

CT School Indoor Environment Resource Team

**Advanced
TfS for
Custodians/
Facilities
Workshop**



Welcome!

***EPA's Indoor Air Quality
Tools for Schools***

4/2011

AGENDA



- **Overview of IAQ**
- **Review of TfS Program**
- **Virtual Walkthrough**
- **Green Cleaning**
- BREAK**
- **Cleaning & Disinfecting**



Addressing school IAQ issues is a very important public health issue:

Asthma epidemic – High rate of asthma in Hartford

Asthma – biggest health reason for absenteeism

Important staff health issue – educators have highest rate of IAQ related occupational disease

-We have a program that really works – Hartford has made much headway, still needs work

-Hartford received a Good Start Award from EPA last year

-State Law

Why is This Important?



- **Children's Asthma Epidemic & Absenteeism**
- **Staff Health Issues**
- **EPA'S TfS Program Works**
- **State Law Requires All CT Schools Have IAQ Program, Green Cleaning**

Addressing school IAQ issues is a very important public health issue:

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What is Indoor Air Quality?

in-door (in'dôr') *adj.* **air** (er,ar) *n.* **quality** (kwo'i'tē) *n.*

1. the temperature, humidity, ventilation, and chemical or biological contaminants of the air inside a building.

Read the definition, say main focus of problem is contaminants, ventilation issues and temp/humidity



Consequences of Poor IAQ

- **Health Problems**
- **Reduced Learning and Productivity**
- **Higher Costs to Fix Problems Than to Prevent**
- **Poor Public Relations**
- **Liability Issues**



EXPLAIN the following points:

- As a result of poor IAQ, health problems can include coughing, asthma episodes, bronchitis, headaches, allergic reactions, toxic poisoning, and the spread of infectious diseases.
- Students don't learn as well and teachers don't teach as well when they are suffering health effects of poor IAQ.
 - When schools aren't aware of IAQ problems, and don't act to prevent them, the eventual costs may be much higher than would have been the case otherwise. Identifying and fixing a problem early, or taking preventive measures, may save many dollars in the long run. For example, if schools must be closed for repair, if substitute teachers must be hired to replace sick ones, or if equipment must be replaced rather than maintained, large costs may be incurred.
 - Negative publicity resulting from poor IAQ may have parents and community members upset, generating lack of trust for the school system.
 - The school system may even be sued for damages caused by poor IAQ.



Indoor Air Pollutant Sources

- **Building Materials and Furnishings**
- **Maintenance Products**
- **Office Equipment**
- **Microbiological Contamination**
- **Outdoor Air Pollution**
- **Soil Gases (e.g., Radon)**
- **Occupants**



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- Building materials and furnishings—like paneling, draperies, or desks—contain components like resins, adhesives, and solvents. These products can emit volatile organic compounds (VOCs) that cause irritating symptoms.
- Maintenance products—such as paints, caulking, and adhesives, emit contaminants while in use or storage.
- Office equipment such as copiers, trade equipment in industrial shops, and science equipment in labs contain formaldehyde and other VOCs, such as ozone, phenols, and methanol.
- Microbiological pollutants include bacteria, viruses, allergens such as pollen, insect parts, and fungi such as mold. Wet carpeting and building materials resulting from leaks, cooling towers, humidifiers, drains, and ducts are incubators of these types of pollutants.
- Common outdoor pollutants that can be sources of indoor air pollution are bus and automobile exhaust, pollen, pesticides, and dust. Dumpsters are also a source of outdoor pollution.
- Radon is a naturally occurring radioactive soil gas that cannot be seen, smelled, or tasted. It is also the second leading cause of lung cancer.



Indoor Air Pollutant Sources



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Common HVAC System Problems

- **Insufficient Outdoor Air Supply**
- **Controls Broken or Disconnected**
- **Dirty Filters**
- **Microbiological Growth in Drip Pans, Ductwork, Coils, & Humidifiers**
- **Improper Operation and/or Maintenance**



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EXPLAIN that HVAC systems may contribute to IAQ problems in several ways:

- As stated before, they may not have been designed to supply sufficient outdoor air or to remove indoor pollutants sufficiently through ventilation. Sometimes people deliberately block the flow of outdoor air.
- Sometimes ventilation controls are broken or deliberately disconnected.
- Filters, if not changed on schedule, become dirty and prevent proper ventilation.

Without regular cleaning, microbiological growth may occur in drip pans, duct work, coils, and humidifiers.

What About “Testing the Air”?



Usually Not the First Move:

- You Have to Know What You Are Looking for
- There Are No Appropriate Standards for IAQ
- There Are No Standards for Indoor Molds Levels
- Results May Be Hard to Interpret
- Can Lead to Confusion, Mistrust

A Comprehensive Building Evaluation Is 1st Step

Note: Useful Tests:

- Temperature
- Water Vapor
- CO₂



• There are no appropriate standards for use in indoor environments such as schools and residences. There are some industrial standards for permissible exposure limits for certain chemicals used in manufacturing and other work place settings, but these standards **should not be used for children, sensitive populations such as pregnant women, the elderly, or people with certain illnesses**. There are no standards for indoor levels of molds so mold testing is not recommended:

• **Find and fix the moisture source, kill and remove mold spores**

• Testing as a first response does not usually lead to an answer or solution. Very often air testing is conducted as a knee-jerk reaction to a reported IAQ problem. Such testing done in the absence of a hypothesis, or as part of a well-planned investigation, usually produces data that raises more questions than it answers. It can raise expectations that a solution will follow, and subsequently raises suspicions if no answer is found.

• Refer participants to fact sheet:

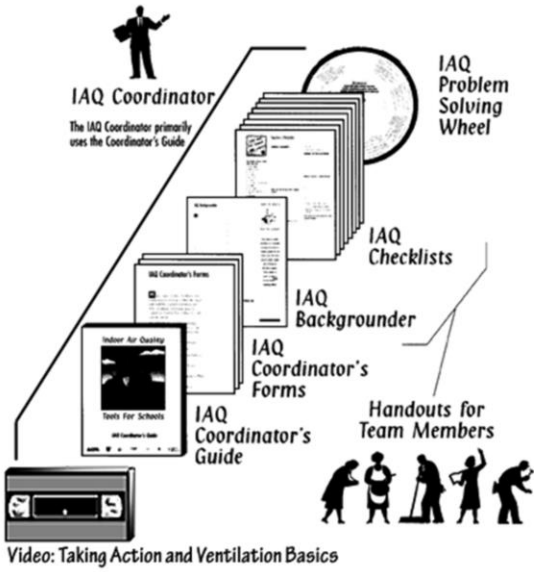
Indoor Air Quality Testing Should Not Be The First Move

- in coordinators folder
- on DPH CD

- Suggest that fact sheet be posted on district web site



IAQ Tools for Schools Action Kit



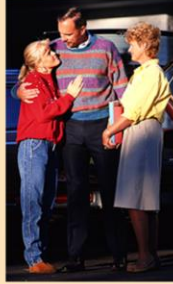


TfS Building Team Members

Teacher



Parent



Administrative Staff



School Nurse

Custodian



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Video: “Taking Action”



Beyond Tools for Schools

Information for Custodians &
Maintenance Personnel

Today's Topics

- **Virtual Walkthrough**
- **Green Cleaning**
- **Cleaning and Disinfecting Surfaces to Help Prevent the Spread of H1N1 Flu Virus**
- **Resources**



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Note that we may or may not get to the last two topics... can select dependant on interest

You Are on the Front Line

- **You See Everything**
- **Staff Report Their Concerns to You**
- **As a Tools for Schools Team Member You Build Cooperation and Improve Communication**

**Virtual Walk-through:
What's Wrong with this
Picture?**

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Hazardous chemical cleaners, insecticides etc



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Clutter... can't clean



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Sources- friable insulation (asbestos?) mercury



Occupied buildings under construction



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Water incursion



22

..... A risk factor for mold and other microbial agents



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Carpet- slab on grade



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Pests.....



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Air intake for ventilation system at grade



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Idling vehicles...



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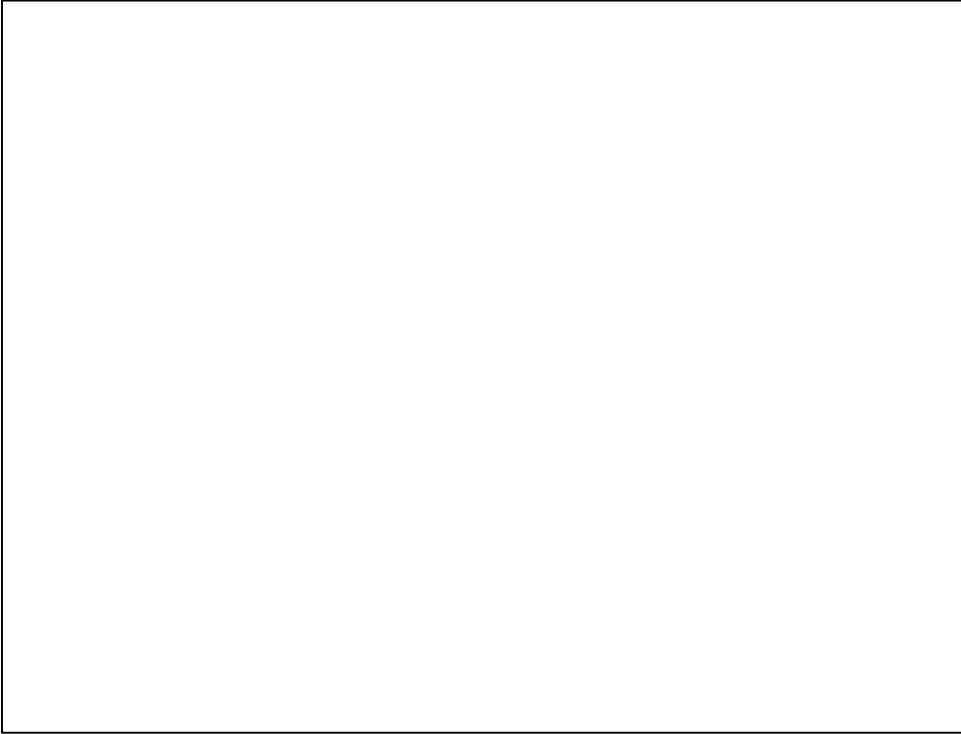
Unit ventilators- hard to maintain with limited staff



Clutter on unit ventilator, air purifier- ozone?

Issues Identified

- **Ventilation- Can Provide Dilution & Thermal Comfort If Properly Designed & Maintained**
- **Chemical Sources Need Controls**
- **Moisture Incursion- a Risk Factor for Biological Agents**



Routes of entry

Inhalation...



Absorption...



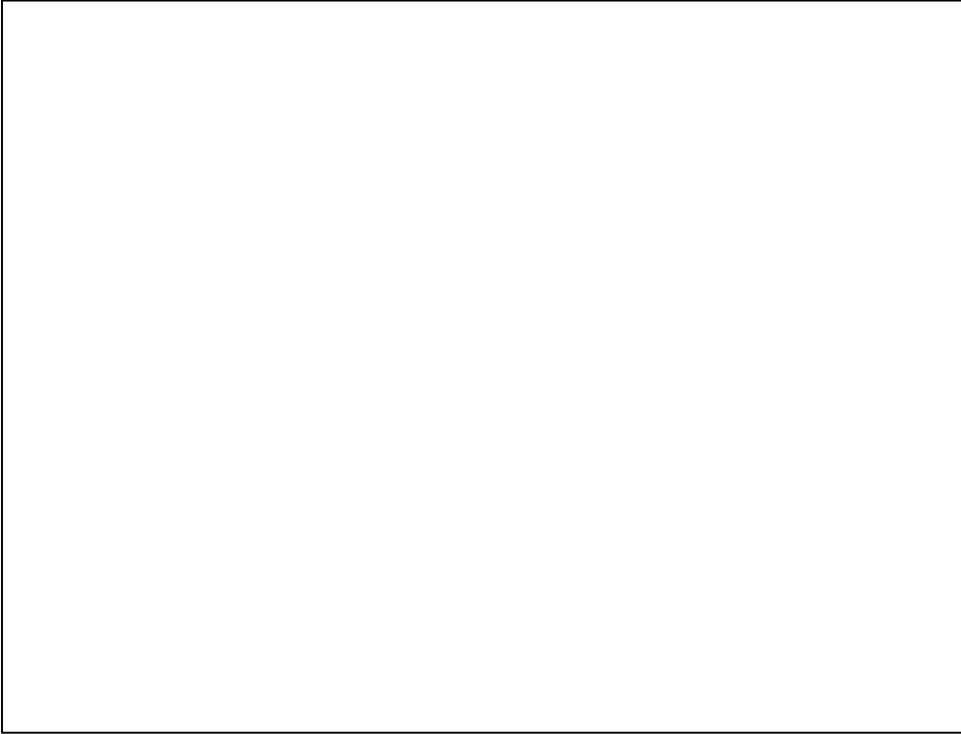
Ingestion...



What is Green Cleaning?

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Have Group list their opinions on a flip chart before you respond.....



DEPARTMENT OF ENVIRONMENTAL PROTECTION

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June 11, 2009

Governor Rell Signs Bill Requiring Green Cleaning Products in Public Schools

Governor M. Jodi Rell today signed House Bill 6496 that requires local and regional school districts to use green cleaning products in schools, helping to ensure a healthier air quality for students, faculty and staff.

"Schools are places of great promise for our children, where dedicated teachers and staff help shape and guide their futures. We can now color that future green, as well," Governor Rell said during a bill signing at Vernon Center Middle School. "This law will help ensure a healthy environment for everyone who walks through the doors of public schools in Connecticut."

House Bill 6496 requires school districts to have a green cleaning program in place by July 1, 2011. The environmentally preferable products must meet nationally certified guidelines and approved by the state Department of Administrative Services. They include products used for general purpose cleaning, bathroom, glass and carpet cleaners; hand cleaners and soaps; floor finishers and strippers. The law also requires that the types of cleaners and the methods used be made public.

The bill drew broad support from educators, the environmental community, health professionals and parents. During the legislative process, proponents testified that nearly one-quarter of cleaning chemicals used in schools are toxic and significantly affect indoor air quality.

"This signals the end of harsh, toxic chemical cleaners used around generations of schoolchildren," Governor Rell said. "It is about time we cleared the air."

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News release: **Connecticut** Governor M. Jodi Rell has signed legislation that [requires local and regional school districts to use green cleaning products in schools](#). The helping to ensure a healthier air quality for students, faculty and staff. School districts must have a green cleaning program in place by July 1, 2011. The environmentally preferable products must meet nationally certified guidelines and be approved by the state Department of Administrative Services. They include products used for general-purpose cleaning; bathroom, glass and carpet cleaners; hand cleaners and soaps; floor finishers and strippers.

The 3 Step Program

- **Step One - Choose "Green" Cleaning Products (Environmentally Preferable, When Possible)**
- **Step Two - Practice State-of-the-art Cleaning Methods ("Best Practices")**
- **Step Three – Use Appropriate Materials and Updated Equipment**

Step 1: "Green" Products

Environmentally Preferable Cleaning Products

- **Less Toxic, Effective Cleaning Products**
- **Independent Third-party Certification**
- **Common Third Party Programs Are:**
 - Green Seal- US 
 - Environmental Choice (EC)- Canada 

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Activity- MSDS review

GLANCE NON-AMMONIATED GLASS CLEANER

National Fire Protection Association (NFPA)	Flame Hazard	Hazardous Material Information System (HMIS)	Health	Reactivity
	1		1	0
			0	0
			0	0

Preventive Measures: None required.
Choking: Emergency Blue Liquid. See Section 8. **Overexposure:** CAUTION: May be mildly irritating to eyes. May be mildly irritating to skin.

Section 1. Chemical Product and Company Identification

Product Name: GLANCE NON AMMONIATED GLASS CLEANER	Code: 2172641 & 2801936
Product Use: Industrial/Institutional Cleaning product	PMID: 3191737
MSDS#: F-0242401	Validation Date: 08/2004
U.S. Headquarters: Johnson Diversey, Inc. 8310 18th Street, Shawnee, Wisconsin 53177-0902. Phone: (800) 552-2248. MSDS Internet Address: www.johnsondiversey.com	Canadian Headquarters: Johnson Diversey - Canada, Inc. 2401 Baskin Circle, Oakville, Ontario L6H 6P1. Phone: 1-800-465-3121
U.S. Headquarters: Johnson Diversey, Inc. 8310 18th Street, Shawnee, Wisconsin 53177-0902. Phone: (800) 552-2248. MSDS Internet Address: www.johnsondiversey.com	Canadian Headquarters: Johnson Diversey - Canada, Inc. 2401 Baskin Circle, Oakville, Ontario L6H 6P1. Phone: 1-800-746-5271

Section 2. Composition and Information on Ingredients

Ingredients	CAS #	% by Weight	Exposure Limits	LC50/LD50
Ethyl Alcohol	64-17-5	0.14	OSHA (United States): TWA: 1000 mg/m ³ ACGR (United States): Not available.	OSHA (LD50): Acute: 7000 mg/kg [Rat] VAPOR (LC50): Acute: 20000 ppm (10 hours) [Rat]
Acetyl Ethoxyates	68439-46-3	1.5	Not available.	OSHA (LD50): Acute: 1378 mg/kg [Rat] DE BRMA (LD50): Acute: >2000 mg/kg [Rat]
Sodium Lauryl Sulfate	151-21-3	1.5	Not available.	OSHA (LD50): Acute: 1280 mg/kg [Rat] DUST (LC50): Acute: >500 mg/m ³ (hours) [Rat]
Sodium Lauryl Ether Sulfate	9094-82-4	1.5	Not available.	OSHA (LD50): Acute: 1600 mg/kg [Rat]
Water	7732-18-5	99.100	Not available.	Not available.

Section 3. Hazards Identification

Route of Entry: Inhalation, Skin contact, Eye contact.

Possible Acute Health Effects: Eyes may be mildly irritating to eyes. Skin may be mildly irritating to skin. Inhalation: None known. Absorption: None known.

Continued on Next Page

GLANCE HC

National Fire Protection Association (NFPA)	Flame Hazard	Hazardous Material Information System (HMIS)	Health	Reactivity
	2		2	0
			2	0
			2	0

Preventive Measures: Clear Blue Liquid. See Section 8. **Overexposure:** DANGER: CORROSIVE. CAUSES EYE AND SKIN BURNS. HARMFUL OR FATAL IF SWALLOWED.

Section 1. Chemical Product and Company Identification

Product Name: GLANCE HC	Code: 3053402 & 3165337 & 4607 & 5275
Product Use: Industrial/Institutional Cleaning product. This product is intended to be diluted prior to use.	PMID#: 3191980
MSDS#: 13457001	Validation Date: 7/29/2003
U.S. Headquarters: Johnson Diversey, Inc. 8310 18th Street, Shawnee, Wisconsin 53177-0902. Phone: (800) 725-6737. MSDS Internet Address: www.johnsondiversey.com	Canadian Headquarters: Johnson Diversey - Canada, Inc. 2401 Baskin Circle, Oakville, Ontario L6H 6P1. Phone: 1-800-746-5271
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Section 2. Composition and Information on Ingredients

Ingredients	CAS #	% by Weight	Exposure Limits	LC50/LD50
Ammonium Hydroxide	1336-21-6	1-5	Not available.	OSHA (LD50): Acute: 350 mg/kg [Rat]
Sodium Pyruvate	1300-32-7	1-5	Not available.	Not available.
Sodium Lauryl Sulfate	151-21-3	5-10	Not available.	OSHA (LD50): Acute: 1238 mg/kg [Rat] DUST (LC50): Acute: >3000 mg/m ³ (1 hour) [Rat]
2-Butoxyethanol	111-76-2	30-80	OSHA (United States): TWA: 60 mg/m ³ ACGR (United States): TWA: 37 mg/m ³	OSHA (LD50): Acute: 500 mg/kg [Rat] (100 mg/kg LD50) Acute: 400 mg/kg [Rat] VAPOR (LC50): Acute: 400 ppm-4 (4 hours) [Rat]
Water	7732-18-5	30-80	Not available.	Not available.

Section 3. Hazards Identification

Route of Entry: Inhalation, Skin contact, Eye contact.

Possible Acute Health Effects: Eyes: Corrosive. May cause permanent damage including blindness. Skin: Corrosive. May cause permanent damage. Inhalation: May cause irritation and corrosive effects to nose, throat and respiratory tract.

Aggravation: Corrosive. May cause burns to mouth, throat, and stomach.

Medical Conditions: Patients with pre-existing skin disorders may be more susceptible to irritating effects. Individuals with **Aggravated by Overexposure:** chronic respiratory disorders such as asthma, chronic bronchitis, emphysema, etc. may be more susceptible to irritating effects.

See Toxicology of Information section 11)

Criteria for "Green" Cleaners

- **Health-based**
No Carcinogens, Reproductive Toxins, Skin Sensitizers; Low Vocs, Skin Absorption; AOEC Asthmagens
- **Environmental Properties**
Biodegradability, Toxicity to Aquatic Organisms, Combustibility, Recyclable Packaging
- **Verifies Performance**



Task-Based Cleaning



- One Heavy-duty Cleaning Product
- One Concentrate Diluted for Several Tasks



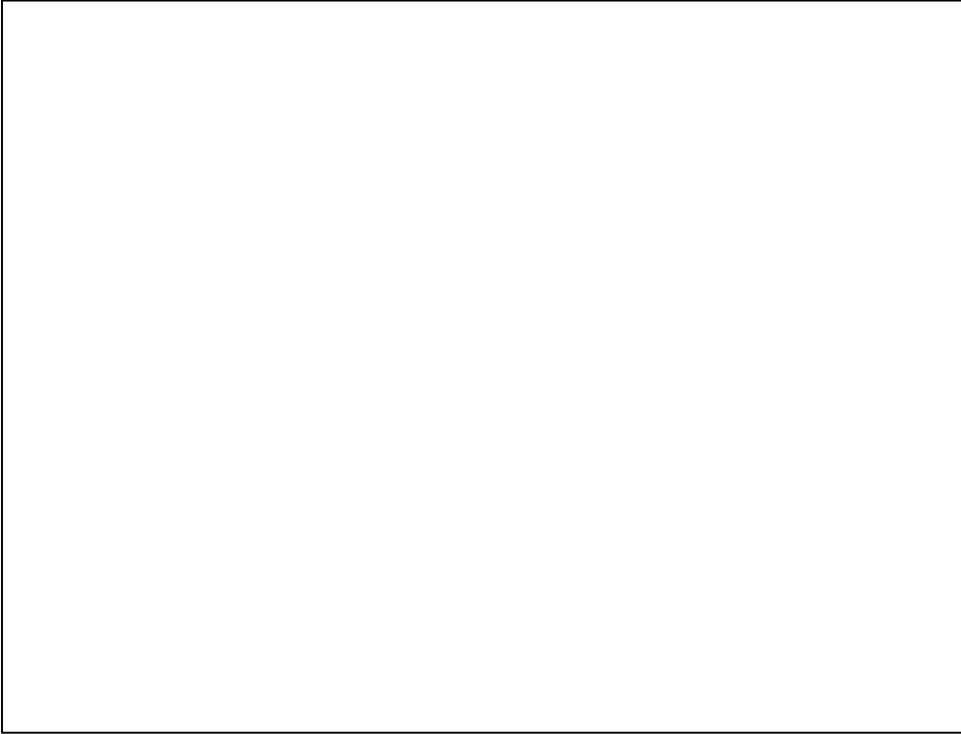
- Specialty Cleaning Products (Graffiti Remover)



Step 2: Cleaning for Health Best Practices

- **Clean From the Top Down**
- **Maintain Flooring/Replace Carpets**
- **Clean up Spills Right Away**
- **Cleaning With Detergent Removes Most Germs. Disinfect Only Target Areas**
- **Avoid Aerosol Sprays**
- **Vacuum Instead of Dust Mopping**



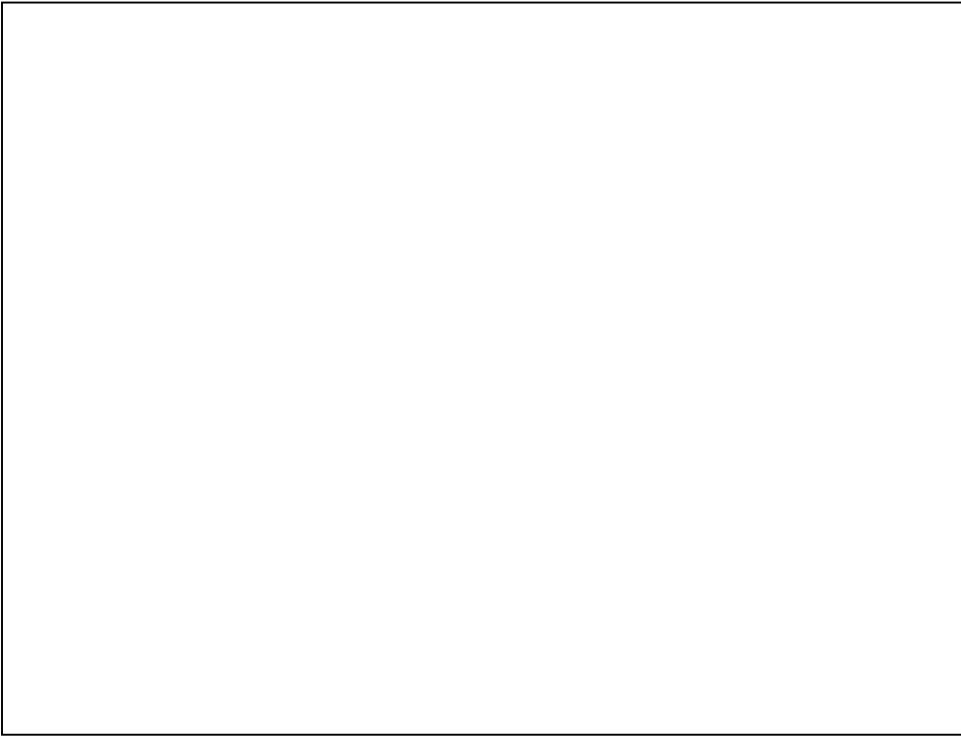


Walk-off Mats



–Up to 80% of Soil in Buildings Tracked by Feet

–15-20' of Multi-level Scrubber Matting



Microfiber

■ Microfiber Mops and Cloths

- Reduce Amount of Chemical Needed
- Mops Are Ergonomically Designed
- Trap & Remove 99% of Soils
- 2-section Mop Buckets
- New Small Washers



Project Recommendations:

For your routine disinfecting protocol, we recommend using a liquid disinfectant and microfiber mops or cloths. The advantages of each type of disinfection application process and equipment are detailed below. We list other types of application processes and equipment to enable you to compare them to our recommendations and because there may be certain applications where they are the best option, e.g., using disinfecting wipes after cleaning up vomit on a school bus. Remember all of the following types of applications require that you clean the surface with detergent and rinse prior to using a disinfectant.

Application Options

Bucket and Mops

Disadvantages - The mopping procedure actually can spread heavy microbial contamination throughout a facility.

Mops and cloths must be adequately cleaned and disinfected, and water-disinfectant mixture must be changed regularly at least every hour after every three to four rooms. Since these guidelines are often not followed, there are problems with cross contamination and germs breeding on mop and cloths. You could use color coded mops and buckets. If you do use a mop and bucket, we recommend using buckets that separate clean and dirty water, so you are not dipping back into the dirty water.

It is hard to disinfect a mop. In one study, standard laundering provided acceptable decontamination of heavily contaminated mop heads, but chemical disinfection with a phenolic (which is a type of disinfectant too strong to use in a school setting) was less effective. Thus, the recommendation is daily laundering of mops. Single-use disposable towels impregnated with a disinfectant also can be used for low-level disinfection for spot- disinfection.^[1]

Advantages

- Can cover large areas.
- Can use existing equipment.

Pre-Saturated Microfiber Mop Head

Advantages

- Prevents cross contamination if changed for each room.
- Microfiber has been found to capture over 90% of bacteria in a hospital setting.

Disadvantages

- Need one for each room.
- Must be laundered.

Floor Care Equipment



- **High-filtration Vacuum Cleaners**
– Carpet and Rug Institute –
www.Carpet-rug.Org



- **Vacuum Attachments for Buffers/burnishers**
- **Autoscrubbers With Stripping Pads**

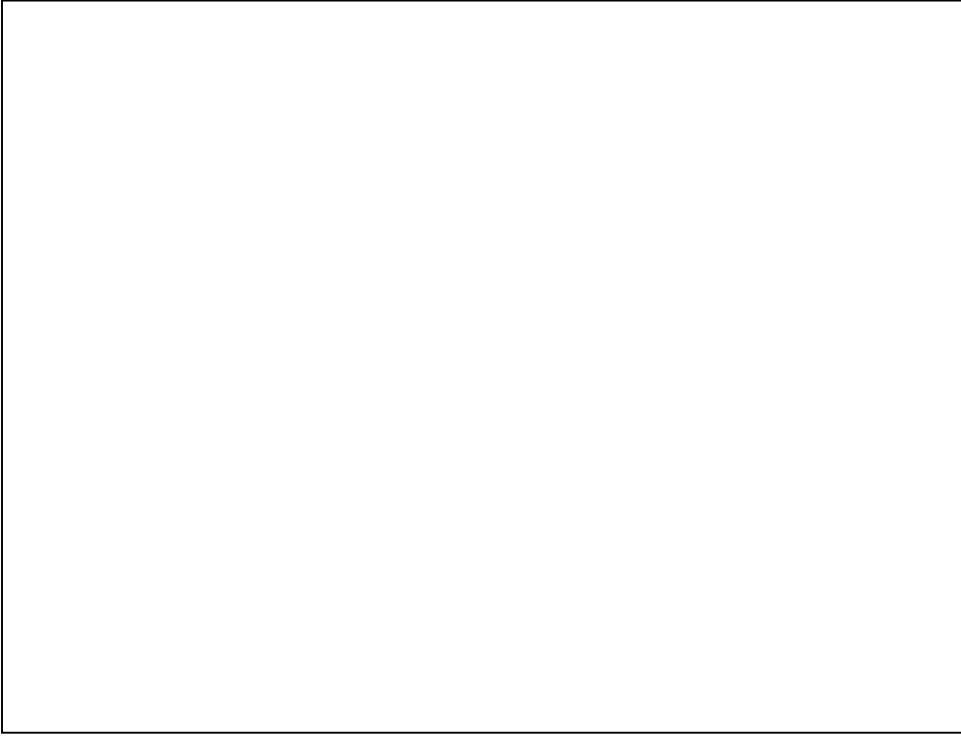
New Equipment: Autoscrubbers



What Has Your School System Done to Implement a Cleaning for Health Program?

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If multiple schools are present, ask a representative from each school to summarize their program for the group.



What are your Challenges?

- **Classrooms Not Ready for Cleaning**
- **Teachers, Staff, or Children Supplying Cleaning Products From Home**
- **Staffing**
- **Custodial Closet (With a Custodian) / 14-18,000 Ft²**
- **Communication Issues**
- **Demand for Disinfection**

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Take a Break!

Cleaning and Disinfecting Surfaces to Help Prevent the Spread of H1N1 Flu Virus

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Note- although the focus of this presentation is on H1N1, the general infection control principles apply for other agents (MRSA, GI illnesses etc)... If schools develop a careful protocol, this will be of benefit throughout the year.

Other types of illnesses:

Common cold

Mononucleosis

Strep throat

Other flues

Diarrhea illnesses

Disclaimer

- **The Information Provided in This Section of the Presentation Is Based on Current Guidance**
- **The Sources Referenced in This Section Should Be Consulted Frequently to Obtain the Most Up-to-date Information.**

Novel H1N1 Influenza (Type A)

Influenza mainly spread person to person through coughing and sneezing. Droplets can travel as far as six feet.

Surface contamination:

person sneezes into hands >

touches surfaces >

others touch surfaces >

then touch their nose/mouth/eyes

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Droplets from a cough or sneeze from an infected person move through the air and make contact with the mouth or nose of people nearby.

How long can influenza virus survive on surface & infect persons?

- Hands- Several Hours
- Hard Surfaces- 2-8 Hours (Estimates Vary)
- Persistence Influenced by Humidity and Temperature

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How long can influenza virus remain viable on objects (such as books and doorknobs)?

Studies have shown that influenza virus can survive on environmental surfaces and can infect a person for up to 2-8 hours after being deposited on the surface.

IFMA Pandemic preparedness manual (2006): influenza viruses may live on hard surfaces for up to two days.

Infection Control

Coordination with school nurse and town health officer

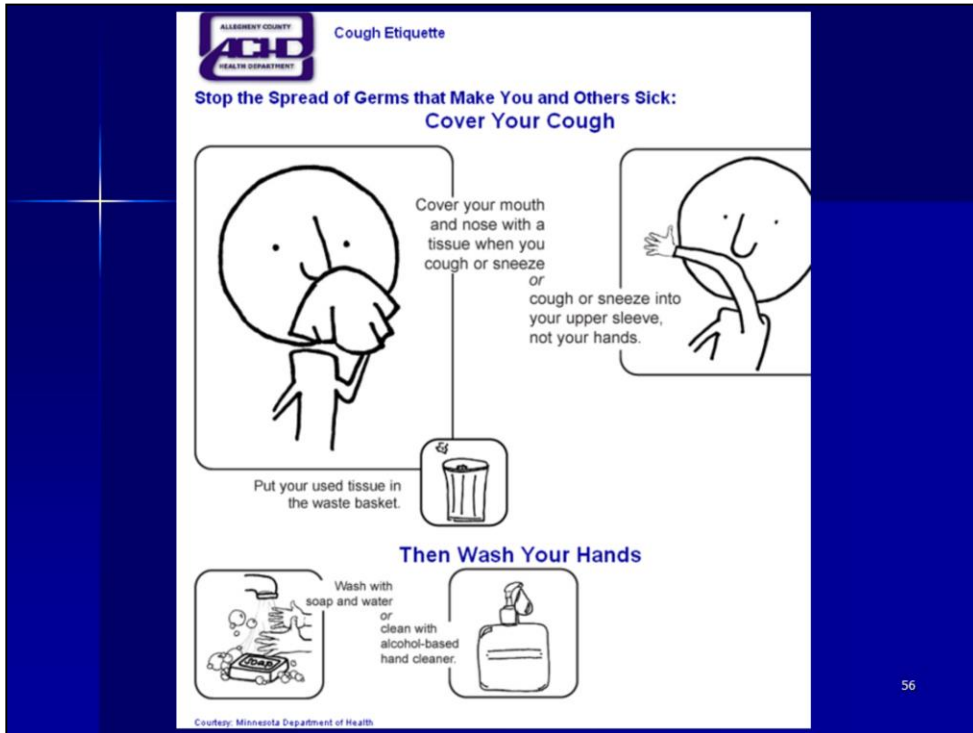
- **Good Personal and Hand Hygiene**
- **Keep Your Hands Away From Your Face**
- **Cough Etiquette**
- **Social Distancing**



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School Custodial and Nursing Staff are on the Front Line for Infection Control

Although beyond the scope of this talk, this is where I would mention that the CDC states that alcohol based hand sanitizers (>60%) are effective against H1N1. Non-alcohol based hand sanitizers may be.



Although beyond the scope of this talk, this is where I would mention that the CDC states that alcohol based hand sanitizers (>60%) are effective against H1N1. Non-alcohol based hand sanitizers may be effective.

Surface Cleaning

- **Regular Cleaning**
- **Prudent, Targeted Use of Disinfectants for Surfaces Touched Frequently by Hands. In Most Cases Frequent Cleaning May Be Enough**
- **Schools Should Continue to Clean & Disinfect the School Buildings per Regular Schedule**

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Disinfection is not the recommended method for controlling the spread of H1N1.... If a school chooses to use disinfectants, must do so carefully.

Clean surfaces and items that are more likely to have frequent hand contact with cleaning agents that are usually used in these areas. Additional disinfection beyond routine cleaning is not recommended.

Hand rails

Door knobs

Elevator buttons

Sinks and faucets

Counter tops

Window sills

Light switches

Equipment controls

Cabinet and file drawer knobs/handles

Vending machines

Chair arms

Copier/printer/fax control buttons

Definitions

- All Purpose Cleaners
Remove dirt, grease, grime, germs
- Sanitizers
Reduce the level of microorganisms
- Disinfectants
Destroy multiple specific test organisms

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Cleaners don't disinfect and disinfectants don't clean

Sanitizers reduce microorganisms to levels considered safe as determined by public health codes or regulations.

general all purpose cleaning products can remove germs but are not disinfectants; EPA prohibits disinfectants from

being labeled 'green', meaning having a reduced effect on health and the environment; Green Seal criteria for cleaning products include

Environment and health effects, as well as product efficacy, and have for many years;

Green Seal recently updated its green cleaning product criteria to strengthen protections for sensitive populations through an extensive

process that engaged 399 stakeholders over 20 months; the details of the new standard were published in August 2008

We recommend the judicious use of disinfectants and sanitizers consistent with CDC and state public health agency

guidelines; further, the use of green cleaning products does not supercede specific needs, such as the OSHA blood borne pathogen rule or appropriate mold remediation.

Both sanitizers and disinfectants are products regulated by the Environmental Protection Agency (EPA). The EPA establishes the rules that govern these products including their testing, claims and direction for use. A disinfectant must completely eliminate all the organisms listed on its label. These organisms are not limited to bacteria but could include viruses and fungi. Sanitizers need not eliminate one hundred percent of all organisms to be effective. Nor are fungi or viruses ever included in a sanitizing claim. For food contact surfaces, a sanitizer must reduce the bacterial count by 99.999%.

A **Disinfectant** is a product which completely destroys all specific test organisms in 10 minutes under conditions of the AOAC Use Dilution Test.

A **Sanitizer** is a product which destroys 99.999% of specified test bacteria in 30 seconds under conditions of the Official Detergent Sanitizer Test (sometimes called Weber & Black Test).

What's the difference between cleaners, sanitizers, and disinfectants?

Cleaners or detergents are products that are used to remove soil, dirt, dust, organic matter, and germs (like bacteria, viruses, and fungi). Cleaners or detergents work by washing the surface to lift dirt and germs off surfaces so they can be rinsed away with water. The same thing happens when you wash your hands with soap and water or when you wash dishes. Rinsing is an important part of the cleaning process. Use these products for routine cleaning of surfaces.

Sanitizers are used to reduce germs from surfaces but not totally get rid of them. Sanitizers reduce the germs from surfaces to levels that considered safe.

Disinfectants are chemical products that destroy or inactivate germs and prevent them from growing. Disinfectants have no effect on dirt, soil, or dust. Disinfectants are regulated by the U.S. Environmental Protection Agency (EPA). You can use a disinfectant after cleaning for surfaces that have visible blood or drainage from infected skin

http://www.dupagehealth.org/health_ed/Communicable%20Disease%20Binder/8%20Safe%20and%20Healthy%20Environment/New%20and%20Updated%20Questions%20and%20Answers%20about%20Cleaning.pdf

All Purpose Cleaners

- **Select Green, Third Party Certification**



- **Use Microfiber/ Friction**
- **Avoid Cross- Contamination**

Sanitizers

Activeion Pro: Certified Lab Results for Sanitizing

TEST SUBSTANCE IDENTITY

Test Substance Name: Activeion Pro Sanal # Q7090127

STUDY DATES

Experiment Start Date: March 26, 2009
 Experiment End Date: March 30, 2009
 Study Complete Date: April 3, 2009

TEST ORGANISM	ATCC #	CULTURE MEDIUM
<i>Escherichia coli</i>	8739	Synthetic Broth
<i>Listeria monocytogenes</i>	9337	Synthetic Broth
<i>Staphylococcus aureus</i> MRSA	5592	Synthetic Broth
<i>Staphylococcus aureus</i>	6525	Synthetic Broth
<i>Salmonella enterica</i>	10706	Synthetic Broth

The microorganism used in this study was obtained from the American Type Culture Collection (ATCC), Manassas, Virginia.

EXPERIMENTAL DESIGN

A film of bacterial cells dried on a surface of glass slide carriers (3" x 1") was exposed to the test substance for a 6 second spray period at approximately 3-4" from the carrier. After exposure, the carriers were wiped three times left to right with Sponsor provided towelflets. The carrier was transferred into individual jars of neutralizing subculture medium and assayed for survivors. Wet carrier quantitation controls were performed per test material and dried carrier quantitation controls were also performed.

INOCULUM COUNT RESULTS

TEST ORGANISM	CFU/ml
<i>Escherichia coli</i> (ATCC 8739)	4.1×10^8
<i>Listeria monocytogenes</i> (ATCC 9337)	1.55×10^8
<i>Staphylococcus aureus</i> MRSA (ATCC 5592)	3.4×10^8
<i>Staphylococcus aureus</i> (ATCC 6525)	4.5×10^8
<i>Salmonella enterica</i> (ATCC 10706)	2.4×10^8

CALCULATED VALUES

ORGANISM	CARRIER #	CFU/CARRIER	AVERAGE CFU/CARRIER	AVERAGE LOG ₁₀	PERCENT REDUCTION	LOG ₁₀ REDUCTION
<i>Escherichia coli</i> (ATCC 8739)	1	4.1×10^8	4.1×10^7	$+1.6$	+99.99%	+4.8
	2	4.1×10^7				
<i>Listeria monocytogenes</i> (ATCC 9337)	1	1.55×10^8	1.55×10^7	$+1.6$	+99.99%	+5.9
	2	1.55×10^7				
<i>Staphylococcus aureus</i> MRSA (ATCC 5592)	1	3.4×10^8	3.4×10^7	$+1.6$	+99.99%	+5.8
	2	3.4×10^7				
<i>Staphylococcus aureus</i> (ATCC 6525)	1	4.5×10^8	4.5×10^7	$+1.6$	+99.99%	+4.0
	2	4.5×10^7				
<i>Salmonella enterica</i> (ATCC 10706)	1	2.4×10^8	2.4×10^7	$+1.6$	+99.99%	+5.7
	2	2.4×10^7				

CFU - Colony Forming Units
 Percent and Log₁₀ Reductions were calculated from the Dry Carrier Quantitation Control.

Disinfectants



Antimicrobial Products Registered for
Use Against Influenza A Virus on Hard Surfaces

Office of Pesticide Programs
U.S. Environmental Protection Agency
Antimicrobials Division

<http://www.epa.gov/oppad001/influenza-disinfectants.html>

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Products currently registered as effective against “influenza A virus” should be effective against novel H1N1 on hard, non-porous surfaces

Active Ingredients (depending on concentration) effective against "Influenza A virus" include:

- Chlorine or Hypochlorite
- Phenolics
- Quaternary Ammonium Compounds [Quats]
- Alcohols (>60%)
- Peroxides*

If Possible, Choose an Environmentally Preferable Disinfectant

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Usually considered to be the most environmentally preferable
This list is in the descending order of toxicity

Health Hazards of Disinfectants

- Chlorine or Hypochlorite- Corrosive
- Phenolics - Rashes
- Quaternary Ammonium Compounds [Quats]- Work Related Asthma
- Alcohols- CNS Symptoms
- Hydrogen Peroxide- Slight Irritation

How to Use a Disinfectant



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After dwell time wipe/rinse off or allow to air dry according to manufacturer's directions.

Carefully select the product

- **Review Product Labels**
- **Use With the Appropriate Dilution**
- **Use Appropriate Dwell Time**

Pre-Cleaning

- **Disinfectants Disabled If Surface Has Much Organic Material (Dirt, Food, Body Waste)**
- **Important to Clean 1st, Then Disinfect (Best Practice)**
- **One Step Cleaner Disinfectants Only Effective If Surface Is Not Visibly Dirty.**
- **Heavily Soiled Surfaces (or When Using Products That Have Not Been Tested With Organic Soil) Must Be Cleaned First**

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Organic soil in the test is simulated with 5% blood serum.

Health and Safety

- **Do Not Mix Disinfectants With Some Cleaners (eg: Bleach [Chlorine]) With Ammonia/Quaternary Ammonia)**
- **Never Spray Disinfectant in a Room**
- **Use Appropriate PPE**
- **Use With Adequate Ventilation**



- **Prohibit Use of Cleaning and Disinfecting Products Brought in by Staff or Parents Without School Review & Approval**



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The new green law requires this....

Activity

- **You Are the Head Custodian for a School in Connecticut. Your School District Has Cases of H1N1. The BoE Has Asked You to Share Your Cleaning Protocol With Them. Use the Activity to Develop an SOP.**

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May 15, 2009

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Second Swine Flu Case Confirmed In Connecticut

By DON STACOM | The Hartford Courant
5:16 PM EDT, May 2, 2009

A Middlefield child has been confirmed as the second person in Connecticut to have swine flu, and five more students at Fairfield University and a Wethersfield child have been identified with "probable" cases of the virus.

State health officials this afternoon emphasized that both of the Connecticut people infected - and all 13 of those with "probable" swine flu diagnoses - have suffered only mild or moderate symptoms.

"They have all recovered or are recovering, and there haven't been any hospitalizations," said Diana Lejardi, spokeswoman for the public health department, which released results of a new round of flu tests today.


Officials are disclosing almost no information about the individuals who've been sickened, but Lejardi said the Middlefield child had been to Mexico with relatives recently.

Lejardi did not say whether the Wethersfield child or any of the five Fairfield University students had links to Mexico; two other students at the university who were listed as "probable" swine flu cases earlier this week had not been to Mexico or been in contact with anyone who had.


At least some of the seven Fairfield University students know each other, said Sands Cleary, health director for the town of Fairfield. Six live on campus and one lives in town.

The number of ill students showing up each day at Fairfield University's

Health Features

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Video

NYC closes three public schools after another swine... 02:01



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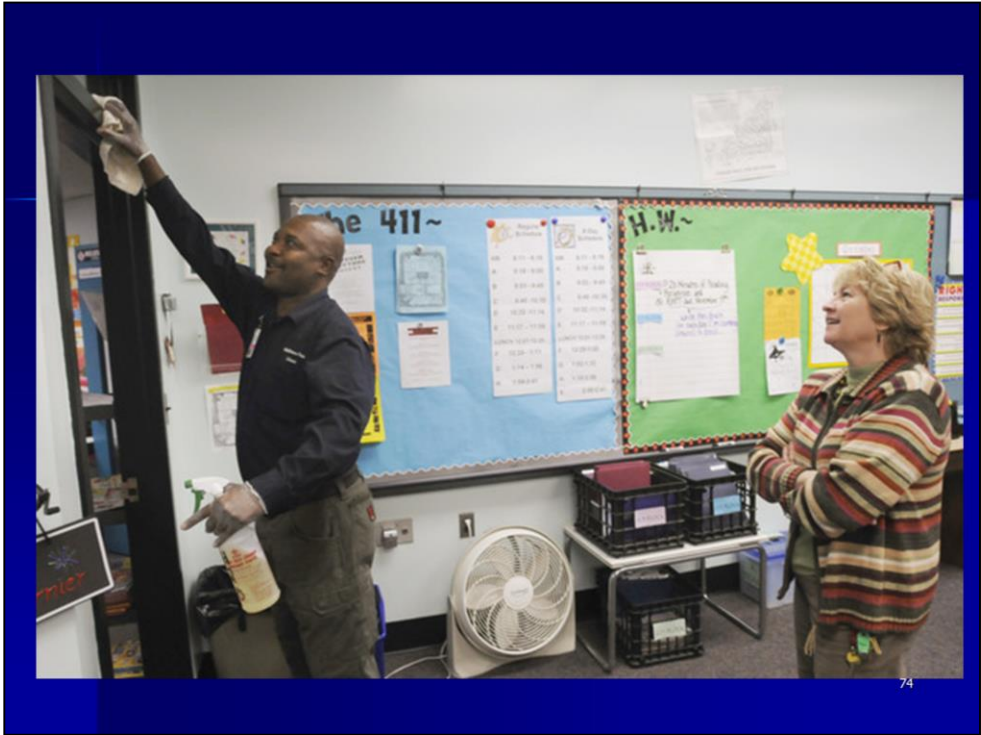
School Response

- **School Communicated With CT DPH & Local Health Director**
- **School Was Not Closed**
- **Cleaning Protocols Enhanced**
 - Cleaned the School Thoroughly Using Best Practices
 - Used All Purpose Cleaner During Day for High Touch Points
 - Used Virex Disinfectant at End of Day Without Occupants in the School (See Technical Sheet)
 - Observed Dwell Time
 - Used Microfiber Cloths
 - Wore Gloves As Part of Best Practices (Normal Routine)

Facility Director Asks...

- **What Is the Organism? How Long Does It Live?**
- **Is It Airborne?**
- **What Cleaning Protocols Are Needed to Address This Outbreak?**
- **How Do I Protect My Custodial Staff During Cleaning? Do They Need to Wear a Mask?**
- **What Is the Best Source for Information?**

**...Guidance and resources needed
for custodians & cleaning staff**



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Additional Resources

US Centers for Disease Control and Prevention

<http://www.cdc.gov/h1n1flu/guidance/guidelinescolleges.htm>

CT Department of Health and Local Health
Departments

<http://www.ct.gov/dph>

National Cleaning for Healthier Schools and Infection
Control Workgroup

Infection Control Handbook:

<http://www.informedgreensolutions.org/?q=publications/school>

Informed Green Solutions:

www.informedgreensolutions.org

Acknowledgements

**Marian Heyman, Kenny Foscue, Joan Simpson
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Environmental Health Section
Connecticut Department of Public Health**

Telephone: 860-509-7740

<http://www.dph.state.ct.us/BRS/EOHA/iaqcm.htm>

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CSIERT
Connecticut School Indoor Environment
Resource Team
<http://csiert.tfsiaq.com/index.html>

National Collaborative Work Group on Green Cleaning
and Chemical Policy Reform
in Schools
www.cleaningforhealthyschools.org

UCONN Health Center
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EVALUATIONS

Thank You!