Pathogens of Concern in Washington State

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School EHS and IAQ Programs
WSU POSC Energy/Facilities Conference
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Washington State Department of Health

Public Health – Always Working for a Safer and Healthier Washington

Washington State Department of Health
School Environmental Health & Safety Program

Our Mission

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



DOH School Environmental Health & Safety Program

Provide technical support & training

- Local Health Jurisdictions (LHJs)
- Schools

Authority

- RCW 43.20.050(2)(c) Adopt rules controlling public health related to environmental conditions including but not limited to heating, lighting, ventilation, sanitary facilities, cleanliness and space in all types of public facilities including but not limited to food service establishments, schools, institutions, …
- WAC 246-366
- DOH / OSPI K12 Health & Safety Guide

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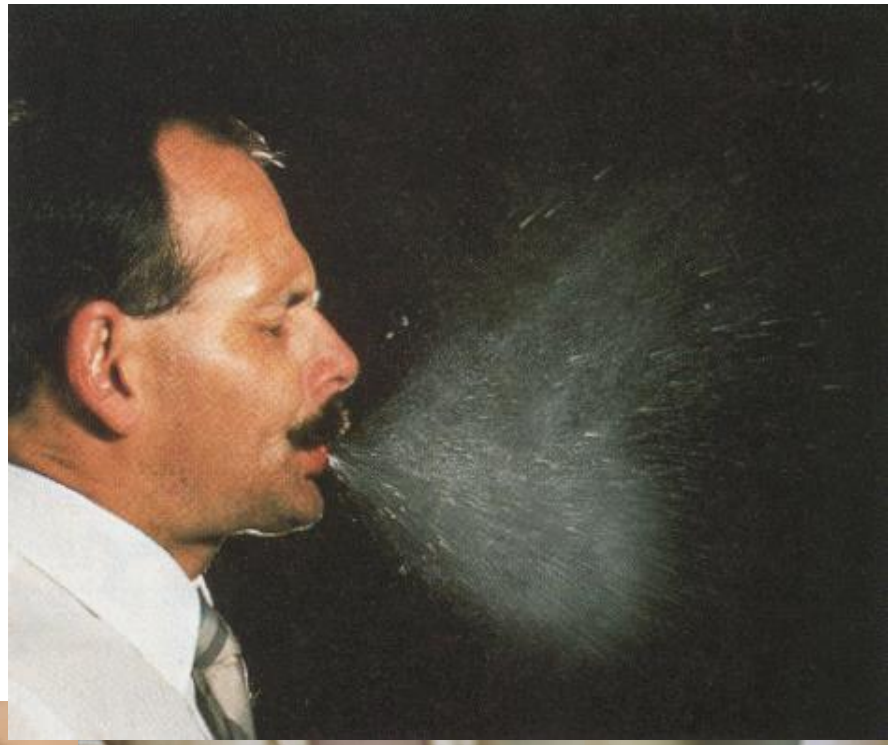
School Environmental Health and Safety

- **Animals**
- **Control of Communicable & Zoonotic Diseases**
  - Disinfection and Green Cleaning
- **Hazardous Chemicals**
  - Arts, Science Labs, CTE
- **Indoor Air Quality**
  - Asthma, Mold, Ventilation, Filtration
- **Injury Prevention**
  - Athletics, Playgrounds, Fall Protection
- **Integrated Pest Management**
- **Lighting**
- **Noise**

How do we get sick?

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



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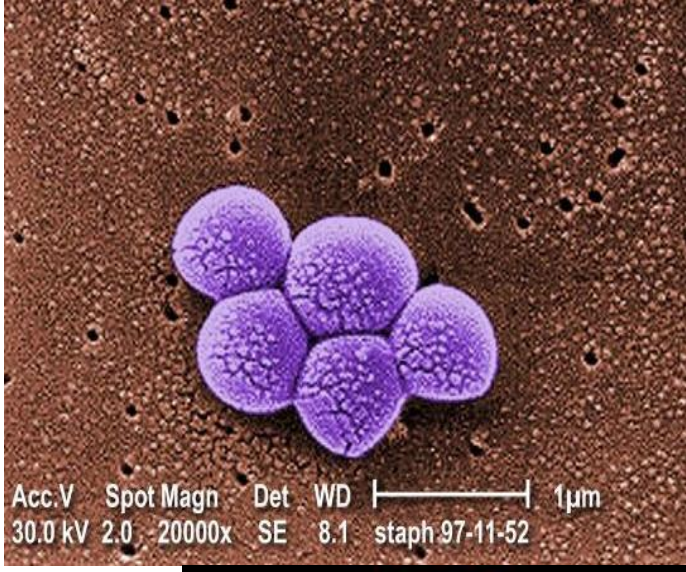
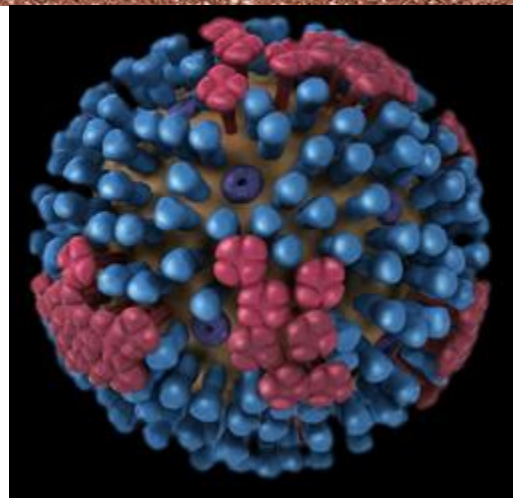
Worried?





- *Clostridium difficile* (C. diff)
- *Enterovirus* D68
- Influenza
- Measles
- *Pertussis*
  Whooping Cough
- MRSA
  Methicillin Resistant Staphylococcus aureus
- Norovirus

Norovirus

- 24-48 hour incubation period
- Sudden onset vomiting, diarrhea , cramping
- Low-grade fever
- Symptoms last 1-2 days
- Viruses in stool and vomit
- Can shed virus for days to 2 weeks after symptoms gone
- Highly contagious (as little as10 virus particles can cause illness)
- Lives for days on surfaces, where it can be “picked up” by others

MRSA

(Methicillin-Resistant *Staphylococcus aureus*)

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

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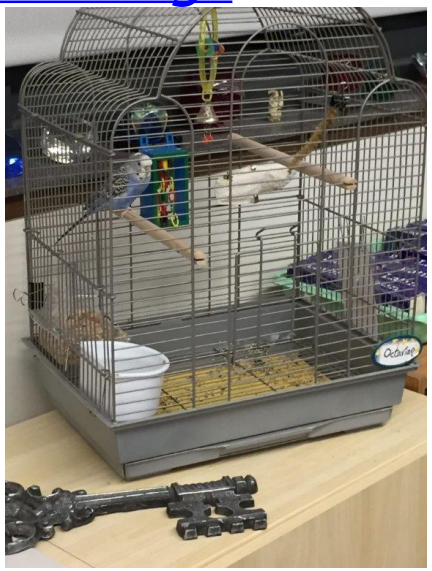
Zoonotic Diseases
Animal Concerns

- *Salmonella*
  - Reptiles
  - Chicks
  - Owl Pellets
- Psittacosis (parrot fever)
- Classroom Pets
  - *Compendium of Measures to Prevent Disease Associated with Animals in Public Settings*
- Rabies
- West Nile Virus
- Hanta Virus
- Lice
- Bed bugs



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Salmonellosis

- Salmonellosis is an intestinal disease
- Exposure to *Salmonella* bacteria can be through direct and indirect contact with infected animals
- Main route of transmission is hand-to-mouth contact (fecal-oral)
- Transmitted by pets and farm animals, especially reptiles and young poultry
  - Turtles, lizards, and snakes
  - Chicks and ducklings

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Salmonellosis

School outbreak of salmonellosis associated with reptiles

- Classroom pet turtle's dirty tank may have triggered outbreak
- 23 ill, mostly fifth-grade students (Massachusetts 2006)

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Salmonellosis

School outbreaks of salmonellosis associated with owl pellets

- 59 ill after Science Club students dissected pellets at two elementary schools (Minnesota, 2001) on the cafeteria table.
- Pellets from a single owl

E coli

- E coli is an intestinal disease
  - Can lead to hemolytic uremic syndrome (HUS)
- Exposure to *Escherichia coli* O157:H7 bacteria can be through direct and indirect contact with infected animals
- Main route of transmission is hand-to-mouth contact
- Farm animals
  - Cows and calves
  - Goats
  - Sheep

Rabies

Description

- Rabies is a viral disease of the central nervous system
- Exposure to the virus is through direct contact with rabid animal
- Main route of transmission is a bite from a rabid animal

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Rabies

Abnormal Behavior

- A rabid animal acts sick
  - staggering
  - trembling
  - glazed eyes
  - nocturnal animal active in daylight
  - weakness
  - paralysis
  - confusion
  - unprovoked aggression

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Rabies

Rabid Bats at School

- Dead bat found between two playground at elementary school tested positive for rabies (Alabama, 2006)
- Bats bite two at University of Florida –Two people were bitten by bats in the same week, including a student who must undergo rabies shots (Florida, 2005)

Bed Bugs

- Work with a pest control company committed to using IPM
- Cleaning/sanitation/clutter control
- Resources
  - DOH Bed Bugs
  - Pest Press: Bed Bugs
  - Bed Bug Information EPA
  - Bed Bug Action Plan for Schools Virginia Tech

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Head Lice

- Parasitic insect adapted to living mainly on the scalp and neck hairs
- Not a health hazard or responsible for the spread of any disease
- Not a sign of uncleanliness
- Transmitted by direct contact with live louse through head-to-head contact or through contact with personal articles such as hats combs

- School District applied a lice insecticide without pre-notification or posting.
- Made the application during recess to the collars and hoods of about 20 coats.
- Residues detected on the coats ranged from 5 to 16 µg/sample.
- Two children had headaches and were nauseated and one child had two very serious asthma attacks that evening.

Dave Zamora

Ticks

- Blood-feeding parasites
- Most tick species wait on low-lying vegetation for an unsuspecting animal to brush against them
- Some (soft ticks) prefer hiding in animal burrows and cabins – come out to feed at night (short feeding time)

- Hard Ticks
  - Lyme Disease
  - Rocky Mountain Spotted Fever
  - Open forest, sagebrush, grasslands, woodland edges
- Soft Ticks
  - Tick-borne relapsing fever
  - Most common tick-borne disease in WA.

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Hantavirus

Hantavirus pulmonary syndrome is caused by *Sin Nombre* virus

Carried by deer mice (*Peromyscus maniculatus*)

Transmitted through inhalation of dust from rodent droppings or nest

Most exposures occur when people are cleaning, living, visiting, or working in rodent infested building, homes, barns, and garages

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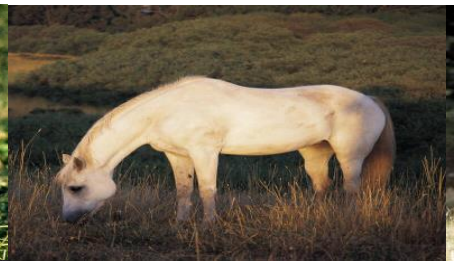
Cleaning up Rodent Infested Areas

- Air out enclosed areas
- PPE
- Do not stir up dust
- Thoroughly wet contaminated areas with 10% bleach.
- Soak for 5 minutes
- Steam clean upholstered materials/carpet.
- Clean/Disinfect gloves before removal.
- Double bag with all cleaning materials, dispose.
- Wash hands thoroughly.

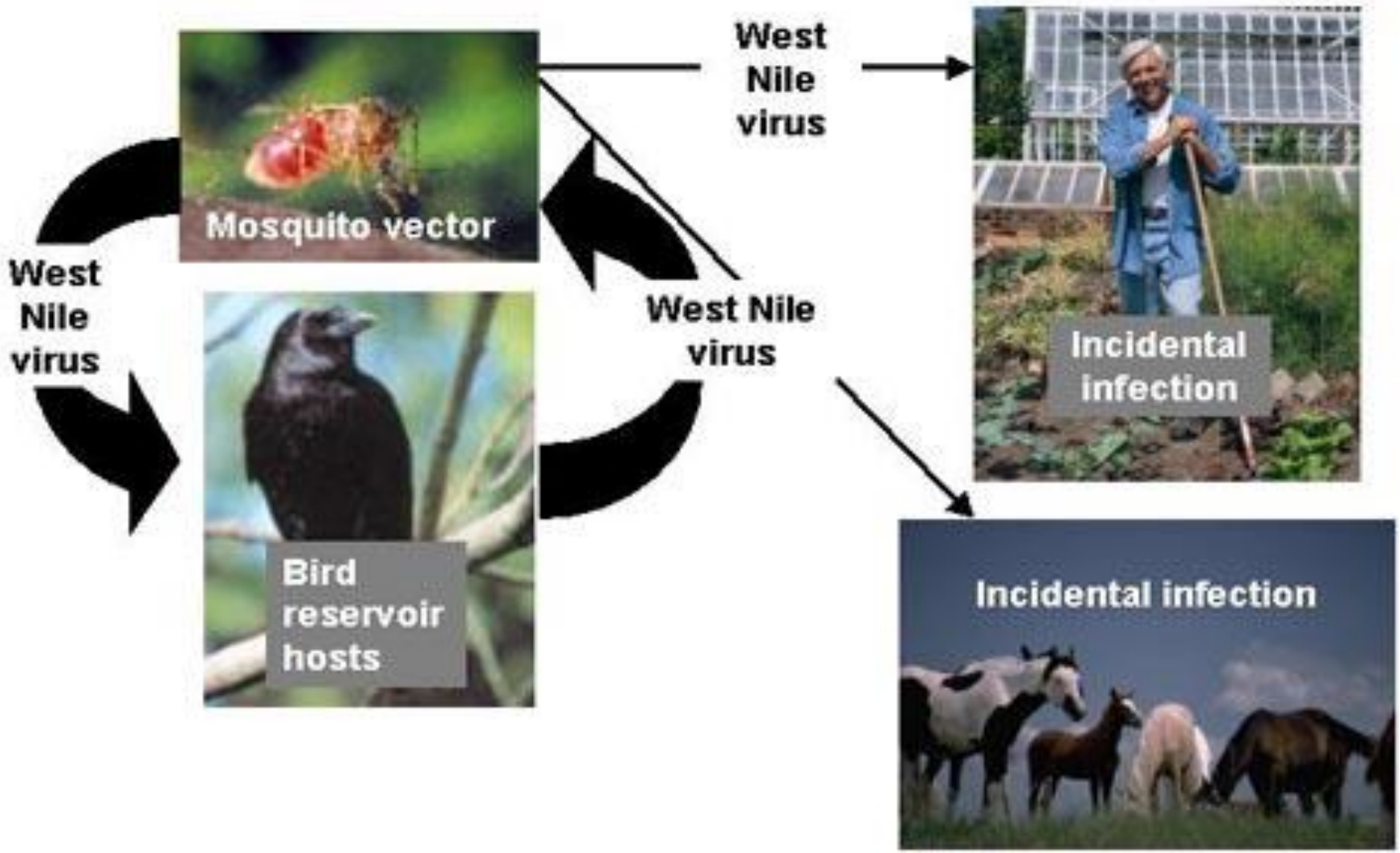
West Nile Virus






- Most people infected will not get sick
- About 1 in 5 infected – mild symptoms
  - Fever, headache, body aches
- About 1 in 150 will develop severe illness
  - Headache, high fever, neck stiffness, stupor, disorientation, tremors, convulsions, muscle weakness, paralysis, coma
- People over age 50 are more likely to develop serious illness
- Don't get bit
- Report dead birds: http://www.doh.wa.gov/YouandYourFamily/IllnessandDisease/WestNileVirus/ReportaDeadBird

West Nile Virus Transmission Cycle



Eliminate Standing Water

Empty any standing water and change water frequently

DEET

Know how to use it safely

15% DEET for children max

30% DEET for adults max

Select a repellent that offers the best protection for the time you will be outdoors

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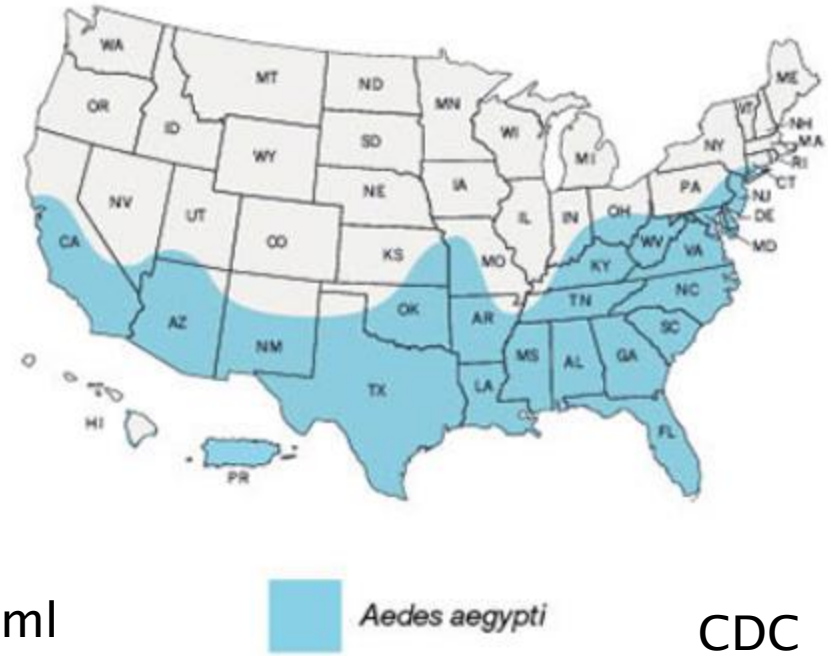
Zika Virus

- Mosquitoes – *Aedes aegypti*, *A. albopictus* – not in WA
- Only 1 in 5 develop symptoms
- Fever, rash, joint pain, red eyes.
- Mild, few days – a week
- Body fluids
- Severe birth defects
- Chikungunya
  - Fever, joint pain
- Dengue
  - Fever, headache, pain, joints
  - Hemorrhagic fever

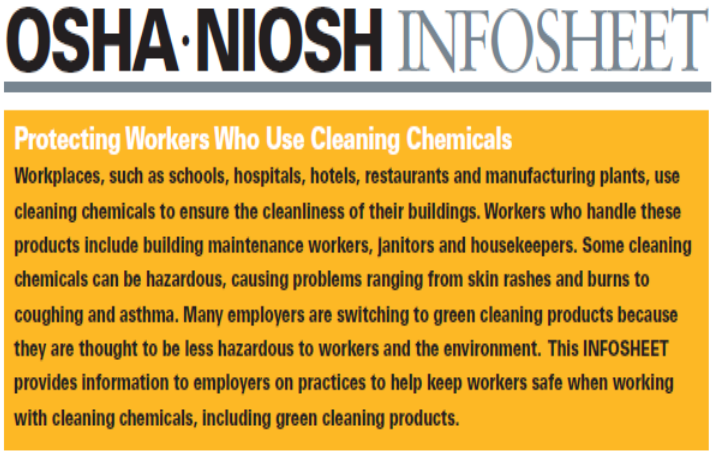


http://www.cdc.gov/zika/index.html

CDC

Custodial and Maintenance the Front Line

- OSHA-NIOSH Information Sheet
  - Protecting Workers Who Use Cleaning Chemicals, July 2012
- www.cdc.gov/niosh/docs/2012-126/



OSHA·NIOSH INFOSHEET

Protecting Workers Who Use Cleaning Chemicals

Workplaces, such as schools, hospitals, hotels, restaurants and manufacturing plants, use cleaning chemicals to ensure the cleanliness of their buildings. Workers who handle these products include building maintenance workers, janitors and housekeepers. Some cleaning chemicals can be hazardous, causing problems ranging from skin rashes and burns to coughing and asthma. Many employers are switching to green cleaning products because they are thought to be less hazardous to workers and the environment. This INFOSHEET provides information to employers on practices to help keep workers safe when working with cleaning chemicals, including green cleaning products.

Keeping Staff Safe

- Trained
  - Always wear appropriate PPE
- The label
- The SDS
- Containers labeled, secured
- Use automated chemical dispenser/dilution
- Ventilation!
- Maintain equipment in good working order
- Wash hands with soap and water frequently!
  - Hands can be contaminated through small holes in gloves – wash after removing

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.

NASN

National Association of School Nurses

www.cleaningforhealthyschools.org/documents/NASN_poster_greencleaning.pdf

Cleaning Products – How Much is Too Much?

- Irritation:
  - Respiratory, Skin, Eye
- Burns
- Endocrine Disruptors
- Reproductive Hazards
- Persistent Bioaccumulative Toxins (PBTs)

Protect Yourself:

Cleaning Chemicals and Your Health

Working with cleaning chemicals can cause:

- Coughing
- Wheezing
- Red, Itchy Eyes
- Skin Rashes
- Skin and Eye Burns
- Shortness of Breath
- Sore Throat
- Headaches or Dizziness
- Nosebleeds
- Asthma

If you have health problems that you think are caused by using cleaning chemicals, tell your supervisor and ask to see a doctor.

What You Need to Know

Do not mix cleaning products that contain bleach and ammonia. Dangerous gases can be released and can cause severe lung damage.

Your employer is required to provide a safe workplace that includes:

- **Sufficient ventilation (airflow) when using cleaning chemicals.**
- Protective clothing, gloves, and safety goggles, when needed.
- Labels on containers of cleaning chemicals.
- Training on the hazards of cleaning chemicals you are using and safe work practices.

Your employer must train you to:

- Know the hazards of cleaning chemicals BEFORE using them.
- Know how to use and store cleaning chemicals safely.
- Know how and when to dilute cleaning chemicals you are using.
- Know what to do if there is a spill or other emergency.
- Know how to obtain and use hazard information on labels and material safety data sheets (MSDS).
- Know how and when to use protective clothing, gloves, and safety goggles.

Remember

- Wash your hands after using cleaning chemicals and before eating, drinking, or smoking.

DHHS (NIOSH) Publication No. 2012-125 OSHA Publication No. 3511-2-12

Green Cleaners

What are they?

- **Cleaning products certified by independent organizations as safer to use and less harmful to your health and the environment.**
- **Cleaners with "green" in their name do not mean it has been certified.**

Are Green Cleaners Effective at Cleaning?

- **Many have met performance standards for its intended use.**
- **Also, many green cleaners are "fragrance-free" but still clean effectively. "Clean" does not have an odor!**

Safety Reminder

- **You may need to use protective clothing, gloves or safety goggles with some certified green cleaners. Ask your employer.**

Microfiber Mop Systems

- Reduce chemical use (~50 – 75%)
- Cut water use (~ 90%) ~100,000 gallons/year
- Reduce injuries (chemical exposure, back strain, accidents)
- Effective (reduce dirt, avoid cross-contamination)

Kids Don't Belong on Cleanup Crews

- http://www.efc.gwu.edu/library/efc-blog/kids-dont-belong-on-cleanup-crews/
- By Jerome A. Paulson, MD, FAAP
- Child or adolescent volunteers are still in the formative part of their lives when they are more vulnerable to environmental hazards than are adults (Cohen-Hubal, et al., 2014). At this point in their lives, their brain, lungs, endocrine system and other parts of the body are still developing; therefore, they are more vulnerable to chemical, physical and biological toxicants that they can encounter in their environment.

Classroom Cleaning Tips for Teachers

http://www.doh.wa.gov/CommunityandEnvironment/Schools/EnvironmentalHealth/ClassroomCleaning

- Teach good handwashing habits
  - Limit hand sanitizers, alcohol-based only
- Cleaning, Sanitizing, and Disinfecting
  - If students are helping to clean:
    - 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.
- Rely on Cleaning to Remove Dirt and Germs
  - All-purpose cleaner for the classroom
  - Microfiber cleaning cloths
  - Disinfection – responsibility of the custodial staff
- Discourage disinfecting wipes
  - Disinfecting wipes are often overused. They aren't appropriate for general cleaning when an all-purpose cleaner or soap and water would suffice.
  - Disinfecting wipes (such as 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.

Most Commonly Reported Lost Time Injuries to Janitors and Custodians

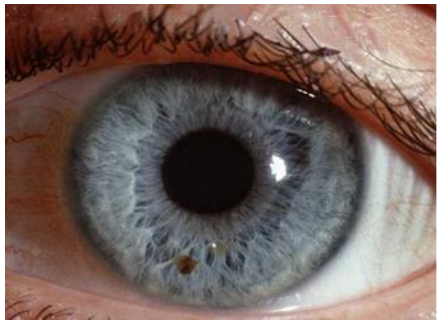
Lost time injuries are those that are so serious, the worker is off work for three days or more.

Healthy Vision Month

- "While workers have a vested interest in safeguarding their eyes, employers have a legal and ethical responsibility to keep workers safe from hazards, including those that may impact vision." NIOSH Blog
- "Every day, about 2,000 US workers receive medical treatment because of eye injuries sustained at work. The most common causes of these injuries include: small particles or objects striking the eye, blunt force trauma, chemical burns, and thermal burns."
- Assessment
- Lighting
- PPE
- Emergency eyewash

Floor Stripper Ingredients and Risks to Users

Strippers are most dangerous to eyes and skin – even when diluted.	
Butoxyethanol	Absorbs through skin. Damages blood, liver, kidneys, developing babies.
Monoethanolamine	Absorbs through skin. Damages blood, liver, kidneys, developing babies. Can damage eyes and skin.
Sodium hydroxide or Sodium Metasilicate	Can cause blindness and severely damage skin.



Chemical Hazards from Cleaning Products – Module 1, L&I:
www.lni.wa.gov/safety/trainingprevention/online/courseinfo.asp?P_ID=142

Clean – Sanitize – Disinfect?

- **Cleaners, Soaps, Detergents**
  - Remove dirt/organics.
- **Sanitizers**
  - Reduce germs from surfaces – 99.9%.
- **Disinfectants**
  - Destroy or inactivate germs and prevent them from growing.

http://www.cdc.gov/flu/pdf/freeresources/updated/cleaning_disinfecting_schools.pdf

Cleaning and/or Disinfecting

- High touch surfaces
  - Door handles
  - Faucets
  - Keyboards
  - Railings
  - Phones
  - Drinking Fountains
- Bathrooms
- Drinking Fountains
- Where someone is ill

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Restrooms

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

Athletic Areas / MRSA

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

- MRSA Toolkit for Middle and High Schools - TPCHD
- MRSA Toolkit for Elementary Schools - TPCHD

Cleaning Products – How Much is Too Much?

- Irritation:
  - Respiratory, Skin, Eye
- Burns
- Endocrine Disruptors
- Reproductive Hazards
- Persistent Bioaccumulative Toxins (PBTs)

Choosing Products

- Third Party Certified (Green Seal, UL GREENGUARD)
- EPA Safer Choice
- Neutral pH
- Low hazard rating
- Use only when and where needed
- Meets or exceeds the California VOC requirements
- Say No
  - phosphates, dye, fragrance, butyl cellusolve, nonylphenol ethoxylate
- Disinfectants – EPA approved for the intended purpose

http://www.epa.gov/oppad001/chemregindex.htm

Less-toxic Ingredients

Use these:	Instead of these:
Alcohol ethoxylates and/or polyglucosides	Nonylphenol ethoxylates or alkylphenol ethoxylates
Hydrogen peroxide	Harsh acids/alkali builders
Corn based esters	Petroleum distillates
Vegetable derived surfactants	Petroleum derived surfactants
Fruit derived solvents and acids	Petroleum solvents or harsh acids

Special Concerns

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

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Choosing Disinfectants

- EPA/WA ST registered
  - ~400 Danger level (Toxicity Class 1) labeled for use in WA schools
  - Out of 30 Danger level disinfectants found in schools, most required protective eyewear, chemical resistant glove, protective clothing
- Efficacy
- Label
  - All 30 used contrary to the label directions for PPE
- PPE
- Hazard level
- SDS
- Beware marketing

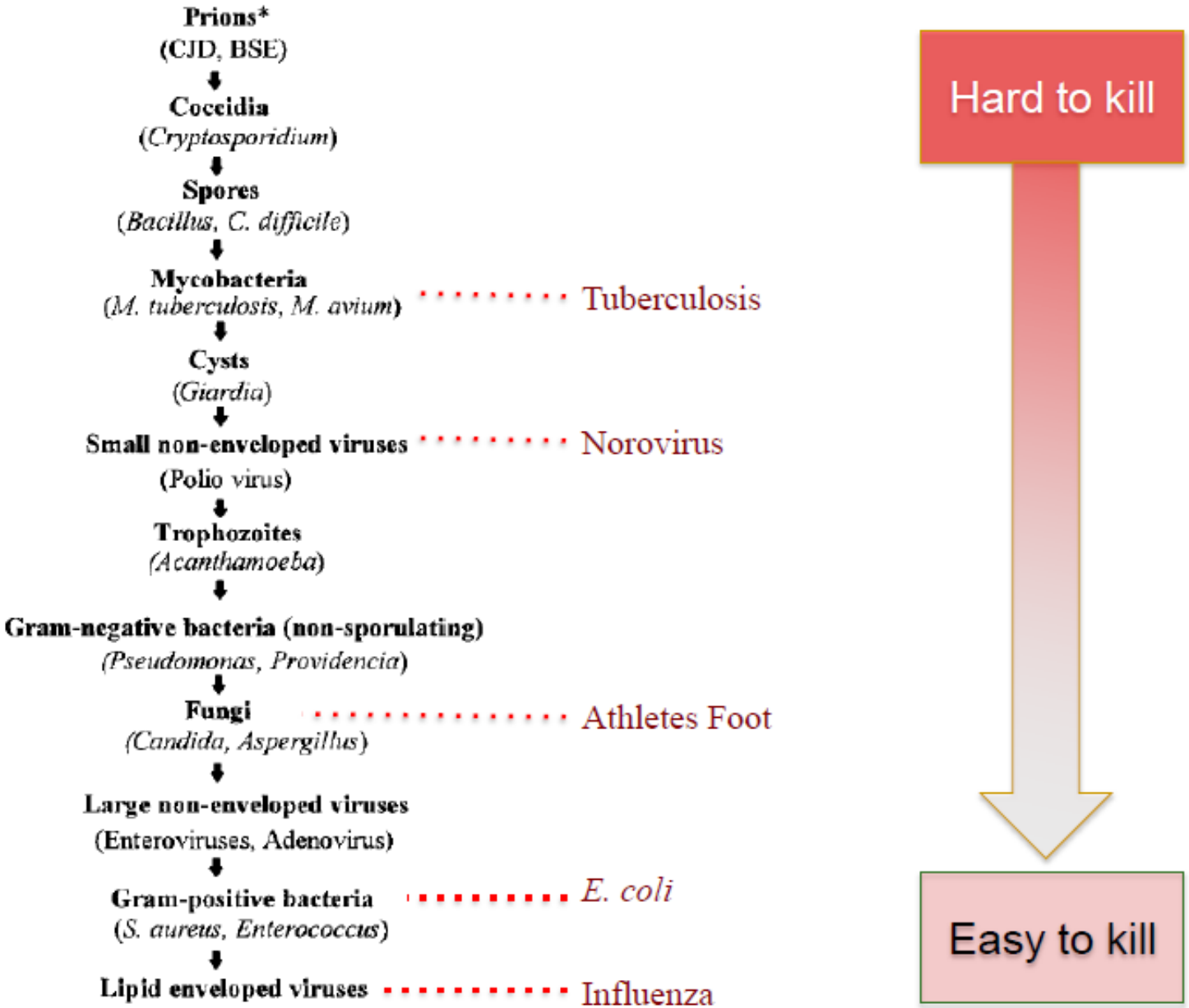

FIG. 1. Descending order of resistance to antiseptics and disinfectants. The asterisk indicates that the conclusions are not yet universally agreed upon.

Source: McDonnell & Russell, 1999

Characteristics of Selected Disinfectants

For More Information, see the 'Disinfection 101' document at 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	Betadyne® 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.

the Center for Food Security & Public Health
Iowa State University
www.cfsph.iastate.edu

Safer Products and Practices for Disinfecting and Sanitizing Surfaces

San Francisco Department of the Environment

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[1]	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[2]	No	No[3]	Yes	None	Low
Quaternary Ammonium Chloride Compounds (Quats)	No	Suspected	Yes	One compound[4]	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[5]	No	Yes	High acute	Low

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

Disinfecting and Sanitizing with Bleach
Guidelines for Mixing Bleach Solutions for Child Care and Similar Environments

Preparation Tips

- **Prepare** a fresh bleach solution each day in a well-ventilated area that is separate from children.
- **Label** bottles of bleach solution with contents, ratio and date mixed.
- **Use cool water. Always add** bleach to cool water, **NOT** water to bleach.
- **Wear** gloves and eye protection.
- **Prepare** solution in an area with an eye wash.

Disinfecting Solutions

For use on diaper change tables, hand washing sinks, bathrooms (including toilet bowls, toilet seats, training rings, soap dispensers, potty chairs), door and cabinet handles, etc.

Water	Bleach Strength* 2.75%	Bleach Strength* 5.25-6.25%	Bleach Strength* 8.25%
1 Gallon	1/3 Cup, plus 1 Tablespoon	3 Tablespoons	2 Tablespoons
1 Quart	1½ Tablespoons	2¼ Teaspoons	1½ Teaspoons

Sanitizing Solutions

For use on eating utensils, food use contact surfaces, mixed use tables, high chair trays, crib frames and mattresses, toys, pacifiers, floors, sleep mats, etc.

1 Gallon	1 Tablespoon	2 Teaspoons	1 Teaspoon
1 Quart	1 Teaspoon	½ Teaspoon	¼ Teaspoon

Disinfection of non-porous non-food contact surfaces can be achieved with 600 parts per million (ppm) of chlorine bleach. To make measuring easier, the strengths listed in this table represent approximately 600-800 ppm of bleach for disinfecting, and approximately 100 ppm for sanitizing. Chlorine test strips with a measuring range of 0–800 ppm or higher can also be used to determine the strength of the solution.

Contact your local health jurisdiction for further instructions on cleaning and disinfecting if specific disease or organisms are identified as causing illness in your program.

***Use only plain unscented bleach** that lists the percent (%) strength on the manufacturer's label. Read the label on the bleach bottle to determine the bleach strength. For example, Sodium Hypochlorite…6.25% or 8.25%.

Steps to Follow

- **Clean** the surface with soap and water before disinfecting or sanitizing.
- **Rinse** with clean water and dry with paper towel.
- **Apply** chlorine bleach and water solution to the entire area to be disinfected or sanitized.
- **Air dry** for at least 2 minutes.

This chart was created by the Disinfection Workgroup led by the Washington State Department of Health. Workgroup members consist of staff from the Department of Early Learning, Snohomish Health District, Local Hazardous Waste Management Program in King County, Washington State Department of

Sporicide / Noro / EV D68 / Hanta

- Blood spills, diarrheal stools, rodent droppings 5000 ppm bleach
- Surfaces must be cleaned with soap and water first
- Usual 1:10 solution – 1 part bleach to 9 parts water
  - 6.25 %: 1 1/2 cups bleach/1 gallon water
  - 8.25 % bleach, (1:9) – 1 1/4 cups bleach/1 gallon water
  - Wet contact time – diarrheal stools: 5+ minutes
  - Wet contact time – Noroviruses: 1+ minute
  - Wet contact time – rodent droppings: 10 minutes
    - See WSDOH Hantavirus webpage for specifics.

➢ This is an extremely concentrated bleach solution. Protect eyes, skin, and clothing during preparation and use. Keep the area well ventilated.

Fungi/Ringworm/Athlete's Foot

- 1) Clean thoroughly with soap and water to remove all organic material.
- 2) Apply chlorine bleach solution with a concentration of 2400 ppm (see below), leaving the surface wet for ten minutes or a 3600 ppm bleach solution staying wet for five minutes.
- 3) Rinse with clean water.

- Fungus can be difficult to eliminate. Where persistent, multiple applications of bleach at a concentration of 5000 ppm, with drying in between, may be necessary to kill.

OR

- Use an EPA registered disinfectant where the label indicates it is effective against fungi.

http://www.cdc.gov/fungal/diseases/ringworm/index.html

32 Students Complain of Rash After Using School Restroom

- **NORTH CAROLINA** – A **cleaning crew mistake** leads to students to develop rashes after exposure to chemical. (WBTV)
  School leaders say a cleaning company that contracts with the district used the wrong chemical to clean the toilets, including the seats.
- According to the GCA report, the chemical used is Consume Eco-lyzer, manufactured by Spartan Chemical. It is used as a disinfectant and helps with odor control.
- "She was in pain, she said it burned really bad, she couldn't hardly sit down,"
- GCA provided the school a list of correction actions including:
  - A review of the steps and actions that led to occurrence of this incident.
  - What steps and procedures should have been taken to avoid this incident.
  - Re-training for the proper use of the chemical dilution system.
  - Re-training for the proper use of chemicals and appropriate applications.
  - Retraining of supervisors for product usage and dilution control.

Respiratory Symptoms and Skin Irritation Among Hospital Workers Using a New Disinfection Product — Pennsylvania, 2015

- Hawley B, Casey ML, Cox-Ganser JM, Edwards N, Fedan KB, Cummings KJ. Notes from the Field. Respiratory Symptoms and Skin Irritation Among Hospital Workers Using a New Disinfection Product — Pennsylvania, 2015. MMWR Morb Mortal Wkly Rep 2016;65:400-401. DOI: http://dx.doi.org/10.15585/mmwr.mm6515a3
- http://www.cdc.gov/mmwr/volumes/65/wr/mm6515a3.htm?s_cid=mm6515a3_e#suggestedcitation
- New disinfection product – hydrogen peroxide, peroxyacetic acid, and acetic acid
- EPA-registered non-bleach sporicide, one-step cleaner, virucide, and deodorizer
- No PPE when it is diluted with water by an automated dispenser
- Eye and nasal problems, asthma-like symptoms, shortness of breath, skin problems, wheeze, chest tightness, and cough

HILLYARD

Suprox-D®

CLEANER • DISINFECTANT • *VIRUCIDE •
DEODORIZER • KILLS GERMS**

Effective in the presence of 5% serum contamination • Effective in the presence of 200 ppm hard water (as $CaCO_3$) **Pseudomonas aeruginosa, Staphylococcus aureus, Salmonella (choleraesuis) enterica, MRSA, CA-MRSA, Escherichia coli, Escherichia coli* O157:H7, Influenza A, HIV-1

ACTIVE INGREDIENTS	
Octyl decyl dimethyl ammonium chloride	1.728%
Dioctyl dimethyl ammonium chloride	0.864%
Didecyl dimethyl ammonium chloride	0.864%
Alkyl (50% C_{14}, 40% C_{12}, 10% C_{16}) dimethyl benzyl ammonium chloride	2.304%
OTHER INGREDIENTS	94.240%
Water, Hydrogen Peroxide, Amine Oxide, Phosphoric Acid	
Total	100.000%

KEEP OUT OF REACH OF CHILDREN

DANGER

FIRST AID

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. **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 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. **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.

NOTE TO PHYSICIAN

Probable mucosal damage may contraindicate the use of gastric lavage.

See side panels for additional precautionary statements.

EPA Reg. No. 1839-224-1658
EPA Est. No. 1658-MO-1

HIL0016106

Distributed by: HILLYARD INDUSTRIES, INC. • PO Box 909 • St. Joseph, Missouri 64502-0909 U.S.A. • Telephone: 816-233-1321

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No Foggers

Too Toxic

Spartan®

GERMICIDAL™
Bowl Cleanse
DISINFECTS CLEANS
DEODORIZES

ACTIVE INGREDIENTS:

Hydrogen chloride	23.00%
n-alkyl (C_{14} -50%, C_{12}-40%, C_{16}-10%) dimethyl benzyl ammonium chlorides	0.05%
INERT INGREDIENTS:	76.95%
Total	100.00%

EPA Reg. No. 5741-11

EPA Est. No. 5741-OH-1

Keep Out of Reach of Children

DANGER • POISON

See other precautions on rear panel.

Electrolyzed Water Devices

- EPA device registration does not reflect efficacy
- 2 types –
  1. tap water + salt = dilute bleach
  2. tap water alone
- Hexavalent chromium
- "Type 1 devices may conceivably be effective as antimicrobials, based on the presence of chlorinated electrolytic products. However, there is not US EPA registration system available to confirm their efficacy for consumers,…With Type 2 devices, the lack of a plausible mechanism casts additional doubt on their germ-killing capabilities, and the presence of chromium ions in the water may pose some risk."

Safer Products and Practices for Disinfecting Surfaces
San Francisco Environment, page 22
http://www.sfenvironment.org/download/safer-products-and-practices-fo

Registered in WA ST

82341-1_EcaFlo Anolyte_20130516_1.pdf

EcaFlo® Anolyte

Aqueous Solution of Sodium Chloride

Active ingredient HOCl derived from naturally-occurring salt minerals and water.

A New Generation of Disinfectant

Cleans, Deodorizes, Disinfects, and Kills:

- Clostridium difficile (C. diff) spores
- Mycobacterium bovis (Tuberculosis)
- Human Immunodeficiency Virus Type 1 (HIV-1)
- Klebsiella pneumonia New Delhi (NDM-1) Carbapenem Resistant
- Methicillin Resistant Staphylococcus aureus (MRSA)
- Vancomycin Resistant Enterococcus faecalis (VRE)

(See back panel for additional organisms)

This product meets AOAC efficacy testing standards for hospital disinfection. Meets requirements of OSHA's Bloodborne Pathogen Guidelines.

ACTIVE INGREDIENT:
Hypochlorous Acid 0.046%
OTHER INGREDIENTS: 99.954%
TOTAL: 100.000%
Contains 500 ppm Free Available Chlorine

Anolyte cleans and disinfects: hospitals, clinics, ambulances, emergency rooms, dentist's offices, home health care settings, retirement homes, correctional facilities, dormitories, schools, day care centers, gymnasiums, locker rooms, hotels, cruise ships, airplanes, trains, theaters, stadiums, food processing plants, restaurants, bars, grocery stores, veterinary facilities, kennels, pet shops, office buildings, public facilities, and homes.

Do not use on steel, aluminum, silver, or chipped enamel. Prolonged contact with metal may cause pitting or discoloration. Test in an inconspicuous place for color washout or contact incompatibility.

Manufactured by:
I.E.T., Inc.
4235 Commerce St, Little River, SC 29566
(843) 390-2500 info@ietltd.net

EPA Reg. No. 82341-1
EPA Est # 82341-SC-1

NSF Reg. No. 141871 and 142320
NSF Category Code D2 -
Antimicrobial agents not requiring a rinse

EcaFlo® Anolyte must be used within 30 days after being produced.

500 ppm
-Clean surface first
-10 minute contact time
-C. diff
-Mrsa
-P. aeruginosa
-Noro
-Rhino
-HIV

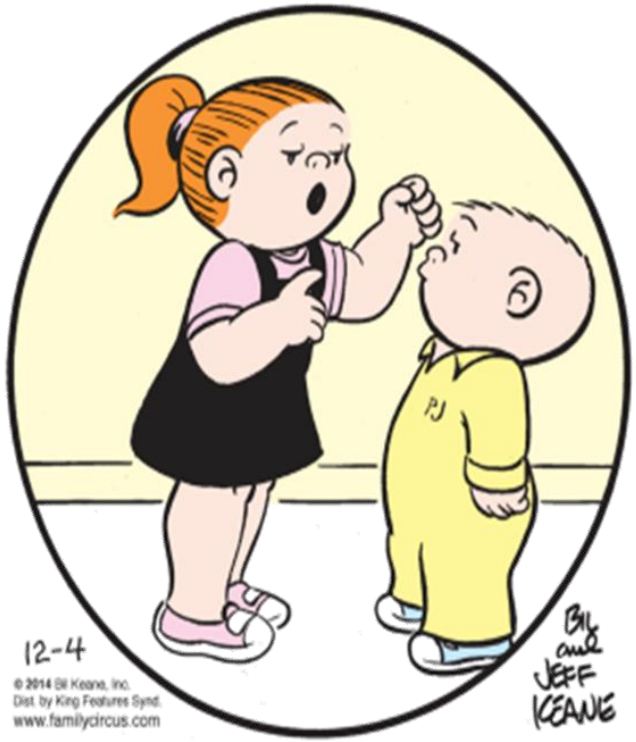
Sanitizer
200 ppm
-Clean surface
-2 minute CT
-air dry

Emergency Washing Facilities

- DOSH Directive 13.0 July 15, 2011
  http://www.lni.wa.gov/Safety/Rules/Policies/PDFs/DD1300.pdf
- WAC 296-800-150, First Aid, and Chapter 296-307 WAC, Part B, Accident Prevention Program, First-Aid Requirements
- **Corrosive** – A substance that, upon contact, causes destruction of living tissue by chemical action, including acids with a pH of 2.5 or below, or caustics with a pH of 11.0 or above.
- **Strong irritant** – A substance that will induce a local inflammatory reaction upon immediate, prolonged, or repeated contact with normal living tissue. It is not corrosive, but causes a reversible inflammatory effect on living tissue by chemical action at the contact site.
- **Toxic Substance** – A chemical that has the inherent capacity to produce personal injury or illness to individuals by absorption through any body surface.
- **Tepid** – Temperatures between 60 and 100 degrees Fahrenheit.

How to not Get Sick

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



"If you need to cough, you're s'posed to hide your mouth in your elbow."

Washington State Department of Health

http://here.doh.wa.gov/materials/be-a-germ-buster/12_GermBust_E06L.pdf

Plain Fragrance Free Soap

- Mild Chemically
- Biodegradable
- Green Seal Certified
- Fragrances have no hygienic function
- If the UW and WSDOH can do it – you can!
- Say NO to antibacterial soaps

Washington State Department of Health

Triclosan

- “superfluous chemical”
- FDA's website: "the agency does not have evidence that triclosan in antibacterial soaps and body washes provides any benefit over washing with regular soap and water.“
- Endocrine Society: alters thyroid and reproductive hormones
- 5-chloro-2-(2,4-dichlorophenoxy)phenol

Hand Sanitizers

- Not a substitute for hand washing
- Not effective on dirty hands
- At least 60% alcohol
- Hands should stay wet for 10-15 seconds
- Not considered effective on non-enveloped viruses or spores
- Flammable / poison
- Preferred: Fragrance free
- 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

- **Hand sanitizers in classrooms do not reduce school absences in children**: August 12, 2014 Science Daily, Source: PLOS Summary: Installing alcohol-based hand sanitizer dispensers in the classrooms does not lead to reductions in the rate of school absences in children, according to new research from New Zealand.
- Student who had an allergic reaction to scented hand sanitizer. The child did not put it on his hands but was standing by the teacher when she used it on her hands. The child ended up being transported to Mary Bridge by ambulance. His symptoms were – puffy eyes, redness under eyes and swollen upper lip, tongue felt thick and itchy. No hives noted anywhere. Parents stated to the school nurse later that the doctor said the cause of the reaction was the scented hand sanitizer.
-

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."

"jet-air" and warm air dyers 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.

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

http://www.kplctv.com/story/27447660/local-school-credits-handwashing-stations-with-drop-in-absences

Resources

- Green Clean Schools, Healthy Schools Campaign, The Quick & Easy Guide to Green Cleaning in Schools
- American Association of School Administrators' Green Cleaning Guide
- Cleaning For Healthy Schools Toolkit
- Informed Green Solutions
- Characteristics of Selected Disinfectants
- Methicillin-Resistant Staphylococcus Aureus (MRSA)
- SF Approved – green products and services that meet San Francisco's health and environment requirements.

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

Recent Journal Article – what's wrong with this picture?

ADVANCEMENT OF THE **SCIENCE**

Evaluation of Ultraviolet Germicidal Irradiation in Reducing the Airborne Cultural Bacteria Concentrations in an Elementary School in the Midwestern United States

May 2015 Journal of Environmental Health

Washington State Department of Health

Thank You

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Nancy.Bernard@doh.wa.gov
360-236-3072

Resources available:

www.doh.wa.gov/schoolenvironment

Join my list serve for timely information!