von Pettenkofer, 1818-1901



# Control Asthma Triggers

- Door mats
- Avoid clutter / cleanable surfaces
- Limit hanging items/ T-bar clips
- Vinyl/leather furniture
- Animals
- Food storage
- Water based/low VOC markers
- No fragranced products
- No chemicals from home
- Premixed clay
- Carpet cleaning
- Wash stuffed toys in hot water every 2 weeks



# IAQ Research

Reported ventilation and CO<sub>2</sub> data strongly indicate that ventilation is inadequate in many classrooms, possibly leading to health symptoms. Adequate ventilation should be a major focus of design or remediation efforts.

*Indoor air quality, ventilation and health symptoms in schools:  
An analysis of existing information* (Daisey, JM, Angell, WJ, Apte, MG, Indoor Air  
2003;13;53-64.

There is evidence that low ventilation rates and other building characteristics can lead to increased incidence of respiratory diseases caused by viruses (Brundage et al., 1988; Fisk, 2001).



# Outside Air

- Increased Ventilation – Increased Achievement
- Work performance may be improved from a few percent to possibly as much as 10% by providing superior indoor environmental quality (IEQ).
- The economic benefits of the work performance improvements will often far outweigh the costs of providing better IEQ.

Lawrence Berkeley National Laboratories

<https://www.iaqscience.lbl.gov/performance-summary>

# Ventilation and School Performance

Increases in classroom ventilation rates up to approximately **20 cfm per student** are associated with improvements in student performance of a few to several percent, with the magnitude of improvement depending on the initial ventilation rate.

Increases of ventilation rates up to approximately **15 cfm per student** are associated with a higher proportion of students passing standardized reading and math tests.

Lawrence Berkeley National Labs Indoor Air Quality Scientific Finding Resource Bank  
<https://www.iaqscience.lbl.gov/performance-summary>

# Ventilation & Air Quality for Reducing Transmission of COVID-19

- <https://www.doh.wa.gov/Portals/1/Documents/1600/coronavirus/VentilationGuidance.pdf> October 27, 2020

The main goal in reducing airborne transmission of viruses is to decrease the number of viral particles that accumulate in indoor air, by increasing the intake of outdoor air as much as possible and/or through effective air filtration. However, **ventilation and air filtration are not effective alone** – they are tools that must be used along with other measures such as health screenings, physical distancing, reducing building occupancy, frequent hand washing, wearing face coverings, and implementing **appropriate** cleaning and disinfection protocols. Additionally, when there are high levels of outside air pollution, such as during a wildfire smoke event, outside air intakes will need to be modified as necessary.

# Ventilation and COVID

- Testing and balancing and setting up the current system to perform to the best of its capabilities for full occupancy.
- Setting up air distribution system to serve a fully occupied building in essence, will provide fewer people with more air volume. This serves the function of "increasing ventilation" without overtaxing the system because it's delivering the volume of air that it was designed to deliver in a fully occupied building.
- Maximize outside air
- Monitor CO<sub>2</sub> – keep below ~700 - 800 ppm if possible
- Increase filtration – MERV 13+ **if possible**
- Reduce recirculated air
- Exhaust especially the bathrooms, nurses, science, CTE, arts (this isn't new)
- Portable HEPA filter air purifiers in the nurse's office/isolation room

# Filtration

- ASHRAE Filter Rating of MERV **13+**
  - prefilter
- Deepest pleat possible – less resistance
- Tight fit – NO LEAKS
- Change as needed
- Not just to protect the unit – **Filter the outside air!**
- Reduce classroom clutter/furnishings
- Entry mats – cleaned regularly
- Vacuums with HEPA filters

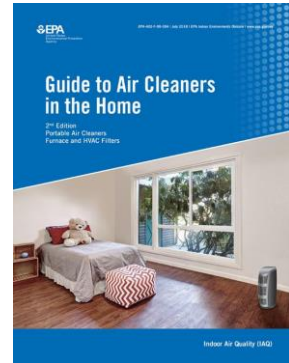
White Paper Proposed Ventilation & Energy Efficiency  
Verification/Repair Program for School Reopening.  
NEMI/UCDavis Energy & Efficiency Institute 6.4.2020



# EPA

- Summary Do no harm. Good ventilation is good practice. Excellent time to check system, review O&M practice (Schoen 2020 and ASHRAE guidance):  
<https://www.ashrae.org/technical-resources/resources>
- 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.
- webinar *Let's Clear the Air: Using Ventilation Practices to Promote Healthy IAQ in Schools* - operating and maintaining efficient HVAC systems to provide clean and healthy air in schools.

# Portable Air Cleaners



- Portable **HEPA** Filter / Charcoal Air Cleaners
  - California Air Resources Board Certified
    - **No ozone**
    - <https://ww2.arb.ca.gov/our-work/programs/air-cleaners-ozone-products/air-cleaner-information-consumers>
  - Size – Clean Air Delivery Rate (CADR)
    - 5-6+ air changes/hour
  - Spec for quiet
  - **Oversize so they can be run on low fan setting**
  - **No ionization, electrostatic precipitators, plasma, UV, etc. – keep it simple.**
- EPA Wildfire Smoke Factsheet – Indoor Air Filtration
  - [https://www.epa.gov/sites/production/files/2018-11/documents/indoor air filtration factsheet-508.pdf](https://www.epa.gov/sites/production/files/2018-11/documents/indoor_air_filtration_factsheet-508.pdf)
- EPA Air Cleaners and Air Filters in the Home
  - <https://www.epa.gov/indoor-air-quality-iaq/air-cleaners-and-air-filters-home>

# Installing air filters in classrooms has surprisingly large educational benefits

\$1,000 can raise a class's test scores by as much as cutting class size by a third.

By [Matthew Yglesias@mattyglesiasmatt@vox.com](mailto:Matthew.Yglesias@mattyglesiasmatt@vox.com) Jan 8, 2020, 1:30pm EST

An emergency situation that turned out to be mostly a false alarm led a lot of schools in Los Angeles to install air filters, and something strange happened: Test scores went up. By a lot. And the gains were sustained in the subsequent year rather than fading away.

NYU's Michael Gilraine "[Air Filters, Pollution, and Student Achievement](#)" that looks at the surprising consequences of [the Aliso Canyon gas leak](#) in 2015.

The impact of the air filters is strikingly large given what a simple change we're talking about. The school district didn't reengineer the school buildings or make dramatic education reforms; they just installed \$700 commercially available filters that you could plug into any room in the country. But it's consistent with a [growing literature on the cognitive impact of air pollution](#), which finds that everyone from [chess players](#) to [baseball umpires](#) to [workers in a pear-packing factory](#) suffer deteriorations in performance when the air is more polluted.

# 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, limonene, **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/>



# 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

American Lung Association **Sample Fragrance-Free School Policy**

<http://www.healthyschools.org/documents/fragrance-free-policy-sample-updated.pdf>

# 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

# 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 \(PDF\)](http://www.energy.wsu.edu/Portals/0/Documents/Good_Ventilation_is_Essential.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 \(PDF\)](http://www.energy.wsu.edu/Portals/0/Documents/Measuring_CO2_Inside_Buildings-Jan2013.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](http://www.hazwastehelp.org/publications/publications_detail.aspx?DocID=z%2F7o%2f2BLUUM%3d) ([www.hazwastehelp.org/publications/publications\\_detail.aspx?DocID=z%2F7o%2f2BLUUM%3d](http://www.hazwastehelp.org/publications/publications_detail.aspx?DocID=z%2F7o%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](http://www.doh.wa.gov/schoolenvironment) ([www.doh.wa.gov/schoolenvironment](http://www.doh.wa.gov/schoolenvironment))
- [School Indoor Air Quality Best Management Practices Manual, 2003 \(PDF\)](http://www.doh.wa.gov/Documents/Pubs/333-044.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/) (<http://schoolipm.wsu.edu/>)
- [Creating Healthy Indoor Environments in Schools, EPA](http://www.epa.gov/iaq/schools/index.html) ([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://www.waasthma.org/wp-content/uploads/2014/05/AMES2014Final.pdf) (<http://www.waasthma.org/wp-content/uploads/2014/05/AMES2014Final.pdf>)
- [Art Hazards, King County Local Hazardous Waste Management Program](http://www.hazwastehelp.org/ChemToxPesticides/artchemicals.aspx) (<http://www.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

- 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\\_0.pdf](https://osha.washington.edu/sites/default/files/documents/Updated%20Safer%20Disinfectants%20List_March%2026%2C%202020_0.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 2010*  
[https://portal.ct.gov/-/media/Departments-and-Agencies/DPH/dph/environmental\\_health/eoha/pdf/CleaningforHealthierSchoolsFINAL2411.pdf.pdf?la=en](https://portal.ct.gov/-/media/Departments-and-Agencies/DPH/dph/environmental_health/eoha/pdf/CleaningforHealthierSchoolsFINAL2411.pdf.pdf?la=en)
- Informed Green Solutions  
<http://www.informedgreensolutions.org/>
- 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)



# THANK YOU!

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**Resources available:**

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

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