

Environmental Health & Infection Control in Schools

The Project

Contracted with the VDH to assist schools through the following activities to prevent harmful chemical exposures and address the causes and management of asthma.

- Conduct environmental assessments
- Promote plans & policies to reduce environmental impacts
- Increase knowledge to reduce Covid-19 transmission
- Promote best practices for safe cleaning, sanitizing & disinfecting

Informed Green Solutions

Trainings & Technical Assistance

- Backgrounds:
 - 30+ years experience in K-12 & childcare
 - Administered VOSHA programs
 - Civil Service Haz-Mat/Environmental Compliance
- Pioneered Cleaning for Health Program throughout the NE
- Worked with:
 - 150+ VT K-12 schools
 - Hospitals
 - Colleges & universities
 - Elder Care
 - Childcare

Vermont Law

Vermont's 2012 Act 68 requires cleaning products* provided or sold to K-12 schools be 3rd-party-certified as safer. Training by vendors mandated.

Available through the state contracts with the Department of Buildings & General Services or directly from vendors

Third-party certifiers:
EPA Safer Choice
Green Seal
UL ECOLOGO®

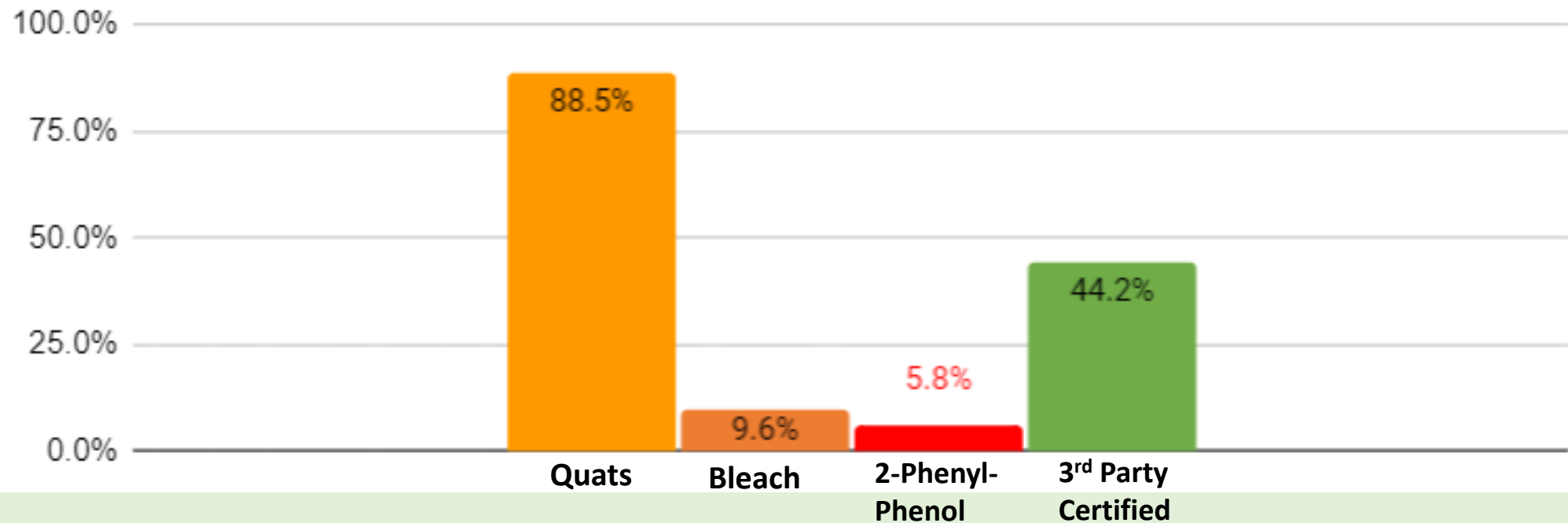


* General purpose cleaners, bathroom cleaners, glass cleaners, carpet cleaners, floor care products, air fresheners, & hand soaps.

Vermont Trends 2022

Conventional Air Freshener	3PC Air Freshener	Conventional All Purp Cleaner	3PC All Purp Cleaner	Conventional Glass Clean	3PC Glass Cleaner	Conventional Bath Room Cleaner	3PC Bath Room Cleaner	Conventional Carpet Cleaner	3PC Carpet Cleaner	Conventional Floor Care	3PC Floor Care	Conventional Hand Soap	3PC Hand Soap
19	2	13	47	21	33	36	38	24	16	39	38	17	42
36.5%	3.8%	25.0%	90.4%	40.4%	63.5%	69.2%	73.1%	46.2%	30.8%	75.0%	73.1%	32.7%	80.8%

Disinfectants Found in VT K-12 2022



Vermont Resources

Vermont's [Envision Program](#) provides tools and supports to improve the

ENVISION PROGRAM: PROMOTING HEALTHY SCHOOL ENVIRONMENTS



Poor indoor air quality in schools has been linked to decreased student and teacher performance and increased absenteeism. Poor indoor air quality can also result in acute symptoms such as eye, nose and throat irritation, headache, nausea, lethargy and chronic conditions—such as asthma and allergies. The *Envision Program – Promoting Healthy School Environments* was created by the Legislature in 2000 as part of the School Environmental Health Act (Act 125) to address indoor air quality issues by providing model environmental health management plans, policies and guidance to schools.

The [School Environmental Health Act 125](#) was passed into law with goals to improve school indoor air quality, reduce hazardous exposures, and help schools earn the [Envision Certificate of Achievement](#).

› [Learn more about Act 125](#)

From unblocking air vents to limiting the use of disinfecting wipes, you can take simple steps to make your school healthier. Check out the video below and learn how to inspect your school building to identify potential environmental health issues. Then scroll down to find important resources about the Envision Program and how to address indoor air quality and environmental health in your school.

environmental health in K-12 schools often at little or no cost.

COVID-19

SARS-CoV-2, the virus that causes COVID-19, is primarily transmitted via airborne droplets and aerosols.

The risk of getting COVID-19 from surfaces is about 1 in 10,000.

Cleaning surfaces, including high touch surfaces, using soap or detergent, **instead of disinfecting**, is enough to reduce risk in most situations. ~CDC



COVID-19

Disinfection is recommended in indoor settings where there has been a suspected or confirmed case of COVID-19 within the last 24 hours.

Cleaning and disinfection products (including wipes) should not be used by children or near children. Disinfectants should only be used in accordance with the label, including contact time, rinsing, and room occupation.

Ventilation

Building ventilation is the most effective way to remove SARS-CoV-2 particles from the air.

- Filtration
 - MERV
 - Filter change schedule
- Air changes per hour



Ventilation

Portable Air Cleaners with HEPA filters can be 99% effective in removing viruses & asthma triggers. Avoid those that emit ozone.

- California Air Resources Board [approved machines](#)
- Air cleaners certified by the [Association of Home Appliance Manufacturers](#).
- Harvard – CU [Portable Air Cleaner Calculator](#)



Look for an AHAM certification stamp on the air cleaner, check the Clean Air Delivery Rate (CADR) and the room size the unit can filter.

Breaking the Chain of Infection - Cleaning



Essential to infection control: uses water, detergent and abrasion.

- Removes most germs & conditions they need to survive (e.g. dirt, moisture).
- Helps break down the outer lipid/fat shell of viruses like SARS-CoV-2.
- Prepares the surface for disinfecting.

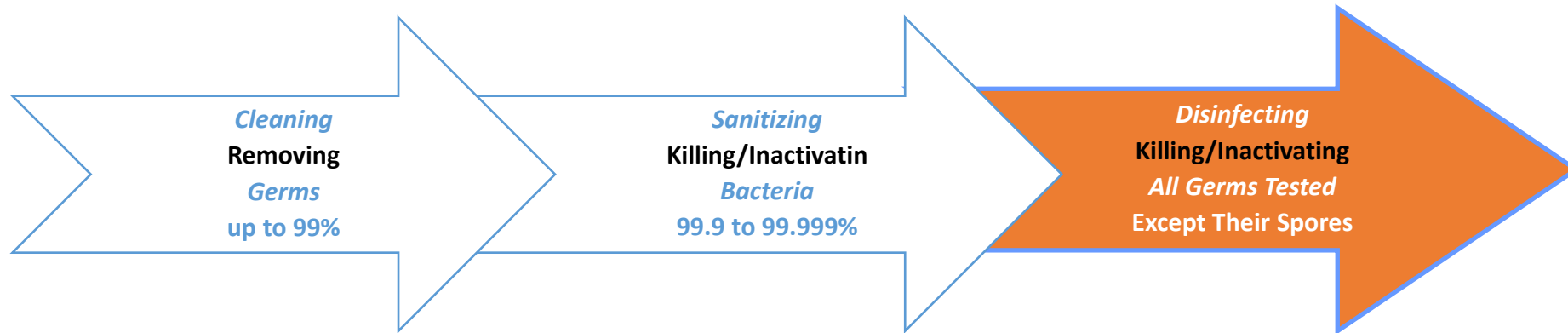
Breaking the Chain of Infection - Sanitizing



For use on food contact surfaces:

- Counters, tables/desks used for eating, dishes, cooking utensils
- COVID-19 is caused by a virus, and sanitizers only work on bacteria.
- Some products are approved to be both a sanitizer and disinfectant at different concentrations and contact times.

Breaking the Chain of Infection - Disinfecting



Registered pesticides designed to kill organisms

- Use on hard nonporous surfaces such as door handles, tables, and other high-touch areas. Requires cleaning first and possibly rinsing surface after disinfecting!
- Choose no-rinse disinfectants with short contact times and safer ingredients.

Why Use 3rd Party Certified Products

Ingredients in common cleaning, sanitizing & disinfecting products are linked to:

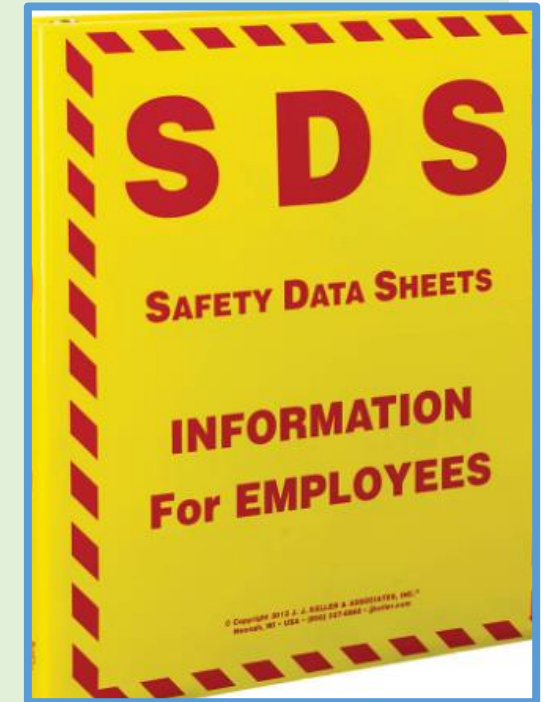
- Asthma & asthma episodes
- Brain, nervous system, reproductive organ, kidney, & liver damage
- Eye irritation & headaches
- Breathing problems & illnesses
- Hormone disruption or mimicking
- Cancer



Safety Data Sheets (SDS) Are Not Enough

A 2022 study of 650 SDS's found:

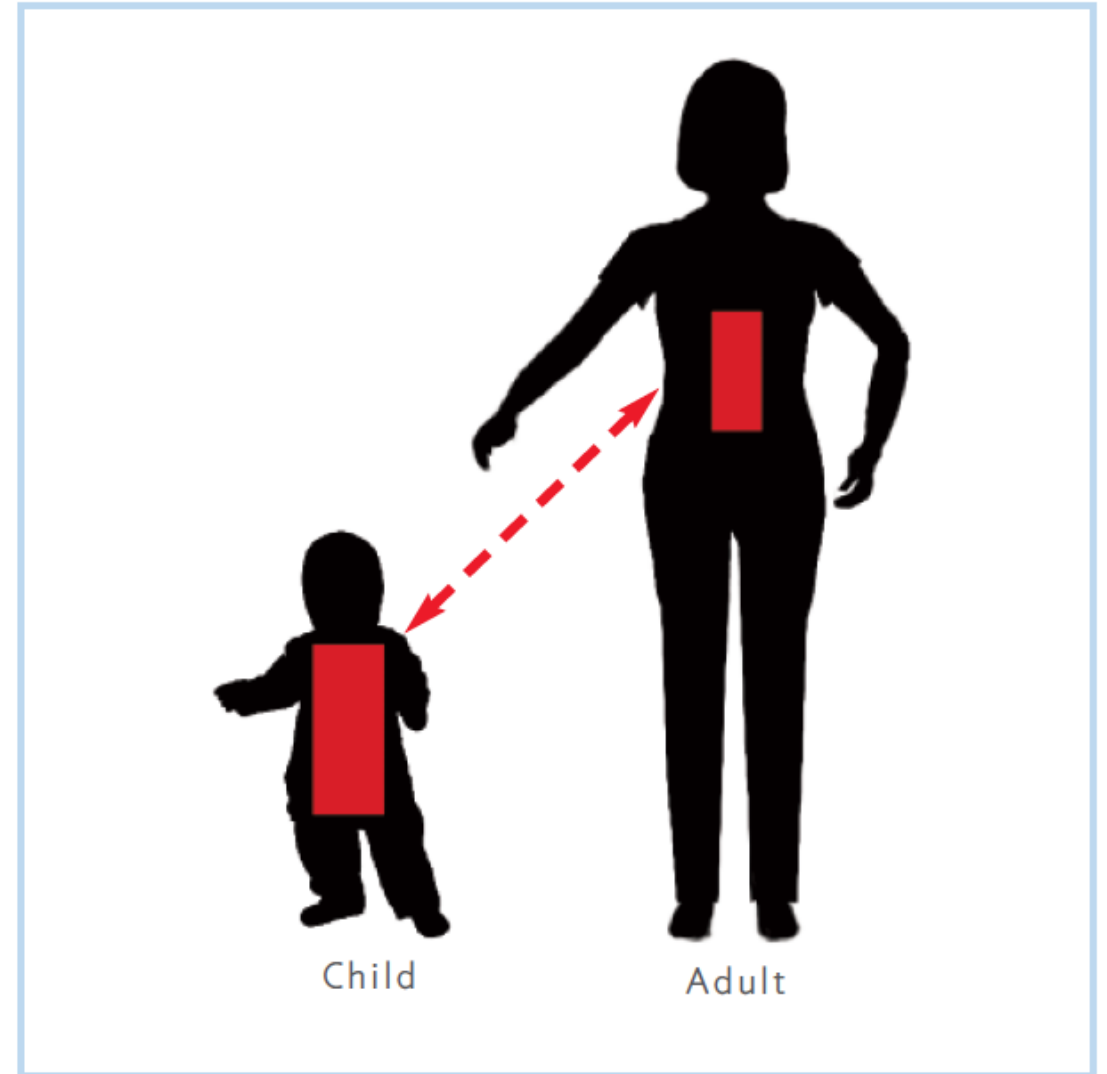
- 30% included inaccurate hazard warnings, including cancer risks
- In products containing carcinogens, 15% failed to warn of cancer risks.
- In products containing reproductive toxins, 21% failed to warn of risks to fertility or fetal development.



<https://www.bluegreenalliance.org/site/obstructing-the-right-to-know-report/>

Exposure

Children exposed to the same dose of environmental or chemical toxins as adults are harmed more severely.

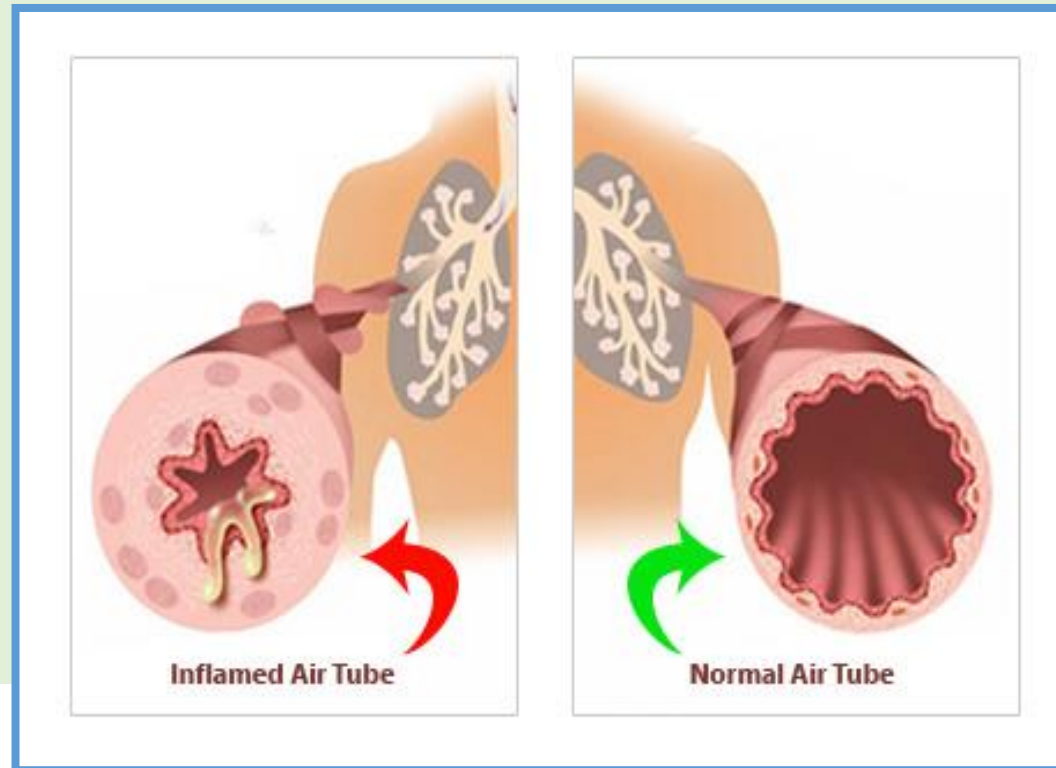


Asthma

Many cleaning, sanitizing, and disinfecting products can irritate the lungs, and trigger or even cause new onset asthma.

Asthma is a chronic inflammatory disorder of the airways in the lungs that results in:

- Wheezing
- Coughing
- Chest tightness
- Trouble breathing



Asthmagens & Asthma Triggers

Benzalkonium Chloride

Bisphenol A (BPA)

Chlorine Bleach

Ethanolamines

- monoethanolamine
- diethanolamine
- triethanolamine

Fragrance Ingredients: volatile organic compounds, aerosols, etc.

Parabens and Phthalates

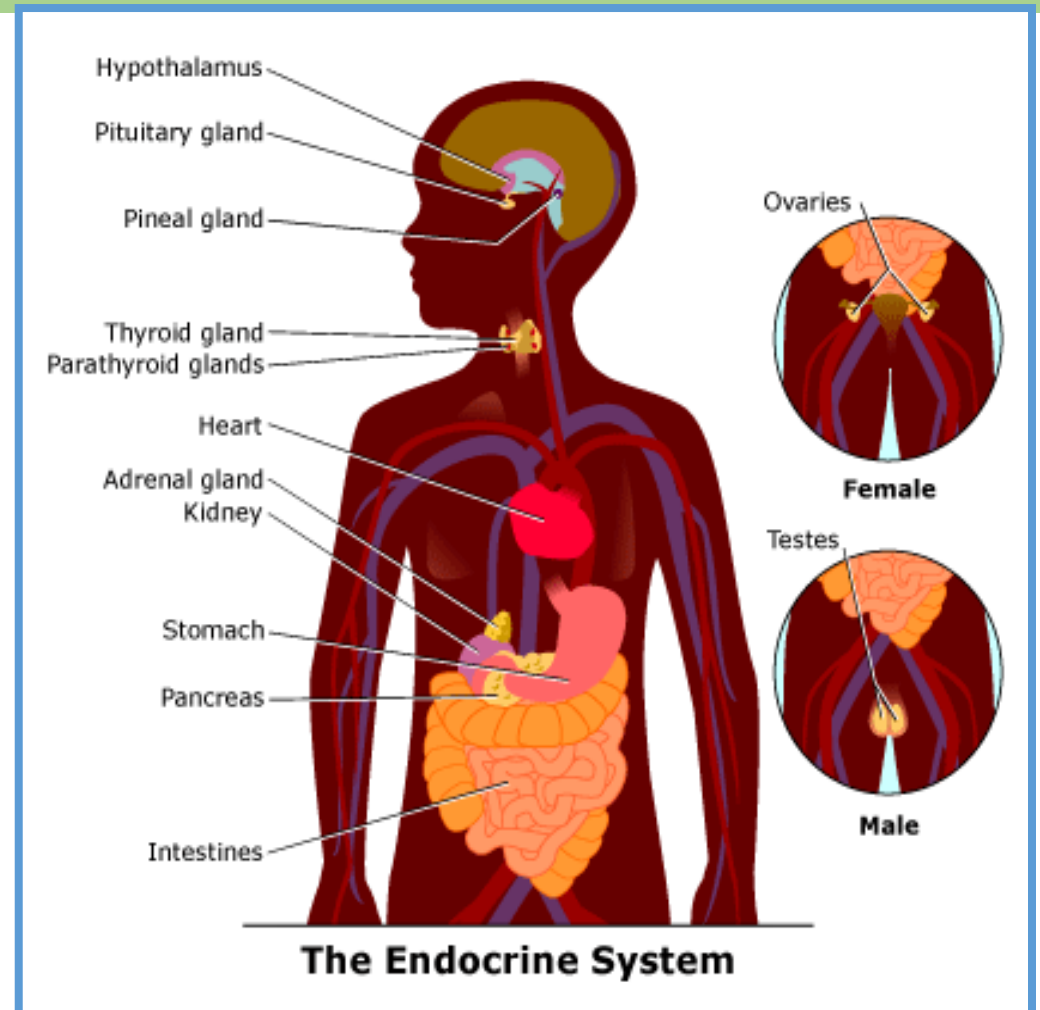
Quaternary ammonium compounds (QUATS):

- alkyl dimethyl benzyl ammonium chloride
- benzalkonium chloride
- didecyl dimethyl benzyl ammonium
- & others not listed here



Quats - Endocrine Disrupting Chemicals (EDCs)

- EDCs interrupt or imitate natural hormonal messages.
- Hormones and EDCs work in tiny doses, parts per billion.
- EDCs may cause:
 - Reduced fertility in women & men
 - Early puberty in girls
 - Increases in cancers of the breast, ovaries, and prostate



Minute doses of EDC's can harm people in different ways, essentially tricking the body into responding to chemicals as hormones during key stages of development.

Asthma-Friendly Schools Recognition Prog

BECOMING AN ASTHMA-FRIENDLY SCHOOL



Becoming an asthma-friendly school is simple to do and benefits all students and staff —especially those who have been diagnosed with asthma. Roughly 8,200 (7%) of Vermont's children has asthma, and Vermont is among the top five states in the country in asthma rates. That means the potential for lots of missed school and workdays, and even asthma-related emergencies.

[Learn more about COVID-19-specific recommendations for schools](#)

WHY BECOME AN ASTHMA-FRIENDLY SCHOOL?

Today, amidst the COVID-19 global pandemic, it has never been more important for schools to be as asthma-friendly as possible, to help students and staff members with asthma avoid triggers, manage their symptoms, and successfully learn and thrive.

Many asthma-friendly strategies are simple to implement and low-cost, which may very well also help schools satisfy other policy requirements and best practices, and reflect steps already taken to address COVID-19 challenges.

HOW TO BECOME AN ASTHMA-FRIENDLY SCHOOL

Below are some proven practices, protocols, programs, and policies that can help to create asthma-friendly school environments. The following should be adopted by all schools and Local Education Agencies (LEAs):

Anybody from the school community can nominate a school for recognition.

Categories include policy, practices and products. They fall under the scope of facilities staff, administrators or school nurses.

To learn more, visit:

[Asthma-Friendly Schools Recognition Application](#)

American Academy of Pediatrics

Disinfectants such as bleach and those containing...Quats should not be used when children or adolescents are present, because these are known respiratory irritants.

Only products labeled as safe for humans and the environment... containing active ingredients such as hydrogen peroxide, ethanol, citric acid, should be selected from List N, because they are less toxic, are not strong respiratory irritants or asthma triggers, and have no known carcinogenic, reproductive, or developmental effects.

Susan Kaplan, J.D., Research Assistant Professor, UIC School of Public Health

American Academy of Pediatrics, "[COVID-19 Guidance for Safe Schools](#)," Jan 5, 2021

Disinfectant Details

	AVOID		USE WITH CAUTION				PREFERRED		
Disinfectant	Bleach - sodium hypochlorite	Quaternary Ammonium Compounds – (Quats)	Thymol	Hydrogen Peroxide (H ₂ O ₂) & Peroxyacetic Acid (PAA)	Hypochlorous Acid in Tablet Form**	Hypochlorous Acid Generated on Site**	Hydrogen Peroxide	Ethanol	Citric Acid
Status of DfE review* (see below)	Failed	Failed	Failed	H ₂ O ₂ & PAA have passed the DfE screen individually, but not together	Not Evaluated	Not Evaluated	Passed	Passed	Passed
Contact time* General & COVID-19	30 second 3- seconds - 10 minutes	10 minutes 10 minutes	30 seconds - 10- minutes 1- 10 minutes	1-10 minutes 1 – 10 minutes	4 – 10 minutes 1-10 minutes	5 - 10 minutes 5 - 10 minutes	30 seconds to 10- minutes 30 seconds to 10- minutes	30 seconds – 10 minutes 30 seconds – 10 minutes	30 seconds – 10 minutes 30 seconds – 10 minutes
Always read product label for contact time specifics based on concentration and targeted microbes.									
Health Hazards	Mixing with ammonia, Quats, or other acids creates poisonous gas Corrosive to eyes and skin ⁶ Respiratory irritant & asthmagen	Mixing with bleach creates a poisonous gas Contact dermatitis & nasal irritation. Respiratory sensitizer, linked to asthma and endocrine disruption	Skin sensitizer	Asthmagen	Mixing with ammonia, Quats, or other acids creates poisonous gas Eye, skin and respiratory irritant & asthmagen	Mixing with ammonia, Quats, or other acids creates poisonous gas Skin irritation	No known health hazards ALWAYS read the label.	No known health hazards ALWAYS read the label.	No known health hazards. ALWAYS read the label.
Effectiveness	Always read product label for specifics as concentrations and corresponding efficacies vary by microbe. For Covid-19 information, check EPA’s List-N.								
Exposure controls	PPE & increased ventilation	PPE & increased ventilation	No special requirements	Concentrate requires eye protection, gloves & respirator	PPE and increased ventilation	PPE & increased ventilation	No special requirements	No special requirements	No special requirements

Identify Safer Disinfectants

EPA's Design for the Environment Disinfectant Program:

- Certifies that products meet their health & safety standards
- Lists only safer active ingredients:
 - Hydrogen Peroxide
 - Citric Acid
 - Chitosan
 - Ethanol
 - L-lactic acid
 - Isopropanol
 - Peroxyacetic acid
 - Sodium Bisulfate



Identify Safer Disinfectants

Look for the following:

- EPA registration number = effective
- 0 Health rating on the Hazardous Materials Identification System (HMIS)
- Signal words CAUTION or WARNING instead of ~~DANGER~~ on label
- Short contact time
- No rinse requirement



Identify Safer Disinfectants

PRODUCT & Description	EPA Reg #	MANUFACTURER	CONTACT TIME	VENDOR
Maxim Facility Plus	45745-12	Midlab	1 min/30 sec-COVID	Swish
Commercial Solutions Hydrogen Peroxide Disinfecting Cleaner	67619-24	Clorox	1 min/30 sec-COVID	WB Mason
Oxivir TB	70627-56	Diversey	1 min	WB Mason
Oxivir Wipes	70627-60	Diversey	1 min	WB Mason
Oxypro 365 Disinfectant Cleaner	6836-385	Triple SSS	3 min/1 min-COVID	Empire
Alpha HP Multi-Surface Disinfectant Cleaner	70627-62	Diversey	5 min	WB Mason
Oxivir Five 16 Concentrate (aka OxyTeam)	70627-58	Diversey	5 min/1 min-COVID	WB Mason
GE Fight Bac	34810-35	Betco	5 min/1 min-COVID	WB Mason
GE Fight Bac Wipes	34810-36	Betco	5 min/1 min-COVID	WB Mason
Professional Surface Disinfecting Wipes	84150-1	Purell	5 min/1 min-COVID	WB Mason Hillyard
Professional Surface Disinfectant	84368-1	Purell	5 min/1 min-COVID	Hillyard

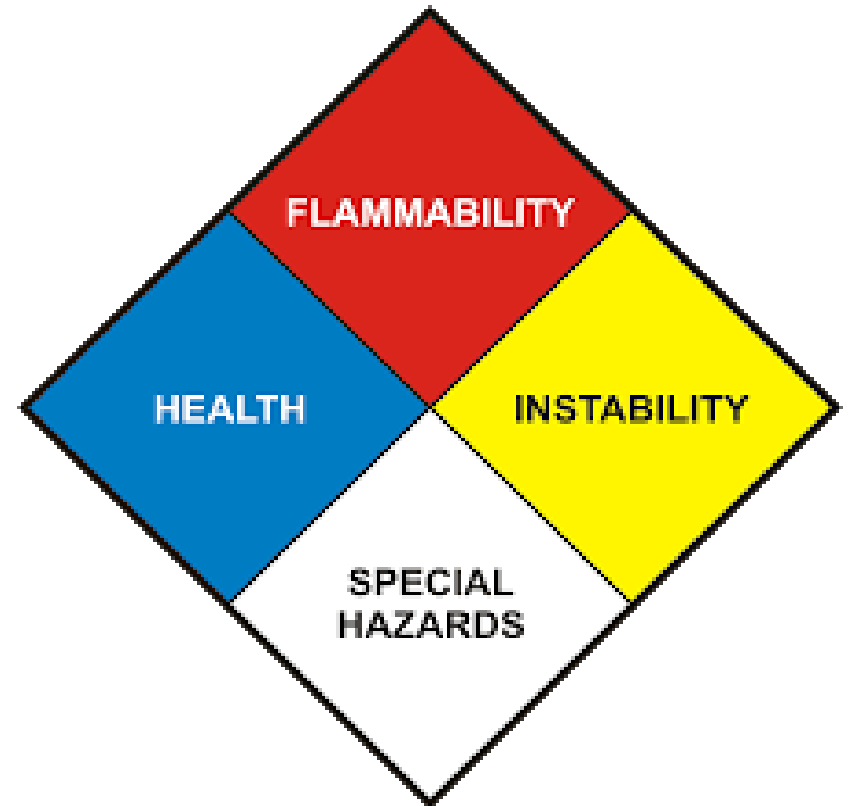


Choosing Safer Sanitizers and Disinfectants

Chemical Name	
HEALTH	0
FLAMMABILITY	0
PHYSICAL HAZARD	0
PERSONAL PROTECTION	0

HMIS

- 4. Severe Hazard
- 3. Serious Hazard
- 2. Moderate Hazard
- 1. Slight Hazard
- 0. Minimal Hazard



NFPA

Disinfectants Approved for COVID-19

EPA created **List N** a searchable database that provides disinfectant formulations effective against the SARS-CoV-2 virus.

List N prioritizes disinfection and many listed products are hazardous to human health. Search for products using the active ingredients certified as safer by DfE.



Disinfectants Approved for COVID-19

List N: Disinfectants for Use Against SARS-CoV-2 (COVID-19)
Date Accessed: 03/12/2021

EPA Registration Number	Active Ingredient(s)	Product Name	Company	Contact Time (in minutes)	Formulation Type	Surface Types	Use Sites	Why is this product on List N?	To kill SARS-CoV-2 (COVID-19), follow disinfection directions for the following pathogen(s)	Date Added to List N
84368-1	Ethanol (Ethyl alcohol)	Urthpro	Urthtech LLC	0.5 (30 seconds)	Ready-to-use	Hard Nonporous (HN); Food Contact No Rinse (FCNR)	Healthcare; Institutional; Residential	Tested against SARS-CoV-2 (COVID-19); Emerging viral pathogen claim	SARS-CoV-2	03/02/2021
84150-3	Ethanol (Ethyl alcohol)	Salsa	GOJO Industries Inc	1	Ready-to-use	Hard Nonporous (HN); Food Contact No Rinse (FCNR)	Healthcare; Institutional; Residential	Kills a harder-to-kill pathogen than SARS-CoV-2 (COVID-19); Emerging viral pathogen claim	Hepatitis A virus	02/11/2021
84150-4	Ethanol (Ethyl alcohol)	Charleston	GOJO Industries Inc	0.5 (30 seconds)	Ready-to-use	Hard Nonporous (HN); Food Contact No Rinse (FCNR)	Healthcare; Institutional	Kills a harder-to-kill pathogen than SARS-CoV-2 (COVID-19); Emerging viral pathogen claim	Hepatitis A virus	08/13/2020
84150-1	Ethanol (Ethyl alcohol)	PURELL Professional Surface Disinfectant Wipes	GOJO Industries Inc	5	Wipe	Hard Nonporous (HN); Food Contact No Rinse (FCNR)	Healthcare; Institutional; Residential	Kills a harder-to-kill pathogen than SARS-CoV-2 (COVID-19); Emerging viral pathogen claim	Norovirus	03/03/2020

Choosing Safer Sanitizers

Look for the following:

- Approval for food contact surfaces
- No rinse required
- 0 health rating on the HMIS
- Signal words CAUTION or WARNING instead of ~~DANGER~~ on label
- Short contact time
- Design for the Environment Logo
- Free of fragrance & dyes



Choosing Safer Cleaning Products

Look for the Following:

- Third-party certification
- Signal word WARNING instead of ~~DANGER~~ on label
- Non-aerosol
- Free of fragrances & dyes
- All ingredients listed on the label or website

How To Identify Safer Cleaning Products

Third-party certifiers

Look for the logos:

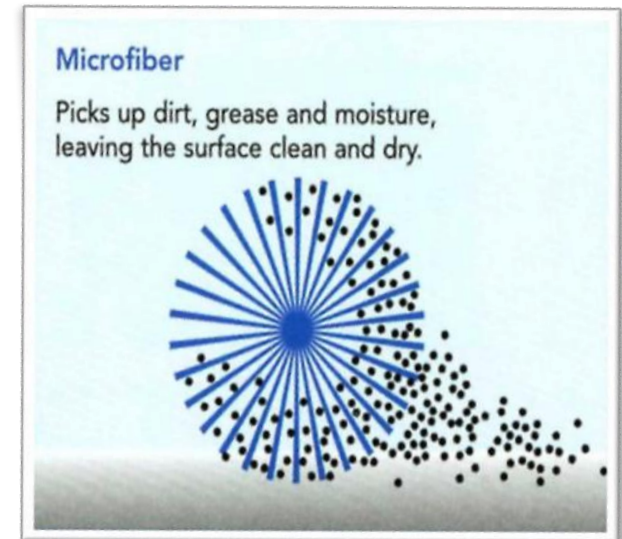
- Green Seal
- Safer Choice (EPA)
- UL ECOLOGO®



Microfiber

More effective than cotton or paper towels

- Removes dirt, oils, & grease, as well as germs (up to 99%) from surfaces
- Requires less detergent to be effective
- Washable 500 - 1,000 times
- Available through rental agencies



Electrostatic Sprayers/Mister Foggers

Sold early in the pandemic, these disinfection application devices raise concerns in the public health community about:

- Lung Exposure:
 - Droplet size
 - PPE requirement compliance/respirators
- Effectiveness – contact time
- Disinfectant overuse

Safety Issues: Electrostatic Sprayers

Note: Always read the equipment manual.

- Health WARNING from one manufacturer:
 - Electrostatic devices may interfere with sensitive medical devices such as pacemakers, defibrillators, or similar devices.
 - DO NOT operate an electrostatic sprayer or stand within 10 feet if you use such medical devices. Contact your physician.



Electrostatic Sprayers Safety Settings

What to know about the spray to reduce product in the air:

- Distance sprayed varies widely, from 3 feet to over 7 feet depending on unit.
- Droplet size (40-100 microns) affects how quickly and long the surface is wetted.



Safety of Disinfectant Applicators: Mister/Foggers

EPA/CDC have concerns with mister/foggers:

- Health risks – the fine mist stays in air longer and poses an inhalation hazard.
- Efficacy – the mist may not stay wet long enough for required contact time.

Recommend against: CDC, VT & other states

Disinfectant Applicators: Mister/Foggers



Should You Use These to Disinfect?

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GREEN SEAL
2020

EPA List N Products	>	YES	>	Follow label directions for approved application methods and required contact times.
Electrostatic Spraying	>	MORE INFO NEEDED	>	EPA and CDC are reviewing safety and effectiveness.
Ultraviolet, Ozone or Steam	>	MORE INFO NEEDED	>	EPA and CDC are reviewing effectiveness.
Fogging	>	NO	>	Increases hazardous chemical exposure and provides no added benefit.
Ultrasonic Waves or LED blue light	>	NO	>	There is no data to suggest these are effective against COVID-19.

* Sams, Jim, Forensics Firm Says Disinfectant Foggers Can Damage Electronics, May 26, 2020, <https://www.claimsjournal.com/news/national/2020/05/26/297233.htm>

Developed by Lynn Rose

Applicators: Aqueous Ozone

Aqueous Ozone has been in use in several VT schools.

- APC
- Sanitizer
- Floor Machine



USDA, FDA



UV Room Disinfection Devices

UV-C light is being used to disinfect hospital OR's and other spaces. Some VT schools have invested in these systems with successful results.

- Plug-in
- Stand alone
- Safety features



IGS Technical Assistance

Funded by VDH

- Policies
- Ventilation
- Flooring/Carpeting
- COVID-19 precautions
- Integrated Pest Management
- Cleaning/Disinfecting
 - Best practices
 - Products (inventory)
 - Disposal assistance
- Technology
 - Microfiber
 - Dilution stations
 - Electrostatic sprayers
misters/foggers

Environmental Health & Safety Policies and Practices	
Enrolled in Vermont's Envision Program.	Y <input type="checkbox"/> N <input type="checkbox"/>
Have a Health and Safety Committee. Meetings are regularly scheduled.	Y <input type="checkbox"/> N <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/>
Hazard Communications Program in place. It is current. SDS are kept for discontinued products for 30 years.	Y <input type="checkbox"/> N <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/>
There have been recent IAQ complaints.	Y <input type="checkbox"/> N <input type="checkbox"/>
Classroom teachers are supplied with cleaning products. Teachers are prohibited from bringing cleaning products.	Y <input type="checkbox"/> N <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/>
Integrated Pest Management policy is in place.	Y <input type="checkbox"/> N <input type="checkbox"/>
Exterior	
Exterior walls and intakes are clear. Ground level intakes & operable windows are far from pollutants (dumpsters, loading docks, bus-idling areas). No idling policy is enforced & signs are posted.	Y <input type="checkbox"/> N <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/>
Ventilation	
HVAC system maintenance contracted out. It is fully functional. It was balanced & tested post room/system modification. Name/Type of System _____ Hours of operation _____ Filter change schedule _____ MERV rating _____ Has Efficiency VT assisted with ventilation changes?	Y <input type="checkbox"/> N <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/>

Resources

Partners:

- VSBIT
- AoE- School Facility Improvement Project
- VDH Division of Health Promotion and Disease Prevention: Asthma
- Envision: VDH Division of Environmental Health

Thank You for Participating

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