

## USING OCCUPANT QUESTIONNAIRES TO HELP SOLVE IAQ PROBLEMS

Solving indoor air quality problems may not be a simple task. There may not be one single situation that is causing a problem, but several, and sometimes several minor problems in synergy can create health effects. It helps to follow a protocol to solve IAQ problems. Along with a walkthrough, **occupant questionnaires** and **health complaint forms** (examples available on this website) can be very helpful.

SPACIAL PATTERNS	SUGGESTIONS
Widespread	Immediately check for chemical spills or leaks and combustion leaks. Check the HVAC (heating and ventilation) system for mold contamination, outdoor air sources being brought into the building and check temperature and humidity control.
Individual zones	Check for recent renovations, new chemicals used for cleaning or in science labs, pesticides for pest control, new equipment or furnishings added, chemical leaks or spills, moisture damage, the HVAC system, equipment not venting properly, dry plumbing/drain traps, and combustion leaks.
Individual	Check the individual's sensitivities or allergies. Check for biological sources such as pollen, dust, mold, animals, composters or plants in the classroom, carpet in the classroom, individuals wearing fragrance chemicals, air deodorizers, new equipment or cleaning products being used, an ozone generator. Also consider external sources such as what the individual may have eaten, or come in contact with in their home or other environments, whether they smoke, etc.

TIMING PATTERNS	SUGGESTIONS
Onset of day	Check to see if the HVAC system has been running during the evenings and weekends. If not, pollutants may build up and be released at the beginning of the daytime cycle.
Particular time of day	Check routines to see if a particular activity may be the source of the problem, such as cleaning routines, fuel delivery, lab activities, delivery activity at a loading dock, bus delivery and pick up, etc.
Recent problem	Look for any change in activities or conditions, including weather, wind patterns, new industries nearby, etc.

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**COMMON POLLUTANTS, SOURCES AND HEALTH EFFECTS**

**ASBESTOS** - can be found in insulation materials, air ducts, floor and ceiling tiles, roof shingles and consumer products. The risk of delayed disease can occur during occupational exposure, when asbestos-containing material is damaged or during unsafe removal of asbestos. Long-term health effects of breathing asbestos fibers may result in lung cancer, pleural cancer or cancer of the larynx, or asbestosis (fibrous scarring of the lungs).

**BIOLOGICAL ALLERGENS** - include molds, bacteria, fungi, yeasts, mildew, viruses, animal dander, dust mites and pollen. Some of the symptoms caused by biological allergens and contaminants can include: sneezing, coughing, watery eyes, runny noses, sore throats, difficulty breathing or shortness of breath, dizziness, headaches and infectious diseases.

**CARBON DIOXIDE** - is a gas which is produced from combustion processes as well as breathing. Carbon dioxide is often used as a measure of indoor pollution build-up or a lack of fresh air. Higher levels of CO<sub>2</sub> can lead to drowsiness, headache, dizziness and fatigue.

**COMBUSTION GASES** - can originate from furnaces or boilers, water heaters, space heaters, fireplaces, wood or coal stoves, gas ranges and ovens, gas clothes dryers, exhaust from engines operating in attached garages, and from welding and soldering tools. Health effects can be mildly irritating to lethal. Symptoms can include: headaches, dizziness, nausea, vomiting, weakness, confusion, sleepiness, irritation to the eyes, difficulty breathing, respiratory irritation, and in extreme cases unconsciousness and even death.

**ENVIRONMENTAL TOBACCO SMOKE** - Health effects associated with ETS are increased risk of lower respiratory tract infections such as pneumonia and bronchitis, increased respiratory irritation, reduced lung function and an inducement of asthma. Researchers are also linking long-term effects of ETS to lung cancer.

**FRAGRANCE CHEMICALS** - Many health effects can be associated with fragrance chemicals. Effects can be mild to severe, physical and neurological: respiratory and sinus problems, sore throats, coughing, swollen lymph glands, sneezing, trigger for asthma attacks, watery eyes, nausea, vomiting, stomach cramps, heart palpitations, exhaustion, eczema, rashes, migraine, dizziness, inability to concentrate, loss of coordination, loss of consciousness, seizures, weakness, short-term memory loss, shortened attention span, depression, irritability, mood swings, aggression, narcotic effect of stupor, sleepiness and hallucinations.

**LEAD** - Lead remains a significant risk to children even though it has been banned from gasoline and paint. Lead can be found in solder, pipes, ammunition, paint manufactured before 1970, toys, jewelry, and contaminated soil and dust. Health effects from lead exposure have been associated with decreased IQ, learning and reading disabilities, reduced attention span, hyperactivity and behavioral problems. The effects of lead poisoning may be irreversible.

**RADON** - is a naturally occurring gas that results from the underground decay of uranium. Long-term health effects of radon can be lung cancer.

**PARTICULATE** - include fine solids such as dust, pollens, mold, heavy minerals, and soot, and also aerosols (liquid droplets) that are formed in the atmosphere from combustion byproducts such as sulfur dioxide and nitrogen oxides. Health effects depend upon the type of particulate but can range from nose, throat, eye, and respiratory irritation to neurological symptoms such as dizziness, inability to concentrate, loss of coordination, and weakness.

**PESTICIDES** - are chemicals, biological materials and other devices used to control and kill pests. Examples include: insecticides, herbicides, rodenticides, fungicides, and nematocides. Exposure to pesticides can cause many types of health concerns. Acute toxicity can lead to death, poisoning, coma, respiratory distress and neurological dysfunction. Researchers have become concerned about possible links between chronic pesticide exposure and childhood cancer, immune system suppression, central nervous system damage, and hormone disruption. Short-term symptoms can include: headaches, convulsions, eye, nose, throat and lung irritation, dizziness, weakness, and nausea.

**VOLATILE ORGANIC COMPOUNDS (VOCs)** - are gases that are released into the air from chemicals. A few examples of sources of VOCs are environmental tobacco smoke, formaldehyde, cleaning chemicals, science labs, auto body shops, personal care products, office equipment, and furnishings. Health effects, depending upon the chemical, can include: irritation to the eyes, nose, throat, lungs and skin, headache, drowsiness, confusion, irritability, loss of coordination, and convulsions. Long-term effects can include: cancer, heart attack, stroke, high blood pressure, immune system suppression, liver damage and birth defects.

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