

Air Pollution & Your Health

Clean air is something we all need.

It is vital to healthy living and a healthy environment.



Canadian Public Health Association

What is air pollution?

Air is a mixture of gases surrounding the Earth. These gases create the atmosphere that allows life to flourish. Clean air consists of 21% oxygen and 78% nitrogen by volume, and traces of other gases such as argon, carbon dioxide (CO₂) and water vapour.

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 people and animals and damaging to plants. **Air pollution** is the term that 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 (NOx), 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.

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

What about greenhouse gases and climate change?

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). Without them, the Earth's average temperature would be too cold to support life. 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".

What is Smog?

Smog is another type of pollution which occurs mostly in urban settings. It refers to the mix of nitrogen oxides (NOx) 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 NOx 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.

What is indoor air pollution?

Most people are aware that outdoor air pollution can damage their health, but fewer realize that indoor air pollution can also contribute to ill health. Studies by Health Canada, the U.S. Environmental Protection Agency (EPA) and other agencies show that levels of indoor pollutants may be even higher

than outdoor levels. Since most people spend as much as 90% of their time indoors, indoor air pollution is a real concern.

Problems with indoor air quality are caused by a range of factors including tobacco smoke, pets, carpets, building materials, furniture, cleaning products, pesticides, printing and copying machines, gas appliances, allergens, moulds, bacteria, viruses, radon and lead. Reduced natural ventilation, too much humidity and the use of chemicals can lead to unhealthy air and affect health and well-being.

What are the health effects of air pollution?

Air pollution can affect health in many 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 even 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, length of exposure);
- amount of pollutant in the air; and
- age, weight, activity level and health status of an individual.

Symptoms of exposure may persist for a number of days after a person is exposed to high pollution levels, or they may appear several days later. There is no known, safe level of air pollution. Even low levels of air pollution can have a negative effect on the health of vulnerable people, such as the elderly, children, and people with cardio-respiratory problems.

Who is affected by air pollution?

Air pollution affects everyone's health in different ways – both urban and rural dwellers – throughout the seasons. Negative health effects will increase as air pollution increases.

Some people may suffer long-term, cumulative effects.

- Seniors, children and people 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 people 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.

Reduce your exposure to air pollution!

- **Take notice:** Refer to the local news and forecasts, your public health clinic, medical officer of health or ministry of health, for information about outdoor air quality and weather. High air pollution levels often happen on hot, humid summer days. This combination can be dangerous because it may lead to dehydration. Drink plenty of water on these days. Be aware of the quality of indoor air. Eliminate tobacco smoke, only use cleaning product chemicals in well-ventilated areas and clean up moulds in your home and workplace.
- **Time it right:** Reschedule strenuous outdoor activities and limit children's outdoor play on high pollution days. Avoid heavy traffic areas.
- **Take action:** To reduce air pollution levels, change your lifestyle. Drive less, use energy more efficiently at home and make wise choices as a consumer. Consider using clean, low-impact

renewable sources of energy in your home and cleaner fuels for your vehicles. Contact your local politicians at all levels of government to voice your concerns about air pollution.

Other actions for you to 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 pesticides for 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, its health effects and what you can do to reduce air pollution, contact the following agencies:

Canada Mortgage and Housing Corporation
800-668-2642 www.cmhc.ca

Canadian Health Network
www.canadian-health-network.ca

Canadian Lung Association
888-566-LUNG www.lung.ca/cando

Canadian Public Health Association
www.cpha.ca/cleanair

Clean Air Day
819-994-5404 www.cleanairday.com

Environment Canada
800-668-6767 www.ec.gc.ca/air

Health Canada
613-957-1876 www.healthcanada.ca/air

**Office of Energy Efficiency,
Natural Resources Canada**
www.oeenrncan.gc.ca

Help make every day a Clean Air Day!
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Children with Asthma

What Parents Need to Know About Air Pollution

You already know many of the triggers of your child's asthma, such as second-hand smoke, pets, respiratory infections and cold air. What you may not know is that air pollution can also contribute to asthmatic episodes in your child.

What is air pollution?

Air pollution is the term that describes any harmful gases or particles in the air. Both indoor and outdoor air contain chemical and biological gases, droplets and particles, some of which are harmful to people and animals, and damaging to plants.

How does air pollution affect asthma?

Most people are aware that outdoor air pollution can damage their health, but fewer realize that indoor air pollution can also contribute to conditions such as asthma. Studies by Health Canada, the U.S. Environmental Protection Agency (EPA) and other agencies show that levels of indoor pollutants may be even higher than outdoor levels. Since most people including children spend as much as 90% of their time indoors, indoor air pollution is a real concern for parents of asthmatic children.

Problems with indoor air quality are caused by a range of factors including pets, carpets, second-hand smoke, building materials, furniture, cleaning products, pesticides, printing and copying machines, gas appliances, allergens, moulds, bacteria, and viruses. Reduced natural ventilation, too much humidity and the use of chemicals can lead to unhealthy air and affect the health and well-being of children at home and school.

How are children with asthma affected by air pollution?

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.

Children (under 16 years of age) inhale more air per kilogram of body weight than adults. As a result, they breathe a higher proportion of pollutants. Children also breathe more quickly than adults and tend to do so through their mouths. This breathing pattern bypasses the natural filters in the nose and allows large amounts of polluted air to go directly into their lungs.

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.

For children with asthma, air pollution can trigger an asthma attack or make symptoms worse. When the air passage becomes irritated, inflamed and filled with mucus, breathing becomes more difficult.

What are the symptoms of asthma in children?

Up to 80% of children with asthma develop symptoms before the age of five. Asthma can be difficult to diagnose and is often mistaken for other respiratory problems, such as bronchitis or pneumonia.

Children are less likely than adults to be aware of symptoms (such as tightness in the chest), which may be a warning of asthma. A child may not complain of other common symptoms such as coughing, shortness of breath and wheezing.

Asthma symptoms may worsen when a sensitive child is exposed to indoor or outdoor air pollutants, as well as respiratory infections and changes in weather. Worry and other negative emotions can also trigger symptoms in some children. Allergens such as animal secretions, dust mites, cockroach droppings, pollens and moulds can also trigger asthma symptoms.

Managing a child's asthma

A child's asthma condition may need to be managed differently if air pollutants are a concern. Managing environmental exposures is one part of overall asthma control. Consult your local health care provider on how to do this effectively.

Other things you can do:

- **Take notice:** Refer to the local news and forecasts, your public health clinic, medical officer of health or ministry of health, for information about outdoor air quality and weather. Plan your day based on this information. High air pollution often happens on hot, humid summer days. This combination can be dangerous because it may cause dehydration. On these days, make sure that children drink

plenty of water. Be aware of the quality of indoor air. Eliminate tobacco smoke, only use cleaning product chemicals in well-ventilated areas and clean up moulds in your home. Reduce exposure to animal dander and dust for sensitive children.

- **Time it right:** Reschedule children's outdoor play and activities on high pollution days. Keep children away from streets with heavy traffic, especially during rush hour.
- **Take action:** To reduce air pollution levels, change your lifestyle. Drive less, use energy more efficiently at home and make wise choices as a consumer. Consider using clean, low-impact renewable sources of energy in your home and cleaner fuels for your vehicles. Contact your local politicians at all levels of government to voice your concerns about air pollution.

How can I help my child manage his/her asthma?

Although there is no cure, your child's asthma can be controlled, and symptoms can be minimized.

- Manage your child's condition as soon as it is diagnosed to prevent it from getting worse.
- Educate yourself about asthma and its control. An allergist, immunologist, or certified asthma educator can teach you and your child about the disease and how to deal with it.
- Reduce exposure to known asthma triggers.
- Make sure school staff know about your child's asthma, including the medication that controls it and possible side effects. Have a written plan listing the child's triggers, how to avoid them, permission to have the inhaler with the child at all times and to use it when needed, how to know if the medication is not working, and when to call an ambulance if needed.

How can I reduce my child's exposure to air pollution and help clean the air?

Other actions for you to 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 maintain 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 pesticides on lawns, gardens and indoor plants.
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800-787-3880 www.asthma.ca

Canada Mortgage and Housing Corporation
800-668-2642 www.cmhc.ca

Canadian Health Network
www.canadian-health-network.ca

Canadian Lung Association
888-566-LUNG www.lung.ca/cando

Canadian Public Health Association
www.cpha.ca/cleanair

Canadian Institute for Child Health
613-230-8838 www.cich.ca

Clean Air Day
819-994-5404 www.cleanairday.com

Environment Canada
800-668-6767 www.ec.gc.ca/air

Health Canada
613-957-1876 www.healthcanada.ca/air

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Air Pollution and Seniors' Health

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Your reaction to air pollution depends on several factors, such as:

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

Symptoms of exposure may persist for a number of days after you are exposed to high pollution levels, or they may appear several days later. There is no known, safe level of air pollution. Even low levels of air pollution can have a negative effect on the health of vulnerable people, such as the elderly, children, and people with cardio-respiratory problems.

How does air pollution affect seniors?

While most seniors lead healthy and productive lives, getting older can lead to certain conditions that can adversely affect your health and well-being.

- If you have a chronic lung, heart or circulatory condition, you may find your condition worsen when you inhale pollutants.
- If you are in general poor health, you are more vulnerable to the effects of pollutants.
- Reduced lung function occurs as a natural part of aging and may get worse because of air pollution.

Lung and heart diseases

The relationship between air pollution, and lung and heart diseases is the subject of considerable medical research. Findings confirm that air pollution can make these diseases worse. An early diagnosis, reduced exposure to air pollution and getting the right treatment at the right time will help you ensure a normal, or close to normal, quality of life.

If you are concerned about any of the symptoms of exposure to air pollution described above, contact your health care provider.

How can you reduce your exposure to air pollution?

Take notice!

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- Be aware of the quality of indoor air. Eliminate tobacco smoke, only use cleaning product chemicals in well-ventilated areas and clean up moulds in your home and workplace.

Time it right!

- Consider rescheduling outdoor activities on high pollution days. Stay away from heavy traffic areas, especially during rush hour.
- If you have a health condition or problem, consider asking someone else to do your errands on high pollution days.

- If a chronic condition gets worse due to air pollution or you find it hard to breathe, avoid strenuous physical activity, rest and consult your health care provider.

Take action!

- To reduce air pollution levels, change your lifestyle. Drive less, use energy more efficiently at home and make wise choices as a consumer.
- Consider using clean, low-impact renewable sources of energy in your home and cleaner fuels for your vehicles.
- Contact your local politicians at all levels of government to voice your concerns about air pollution.

Other actions for you to consider:

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- Avoid using gas-powered equipment, such as lawn mowers, on high pollution days.
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A Special Note to Caregivers:

Due to limited physical mobility or other causes, some seniors may not be able to protect themselves or act on health protection messages effectively. Caregivers should be aware of this, especially on days when pollution levels are high.



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Canada Mortgage and Housing Corporation
800-668-2642 www.cmhc.ca

Canada's Association for the Fifty-Plus
800-363-9736 www.50plus.com

Canadian Health Network
www.canadian-health-network.ca

Canadian Lung Association
888-566-LUNG www.lung.ca/cando

Canadian Public Health Association
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Health Canada
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Heart and Stroke Foundation of Canada
888-HSF-INFO www.heartandstroke.ca

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