

What is indoor air quality and how is it affected by cleaning, sanitizing, and disinfecting?



Indoor Air Quality (IAQ) is a measure of how clean the air is inside the buildings where we live, work, and play. IAQ is influenced by:

- ◆ a building's ventilation system (the equipment that moves air in a building).
- ◆ whether windows can be opened.
- ◆ chemicals or microbes (such as mold) that enter the building.
- ◆ chemicals like cleaning products and art supplies that are used in the building.
- ◆ chemicals that are created by activities inside the building.
- ◆ building materials and furniture that produce pollutants like formaldehyde.

Some pollutants in indoor air can make us sick. Children are especially vulnerable. Some air pollutant levels in indoor air are two to five times worse than in the air outdoors. Sometimes indoor air can be up to 100 times worse.

- ◆ We spend as much as 22 hours a day indoors in our homes, schools, and workplaces.

Common indoor sources of pollutants include:

- ◆ Cigarette smoke
- ◆ Cleaning, sanitizing, and disinfecting products
- ◆ Pesticides
- ◆ Burning fuel in gas cook stoves and heaters, and wood burning stoves and fireplaces, especially when exhaust fans are not used

- ◆ Pet dander
- ◆ Mold, moisture, and chemicals from water damage
- ◆ Asbestos, lead, and radon

IAQ problems are also caused by poor ventilation. Ventilation is when 'clean' air (normally outdoor air) is brought indoors and pollutants in indoor air are removed or reduced. Ventilation:

- ◆ occurs naturally by opening windows and doors or
- ◆ occurs mechanically through properly operating heating, cooling, and ventilation equipment.
 - ◇ Mechanical ventilation may provide a mixture of outdoor air and recirculated air.
 - ◇ The best mechanical systems provide enough outside air, good air movement, and temperature control.

When it is hot and humid, the concentration of some pollutants in the air is worse. Outdoor ozone levels are higher in the summer. This leads to higher ozone levels indoors as well. For ozone forecasts in your community, visit <http://airnow.gov> and click on "Local forecasts and conditions."

Indoor air pollutants can cause:

- ◆ immediate health problems such as asthma attacks, headaches, dry eyes, nasal congestion, nausea, and fatigue.
- ◆ long term health problems such as asthma and cancer. Some indoor air pollutants can also make heart disease worse when people are exposed to them for months or years.

Cleaning, sanitizing and disinfecting products can increase indoor air pollution. They can produce:

- ◆ volatile organic compounds (VOCs), which are gases that come from liquids such as aerosol sprays and liquid cleaners. VOCs also come from solvents, glues, and adhesives found in furniture and plywood. They are common indoors.

Some VOCs react with ozone to make formaldehyde and ultrafine particles, both of which can harm human health.

Formaldehyde is known to cause cancer in people and there is no level of exposure that is safe.

- ◆ particulate matter (PM). PM is made up of particles that are small enough to be carried by the air and can be breathed in by people. The smallest particles are the greatest threat to human health because they can travel deepest into the lungs. Some can even pass from the lungs into your blood.

The kinds of health effects caused by VOCs and PM will depend on many factors, including:

- ◆ how much you are exposed to.
- ◆ how long you are exposed to it.

Actions you can take to reduce the effects of cleaning, sanitizing, and disinfecting products on indoor air quality:

Ventilation is an important part of improving indoor air quality, but the best way to maintain the quality of your indoor air is to *reduce sources of pollution indoors*.

- ◆ **Use only the amount of cleaning, sanitizing, or disinfecting product that is necessary to complete the job.** Disinfect only when and where required.
- ◆ **Avoid the use of fragranced or scented products** in your facility (see Curriculum Section 8: Clean Isn't a Smell), especially air fresheners which are a concentrated source of indoor air pollutants.

- ◆ **Don't use machines that clean the air, or air "purifiers," that produce ozone.** Ozone is a gas that can harm human health. To find air cleaners that are safe, consult the California Air Resources Board list of safe air cleaners: <http://www.arb.ca.gov/research/indoor/aircleaners/certified.htm>
- ◆ **Never mix cleaning products.** They can form toxic gasses when combined.
- ◆ **Read the label!** If it says to use the product in a well-ventilated area, go outdoors or to areas with an exhaust fan to use it. If it must be used indoors, open several windows.
- ◆ **Rinse surfaces well with water after cleaning.** Dried cleaning products that stay on surfaces will continue to react with any ozone present in the air. They can also flake off surfaces and add to particles in the air that you breathe.
- ◆ **Throw away partially full containers of old or unneeded chemicals *safely*.** Because gases can leak even from closed containers, this single step could help reduce chemical pollutants in your facility's air. Use earth911's website to find out where to dispose of hazardous household waste in your area <http://search.earth911.com/?what=HHW>
- ◆ **Limit the use of cleaning products advertised as pine – or lemon-scented, or contain pine or citrus oils.** These products contain terpenes which react with smog to produce formaldehyde and other harmful chemicals. This is especially important in the summer when smog is worst.

RESOURCES

California Environmental Protection Agency | AIR RESOURCES BOARD, FACTS ABOUT ENVIRONMENTAL EXPOSURES: Air pollution and contaminants at child-care and preschool facilities in California
www.arb.ca.gov/html/fact_sheets/preschool_exposure.pdf

Cleaning Products and Indoor Air Quality: Actions you can take to reduce exposures
http://www.arb.ca.gov/research/indoor/cleaning_products_fact_sheet-10-2008.pdf

For help with reducing other indoor air pollutants, go to <http://www.epa.gov/iaq/voc.html> or the California EPA Air Resources Board website: <http://www.arb.ca.gov/research/indoor/indoor.htm>