

## Environment

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### Air Pollution

**We all have to breathe, but breathing polluted air can kill you.**

We all have to breathe to live. Yet sometimes the air we breathe contributes to poor health. If air pollution is bad enough, it can kill you. The 4,000 people who died in London, England during what was called in 1952, the London "Fog" died from air pollution. It was a wake up call to industrialized society which linked for the first time air pollution and death.

Based on a 2004 burden of illness study, Toronto Public Health estimated that air pollution in Toronto contributed to about 1,700 premature deaths and 6,000 hospitalizations on an annual basis. The mortality estimate is based on the health risk associated with acute exposures to ozone, nitrogen dioxide, carbon monoxide and sulphur dioxide, as well as the health risk associated with chronic exposure to fine particles (PM2.5). Scientific studies by others have demonstrated that fine particles are associated with chronic endpoints such as cancer.

### Health Effects –Toronto - Annual Estimate for Inhalable Particulates (PM10)

- Premature Mortality (acute) 177 cases
- Cardiovascular hospitalization 421 cases
- Respiratory hospitalizations 597 cases
- Adult chronic bronchitis, 1,186 cases
- Emergency room visits 5,981 cases
- Bronchitis in children 11,997 cases
- Asthma symptom days 71,930 cases

These disturbing facts are true for Toronto, Canada's largest city. A similar tale can be told for all Canadian cities. Rural and wilderness areas as well, do not escape the ravages of air pollution.

### How is Our Health Affected?

Air pollution can increase difficulty in breathing, cause coughing or wheezing. Air pollution can cause and worsen both heart and lung disease as well as cancer.

For sensitive individuals, such as people with asthma or other respiratory problems or heart disease, any increase in pollution makes their illness more severe. Elderly people and those with weakened immune systems are at greater risk. Children breathe faster and spend more time active outside in the summer which makes them at greater risk. The increasing incidence of childhood asthma is due to air pollution though there are other possible contributing causes. For children under one year old, 15 % of respiratory admissions to hospital were associated with air pollution events.

Healthy people are also affected if they do strenuous activities such as construction work, many factory jobs, cycling or playing sports.

These health effects not only last during the times of high pollution, but can also cause long-term damage.

The respiratory system is the most vulnerable to air pollutants but airborne lead, pesticides and volatile organic compounds can be absorbed and cause damage to other organs in the body.

## **What is Air Pollution?**

Air can carry many contaminants, including atmospheric gases and particles. The main airborne contaminants found in Canada include:

- ground level ozone
- Particles
- acid aerosols
- nitrogen oxides
- sulphur oxides
- Sulphates
- polycyclic aromatic hydrocarbons (PAHs)
- volatile organic compounds (VOCs)
- carbon monoxide
- carbon dioxide

## **Some Effects of Ground-Level Ozone**

In outdoor workers there is a decreased ability of the lung to take up oxygen.

In children:

- reduced lung capacity
- more pneumonia, bronchitis and other lung infections
- more asthma symptoms
- more long-term lung disease

## **Where Does Air Pollution Come From?**

Air of course knows no boundaries. Some air pollution is carried all over the earth in the jet stream. This is why dioxins and PCBs are found in the Canadian Arctic, far from their initial sources.

High smokestacks from industrial sources such as refineries and coal-fired electrical power generating plants can carry pollutants such as acid aerosols and sulphur oxides over hundreds of kilometres in air that moves freely across international borders. Southern Ontario pollutes the north-eastern United States and the Ohio valley pollutes Southern Ontario. Acid rain is just as real today as it was ten years ago. Fish in lakes die when air pollution increases the level of acidity in the lakes.

Other industrial sources pollute the air close to the factory. Air can usually carry heavy metals, for example, only over a short distance. If you live close to such a source your house and yard can become contaminated. Residents around the closed Inco refinery in Port Colborne, for instance, have seen their houses contaminated from nickel oxide when contaminated dirt is disturbed and it blows into their houses and yards on the wind.

Residents of Sydney, Nova Scotia, have seen their homes contaminated by air and water pollution from the Sydney steel mill.

A major source of air pollution in cities is from automobiles and trucks. Nitrogen oxides and volatile

organic compounds come from vehicles and when they interact with sunlight, ozone is produced. Ground level ozone can cause eye and nose irritation. It can dry out the protective membranes of the nose and throat and interfere with the body's ability to fight infection increasing susceptibility to illness. Ground level ozone can inflame breathing passages, decreasing the lungs working capacity. Symptoms can include shortness of breath, pain when inhaling deeply, wheezing and coughing.

Diesel exhaust contains more contaminants including particulates which act as tiny charcoal filters absorbing carcinogenic PAHs on them, enabling them to be inhaled deep into your lungs where they are deposited.

Heating our homes, buildings and factories by burning fossil fuels is another major source of air pollution.

## **Diesel and Cancer**

Air pollution in and around Los Angeles, California, is calculated to cause about 1,400 extra cancer cases per million people. Around 70 % of these, or 1,000, are linked to particles from diesel exhaust.

## **Smog**

We can see smog easily in the summer. It's that brown grunge formed when pollutants interact with sunlight and heat so there is more of it in the summer. Smog comes from many sources, including:

- gasoline and diesel
- gasoline and diesel powered vehicles
- factories and utilities
- oil-based paints, solvents and cleaners
- Pesticides
- road paving (asphalt) and construction
- Barbecues
- Lawnmowers
- coal-fired generating plants

But the air pollutants nitrogen dioxide, carbon monoxide and sulphur dioxide are all higher in the winter.

## **Effects of Sulphur Dioxide**

A study of 11 cities in Canada found that sulphur dioxide was responsible for an average of 1.4 percent increase risk in death.

What Can We Do About Air Pollution? We need to:

- Ensure the workplaces we rely on for our livelihoods do not pollute the air by protecting both the health of the workers inside the factory and the health of those in the community outside the factory.
- Make existing laws more stringent. The existing AIQ (Air Quality Index) is not stringent enough to protect human health.
- Set a limit (emission cap) on the total amount of pollution produced by power plants.
- Make allowable emission rates for specific pollutants such as nitrogen dioxide at least as stringent as they are in the United States.
- Design and retrofit buildings to make them more energy efficient so we don't need to use coal-

fired generating plants.

- Switch coal-fired generating plants over to wind energy, which is a renewable resource.
- Equip coal-fired generating plants with the most effective scrubbers possible to ensure contaminants are not released into the atmosphere.
- Develop more solar energy sources.
- Phase out nuclear energy, which comes with its own insidious form of pollution, in the form of radiation.
- Require reduced sulphur and benzene levels in gasoline and diesel fuel.
- Reduce reliance on private automobiles for commuting and improve public transit.
- Move to zero emission vehicles such as fuel cells and electric cars with hybrid cars used in the interim.
- Redesign our cities so we live close to where we work, shop, and play.
- Car pool, use public transit, use bicycles, walk.
- Use electric powered lawn mowers or push mowers.

## **Green Power**

Green Power is energy that is generated from renewable sources such as water, solar and wind. Green power does not create harmful smog emissions. Green power also helps combat global climate change.

## **There is Money to be Saved**

Studies show that 11 to 30 billion dollars could be saved in Canada with reductions in motor vehicle emissions alone of particles, nitrogen oxides, VOCs and other toxic contaminants. These include savings on health costs, impact on forest, fisheries and agriculture, and savings from spending less on fuel.

## **More Information**

For more information, please visit [www.city.toronto.on.ca/health/](http://www.city.toronto.on.ca/health/) and look for *Toronto's Air: Let's Make it Healthy*.

Your own community's Public Health Department may provide similar information.