

FAQs on the Health Effects of Air Pollution

A Resource for Health Professionals



1. What is air pollution?

Every day, the average adult breathes about 15,000 to 20,000 litres of air. Both indoor and outdoor air contain chemical and biological gases, droplets and particles, some of which are harmful to health. **Air pollution** describes any harmful gases or particles in the air.

Canada's air quality is affected by pollutants, which include ground-level ozone (O₃), particulate matter (PM), sulphur dioxide (SO₂), carbon monoxide (CO), nitrogen oxides (NO_x), volatile organic compounds (VOCs), hydrogen sulphide (H₂S), sulphates and nitrates. Additional air pollutants include toxic metals (lead, mercury, manganese, arsenic and nickel), benzene, formaldehyde, polychlorinated biphenyl (PCB), dioxins, and other chemicals.

Air pollution can affect both urban and rural areas. Although natural emissions from forest fires and wind-blown dust from soil and volcanoes contribute to air pollution, human activities release far more pollutants into the environment. Canada's largest sources of air pollution are power plants, industries and vehicle emissions. While emission controls have improved in Canada over the last 20 years, a growing demand for power and the use of cars have increased the consumption of fossil fuels (gasoline, oil, natural gas, coal). Some other causes of air pollution are burning of wood, pesticides and toxic household products.

Greenhouse gases (GHGs) are gases in the atmosphere that trap heat from the sun. Naturally occurring GHGs include water vapour, ozone (O₃), carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O). While these naturally occurring gases make life possible, a serious concern today is "climate change", which is caused by increased levels of some of these gases in the atmosphere. Higher concentrations of GHGs cause the Earth's average surface temperature to rise, leading to "global warming".

Another type of pollution occurs mostly in urban settings. **Smog** refers to the mix of nitrogen oxides (NO_x) and volatile organic compounds (VOCs) just above the Earth's surface, which form ground-level ozone in the presence of sunlight. Human activity is responsible for the increase in ground-level ozone in recent years. About 95 per cent of NO_x from human activity comes from the burning of gasoline, coal, gas and oil in motor vehicles, homes, industries and power plants. VOCs come mainly from gasoline combustion and from the evaporation of liquid fuels and solvents.

Air pollution and climate change are intrinsically linked. Smog pollutants and GHGs are often emitted from the same tailpipes and industrial smokestacks. Taking steps to reduce air pollution also helps slow global warming.

Although similar contaminants can be found in both indoor and outdoor air, concentrations may vary. As well, chemicals emitted indoors through the use of common household products and practices can contribute to a certain set of health risks when inhaled. However, the very same chemicals or contaminants emitted outdoors will primarily contribute to the formation of ground-level ozone.

Where smoking is still permitted indoors, tobacco smoke is the most important single source of indoor air pollution.



2. What are the health effects of air pollution?

Air pollution can affect health in a variety of ways:

- irritation of eyes, nose and throat;
- wheezing, coughing and breathing difficulties;
- worsening of existing lung and heart problems;
- increased risk of heart attack; and
- in especially sensitive people, may result in premature death.

Individual reactions to air pollution depend on several factors, such as:

- level, type and combination of pollutants in the air;
- degree of exposure of individual (e.g., location, local sources of pollution, duration of exposure);
- quantity of pollutant present; and
- age, weight, activity level and health status of an individual.

Symptoms of exposure may persist for a number of days after a high pollution episode, or they may not appear until several days afterwards. There is no known, safe level of air pollution and even low levels of air pollution can negatively affect the health of vulnerable populations such as the elderly, children, and individuals with cardio-respiratory problems.

Recent findings published in the Canadian Public Health Association's *Canadian Journal of Public Health* indicate that approximately 8% of non-traumatic mortality in Canadian cities is attributable to air pollution caused by the burning of fossil fuels.

3. Who is affected by air pollution?

Air pollution affects everyone's health in different ways – both urban and rural dwellers – throughout the seasons. Impacts may be cumulative over the long term for some individuals.

- Seniors, children and individuals with lung and heart diseases are most affected. This includes people with heart conditions and those with asthma, emphysema, chronic bronchitis or allergies.
- Even healthy individuals may have more difficulty breathing on days when the air is highly polluted.

Health Canada estimates that every year several thousand Canadians die prematurely due to air pollution. The Ontario Medical Association estimates that every year tens of thousands of people in Ontario visit emergency rooms or are admitted to hospital as a result of exposure to smog.

Children

Children (≤ 15 years of age) inhale more air per kilogram of body weight than adults and as a result, proportionately more pollutants. Children also breathe more rapidly than adults and tend to breathe through their mouths, thus bypassing the natural filtering system in the nose. This breathing pattern allows large amounts of polluted air to get directly into their lungs.

As well, children are especially vulnerable to the negative effects of air pollution because:

- their lungs are not fully developed, and new tissue growing during childhood is more sensitive to any irritants including air pollutants;
- they are likely to be active outdoors, which increases their exposure to pollutants; and
- the places where many children play (in city parks and schoolyards near high traffic areas), and the distance from ground level at which they breathe, put them at greater risk of inhaling pollutants.

Children with asthma

According to the 1988/99 results of the National Longitudinal Survey of Children and Youth, 15.2% of Canadian children between the ages of 4 and 11 have been diagnosed with asthma. Studies show that air pollution makes asthma symptoms worse, including coughing, wheezing, chest tightness and shortness of breath. There is no known safe level of air pollution.

Seniors

While most seniors lead healthy and productive lives, increasing age can lead to certain conditions that adversely affect their health and well-being.

- Seniors with chronic respiratory or heart conditions, or

other pulmonary and circulatory stresses, may find their conditions worsened by the inhalation of pollutants.

- *Specifically*, a history of heart attack, asthma, emphysema or chronic bronchitis can increase sensitivity to the adverse health effects of air pollution.
- Seniors in general poor health are also susceptible to the effects of pollutants.
- The decline in lung function that occurs as part of the natural aging process can be accelerated by the damaging effects of air pollution.

Patients with lung and heart diseases

An early diagnosis, reduced exposure to air pollution and appropriate treatment when necessary will usually ensure a normal, or close to normal, quality of life.

4. What advice can I give my patients?

There are a number of actions you can recommend to your patients to help them reduce their exposure to air pollution:

- *Encourage your patients* to make informed decisions. Advise your patients to refer to the media, ministries of health, public health clinics and medical officers of health for news about outdoor air quality and the weather.
- *Ask your patients* to consider rescheduling strenuous outdoor activities on high pollution days. Advise your patients to avoid heavy traffic areas.
- *Remind your patients* to also be aware of the quality of indoor air. An indoor environment filled with tobacco smoke, chemicals from cleaning products or moulds due to high humidity will have a negative impact on health.
- *Remind your patients* that high air pollution levels often correspond with hot, humid summer days. This combination can be dangerous, possibly leading to dehydration. Advise your patients to drink plenty of water on these days.
- *Tell your patients* to monitor their health. If respiratory symptoms or chronic conditions worsen due to air pollution, they should decrease strenuous activities, reduce exposure to pollutants and consult their health care provider.

Parents should consider:

- Reducing children's strenuous outdoor activities on high pollution days, keeping in mind the quality of indoor air as well.

Seniors with chronic health conditions should:

- Avoid strenuous activities when poor air quality is forecast and make arrangements for someone else to do their errands on high pollution days.

Caregivers need to know that:

- Due to limited physical mobility or other causes, some seniors may not be able to protect themselves or heed health protection messages effectively.



5. What resources are available to give to my patients?

The Canadian Public Health Association (CPHA) offers information resources to assist you in helping your patients reduce their exposure to air pollution, protect their health and take action to improve the air. Three brochures and a poster are available in both English and French. The brochures are directed to three audiences: the general adult population, parents of children with asthma, and seniors. To find out more about these resources or to order the series, please contact:

Canadian Public Health Association

400-1565 Carling Ave Ottawa, ON K1Z 8R1

Tel: (613) 725-3769 Fax: (613) 725-9826

www.cpha.ca/cleanair

6. What actions can I suggest to decrease air pollution?

To reduce air pollution levels, advise your patients to reduce their own contributions to air pollution. They can drive less, use energy more efficiently at home and make wise choices as consumers. They can consider using clean, low-impact renewable sources of energy in their home and cleaner fuels for their vehicles. Advise them to contact their local politicians at all levels of government to voice their concerns about air pollution.

Other actions your patients can consider:

In transit

- Walk, cycle, car pool or use public transit instead of driving.
- If you do drive, keep your car properly tuned and reduce idling. Ten seconds of idling uses more fuel than restarting.
- Avoid rapid acceleration and drive at lower speed.
- If buying, renting or leasing a vehicle, choose one that is fuel-efficient.

At home

- Buy or make non-toxic alternatives for common household cleaners.
- Make sure no one smokes in your home.
- Look for alternatives to using pesticides on lawns, gardens and indoor plants.
- Hang clothes to dry and lower thermostats on hot water heaters and furnaces.
- Reduce your use of air conditioning.
- Avoid using gas-powered equipment, such as lawn mowers, on high pollution days.
- Work with your landlord or condominium association to conserve energy in your building.



Celebrate Clean Air Day

June 2, 2004
June 8, 2005
June 7, 2006

Clean Air Day (CAD) occurs the first Wednesday every June and is a celebration of environmentally friendly activities that promote clean air and good health. The Government of Canada proclaimed CAD as part of Canadian Environment Week to increase public awareness about air quality and climate change. CAD is a grassroots event built on community activities. It is a great time to join other Canadians in making choices that will create a cleaner, safer world now and for the future. Visit www.cleanairday.com.

For more information on air pollution, health effects and actions to reduce air pollution, contact the following agencies:

Asthma Society of Canada

800-787-3880

www.asthma.ca

Canada's Association for the Fifty-Plus

800-363-9736

www.50plus.com

Canadian Association of Physicians for the Environment

www.cape.ca

Canada Mortgage and Housing Corporation

800-668-2642

www.cmhc.ca

Canadian Health Network

www.canadian-health-network.ca

Canadian Institute for Child Health

613-230-8838

www.cich.ca

Canadian Lung Association

888-566-LUNG

www.lung.ca/cando

Canadian Nurses Association

800-361-8404

www.cna-nurses.ca

Canadian Public Health Association

www.cpha.ca/cleanair

Clean Air Day

www.cleanairday.com

Environment Canada

800-668-6767

www.ec.gc.ca/air

Health Canada

613-957-1876

www.healthcanada.ca/air

Health Care Without Harm

www.noharm.org

Office of Energy Efficiency Natural Resources Canada

www.oe.nrcan.gc.ca

Help make every day a Clean Air Day!

You can view / download the FAQs and other resources at www.cpha.ca/cleanair