



Part II

School Nurses
have
responsibilities

PEOSH
Indoor
Air Quality
Training for
School Nurses



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Occupational Health Surveillance Unit
Work-Related Asthma

Nurse's Role

- **Asthma Episodes/Triggers**
 - Track Episodes
 - Evaluate Triggers
- **Green Cleaning**
 - Selection of Cleaning Agents
 - Cleaning vs Disinfecting
 - Choose Safer Products (choose GREEN)
- **IAQ Team/Walkthrough**
 - Encourage Team Approach
 - Participate in Prompt Walkthrough

Building Related Symptoms

Sick Building Syndrome	Building Related Illness
No pattern of any particular illness	Distinct illness – causes known
Difficult to trace to a specific source	Accompanied by expected physical signs*, symptoms, lab findings
Relief occurs upon leaving the building	Relief from illness may not occur upon leaving the building

In both categories, the symptoms are real !

*respiratory tract irritation, rashes, chills, fever, muscle aches, cough, chest tightness, congestion

Asthma Episodes/Triggers

Episodes

- tightness in the chest
- difficulty in breathing or shortness of breath
- wheezing; coughing (particularly at night)

Triggers

- A “trigger” is an allergen or irritant that provokes or causes asthma symptoms.
- Asthma triggers are as individual as the person.
- Not all factors affect all people.

Track Asthma Episodes

- o Provide a clear procedure to report symptoms
- o Encourage 'first report of injury' (school district)
- o Prioritize cases (history of asthma – priority)
- o Encourage follow-up to primary physician

Evaluate Asthma Triggers

- o Asthma Triggers

 - Types: Allergens/Irritants

 - Management of Triggers

- o Common Triggers in Schools

 - Nationwide

 - New Jersey

Asthma Triggers



- Infections in the upper airways, such as colds

- Exercise



- Changes in weather and temperature



- Physical expressions of strong feelings (crying or laughing hard, yelling)



Allergens such as:

- Furred and feathered animals



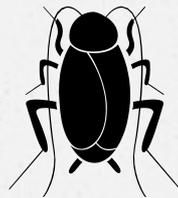
- Pollens from grass and trees



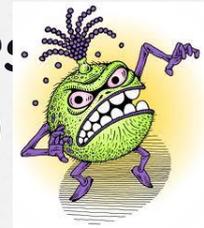
- Dust mites



- Cockroaches



- Molds (indoors and outdoors)

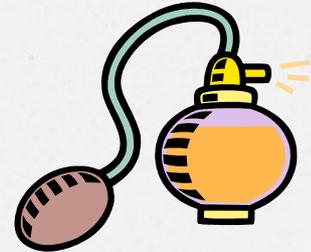


Irritants such as:

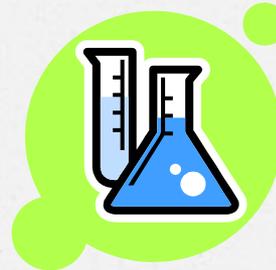
- Tobacco smoke



- Scented products



- Outdoor air pollution



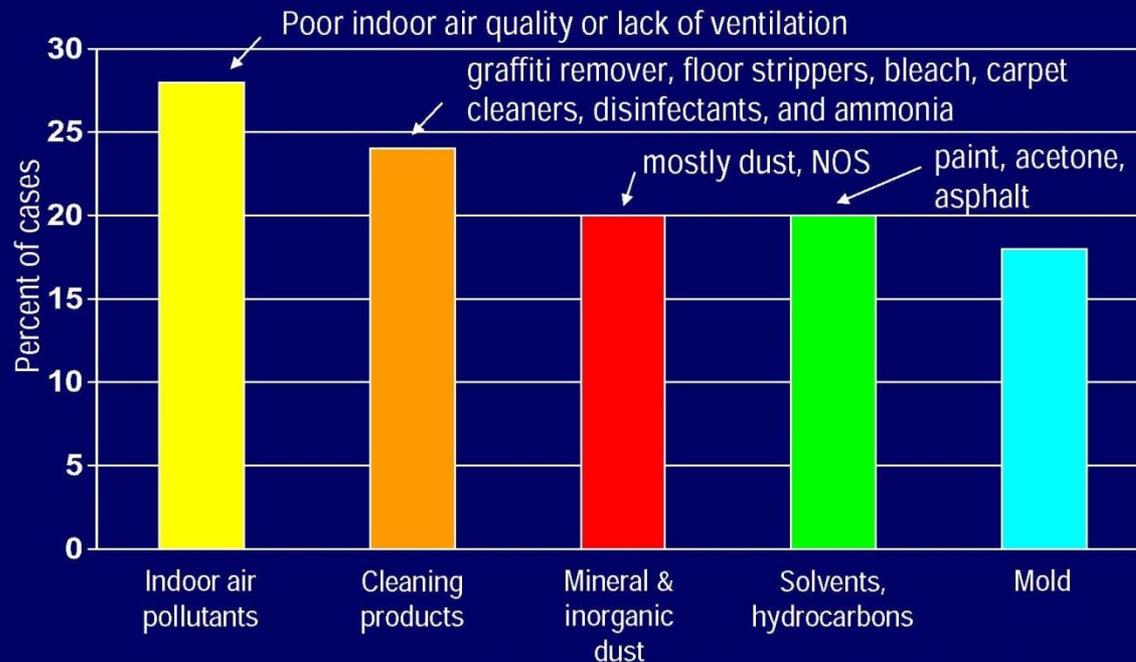
- Strong fumes or odors



Common Asthma Triggers (schools)

Asthma Triggers	Asthma Management
Dust mites	Remove habitat-dust/vacuum regularly, remove clutter
Mice	Exclude from building-Store food in tightly sealed containers; place dumpsters away from building
Cockroaches/Ants	Sanitation-baits/gels
Animal Dander	Remove animals, if possible; keep away from sensitive students/ventilate systems
Mold	Fix leaks, dry wet areas; Clean hard, moldy surfaces with water and detergent and dry
Tobacco Smoke	Enforce no-smoking policy
Odors/Fumes	Use less toxic products, ventilate, clean when no one is around
Outside Air Pollution	Do not allow into the ventilation system-monitor location of intakes; no vehicle idling

Top Categories of Agents Associated with WRA Cases, Educational Services, 1993–2000



Acknowledgement: Jacek Mazurek, MD, MS (NIOSH, DRDS)¹⁰

Top Categories of Agents in NJ Associated with WRA Cases, Educational Services (1993-2008)

Agent	No.	%
Mold, NOS	7	1.79
Air Pollutant, Indoor	4	0.85
Inorganic Dust, NOS	2	0.42
Chemicals, NOS	2	0.42
Capsicum	2	0.42
Wood Dust, NOS	2	0.42
Disinfectants, NOS	1	0.21
Gasoline	1	0.21
Asphalt	1	0.21
Ethylene Glycol	1	0.21
Methylene Biphenyl Diisocyanate	1	0.21
Bleach plus Acid (mixture)	1	0.21
Cleaners, Floor Stripper	1	0.21
Cleaning Mixtures (excluding Bleach plus Acid or Ammonia)	1	0.21
Smoke	1	0.21
TOTAL	28	6.21

Green Cleaning

- o Selection of Cleaning Agents
- o Cleaning vs Disinfecting
- o Choose Safer Products (choose GREEN)

Selection of Cleaning Agents

Who chooses these at your school?

Disinfectant

General Purpose Cleaner

Floor Finish Stripper

Sanitizer



Carpet Spotter

Toilet Bowl Cleaner

Asthma/Respiratory Disease Related Ingredients

- Cleaners
- Disinfectants
- Volatile organic compounds – VOC's
 - Known or suspected to cause cancer
 - Propellants in aerosol containers - butane, benzene, propane, etc.
 - Solvents
- Fragrances – air fresheners
- Do not allow staff to bring in or use home products!



Cleaning versus Disinfecting

What kind of cleaning does the surface need?

GUIDING PRINCIPLE

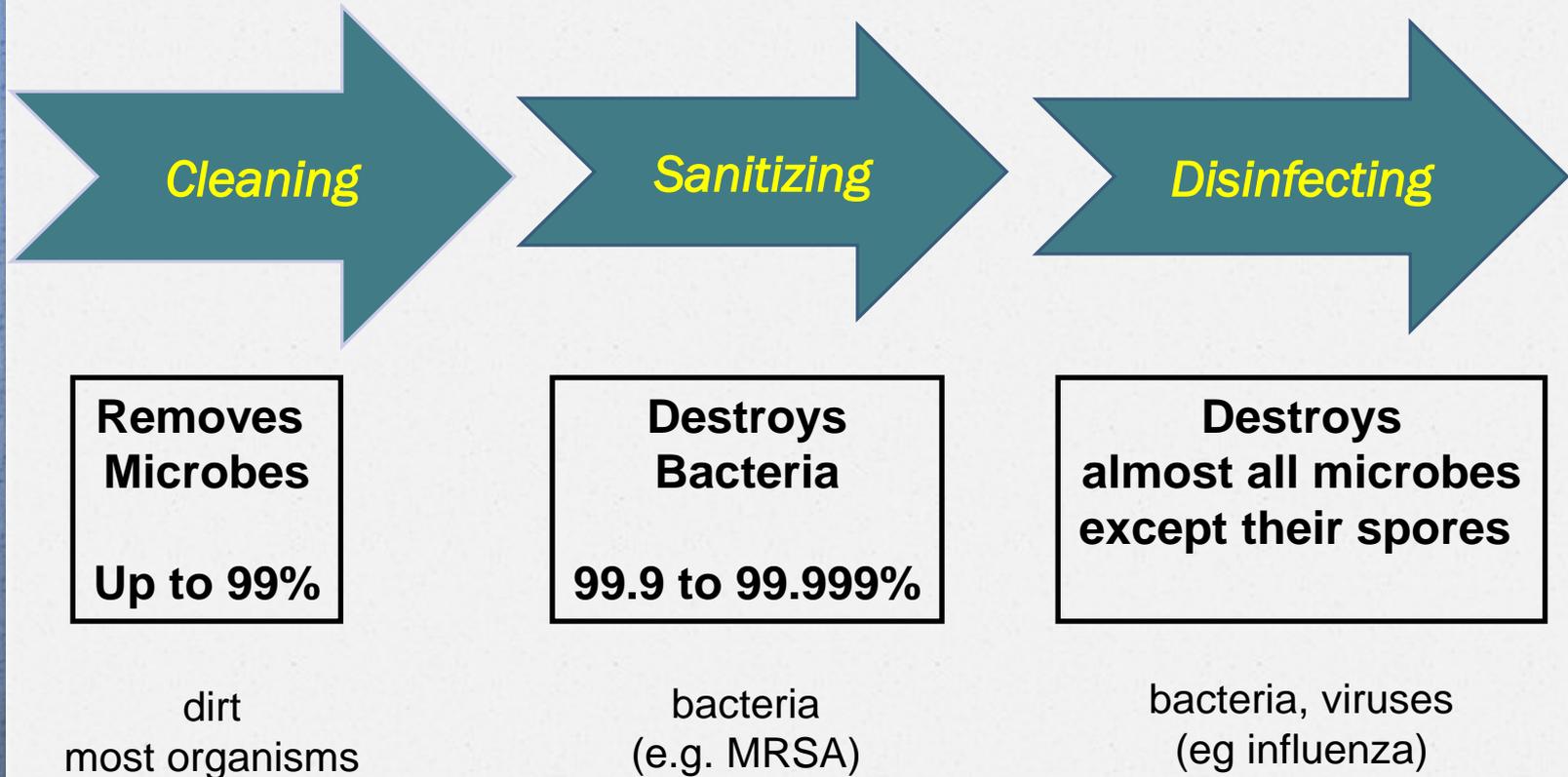
REMOVE microbes if possible

(through general surface cleaning)

rather than kill them

(with a sanitizer or disinfectant).

3 Levels of Microbe Control



Disinfectants

Disinfectants are pesticides, *not* cleaners.



Cide = Kill

- Are formulated to kill organisms
 - Can be toxic to humans as well as microbes
- Consider alternatives to chlorine bleach
 - Check requirements for safe & effective use
- May be corrosive
 - Require special handling!
- Keep away from children:
 - Mixing *or* using
 - **No children in room!**
 - No routine use of disinfectant wipes in classrooms
- Follow the label!
 - The label is the law!

[National Cleaning for Healthier Schools and Infection Control Workgroup]

Choose Safer Products



Common
Misconceptions

Green Chemicals Are Hard To Get
Green Chemicals Are Too Expensive
Standardization Does Not Matter

NOT Green Ingredients

- o No high or low pH levels and no known carcinogens
- o No APEOs (alkylphenoxyethoxyethanol) Surfactants
- o No EDTAs (Ethylenediaminetetraacetic Acid Sodium Salts) chelate or water softener
- o No Phosphates, Includes all potassium salts
- o No “Butyl”: 2-Butoxy-Ethanol
- o No or Low VOC (Volatile Organic Compounds)

Recommended Green Ingredients

Product Type	Recommended Products
Disinfectants●	<ul style="list-style-type: none"> --Accelerated Hydrogen Peroxide --Botanicals --Silver Hydrogen Citrate
Hard Surface Sanitizers●	--Envirox Concentrate 118 [H1N1]
Hand Sanitizers ●▲	Products without added fragrances
Antimicrobial Soaps/Cleansers▲	Soap and water cleaning is sufficient
Furniture Polish	Use Microfiber Cloths, Mops (to eliminate need for polish)
General Purpose Cleaners▲	See 3 rd Party Certification Lists

- Must be EPA Registered
- ▲ 3rd Party Certification

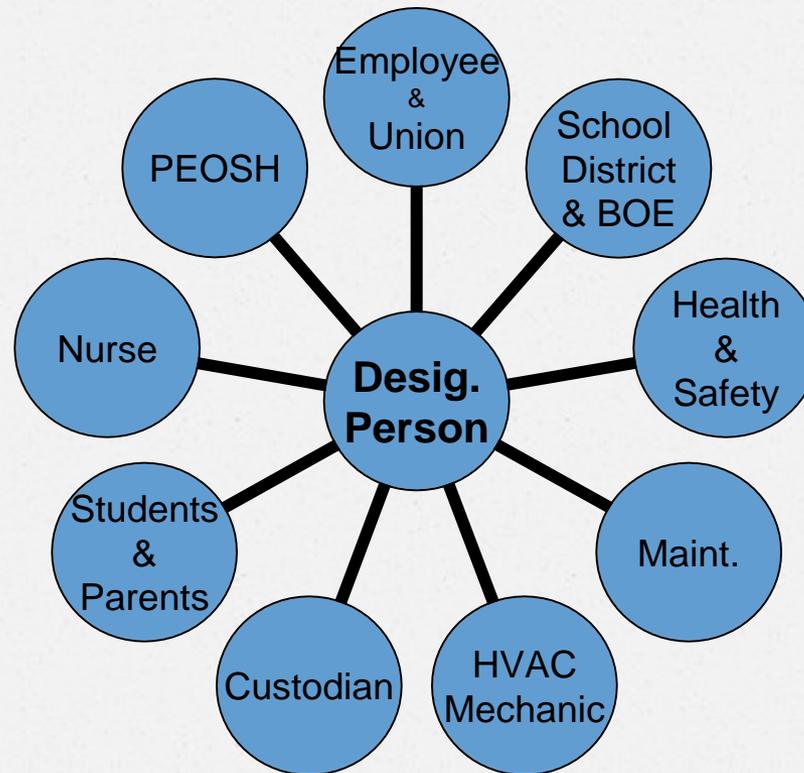
Environmentally Preferable Cleaning Chemicals

- Less-toxic chemicals from manufacturers and distributors
 - Third-party certification is important to ensure quality
- Common third-party programs are:
 - Design for the Environment – EPA <http://www.epa.gov/dfel/>
 - Green Seal (GS) – US <http://www.greenseal.org/>
 - EcoLogo – Canada www.ecologo.org
- Also, other sources of information:
 - American Lung Association; other non-profits
 - INFORM – Cleaning for Health www.informinc.org
 - Industry standards: paints, carpets, etc.

IAQ Team/Walkthrough

- o Encourage Team Approach
- o Persons most often involved in IAQ in School Districts
- o Participate in Walkthrough

Team Approach



Management of IAQ and asthma prevention is a coordinated effort.

Encourage a sense of shared responsibility.

IAQ Team

Persons most often involved in IAQ in School Districts

IAQ Designated Person

Indoor Air Quality Teams
at each building

Principal
School Nurse
Union Representatives
Chief Custodian

Facilities and
Custodial Staff

Chief custodians
Contract custodians
&
HVAC/Plumbers

The Walkthrough

PEOSH IAQ Standard Inspection Checklist

- o General Requirements
- o Controls of Specific Contaminants
- o Renovation/Remodeling
- o Recordkeeping

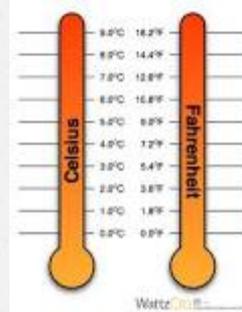


General Requirements

Maintain acceptable IAQ indicators
in mechanically ventilated areas

Temperature

If temperature in the indoor
environment
is outside the range
of 68 – 79 F



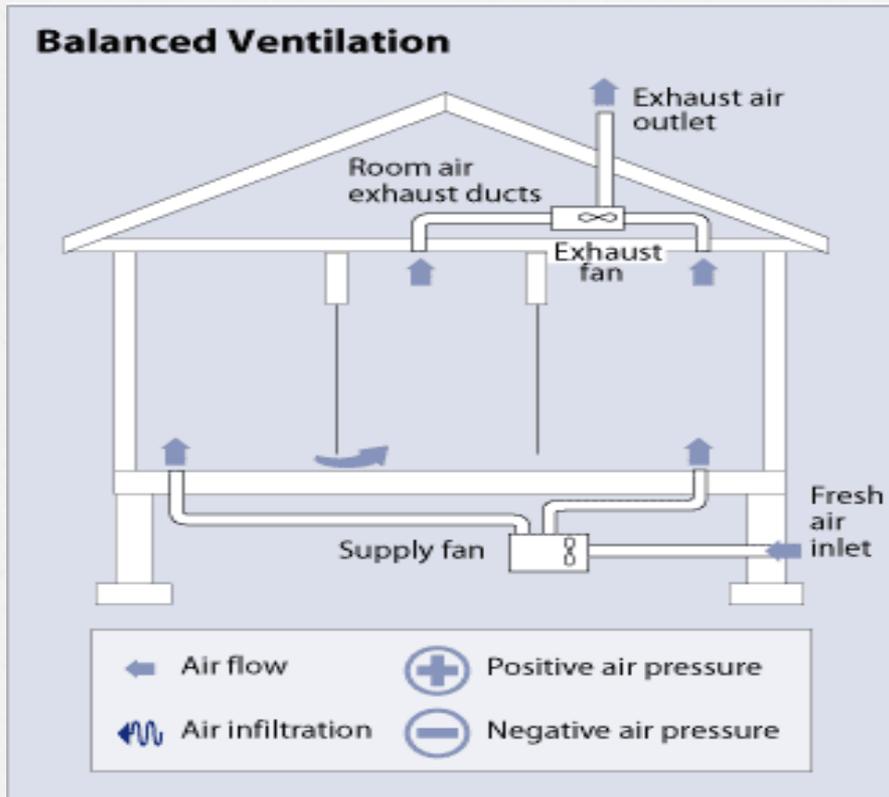
Carbon Dioxide

Carbon dioxide
concentration
exceeds 1000
parts per million

Employer must “check to make sure that ventilation system is operating as designed.”

Mechanical
Ventilation

Basic Ventilation System



mechanical ventilation systems should be “positively pressured” to avoid pulling in outside contaminants.

Buildings without mechanical ventilation, make sure the following are operable:

**Natural
Ventilation**

- Windows
- Doors
- Vents
- Stacks
- Any portals designed for natural ventilation



Eliminate sources of contamination from air supply

Local Exhaust Ventilation

Use local exhaust where housekeeping and maintenance activities could release chemicals/dusts above permissible limits.



Common Locations for Local Exhaust



lab

kitchen



Day to day operation of the unit vents or air handling units



Who controls the
thermostats?

Can units be accessed
easily
for servicing?



Are air flow grates
and air return
grates
unobstructed?

Control Specific Contaminants

Water Intrusion – Focus on correcting the source



All water-damaged ceiling tiles
should
be replaced promptly!

water intrusion



growth of biological agents



possible health problems

Wet Carpeting

Carpet cleaning is rarely effective in removing microbial contamination.



Remove and Replace all water-damaged carpeting if it can't be completely dried within 48 hours.

Microbial growth may begin to occur with a potential to disseminate into the air.

Mold

Remove visible microbial contamination



- Remove and discard all porous materials containing visible mold.
- Clean hard surfaces of mold with detergent.
- Follow clean-up guidelines from PEOSH/EPA to protect workers depending on size of project.

For MOLD & ASBESTOS Call the PROS!

Renovation & Remodeling

- o Evaluate chemicals for health hazards BEFORE they are selected for use - **obtain MSDS sheets**
- o Notify employees 24 hours prior to any construction
- o Isolate construction areas to confine dust, debris and air contaminants
- o Use local exhaust ventilation to move dust and contaminants outside and away from occupied areas
- o Clean and air-out construction area prior to re-occupancy

Isolate and ventilate the area being renovated



Make Systems Automatic

Build requirements for MSDS sheets satisfactory cleanup into bid specs / contracts



Have adequate numbers of local exhaust fans available if not supplied by contractors

Consistently inform employees about planned renovations.

NOTICE

Dear Employee:

In accordance with the requirement of the NJ Indoor Air Quality Standard (N.J.A.C. 12:100-13)(2007), you are hereby notified that a construction/renovation project will take place at _____ from _____ through _____. Materials will be utilized which contain ingredients that may be potentially offensive or harmful.

Record Keeping

- Preventive maintenance schedule/log
- Record Retention (3 years)
- Records available for inspection



Work **WITHIN** the District's system to address employees' IAQ concerns BEFORE complaint filed with PEOSH

Your response to IAQ complaints

- Conduct employee interviews
- Review building operations & maintenance procedures
- Walk-through inspection
- Inspect HVAC system
- Review as-builts
- Conduct sampling, if necessary
- Complete IAQ checklist

PEOSH's response to IAQ complaints

- Conduct employee interviews
- Review building operations & maintenance procedures
- Walk-through inspection
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Asthma-Friendly School Award



- o PEOSH Designated Person's Training has been completed by:
 - the school nurse and
 - the IAQ Designated Person for the school district
- o Identify the initial person to report to in each school – school An Indoor Air Quality TEAM has been established at the school.

IAQ Tools for Schools Action Kit



- IAQ Coordinator's Guide
- IAQ Reference Guide
- IAQ Backgrounder
- Checklists and Topic Backgrounders
- Managing Asthma in the School Environment
- The Framework for Effective School IAQ Management
- Managing Radon in Schools
- Problem Solving Tool



IAQ Tools for Schools Action Kit

IAQ Backgrounder

The goal of the Checklist is to provide clear and easily applied activities that you can use to help prevent indoor air quality problems and resolve any problems promptly if they do arise. Once you understand the basic principles and factors that influence indoor air quality in your school, you will note that the specific activities involve two major actions - the management of pollutant sources, and the use of ventilation for pollutant control. This guidance is based on the following principles:

- Many IAQ problems can be prevented by school staff and students.
- When IAQ problems do arise, they can often be resolved using the skills of school staff.
- The expense and effort required to prevent most IAQ problems is much less than the expense and effort required to resolve problems after they develop.

Why IAQ is Important to Your School

Most people are aware that outdoor air pollution can damage their health, but many do not know that indoor air pollution can also have significant harmful effects. U.S. Environmental Protection Agency (EPA) studies of human exposure to air pollutants indicate that indoor levels of pollutants may be 2-5 times, and occasionally more than 100 times, higher than outdoor levels. These levels of indoor air pollutants may be of particular concern because it is estimated that most people spend about 90% of their time indoors. Comparative risk studies performed by EPA and its Science Advisory Board have consistently ranked indoor air pollution among the top five environmental health risks to the public.

Failure to prevent indoor air problems, or failure to respond promptly, can have consequences such as:

- increasing the potential for long term and short term health problems for students and staff
- impacting the student learning environment, comfort, and attendance
- reducing performance of teachers and staff due to discomfort, sickness, or absenteeism
- accelerating deterioration and reducing efficiency of the school physical plant and equipment
- increasing the potential that schools will have to be closed, or occupants temporarily relocated
- straining relationships among school administration and parents and staff
- creating negative publicity that could damage a school's or administration's image and effectiveness
- creating potential liability problems

Indoor air problems can be subtle and do not always produce easily recognized impacts on health, well-being, or the physical plant. Children may be especially susceptible to air pollution. For this and the reasons noted above, air quality in schools is of particular concern - proper maintenance of indoor air is more than a "quality" issue, it encompasses safety and stewardship of our investment in the students, staff, and facilities.

Understanding IAQ Problems and Solutions

Over the past several decades, exposure to indoor air pollutants has increased due to a variety of factors, including the construction of more tightly sealed

Indoor Air Quality



Tools for Schools

Good indoor air quality contributes to a favorable learning environment for students, performance of teachers and staff, and a sense of comfort, health and well-being for all school occupants. These combine to assist a school in its core mission - educating children.

IAQ Checklists Available

- Teacher's
- Administrative Staff
- School Official's
- Health Officer's
- Ventilation
- Building Maintenance
- Food Service
- Waste Management
- Renovation and Repairs
- Integrated Pest Management
- Walkthrough



IAQ Tools for Schools Action Kit

Walkthrough Backgrounder

During the walkthrough, use your senses:

- o **Look** at the general level of cleanliness
- o **Smell** for unique or objectionable odors—including mold, mildew, and “chemical” smells—as you move from room to room. Note any potential sources of these odors.
- o **Feel** for uncomfortable air temperatures, drafts, and high or low humidity. Check for air flowing into and out of grilles and air vents.
- o **Listen** to the concerns of school occupants regarding IAQ. Do they experience any IAQ-related symptoms in classrooms?



Indoor Air Quality Tools for Schools
REFERENCE GUIDE

TYPICAL SOURCES OF INDOOR AIR POLLUTANTS

<p>OUTDOOR SOURCES</p>	<p>BUILDING EQUIPMENT</p>	<p>COMPONENTS/ FURNISHINGS</p>	<p>OTHER POTENTIAL INDOOR SOURCES</p>
<p>Polluted Outdoor Air</p> <ul style="list-style-type: none"> • Pollen, dust, mold spores • Industrial emissions • Vehicle and nonroad engine emissions (cars, buses, trucks, lawn and garden equipment) <p>Nearby Sources</p> <ul style="list-style-type: none"> • Loading docks • Odors from dumpsters • Unsanitary debris or building exhausts near outdoor air intakes <p>Underground Sources</p> <ul style="list-style-type: none"> • Radon • Pesticides • Leakage from underground storage tanks 	<p>HVAC Equipment</p> <ul style="list-style-type: none"> • Mold growth in drip pans, ductwork, coils, and humidifiers • Improper venting of combustion products • Dust or debris in ductwork <p>Other Equipment</p> <ul style="list-style-type: none"> • Emissions from office equipment (volatile organic compounds (VOCs), ozone) • Emissions from shop, lab, and cleaning equipment 	<p>Components</p> <ul style="list-style-type: none"> • Mold growth on or in soiled or water-damaged materials • Dry drain traps that allow the passage of sewer gas • Materials containing VOCs, inorganic compounds, or damaged asbestos • Materials that produce particles (dust) <p>Furnishings</p> <ul style="list-style-type: none"> • Emissions from new furnishings and floorings • Mold growth on or in soiled or water-damaged furnishings 	<ul style="list-style-type: none"> • Science laboratory supplies • Vocational art supplies • Copy/print areas • Food prep areas • Smoking lounges • Cleaning materials • Emissions from trash • Pesticides • Odors and VOCs from paint, caulk, adhesives • Occupants with communicable diseases • Dry-erase markers and similar pens • Insects and other pests • Personal care products • Stored gasoline and lawn and garden equipment



The Road to Success for Your IAQ Team

EPA Tools for Schools IAQ Management Plan:

- 1. Fix existing IAQ problems.**
- 2. Instill IAQ awareness that leads to preventive actions.**
- 3. Resolve IAQ complaints and incidents as they occur.**

Encourage a sense of shared responsibility and cooperative effort

Walkthrough Basics

Checklist(s)

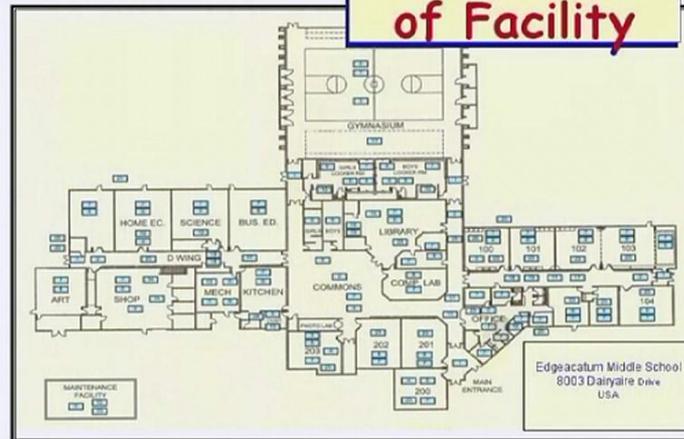
Floor Plan

Walk-Through Checklist

OK	See Notes	Major Categories
<input type="checkbox"/>	<input type="checkbox"/>	Entries & Hallways
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Classrooms & Portables
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Ventilation & Mechanical
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Staff Lounge/ Workroom
<input type="checkbox"/>	<input type="checkbox"/>	Science Labs & Shops
<input type="checkbox"/>	<input type="checkbox"/>	Custodial & Storage
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Basements, Crawl, Tunnels
<input type="checkbox"/>	<input type="checkbox"/>	Exterior & Roof

Fire Escape Plan

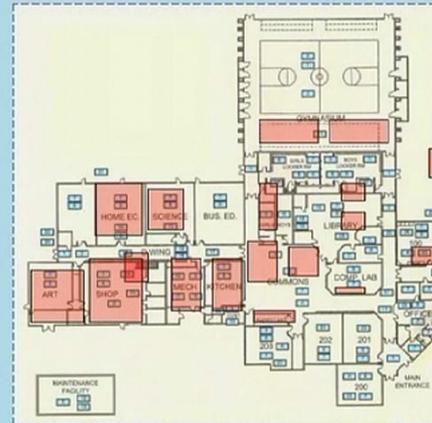
Basic Map of Facility



Walkthrough Basics

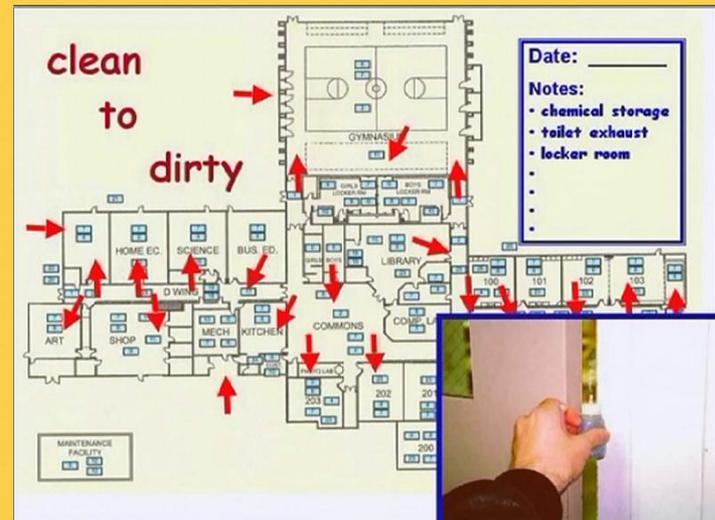
Pollutant Source/Location

Pollutant Control: Source Inventory



- Chemistry
- Physics
- Biology
- Art
- Home Science
- Custodial
- Rest Rooms
- Workroom
- Locker Rooms
- Kitchen
- Boiler Room

Direction of Air Flow



Summary of Nurse's Role

Asthma Episodes/Triggers

Green Cleaning

IAQ Team/Walkthrough



Resources

PAIPM Program/Penn State Extension

extension.psu.edu/ipm

National Heart Lung & Blood Institute

http://www.nhlbi.nih.gov/health/prof/lung/asthma/basics_schools

Whitney-IAQ Tools for Schools National Symposium

<http://www.iaqsymposium.com/pdfs/2011/BreakoutSessionPDFs/GreenCleaning/WhitneyGreenCleaning.pdf/epa>

Virtual Walkthrough

<http://www.nwcleanair.org/aqPrograms/indoorAir.htm>