Safer Cleaning and Disinfecting in Schools

A webinar hosted by the Toxics Use Reduction Institute

August 14, 2020

TURI
TOXICS USE REDUCTION INSTITUTE
UMASS LOWELL

The Massachusetts Toxics Use Reduction Institute

Since 1989, tasked with providing research, education and policy analysis to help companies and communities reduce their use of toxic chemicals

During this moment in history, TURI is prioritizing:

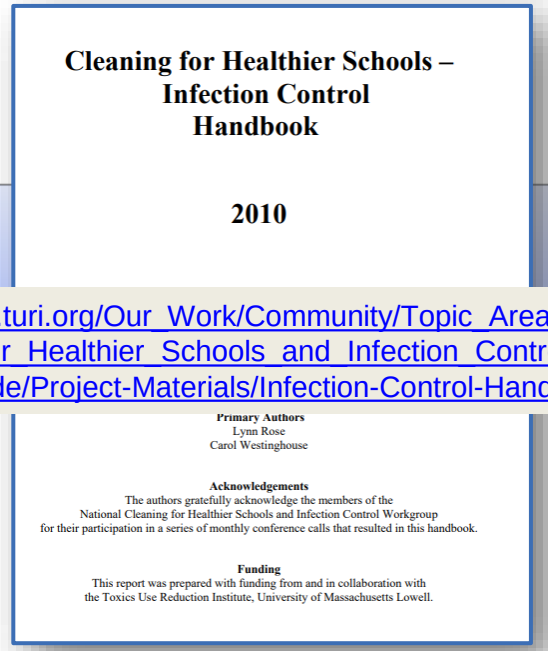
- Safer and effective cleaning and disinfecting as critical to reducing pathogen spread
- Helping MA reduce chemical exposures that can lead to health impacts

Go to www.turi.org and click on "**Learn about safer alternatives for combating COVID-19**" for related resources

Evolution of this project

Infection control handbook for schools

- Developed during H1N1 outbreak
- A 5-yr national school disinfection collaboration
- Recently updated priority sections for SARS-CoV-2
- Will update all sections in the next several months


Cleaning for Healthier Schools – Infection Control Handbook

2010

Primary Authors
Lynn Rose
Carol Westinghouse

Acknowledgements
The authors gratefully acknowledge the members of the National Cleaning for Healthier Schools and Infection Control Workgroup for their participation in a series of monthly conference calls that resulted in this handbook.

Funding
This report was prepared with funding from and in collaboration with the Toxics Use Reduction Institute, University of Massachusetts Lowell.

https://www.turi.org/Our_Work/Community/Topic_Areas/Schools/Cleaning_for_Healthier_Schools_and_Infection_Control_Workgroup_Statewide/Project-Materials/Infection-Control-Handbook

TURI Lab has focused on safer cleaning for decades

- Now building capacity to evaluate efficacy of safer disinfectants

Materials available on TURI's website

- turi.org/covid-19/school_cleaning

Today's Speakers

Ken Wertz

- Executive Director, MA Facilities Administrators Association; exec@massfacilities.com

Lynn Rose

- Pollution Prevention and EHS consultant; lynnfaith@comcast.net

Carol Westinghouse

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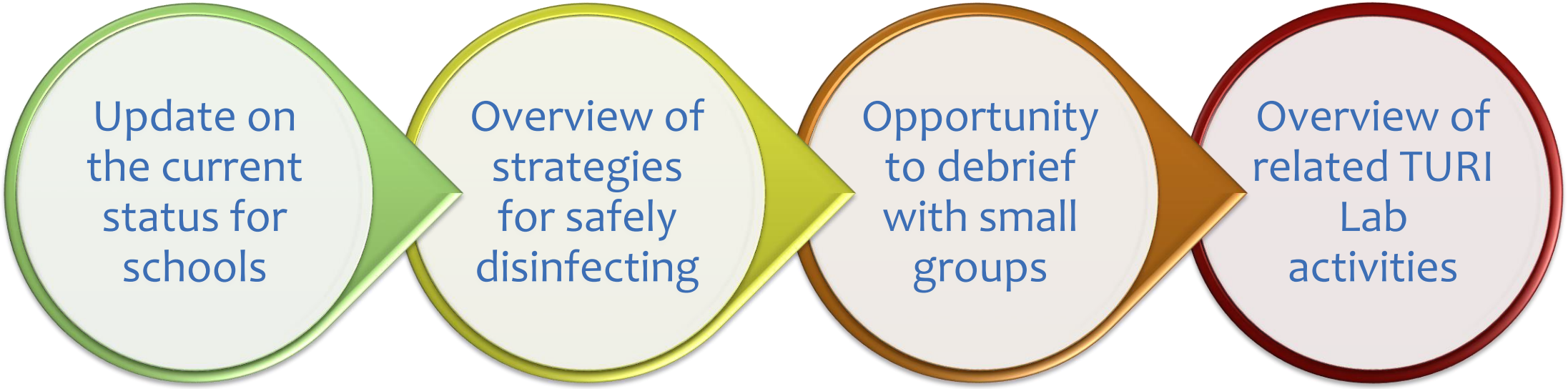
Today's webinar



All materials, including webinar recording, slides and resources discussed will be available on TURI's website after the webinar: www.turi.org

MFAA
MASSACHUSETTS FACILITIES ADMINISTRATORS ASSOCIATION

Current Status of Schools

Ken Wertz

MFAA Executive Director

massfacilities.com

Current status of schools

DESE:
http://www.doe.mass.edu/covid19/on-desktop.html

- Variations of plans – Why?
- Cleaning Procedure and Product
- Water
- HVAC
- Communication Gaps
- Anxiety and differing views

Roles

- Custodians
- Teachers
- Students
- Parents

https://massfacilities.com/covid-resources/

Ken Wertz

MFAA Executive Director

exec@massfacilities.com

Webinar August 14, 2020

School Cleaning and Disinfecting In K-12 School Districts for COVID-19

Developed by Lynn Rose and Carol Westinghouse, Informed Green Solutions, Inc.

Funded by the Toxics Use Reduction Institute, UMass Lowell

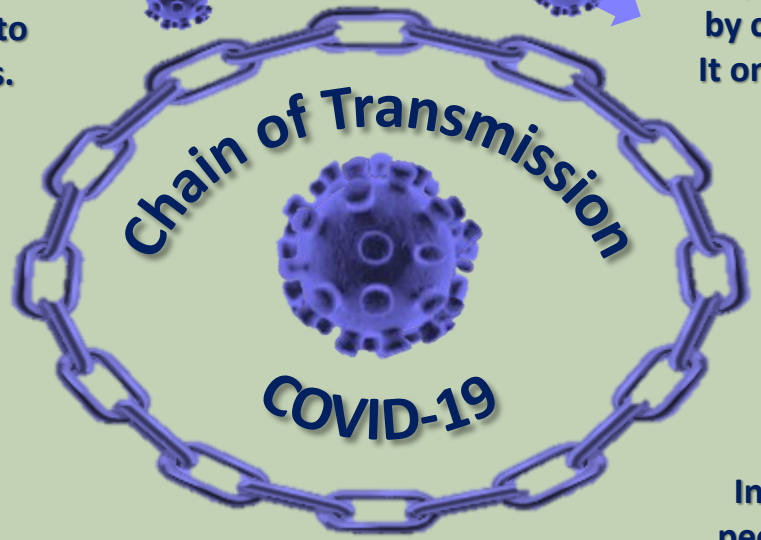
The following webinar information and resources available on the TURI webpage are based on:

A COVID-19 Update of the Cleaning for Healthier Schools: Infection Control Handbook

Original 2010 publication and trainings:

Based on the
National School Disinfection Workgroup
Five Year Collaboration

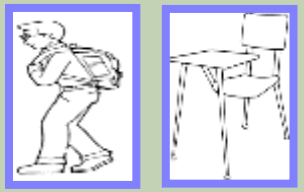
How is the Virus Transmitted?



Infectious Agent - SARS-CoV-2
is the Virus that causes the disease Covid-19

Person as a Host
SARS-CoV-2 can infect people and make some people sick with COVID-19. People with COVID-19 without symptoms may still be able to transmit the virus to others.

Reservoir
Where the virus lands on living and nonliving things. It survives outside the body for a length of time determined by conditions and type of surface. It only reproduces inside the body.



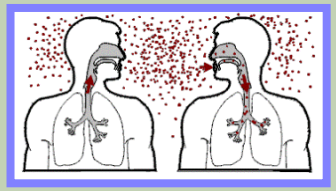
The Virus Enters the Body
Eyes and respiratory system: nose and mouth

The Virus Leaves Reservoir
Infected person touches surfaces and people, and sneezes, coughs, sings, etc.

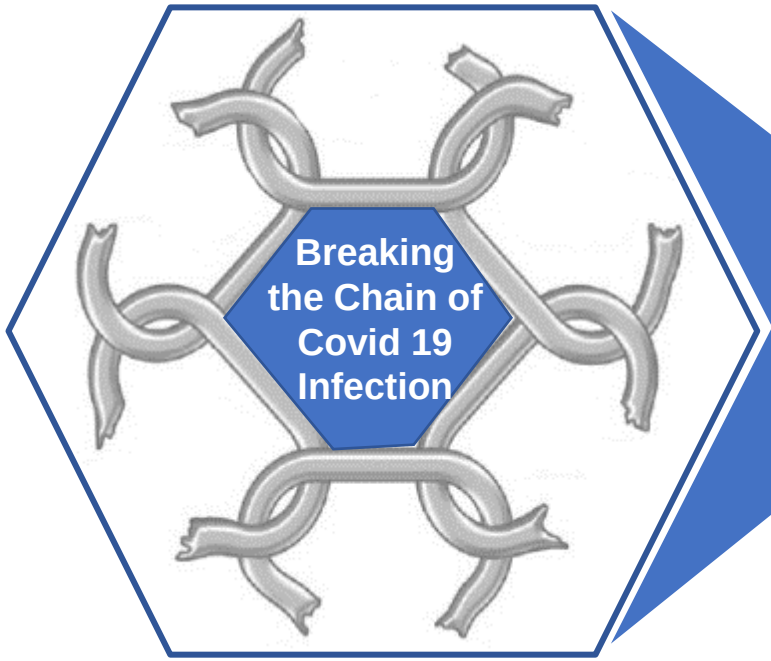
The Virus is Transported to New Locations
where people come in contact with it:

Contact with Person

Expelled Respiratory Droplets and Aerosols

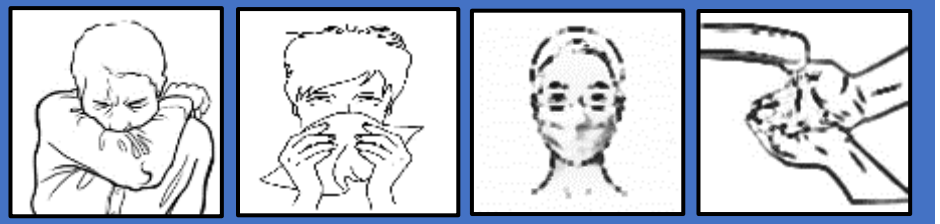


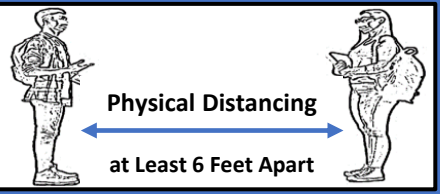
Contact with Surface



3-Pronged Strategy

1. Personal Hygiene & Social Strategies

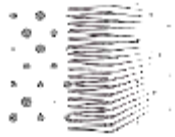




Isolation and Quarantine

2. Manage Airborne Transmission

Examples of Strategies: Increased Air Exchange and Increased Filtration



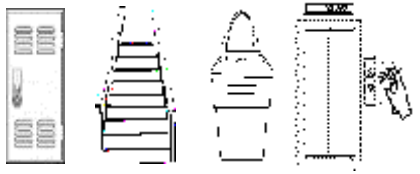
Examples of Strategies: Air Treatment

3. Cleaning for Health and Targeted Disinfection

Environmentally Preferable Products

Microfiber, HEPA Vacuum, Steam, Electrically Activated Water

Examples of High Touch Points



Breaking the Chain of Infection
"3 Levels of Germ Control"

Cleaning

Removing

Germs

up to 99%

Sanitizing

Killing

Bacteria

99.9 to 99.999%

Disinfecting

Killing

All Germs Tested

Except Their Spores

Breaking the Chain of Infection - 3 Levels of Germ Control

1. Cleaning

It involves using water, detergent and a cloth or microfiber to scrub the surface.

It is an essential activity in infection control as it:

- **Physically <u>removes</u> germs *and* the conditions they need to survive (e.g. dirt, moisture).**
- **Helps inactivate this type of virus by breaking down the outer fat (lipid) protective coating of the virus.**
- **Prepares the surface for disinfecting.**

Breaking the Chain of Infection - 3 Levels of Germ Control

2. Sanitizing

Designed for use on both soft and hard surfaces:

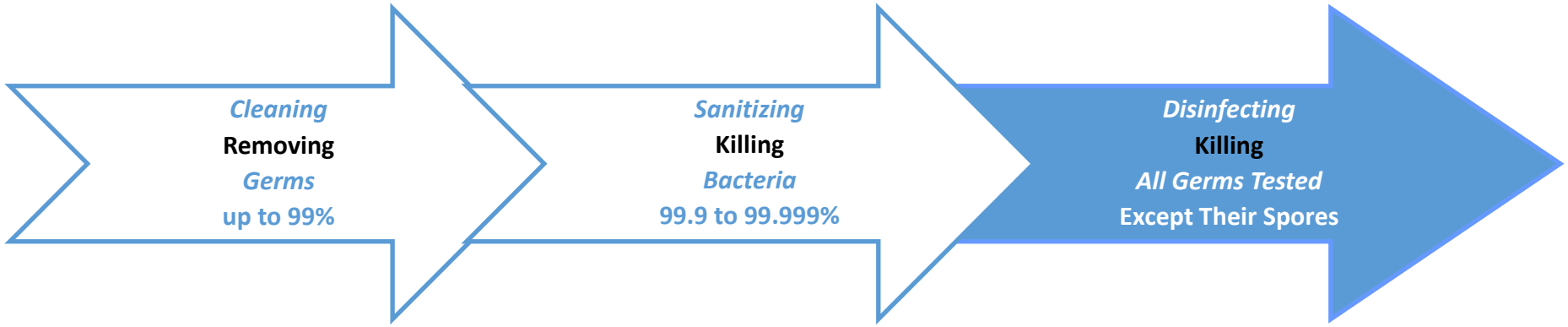
- **<u>Food</u> contact surfaces: sanitizing rinses for surfaces (e.g. dishes, cooking utensils, high chairs)**
- **<u>Non-food</u> contact surfaces: (e.g., carpet, laundry)**

Key points:

- **COVID-19 is caused by a <u>virus</u>, and sanitizers only work on <u>bacteria</u>.**
- **Some products are approved to be both a sanitizer and disinfectant at different concentrations and contact times.**

Breaking the Chain of Infection - 3 Levels of Germ Control

3. Disinfecting



- **Use on hard <u>nonporous</u> surfaces such as door handles, tables, etc.**
- **Requires cleaning and rinsing surface (if required) prior to disinfecting!**

Disinfectants Approved for COVID-19?

- **EPA created "List N", a searchable database that provides disinfectant formulations approved for COVID-19.**

- **Although approved disinfectants help protect us from the virus, they can also pose some health risks. They are "pesticides" formulated to kill germs.**

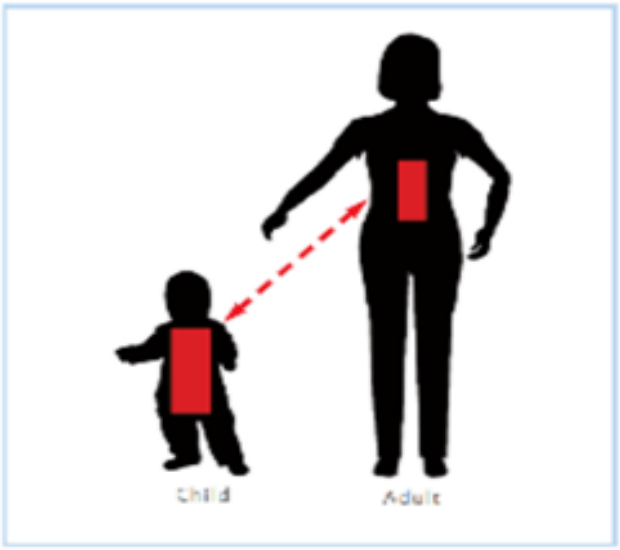
- **List N contains some products that are very hazardous, and some products that are safer.**

https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2

What Common Disinfectants Are Hazardous? *Bleach*

- **Bleach can:**
  - **cause occupational asthma**
  - **trigger asthma episodes**
  - **affect breathing**
  - **irritate the skin and eyes**

What's the Problem With Bleach?



- Children are at greater risk from breathing bleach vapors because their lungs are still developing.
- Bleach has a short shelf life, so must be purchased monthly and solutions mixed daily.
- Mixing bleach with other chemicals containing ammonia, quaternary ammonium compounds (found in other disinfectants), vinegar or other acids can create a toxic gas.

What Common Disinfectants are Hazardous? *Quats*

- **Quaternary Ammonium Compounds**

  (Quats are known under individual names - Benzalkonium chloride, Alkyl dimethyl benzyl ammonium chlorides, Benzyl-C12-18-alkyldimethyl, chlorides, Didecyl dimethyl benzyl ammonium chlorides etc.)

- **Quats can cause:**
  - **asthma**
  - **irritation of skin and respiratory system**
  - **reproductive/fertility issues**
- **The overuse of quats and bleach can promote antibacterial-resistant bacteria known as "superbugs".**

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

Finding the Safest Disinfectants on List N?

Check for products that have third-party certifications:

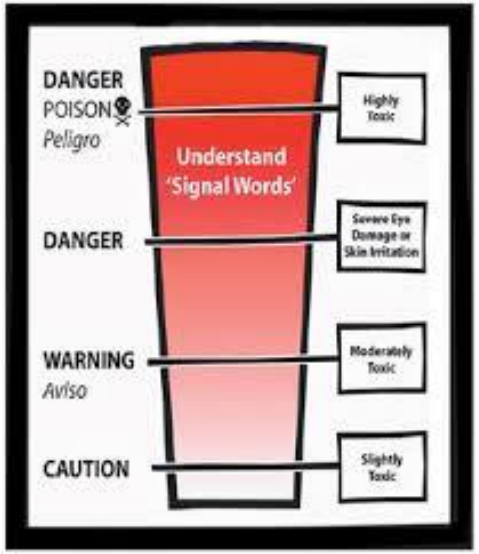
- EPA's Design for the Environment/Safer Choice
- Green Seal

Look for the logos!

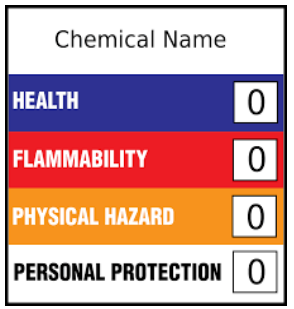
Selecting Safer Disinfectants

Look for the Following:

1. **Safety Data Sheets and Product Labels**
   - **The signal word Caution or Warning rather than Danger.**
   - **Zero rating on the Hazardous Materials Identification System (HMIS) or National Fire Protection Association (NFPA) health rating scales.**



NFPA



HMIS

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

Cleaning for Healthier Schools – Infection Control Handbook

Available on TURI Website

Chapter 4. Selection of Products, Dispensing Equipment, and Application Systems

	AVOID		USE WITH CAUTION				PREFERRED		
Disinfectant Character-istics	Bleach - sodium hypo-chlorite	Quaternary Ammonium Compounds – QACs or Quats	Thymol** (e.g. Benefect®)	Hydrogen Peroxide - H_2O_2 and Peroxyacetic Acid - PAA (e.g. Oxycide Daily Disinfectant Cleaner)	Hypochlorous Acid*** (e.g. Brutabs /PurTab/CDiff ViroTab Tablets)	Hypochlorous Acid*** (e.g. Force of Nature, Envirocleanse A)	Hydrogen Peroxide (e.g. Oxivir TB)	Ethanol (e.g. Purell Professional Surface Disinfectant)	Citric Acid (e.g. CleanCide and Betco GE Fight Bac - same product privately labeled)
Status of DfE review*	Will not pass DfE screen	Will not pass DfE screen	Will not pass DfE screen	H_2O_2 and PAA have passed the DfE screen individually but not together	Has not been evaluated using the DfE screen	Has not been evaluated using the DfE screen	Active ingredient has passed DfE screen	This product has passed DfE screen	CleanCide has passed DfE screen
EPA Acute toxicity category*	Category I	Category III	Category IV	Category III or IV, product specific	Category III	Category III	Category III or IV, product specific	Category IV	Category IV

Sources of Information on Safer Products

Organizations that review and list products for health and safety considerations:

Toxics Use Reduction Institute: https://www.turi.org/Our_Work/Cleaning_Laboratory/COVID-19_Safely_Clean_Disinfect/Safer_Disinfecting_Products

Green Seal: https://greenseal.org/about/blog/how-to-safely-disinfect-for-coronavirus

Responsible Purchasing Network:
https://osha.washington.edu/sites/default/files/documents/Updated%20Safer%20Disinfectants%20List_March%2026%2C%202020.pdf

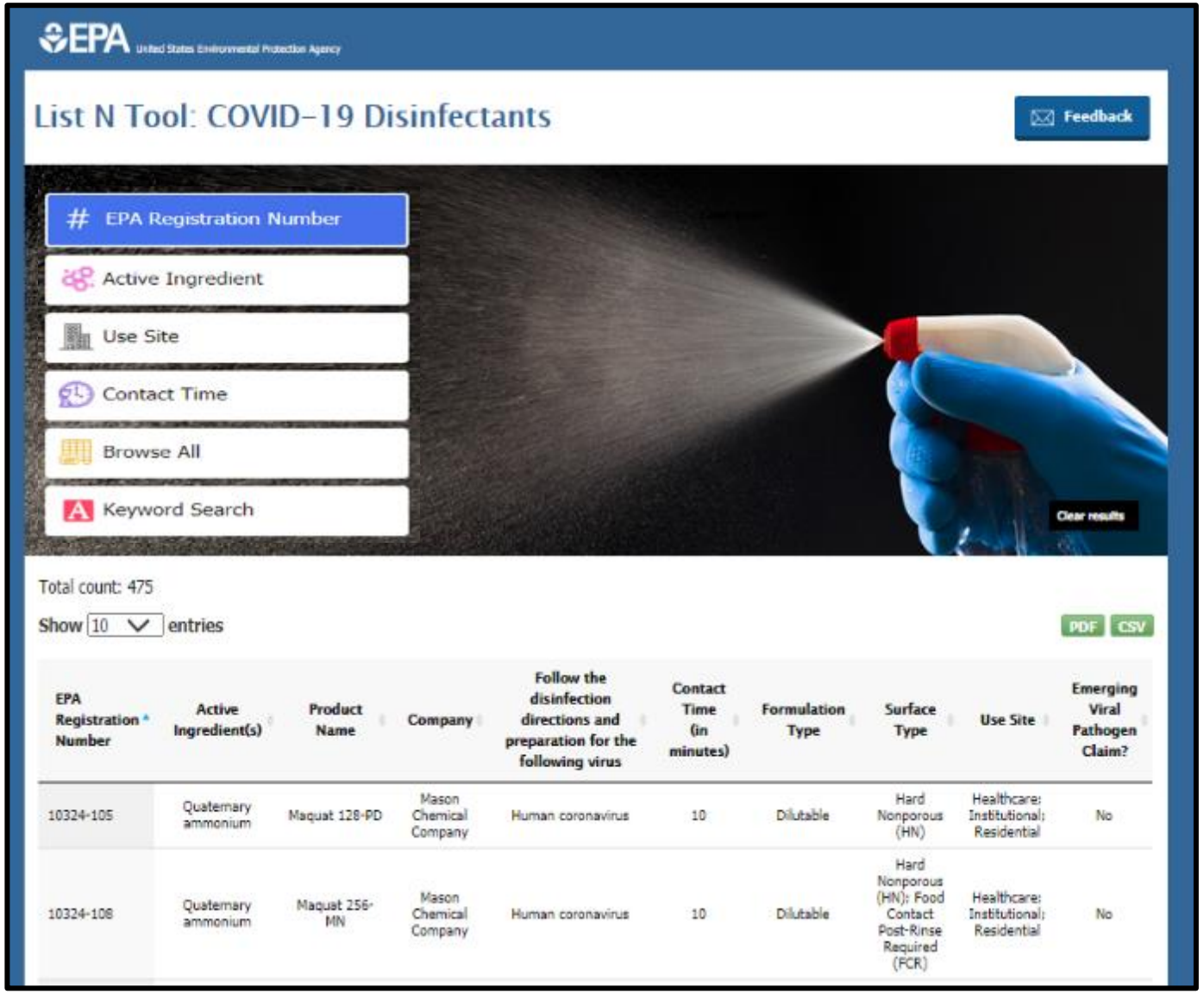
Massachusetts Operational Services Division – Environmentally Preferable Products Program, FAC85 Cleaning Equipment and Supplies:
https://www.mass.gov/doc/fac85/download

Using the EPA's List N for Emerging Pathogens

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

Some key topics to search by:

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

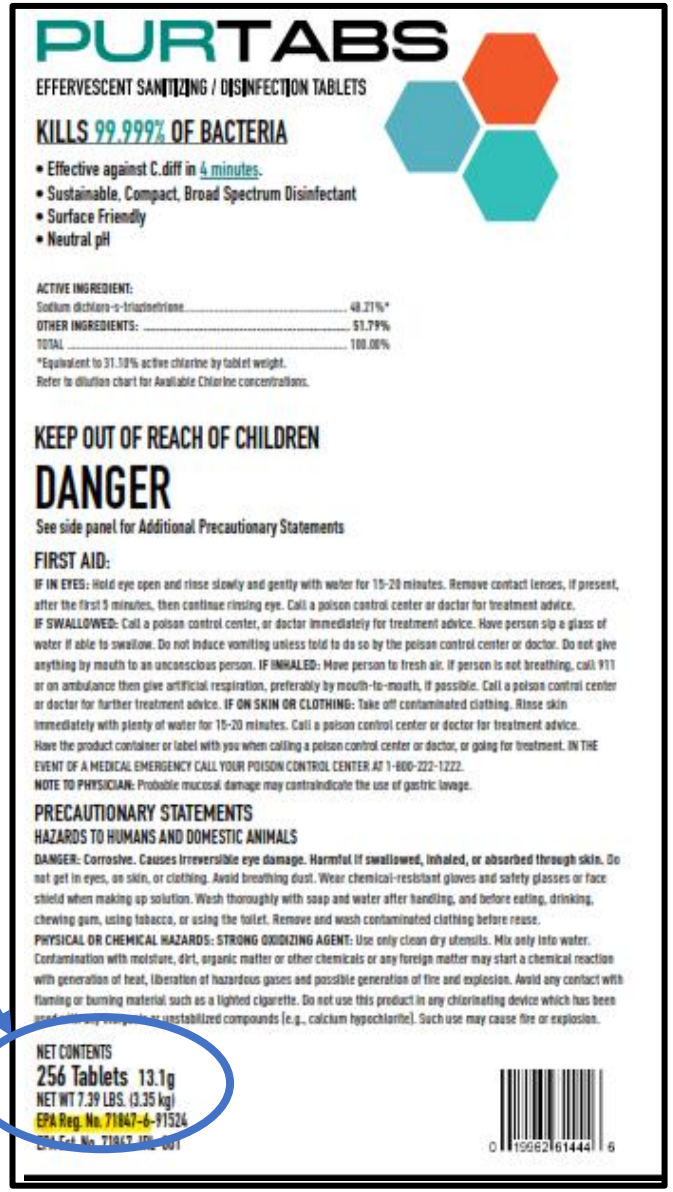


EPA Registration Number	Active Ingredient(s)	Product Name	Company	Follow the disinfection directions and preparation for the following virus	Contact Time (in minutes)	Formulation Type	Surface Type	Use Site	Emerging Viral Pathogen Claim?
10324-105	Quaternary ammonium	Maquat 128-PD	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard Nonporous (HN)	Healthcare; Institutional; Residential	No
10324-108	Quaternary ammonium	Maquat 256-MN	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard Nonporous (HN); Food Contact Post-Rinse Required (FCR)	Healthcare; Institutional; Residential	No

Using the EPA's List N for Emerging Pathogens

Some products on List N may not be listed by product name.

- **The list only includes the primary EPA-registered product formulation**
- **Formulations are given different product names by different distributors**
- **You can find the product formulation by using the search bar for the product's EPA Registration Number**
- **The EPA Registration # can be found on the product label, or by an internet search of the product name and words "EPA Registration Number"**


PURTABS

EFFERVESCENT SANITIZING / DISINFECTION TABLETS

KILLS 99.999% OF BACTERIA

- Effective against C.diff in 4 minutes.
- Sustainable, Compact, Broad Spectrum Disinfectant
- Surface Friendly
- Neutral pH

ACTIVE INGREDIENT:
Sodium dichloro-s-triazinetrione 48.21%*
OTHER INGREDIENTS: 51.79%
TOTAL 100.00%
*Equivalent to 31.10% active chlorine by tablet weight.
Refer to dilution chart for Available Chlorine concentrations.

KEEP OUT OF REACH OF CHILDREN

DANGER

See side panel for Additional Precautionary Statements

FIRST AID:

IF IN EYES: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.
IF SWALLOWED: Call a poison control center, or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the poison control center or doctor. Do not give anything by mouth to an unconscious person. **IF INHALED:** Move person to fresh air. If person is not breathing, call 911 or an ambulance then give artificial respiration, preferably by mouth-to-mouth, if possible. Call a poison control center or doctor for further treatment advice. **IF ON SKIN OR CLOTHING:** Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.
Have the product container or label with you when calling a poison control center or doctor, or going for treatment. IN THE EVENT OF A MEDICAL EMERGENCY CALL YOUR POISON CONTROL CENTER AT 1-800-222-1222.
NOTE TO PHYSICIAN: Probable mucosal damage may contraindicate the use of gastric lavage.

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

DANGER: Corrosive. Causes irreversible eye damage. Harmful if swallowed, inhaled, or absorbed through skin. Do not get in eyes, on skin, or clothing. Avoid breathing dust. Wear chemical-resistant gloves and safety glasses or face shield when making up solution. Wash thoroughly with soap and water after handling, and before eating, drinking, chewing gum, using tobacco, or using the toilet. Remove and wash contaminated clothing before reuse.
PHYSICAL OR CHEMICAL HAZARDS: STRONG OXIDIZING AGENT: Use only clean dry utensils. Mix only into water. Contamination with moisture, dirt, organic matter or other chemicals or any foreign matter may start a chemical reaction with generation of heat, liberation of hazardous gases and possible generation of fire and explosion. Avoid any contact with flaming or burning material such as a lighted cigarette. Do not use this product in any chlorinating device which has been [illegible] unstabilized compounds (e.g., calcium hypochlorite). Such use may cause fire or explosion.

NET CONTENTS
256 Tablets 13.1g
NET WT 7.39 LBS. (3.35 kg)
EPA Reg. No. 71847-6-91524

Excerpt of Pesticide Label for Concentrate

Using the EPA's List N for Emerging Pathogens

When you find the product EPA Registration Number:

Only reference the first two sets of numbers

EPA Registration Number 71847 - 6

EPA Registration Number 71847 - 6 - 2567

It is the same product that can be used for COVID-19

Sources: NPIC and EPA Antimicrobials Division

Using the EPA's List N for Emerging Pathogens

- **Disinfectants on List N do not yet have SARS-CoV-2 listed on their label**
- **EPA has identified "surrogate" germs for all disinfectants listed**
- **Look on your disinfectant label for the "surrogate" germs**
- **Follow the instructions for the surrogate germ for concentration and contact time**

List N Disinfectant Results Table - Explore

EPA Registration Number	Active Ingredient(s)	Product Name	Company	Follow the disinfection directions and preparation for the following virus	Contact Time (in minutes)	Formulation Type	Surface Type	Use Site	Emerging Viral Pathogen Claim?
71847-6	Sodium dichloroisocyanurate	Klorsept	Medentech LTD	Hepatitis A virus; Coxsackievirus B3	1	Dilutable	Hard Nonporous (HN)	Healthcare; Institutional; Residential	Yes

Sourcing Safer Products and Cleaning Equipment in Massachusetts

Key cooperative contracts:

- **OSD COMMBUYS Environmentally Preferable Products Program:**

  FAC85 Contract for cleaning and disinfecting supplies and equipment (multi-state contract)

- **Massachusetts Higher Education Collaborative (MHEC):**

  G17 Custodial Cleaning Equipment and Supplies

FAC85: Environmentally Preferable Cleaning Products, Programs, Equipment and Supplies Statewide Contract

UPDATED: May 21, 2020

Contract #:	FAC85
MMARS MA #:	FAC85*
Initial Contract Term:	March 15, 2015 – March 15, 2018
Current Contract Term:	March 15, 2019 – March 15, 2022
Maximum End Date:	March 15, 2022
Contract Manager:	Julia Wolfe, 617-502-8836, julia.wolfe@mass.gov
This Contract Contains:	Environmentally Preferable Products and Supplier Diversity Program
UNSPSC Codes:	See Appendix C
Notes:	This is an ALL green contract – all products on the contract are required to meet environmentally preferable specifications.

*The asterisk is required when referencing the contract in the Massachusetts Management Accounting Reporting System (MMARS).

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Questions to Ask Vendors When Selecting Disinfectants

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

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

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

Training and Supplies

Staff Training Content

- Work Practices
- Infection Control (preventing disease transmission)
- OSHA Hazard Communication (including use and care of PPE)

Staff Supplies and Guidance – *See Fact Sheet*

- Safety Data Sheets
- Written Work Practices – use and storage of products
- PPE for chemical use
- PPE for virus protection - the MA Dept of Elementary and Secondary Education (DESE) developed a purchasing system

For more information, contact LEAestimates@mass.gov.

Group	Quantity per 100 per group	12-week Supply at 100% Attendance	12-week Supply at 50% Attendance	12-week Supply at 25% Attendance	Assumptions	Quantity (Unit of Measure is each)	Average Price Paid	Cost Estimate
Students	100 masks per week	1,200	600	300	1 disposable mask per week per student (to supplement the cloth masks provided by parent/guardian).	0	$ 1.02	$ -
Teachers and other staff	500	6,000	3,000	1,500	5 disposable masks per week per teacher.	0	$ 1.02	$ -
School nurses and health providers	1,000	12,000	6,000	3,000	10 disposable masks per week per school nurse.	0	$ 1.02	$ -

The following excerpt is of a handout on the TURI website that provides guidance by department on what criteria should be considered when developing an infection control plan. Each department has unique issues to address.

Handout: COVID-19 Cleaning and Disinfecting by School Departments

Department	Items/Areas to be Disinfected	Product and Equipment Criteria	Criteria to Consider When Developing Procedures
Athletics This department has had to deal with disinfecting for MRSA, a resistant bacterium transmitted from infected skin.	Foam mats and shared athletic equipment (weights and weight machines), and shared items (e.g. balls, frisbees).	Ideally disinfectant requires no rinse, and has a short dwell time. Needs to have kill claims for MRSA as well. Consider an electrostatic sprayer to do mats, and equipment touch points quickly.	No student use of cleaning and disinfecting products. Items and surfaces cleaned and disinfected between every use. All students clean their hands before and after equipment use, and/or playing with a common item (e.g. ball, frisbee)

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Supplies: *Microfiber*

- **Microfiber cloth is the most effective type of cloth to use for cleaning and removing germs from a surface.**
- **Districts will need to organize a microfiber collection, laundering and distribution system.**
  - **The lack of a system can serious hinder efforts to use microfiber!**
  - **Options include either washing on-site and laundering services (available on SWC FAC85)**

See project fact sheet, *Using Microfiber Cloths and Mops for Infection Control* for more information.

Determine Surfaces and Items to Disinfect

CDC Decision Making Tool for Cleaning and Disinfecting

https://www.cdc.gov/coronavirus/2019-ncov/community/cleaning-disinfecting-decision-tool.html

CLEANING with soap and water removes germs and dirt from surfaces. It lowers the risk of spreading infection.

DISINFECTING kills germs on surfaces. By killing germs on a surface after cleaning, it can further lower the risk of spreading disease.

Is the area outdoors?

Yes

Is it an indoor area?

No

Maintain existing cleaning practices.

Coronaviruses naturally die in hours to days in typical indoor & outdoor environments.

Viruses are killed more quickly by warmer temperatures and sunlight.

Has the area been occupied in the last 7 days??

Yes

The area has been occupied within last 7 days.

No

The area has been unoccupied within the last 7 days.

The area will need only routine cleaning.

It is frequently touched surface or object?

Yes

It is a frequently touched surface or object.

No

Thoroughly clean these materials. Consider setting a schedule for routine cleaning and disinfection, as appropriate.

What type of material is the surface or object?

Hard, nonporous surfaces like glass, metal or plastic.

Soft and porous materials like carpet, or seating material.

Visibility dirty surfaces should be cleaned prior to disinfection.

More frequent cleaning and disinfection is necessary to reduce exposure

Thoroughly clean or launder materials.

Consider removing porous materials in high traffic areas.

Disinfect materials if appropriate products are available.

Guidance for Spaces After a Diagnosis of COVID-19

CDC and Massachusetts Guidelines

https://www.cdc.gov/coronavirus/2019-ncov/community/disinfecting-building-facility.html
https://eeclead.force.com/resource/1591036172000/Min_Req

See the guidance for detailed instructions.

Wait 24 hours,

the virus is viable for at least 3 hours *in the air.*

Clean first,

then disinfect!

Consider High Risk Areas

Nurse's Office – e.g., cots, sink areas, waiting area, rails, etc.

The nurse's space may be expanded to provide services during the pandemic.

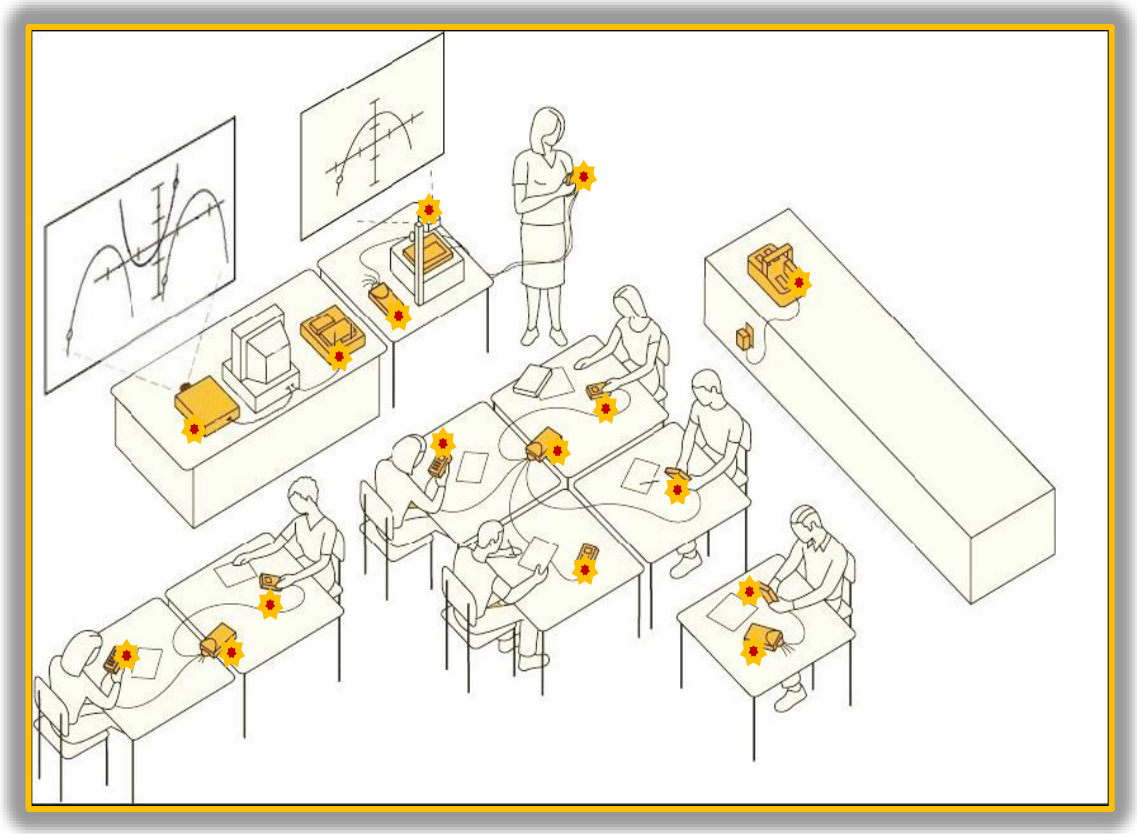
Special Education – e.g., floors, food contact surfaces, OT equipment

Preschool – e.g., floors, food contact surfaces, toys

Consider Floors

- **Routine and targeted disinfection of floors is not necessary, unless:**
  - **there is a blood (regulated) or sewage spill**
  - **required in certain areas of athletic facilities**
  - **children or special education students are crawling or playing directly on the floor**
- **Routine Cleaning**
  - **Clean floors with a microfiber mop (when available) and an all purpose green floor care product.**

Cleaning and Disinfecting



Common High-Touch Points
By
Location in School Building

Customizable Templates

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Work Practices

Ensure Occupational and Occupant Safety

- Always know the hazards of the products you, and/or other staff are using.
- Read labels and safety data sheets to understand the hazards, precautions, safe use, etc.
- Do not bring in unauthorized products.

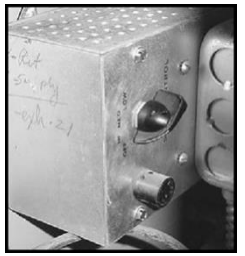
Label

Safety Data Sheet

- Wear PPE – nitrile gloves and chemical splash goggles (particularly when dispensing products.)

Prepare to Safely and Effectively Disinfect

- ***Schedule disinfection activities*** **- when there will be the fewest occupants.**



- ***Ventilate the space as much as possible*** **- the HVAC system should be operating, or the windows open.**

- ***Put on PPE*** **– wear nitrile gloves and chemical splash goggles (if working with the concentrate or a corrosive.)**

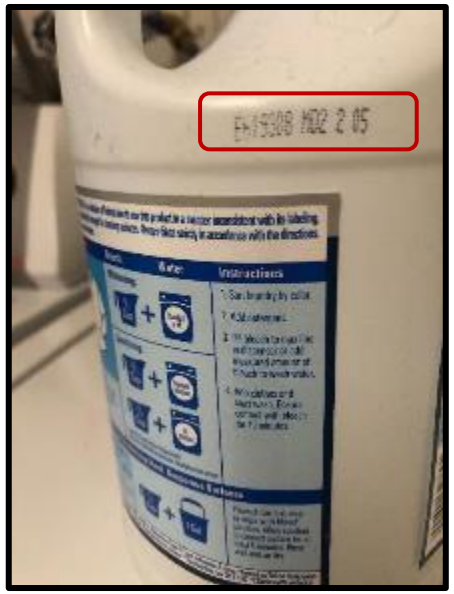
DILUTION CHART Tablet size 13.1g		
Solution ppm (mg/L) available chlorine	Tablets	Gallons of Water
0.5	1	2153
1	1	1076
1.5	1	718
3	1	359
4	1	269
5	1	215
10	1	100
100	1	10
538	1	2
1076	1	1
2153	2	1
4306	4	1
5382	5	1

- ***Follow dilution rate instructions exactly*** **– disinfectants are tested to be effective at specific concentrations for specific germs.**

Developed by Lynn Rose

Prepare to Safely and Effectively Disinfect

- ***Do not mix chemicals!***
- ***Preclean and rinse surface*** **– for disinfectant to be most effective.**
- ***Check expiration date-***
  - **Diluted products have a shorter shelf life.**
  - **Properly discard any expired products.**



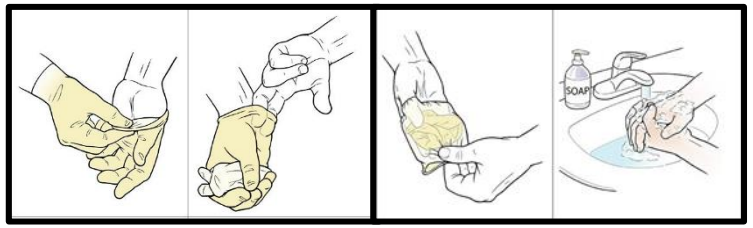
Safely and Effectively Disinfect

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

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

- ***Follow label directions for "contact time"*** **- the length of time it is required to be wet on the surface. It is different for each product.**

- ***Rinse high touch surfaces*** **- if required on the label. Any residue may be hazardous when it comes in contact with skin.**



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

Developed by Lynn Rose

Using Disinfecting Wipes

- There is extensive misuse of wipes.
- This may be due to the many types of wipes, including; disinfecting, sanitizing, cleaning and hand wipes.
- Use the correct product for the job to prevent exposures to disinfectants.
- Either prohibit the use of, or, if use is authorized, provide the wipes, and specify how, when and where they can be used.
- Students should not be using disinfecting wipes.

Using Disinfecting Wipes at School

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

Antimicrobial Pesticides

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

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

What are disinfectant wipes?

☑ Disposable material soaked in disinfectant.

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

What should wipes not be used for?

☒ They are NOT handwipes or baby wipes, and should NOT be used on skin.

☒ They should NOT be used on produce, or have contact with food.

How can I safely and effectively use wipes?

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

Who can use wipes in school?

☑ Only adults should use disinfecting wipes.

☒ Children under 18 should NOT use wipes.

Keep Out of Reach

Where can I get more information?

www.informedgreensolutions.org
Poster funded by: Toxics Use Reduction Institute. UMass. Lowell

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

Strategies for Preventing Cross Contamination (transfer of germs from one location to another)

- **Use one side of a cloth for each surface cleaned. The 8 fold method helps with this.**

- **Use a different set of cloths for different spaces (e.g. kitchen versus bathroom).**
- **Allow laundered cloths to dry before re-use.**
- **Clean hands and shared equipment after disinfecting.**

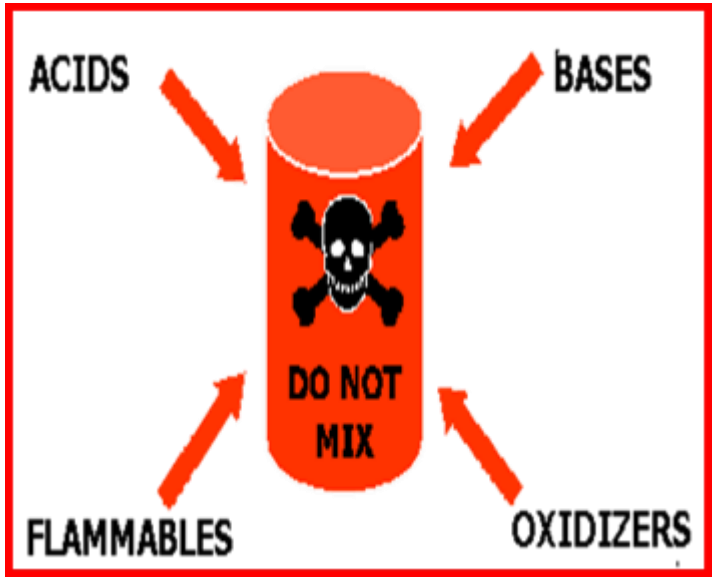
Developed by Lynn Rose

How to Prevent a Beirut Incident in Your School!

Store disinfectant by hazard categories to prevent hazardous reactions.

Common disinfectant ingredients come in the following hazard categories:

- **Acids – lactic acid, citric acid, hydrogen peroxide, Peroxyacetic Acid, some alcohol based products**
- **Bases – quaternary compounds, some alcohol based products are slightly above corrosive**
- **Flammables – alcohol**
- **Oxidizers – bleach, hydrogen peroxide, hypochlorous acid**



Sample shelf storage plan based on chemical compatibility.

Addressing Electronics During the Pandemic

- **Laptops returned to IT from teachers and students:**
  - **may contain and need to be treated for pests (e.g. bedbugs, cockroaches)**
  - **need to cleaned and disinfected for germs**

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

Addressing Electronics During the Pandemic

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

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

Small Group Discussions

- 10 min discussion
  - Give space for everyone to speak up
  - Not recorded
  - I'll give you the 60 sec warning
  - Select someone to offer one key point from your discussion (we may have time for 2 or 3 people to share with the larger group)
- Discuss: What do you see as the biggest challenge for your school/facility?
  - Share tips with each other from your own experiences

Chemistries and Applicators
What Does it All Mean for Disinfection

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

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Safer Disinfecting Chemicals-Processes

- EPA Listed Active Ingredients
  - Citric Acid
  - Caprylic Acid
  - Hydrogen Peroxide
  - L-Lactic Acid
  - Ethanol
  - Isopropanol
  - Peroxyacetic Acid
  - Sodium Bisulfate
- Other Methods/Active Ingredients
  - Steam
  - Hypochlorous Acid
    - Electrolyzed water
    - NaDCC tablets
  - UVC light
  - All Purpose Cleaners
    - Possible but not validated yet

EPA Design for Environment Disinfecting Chemical List

- Products composed of one or more of the active ingredients may be considered for the DfE logo on a case by case basis
  - All ingredients, active or inert, must meet the Safer Choice standard

https://www.epa.gov/pesticide-labels/design-environment-logo-antimicrobial-pesticide-products

EPA-authorized antimicrobial pesticide

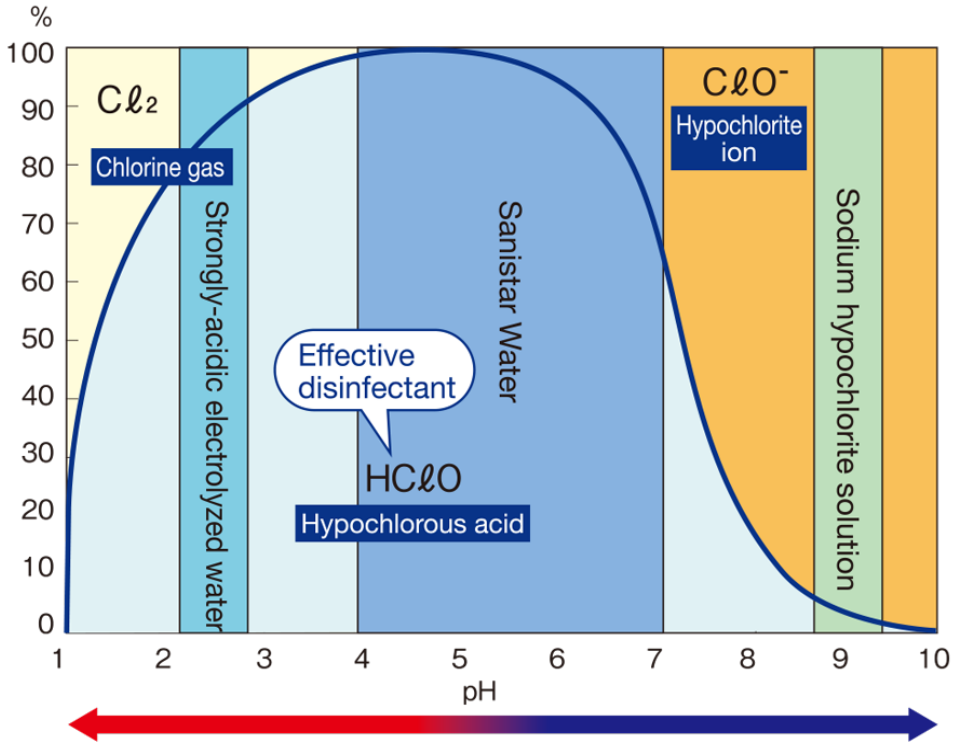
- Is in least-hazardous classes (IV, III) of EPA's acute toxicity category hierarchy
- Is unlikely to have carcinogenic or endocrine disruptor properties
- Is unlikely to cause developmental, reproductive, mutagenic, or neurotoxicity issues
- EPA has reviewed and accepted mixtures, including inert ingredients
- Does not require the use of Agency-mandated personal protective equipment
- Has no unresolved or unreasonable adverse effects reported
- Has no unresolved efficacy failures (associated with the Antimicrobial Testing Program or otherwise)
- Has no unresolved compliance or enforcement actions associated with it
- Has identical formulation as one identified in DfE application approved by EPA

Other Options

- Steam – Dry steam vapor
  - Very effective for cleaning and rapid sanitizing/disinfecting
  - Vendor tests show units effective on
    - Harder-to-kill viruses, such as canine parvovirus
    - Similar human coronavirus, such as coronavirus 229E
  - Expected to be effective according to the U.S. Environmental Protection Agency (EPA)

Other Options

- Hypochlorous Acid (HOCl)
  - Can be generated from various starting points
    - Electrolyzed water
    - Tablets (NaDCC)
  - Dominant active ingredient when operated in pH range of 4-6
    - Other ranges will have mixture of chemicals



Sanistar Water: available chlorine 10 - 30 ppm, pH 4.0 – 7.0

https://www.sanistar.pro/what-is-sanistar-water.html

Electrolyzed Water

Early technology used membranes to force saltwater into two solutions of HOCl and NaOH

1

In the 1980s, single stream systems were developed that produced one solution of HOCl without byproduct

Recently, single stream systems have been innovated to last longer and generate more stable solutions

Sodium Dichloroisocyanurate - NaDCC

- Tablets are available with different NaDCC levels
- Are usually effervescent, allowing the smaller tablets to dissolve in less than one minute
- When added to water, NaDCC generates hypochlorous acid
  - Reacts through oxidization with microorganisms and kills them

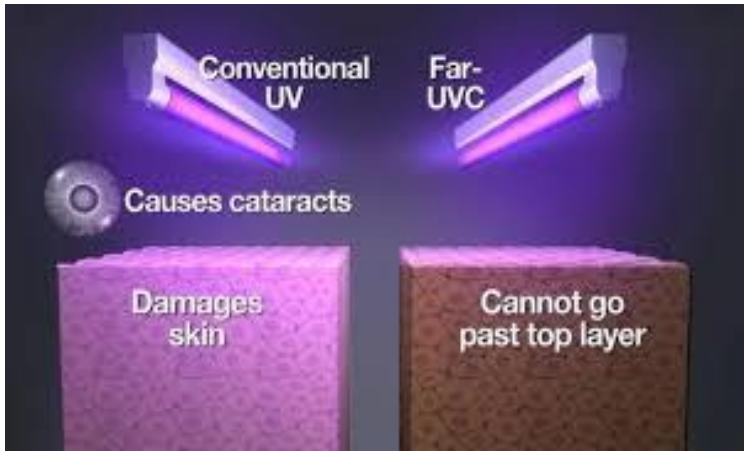
So Why is HOCl not on EPA's DfE List

- Remember that list of things EPA looks for?
  - Has no unresolved compliance or enforcement actions associated with it
- Well, here's the deal
  - During Drinking Water Treatment
    - Chlorine reacts with organic matter naturally present in water to form by-products such as trihalomethanes (THMs), potentially cancer-causing
      - Inadequate epidemiological evidence of carcinogenicity in humans for all four THM compounds
      - Rate of formation for THMs is relatively slow–on the order of days for ultimate formation
- For home use electrolyzed water systems, organic matter is not present in water

UV Light

- Ultraviolet light has been used to stop pathogens in their tracks for decades
- Does it work against SARS-CoV-2?
  - It takes the right kind of UV in the right dosage
  - Complex operation that is best administered by trained professionals
    - At-home UV-light devices that claim to kill SARS-CoV-2 likely aren't a safe bet

UVC - Wavelength 200-280 nm



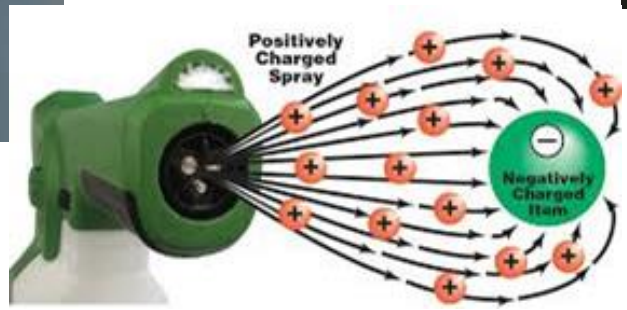
- Shortest ultraviolet wavelength and highest energy
  - Can act as a disinfectant
    - At wavelength of 254 nanometers, UVC successfully inactivates H1N1 influenza and other coronaviruses
      - Severe acute respiratory virus (SARS-CoV)
      - Middle Eastern Respiratory Syndrome (MERS-CoV)
- Causes lesions in DNA and RNA
  - Enough exposure to UVC-254 damages DNA and RNA
    - Can't replicate
    - Effectively killing/inactivating microorganism or virus
- This delivery isn't possible with at-home devices

All Purpose Cleaners-Degreasers

- Does soap work on the SARS-CoV-2, the coronavirus and indeed most viruses?
  - Virus is a self-assembled nanoparticle in which the weakest link is the lipid (fatty) bilayer
  - Theoretically, degreasers should work on dissolving this layer
- Possible but not validated yet

Methods of Application

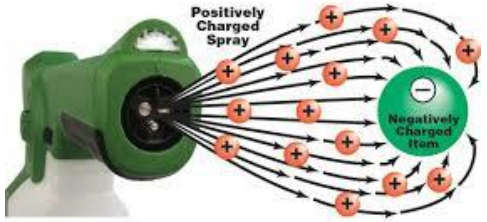
- Wipe on
- Immerse into solution
- Spray bottle
- Electrostatic sprayer
- Fogger or Mister



Safety Still Matters

- Use as Directed
  - CLEAN FIRST still applies
  - Recommended concentration
  - Appropriate dwell time
  - Proper PPE
- Need EPA approval to add electrostatic, fogging or misting spraying directions to both new and currently registered disinfectant products
- Disinfectant product's safety and effectiveness may change based on how it is used

Electrostatic Sprayer



- Most electrostatic sprayers generate positively-charged particles
  - Most surfaces are negatively charged
  - Charged particles stick to most surfaces
  - Particles repel each other and have a better chance to stick to something else
- Traditional wipes/trigger sprays require significant effort and are prone to human error
  - Including missed surfaces

Foggers and Misters

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

TURI Lab Testing

Explore best practices

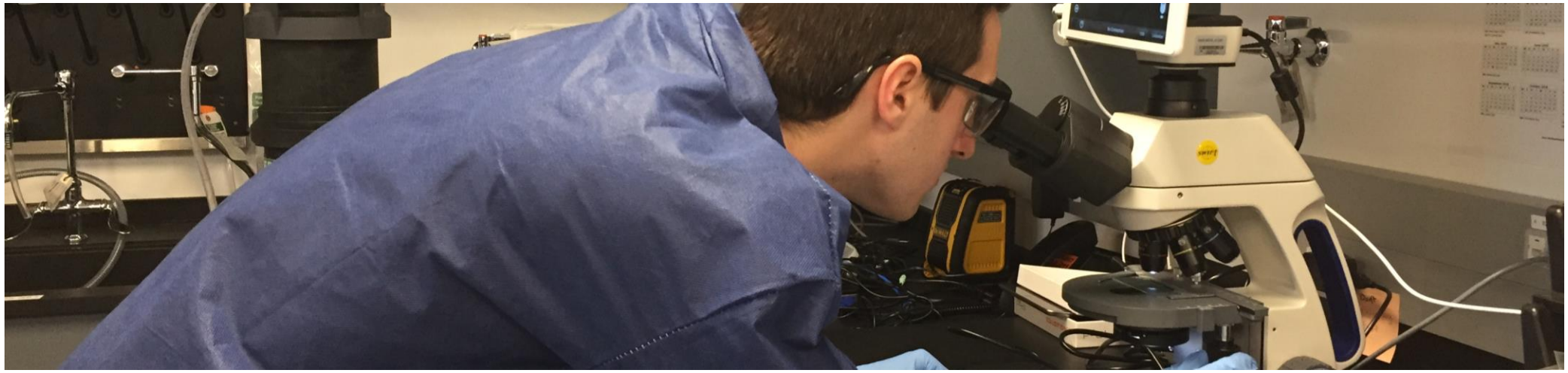
- Limit exposure to COVID-19
- Reducing risk to users of disinfectants

This work will help users select safer and effective disinfecting chemicals

Test common disinfectants as well as safer alternatives to determine performance on virus with similarities to the SARS-CoV-2 virus

TURI Lab Testing

- Preliminary testing
  - Hypochlorous acid vs sodium hypochlorite (bleach)
  - Products will be evaluated for effectiveness at killing MS2 bacteriophage
  - Products will be assessed for concentration and dwell times



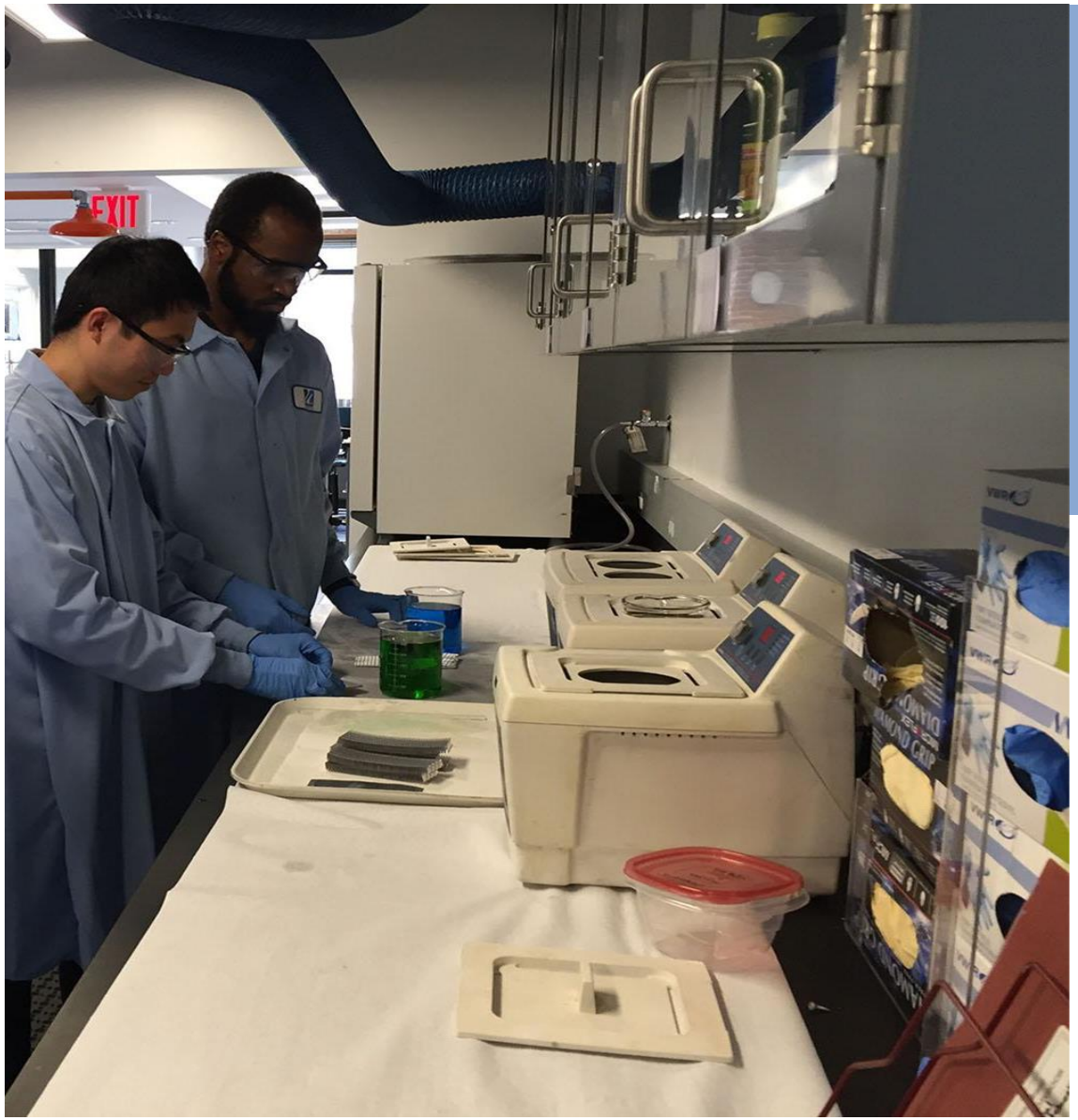
TURI Lab Testing

- Exposure assessment
  - Exposure levels to Cl_2 in air
  - During each phase of use
    - Generation/mixing
    - Applying to surface
    - Dwell times
  - Application methods may include
    - Spray surface-wipe, spray the wipe, immerse cloth
    - Electrostatic spraying
    - Fogging

TURI Lab Testing

- Find effectiveness of safer disinfecting chemicals
  - Citric Acid, Caprylic Acid, Hydrogen Peroxide, L-Lactic Acid, Ethanol, Isopropanol, Peroxyacetic Acid, and Sodium Bisulfate
- Steam
  - Clean, disinfect, dirty disinfecting, real world disinfecting
- UVC
- General purpose cleaners
- Probiotic barrier solutions

Donut forget that we are here to help...



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