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HealthSTATS



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Outdoor Air Quality in Simcoe Muskoka

The air we breathe is a priceless resource. In a time of increasing smog days, heat advisories and global climate change, air quality has become a major concern.

Air quality is affected by pollutants from a variety of sources, but mostly from human activities like industry and transportation. These pollutants result in illness and premature death and cost our health care system millions of dollars each year. Evidence shows that people in Simcoe Muskoka are experiencing negative health impacts from air pollution. In the future, rapid population growth and the aging of the population will contribute to an increased number of these unhealthy effects.

This report will focus on the health effects of outdoor air pollution, examine the range of factors that contribute to poor air quality, and report on local activities that are helping to improve air quality in Simcoe Muskoka.



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"Few things are as important as the air we breathe, but our breathing has been increasingly threatened by smog."

Ontario Medical Association

Health Effects from Air Pollution

Numerous studies show that poor air quality contributes to:

- premature death
- cardiovascular disease
- cancer
- stroke
- asthma and other respiratory diseases.¹

Air pollutants, particularly ground-level ozone (O₃) and fine particulate matter (PM_{2.5}), are known to make asthma and other respiratory conditions worse. New research suggests that air pollution is also associated with the development of asthma, particularly in children who play outdoor sports in communities with higher ozone levels.² Rates of asthma in Canada have increased four-fold over the past 20 years, to the point where more than one in 10 Canadian children has been diagnosed with asthma. Currently, asthma is one of the leading causes of hospitalization for children ages one to 19 years in Simcoe Muskoka.³

Children are particularly vulnerable to the effects of air pollution. Studies have found that air pollution may interfere with the normal rate of children's lung growth and development.⁴ Their small lungs, narrow airways and rapid breathing mean they inhale a greater amount of air than adults. According to one study,

children living in communities with higher levels of traffic-related pollution had lung function growth approximately 10% slower than children in communities with less air pollution. The rate of lung function growth improved once they moved to lower pollution areas.⁴ Exposure to air pollution can also harm the developing fetus. Studies show that prenatal exposure to air pollution can result in poor birth outcomes such as lower birth weight.⁵



The elderly are also vulnerable to air pollution and may experience health effects at lower levels of pollutants.⁶ A study of people older than 60 years found a greater rate of hospital admissions and premature deaths from respiratory conditions among those whose homes were located on roads with higher traffic densities than among those whose homes were on roads with lower traffic densities.⁷

Although children and the elderly are most at risk, recent studies indicate that there is no safe level of human exposure to air pollution, particularly to two key pollutants: ozone and fine particulate matter. Even healthy people experience long-term health effects when they are exposed to air pollution while doing strenuous activities, such as construction work or cycling.⁷

Daily exposure to elevated levels of fine particulate matter has been linked to cardiovascular disease, triggering heart attacks and causing abnormal heart rhythms, strokes and hardening of the arteries.⁸ Researchers estimate the increased risk of death from cardiovascular disease due to long-term exposure to fine particulate matter in some cities is comparable to that associated with being a former smoker.⁸ One study found that the risk of a heart attack triples within an hour of being exposed to air pollution, whether travelling in cars, on mass transit or by bicycle.⁸

Research concludes that air pollution has a negative impact on health. The exact impact of air pollution depends on the type and amount of pollutants, the length of exposure and individual health status.⁶

Illness Costs of Air Pollution (ICAP)

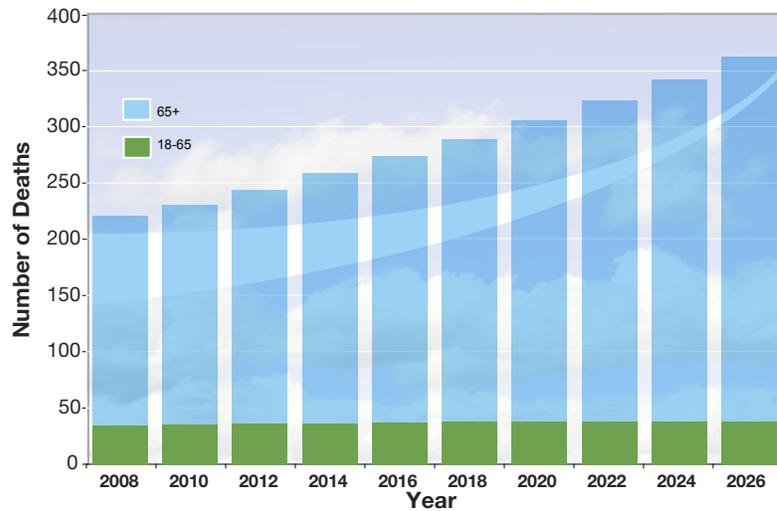
The Ontario Medical Association (OMA) estimates that for 2008, air pollution will contribute to an estimated 6,200 premature deaths in Ontario, including 220 in Simcoe Muskoka. This number is projected to increase in Simcoe Muskoka to 360 premature deaths in 2026. Those 18 to 65 years of age will experience an 11% increase in premature mortality as a result of air pollution, while the 65+ age group will experience an increase of approximately 74%.⁹

In 2008, the total hospital admissions related to air pollution exposure is estimated at 580 for Simcoe Muskoka. Most of the hospital admissions will be associated with cardiovascular illnesses. By 2026, admissions are expected to reach nearly 820.⁹

Less severe respiratory and cardiovascular illnesses are often treated by emergency room (ER) visits. In 2008, the ER visits associated with air pollution exposure in Simcoe Muskoka are estimated at almost 2,160 cases.⁹ Although it is commonly believed that air pollution primarily causes respiratory effects, the OMA found that there were three times more smog-related emergency room visits for cardiac symptoms than for respiratory symptoms.¹⁰

Estimated Annual Number of Premature Deaths by Age

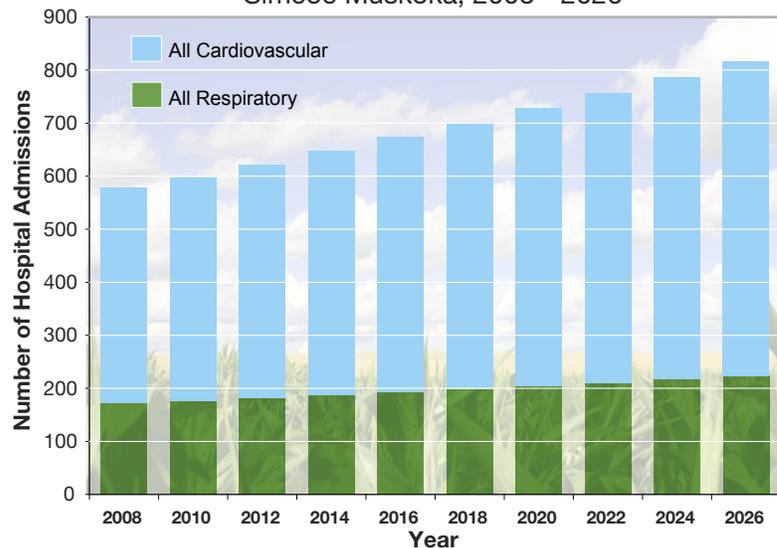
Attributable to O₃, PM_{2.5}, CO, SO₂, NO₂*
Simcoe Muskoka, 2008 - 2026



Source: ICAP Version 5.0, 2005, Ontario Medical Association
* O₃=ozone, PM_{2.5}=fine particulate matter, CO=carbon monoxide, SO₂=sulphur dioxide, NO₂=nitrogen dioxide

Estimated Annual Number of Hospital Admissions

Attributable to O₃ and PM_{2.5}
Simcoe Muskoka, 2008 - 2026



Source: ICAP Version 5.0, 2005, Ontario Medical Association

Sources of Pollutants

Air is a mixture of gases, mostly oxygen (21%) and nitrogen (78%). However, due to human activities other gases and particles that cause air pollution are introduced into the air.¹¹ The most significant sources of air pollution in Ontario are energy generation and transportation (planes, trains and automobiles).⁷ Individuals also contribute significantly to air pollution by consuming energy and using vehicles.



Another pollution source, also known as trans-boundary pollution, is generated as far away as the Ohio Valley and carried to Ontario by wind and air currents. Air pollution moves between rural and urban areas and across federal and provincial boundaries.

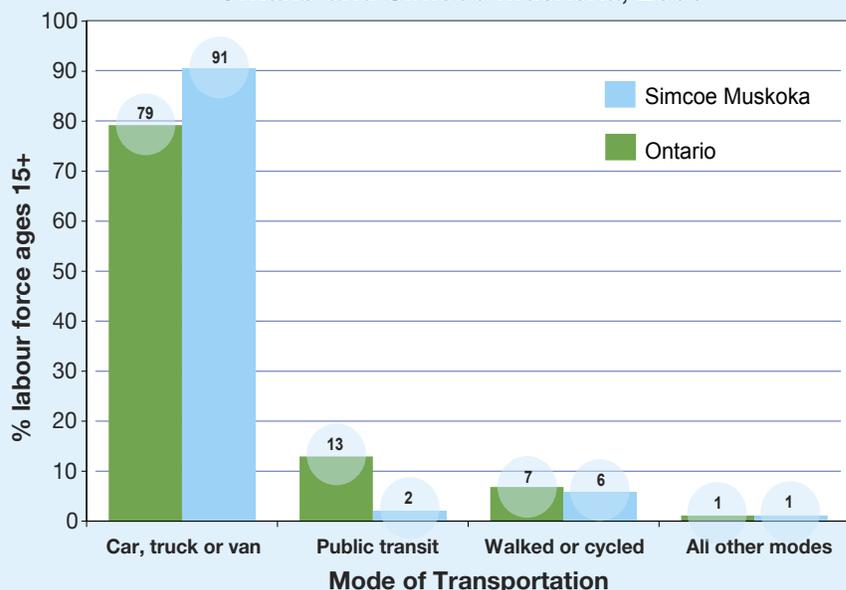
Weather conditions can greatly affect the concentration of pollution in the air. Hot, humid and windless days in the summer can “trap” air pollution near the ground.¹²

Transportation

One of the key causes of air pollution is emissions created by motor vehicles. Many residents of Simcoe Muskoka (ages 15+) drive to work. According to the 2006 Census, the majority of these trips to work (91%) were by private vehicle, while very few (less than 10%) were by active forms of transportation (walking or cycling) or public transit. In comparison, a higher percentage of people across Ontario (20%) used active forms of transportation or public transit and fewer (79%) used private vehicles to get to work.¹³

Twenty per cent of Ontario residents and 19% of Simcoe Muskoka residents (ages 15+) in the labour force reported commuting to a different census division for work. Within Simcoe Muskoka, commuting rates differ depending on place of residence. For example, in Bradford-West Gwillimbury, 57% of the labour force commutes outside Simcoe County, while 39% of Georgian Bay workers commute beyond the border of Muskoka District to get to their place of work.¹³

Mode of Transportation to Work
Ontario and Simcoe Muskoka, 2006



Source: Statistics Canada, 2006 Census. Mode of Transportation 2006 Community Profile - 20% Sample Data.

Measuring Air Quality

Air Quality Index

The Ontario Ministry of the Environment monitors air quality using the Air Quality Index (AQI) system. The AQI is an indicator of air quality based on hourly pollutant measurements of some or all of the six most common air pollutants: sulphur dioxide (SO₂), ozone (O₃), nitrogen dioxide (NO₂), total reduced sulphur compounds, carbon monoxide (CO) and fine particulate matter (PM_{2.5}).



NEW REPORTING SYSTEM

Since 2001, federal, provincial and municipal governments, non governmental organizations and health professionals have been working together to develop an improved national air quality reporting system called the Air Quality Health Index (AQHI).

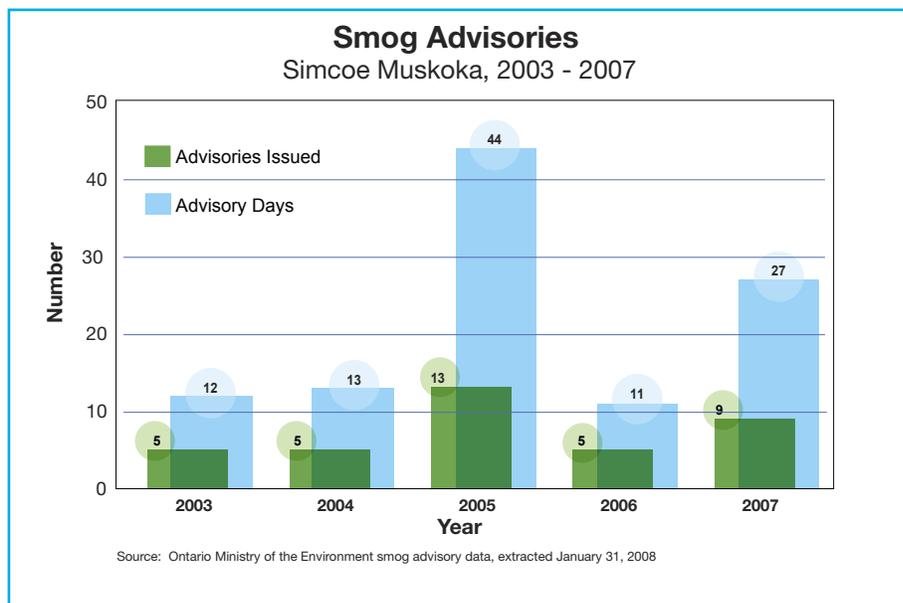
The AQHI uses a scale to report the level of risk to people's health from exposure to air pollution. The AQHI was piloted in the City of Toronto in 2007 and expanded into the Greater Toronto Area in 2008. Discussions are underway to further expand the AQHI index in Ontario.

Measurements for the Simcoe Muskoka area originate from two ambient air monitoring stations in Barrie and Dorset. The AQI generates a number that indicates five categories for air quality: very poor, poor, moderate, good and very good. Very poor air quality may have adverse effects for a large proportion of those exposed and may cause significant damage to vegetation and property. Poor air quality could result in adverse health effects for people with existing health conditions. Moderate air quality may result in some adverse effects for people with health problems. Good and very good air quality results in few adverse health effects.¹⁴

Smog Advisories

Smog is formed when ozone, fine particulate matter and other contaminants mix in the atmosphere. Smog advisories are issued by the Ontario Ministry of the Environment when elevated pollutant levels occur (AQI indicates a poor or very poor level) or are predicted to occur and could persist for several hours.¹⁴

The number of smog advisory days varies from year to year, primarily due to weather conditions. During the hot, humid conditions of 2005 there were a greater number of smog advisory days compared with the cooler, cloudier summers of 2004 and 2006. In 2007, there were nine smog advisories issued, lasting a total of 27 days. Although most smog days occur in the summer months, smog can also occur in the winter.



Measuring Air Quality

Ground-Level Ozone (O₃) and Fine Particulate Matter (PM_{2.5})

The key contributors to smog and poor air quality in Simcoe Muskoka are ozone and fine particulate matter. Ground-level ozone is formed when pollutants from vehicle exhaust emissions react in sunlight.

Sunlight intensity and higher temperatures increase the formation of ground-level ozone.¹⁵ Ozone irritates the respiratory tract and eyes and results in chest tightness, coughing and wheezing. Fine particulate matter can penetrate deep into the respiratory system triggering a heart attack or stroke.

Children who are active outdoors when air pollution levels are high and individuals with pre-existing respiratory disorders, such as asthma and chronic obstructive pulmonary disease (COPD), are particularly at risk. Ground-level ozone levels at rural locations tend to be higher than levels in cities as pollutants produced in cities combine and react in sunlight and are carried by air currents into rural areas.¹⁶

Throughout the year, levels of ozone and fine particulate matter in Simcoe Muskoka often exceed Ontario's air quality criteria. These exceedances vary from year to year. Ontario's air quality criteria are less stringent than the

Canada-wide standards, the national standards in many other developed nations including Europe and Australia, and the health-based guidelines published by the World Health Organization (WHO). This means that at times when pollutant levels are not exceeded according to Ontario criteria, the same conditions would trigger an air quality advisory in those provinces or countries where the standards are stricter. For example, in Barrie in 2007, the ozone levels recorded at the local monitoring station exceeded the Ontario criteria seven times. However, when the WHO recommendations are applied the total number of exceedances for ozone levels would have been 42.

OZONE – THE GOOD AND THE BAD

Stratospheric ozone, commonly referred to as the ozone layer, is found 20-30 kilometres above the earth's surface and is important in protecting us from the sun's ultra-violet rays. Tropospheric ozone, or ground-level ozone, damages human health and vegetation.

Number of Times Air Pollutant Levels Exceeded Ontario's Criteria*
Simcoe Muskoka Area, 2004 - 2007

Year	Ozone (O ₃)		Fine Particulate Matter (PM _{2.5})	
	Barrie Air Monitoring Station	Dorset Air Monitoring Station	Barrie Air Monitoring Station	Dorset Air Monitoring Station
2004	1	3	8	2
2005	24	41	9	6
2006	0	4	1	0
2007	7	34	7	2

*Ozone 1-hour Ambient Air Quality criterion is 80 ppb

*The PM_{2.5} reference level is 30 µg/m³ for a 24-hour period

Source: Ontario Ministry of the Environment, Historical Air Quality Data, 2004-2007, extracted June 12/08. www.airqualityontario.ca

Air Pollutant Exceedances in the Barrie Area * in 2007

Comparison of Number of Exceedances Based on Ontario, Canada and WHO Parameters

Air Pollutant	Ontario Ambient Air Quality Criteria (AAQC) ¹	Canada Canada Wide Standards (CWS) ²	World Health Organization (WHO) Air Quality Guidelines ³
Ozone (O ₃)	7	7	42
Fine Particulate Matter (PM _{2.5})	7	7	10

*Barrie air monitoring station results

1 Ontario Ministry of the Environment. Air Quality in Ontario 2006 Report. 2007

2 Canadian Council of Ministers of the Environment. Guidance Document on Achievement Determination. Canada-wide Standards for Particulate Matter and Ozone Revised. 2007

3 World Health Organization. WHO Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide. Global update 2005. Summary of risk assessment. 2006

Source: Ontario Ministry of the Environment, Historical Air Quality Data, 2004-2007, extracted June 12, 2008. www.airqualityontario.ca

A Comparison of Air Quality Parameters for Ozone and Fine Particulate Matter

Pollutant	Ontario Criteria	Canada Wide Standards	World Health Organization
Ozone (O ₃)	80 ppb 1-hour mean	65 ppb, 8-hour averaging time	50 ppb 8-hour mean
Fine Particulate Matter (PM _{2.5})	30 µg/m ³ 24-hour mean	30 µg/m ³ 24-hour average	25 µg/m ³ 24-hour mean

Air Quality and Climate Change

Climate change is a prolonged change in temperature (warming or cooling) and other climatic conditions (such as humidity and precipitation) around the globe.

Air quality and climate change are closely connected. The same gases that pollute the air and create smog also trap heat and cause the earth to warm up. The formation of pollutants, such as ozone, is enhanced at high temperatures.

Recent research indicates that due to climate change, the average annual air temperature in Ontario could be three to eight degrees higher by the latter part of the century.

Climate change is expected to increase the number and duration of heat waves and smog episodes, as well as illness and premature death.¹⁷

In 2003, extreme heat caused the death of more than 30,000 people in Europe. If current climate trends continue, by 2080 the number of people dying from heat-related causes in Toronto and other cities in Canada will increase threefold.¹⁷



In addition to extreme heat events, climate change is also expected to:

- Increase the frequency and severity of other extreme weather events such as tornadoes, hurricanes, snowstorms, ice storms, droughts and floods;
- Impact the quality and quantity of surface water and groundwater used for drinking, recreation and commerce;
- Increase incidence of water-borne and food-borne diseases;
- Alter the range, intensity and seasonality of vector-borne diseases (e.g. West Nile virus, St. Louis encephalitis, Dengue fever, Hantavirus and Lyme Disease) as the natural habitat and range of insect or rodent vectors expand or change.¹⁸

Think Globally, Act Locally

Air pollution is a global problem with multiple sources and relationships. Improving air quality requires action and collaboration between people, agencies, organizations and governments at the international, national, provincial and local levels.

Actions to improve air quality can include individual behaviour change, the implementation of awareness campaigns, providing supportive environments and the adoption of policies. These actions can:

- improve personal health
- improve quality of life
- prevent premature death
- relieve the health care burden.

Efforts to improve air quality are underway in Simcoe Muskoka. A number of stakeholders, including the health unit, have initiated programs and activities to raise awareness and to promote less air-polluting behaviour throughout the area.

In 2006 and 2007, the health unit developed information materials for local candidates in municipal and provincial elections. The materials provided information about the public health impacts of air pollution and examples of government policies and actions that can lead to improved air quality.



In 2007 and 2008, with the support of Enbridge Energy's Awaire Fund and two local school boards and municipalities, the health unit implemented an anti-idling campaign called *Turn It Off*. This campaign ran at several elementary schools and community sites in Simcoe and Muskoka. The initiative included idling awareness and education for students, parents, drivers and the public. It also included on-site observations of idling behaviours before and after the campaign.

Data from the Simcoe Muskoka campaign showed an increase in the proportion of drivers who chose not to idle their vehicle from 28% (95% confidence interval: 23.6%, 32.0%) in the pre-campaign period to 43% (38.0%, 47.2%) in the post-campaign period. In addition to successfully influencing

drivers' idling behaviours, the initiative generated both municipal and public interest regarding the impacts of transportation on outdoor air quality.

Getting people out of their cars and walking, cycling or using public transit is another way to improve air quality.

In Canada, more than half of car trips are less than five kilometres in length—the average being between two and three kilometres. This distance is ideal to cover by active forms of transportation.¹⁹

In a recent survey in Simcoe Muskoka, 78% (74.1%, 82.1%) of survey respondents reported spending at least some time walking to work, school or to do errands in a typical week, while 10% (7.0%, 12.9%) reported cycling for the same reasons each week.²⁰

Think Globally, Act Locally

Through its Walkable Communities Task Group and two heart health projects (Take Heart and Good for Life), the health unit, along with community partners, is promoting active transportation and advocating for walkable communities in Simcoe Muskoka. Activities include:

- facilitating active transportation workshops and planning throughout the County of Simcoe and District of Muskoka
- providing resources and presentations to municipal councils and committees
- offering *WalkON*, a program that encourages walkable communities and provides active transportation tools and supports.

The health unit has been, and will continue to be, actively involved in health promotion activities and policy development and will work with its partners to improve air quality in Simcoe Muskoka by:

- supporting municipal anti-idling bylaws
- advocating for improvements to air quality standards that more accurately reflect health impacts
- preparing for Air Quality Health Index (AQHI) implementation
- supporting transportation and energy conservation initiatives
- providing information so that air quality is considered in municipal planning decisions
- developing a health unit green office plan
- promoting innovation and sharing successful environmental practices
- exploring best practices, policy development and funding opportunities related to air quality, climate change and environmental programs.

Together we can bring about change through a combination of individual and municipal action, such as:

- walking or cycling to work or school on safe routes
- carpooling
- using public transit
- setting thermostats to conserve energy
- purchasing fuel-efficient vehicles and energy-saving appliances.

We can also encourage and support municipalities to show environmental leadership by taking the following actions:

- increasing the number of safe cycling and walking routes
- implementing anti-idling policies and bylaws
- supporting green initiatives such as tree preservation policies and green roofs
- establishing bylaws that support energy conservation
- improving access to transit.

*As individuals and as communities,
our actions can make a difference.*

Data Sources

Air Quality Pollutant Data

Air quality pollutant data are collected by the Ontario Ministry of the Environment. Data obtained from automated ambient air monitoring instruments that operate continuously produce an average measurement for every hour for a possible total of 8,760 measurements in a given year. In addition, the second and third quarters of the year should have 75% valid data for ozone, whereas for PM_{2.5}, each quarter of the year should have 75% valid data. Data for the Simcoe Muskoka area originate from two continuous ambient air monitoring stations in Barrie and Dorset. Ground-level ozone and fine particulate matter readings are collected at both stations while the Barrie station also monitors levels of nitrogen dioxide and sulphur dioxide.

Census

The Canadian Census is conducted by Statistics Canada every five years to provide a reliable source for describing the characteristics of Canada's people, dwellings and agricultural operations. The Census provides the population and dwelling counts not only for Canada, but also for each province and territory and for smaller geographic units such as cities or districts within cities. The Census also provides information about Canada's demographic, social and economic characteristics. The most recent Census of Canada took place on May 16, 2006.

Hospital Inpatient Discharges

Data are collected from each patient's chart at the time of discharge (or separation) from hospital and are recorded on an abstract provided by the Canadian Institute for Health Information (CIHI). The abstract collects information on the patient and the nature of their stay. One abstract is completed for each separation (stillbirth, death, discharge) from the hospital. The main diagnostic code gives the primary reason for the hospital stay or "most responsible diagnosis" (MRD). A second set of codes, external cause or "e-codes", are used to classify the environmental events, circumstances and conditions that cause an injury (e.g. motor vehicle traffic injury). The data source contains discharge records, not admissions. The data is reported for completed cases only. Hospitals do not report on cases that are still being treated. The data presented in this report includes discharges from January 1, 2003 to December 31, 2006. The data represents the number of discharges, not the number of people.

Illness Costs of Air Pollution (ICAP)

The Illness Costs of Air Pollution (ICAP) is used to identify the direct health effects of air pollution, as well as the economic consequences to the provincial healthcare system in Ontario. ICAP was developed in 2000 from the Ontario Medical Association, prepared by DSS Management Consultants Inc. Users have the ability to pinpoint a census division and analyze the pollutant level with a specific illness. Changes to ICAP have been made and a new, more robust version (Version 5.0) was released in 2005. ICAP receives its pollutant level data from the Environment Canada's National Air Pollution Surveillance Network (NAPS) sites in Ontario for the years 1985 to 2003, as well as the United States Environmental Protection Agency (EPA) for the years 2000 to 2003, except for sulphur dioxide (SO₂). ICAP uses various epidemiological studies (cohort and time-series studies for premature deaths and time-series studies for hospital admissions and

emergency room visits) that analyze the effects of air pollution on one's health. ICAP uses information from Statistics Canada (2001 Census and death statistics) and the Canadian Institute of Health Information (CIHI) for the analyses of specific illnesses that are affected by pollution. An updated ICAP model is set for release sometime in 2008 but was unavailable at the time of this report's publication.

Rapid Risk Factor Surveillance System (RRFSS)

RRFSS is an ongoing monthly telephone survey that occurs in various public health units across Ontario. Every month, a random sample of 100 adults aged 18 years and older in each participating health unit area is interviewed regarding awareness, knowledge, attitudes and behaviours about topics and issues of importance to public health. These can include: smoking, sun safety, use of bike helmets, water testing in private wells, air quality, etc. The telephone survey is conducted by the Institute for Social Research at York University on behalf of the Simcoe Muskoka District Health Unit.

Smog Advisory Statistics

The Ontario Ministry of the Environment monitors air pollution levels and issues smog advisories when there is a strong likelihood that widespread, elevated and persistent smog levels are expected. Smog advisory statistics for the Simcoe Muskoka area are estimated from data collected at air monitoring stations located in three regions: Dufferin-Innisfil, Barrie-Orillia-Midland and Parry Sound-Muskoka-Huntsville.

Turn It Off Anti-idling Campaign

In the fall of 2007 and spring of 2008, the Simcoe Muskoka District Health Unit conducted an evaluation assessing the effect of an awareness-building/educational intervention on vehicle idling behaviour of drivers. The intervention targeted parents/drivers picking up their children at four elementary schools - two in Simcoe County and two in Muskoka District. A total of 851 vehicles and 58 school buses were observed in Muskoka, and 914 vehicles and 96 buses in Simcoe. These vehicle idling observations were made during the week before the intervention (September 15 to 19, 2007, in Muskoka and March 31 to April 4, 2008, in Simcoe) for one hour depending on when the bell rings at the schools and during the week following the intervention (October 9 to 12 and 15, 2007, in Muskoka and April 21 to April 28, 2008, in Simcoe) for one hour. The intervention was carried out at an elementary school in Muskoka from September 24 to October 5, 2007, and at an elementary school in Simcoe from April 7 to April 18, 2008.

WalkON Survey

WalkON is an initiative which supports the development of walkable communities through education and access to resources. The WalkON survey was developed by six Heart Health initiatives in the Central West region of Ontario. Simcoe Muskoka District Health Unit (SMDHU) conducted the survey in Simcoe Muskoka in the fall of 2007. The survey data provide information on the existing knowledge, attitudes, and practices to inform programming decisions. The questionnaire was designed by the partnership and was conducted by the University of Waterloo (Survey Research Centre). Data were gathered through random telephone calls of households in the Simcoe Muskoka area of persons aged 18 and older. A sample of 403 was achieved.

Definitions

Active transportation – Any non-motorized form of getting around, such as walking, cycling, rollerblading or skateboarding.

Ambient air – Outdoor or open air.

Ambient Air Quality Criteria (AAQC) – AAQCs are contaminant-specific, effect-based levels to assess general air quality. They are set at levels below which adverse health and/or environmental effects are not expected.

Asthma – A disease characterized by cough, shortness of breath, chest tightness and wheeze. Asthma symptoms and attacks (episodes of more severe shortness of breath) usually occur after exercise or exposure to allergens, viral respiratory infections (colds), irritant fumes or gases. These exposures cause an inflammation of the airway wall and an abnormal narrowing of the airways, which lead to asthma symptoms. Most evidence suggests that air pollution is a trigger for worsening asthma.

Cardiovascular diseases – All diseases of the circulatory system including acute myocardial infarction, ischemic heart disease, valvular heart disease, peripheral vascular disease, arrhythmias, high blood pressure and stroke.

Census division – Group of neighbouring municipalities joined together for the purposes of regional planning and managing common services (such as police or ambulance services). Census divisions are intermediate geographic areas between the province/territory level and the municipality (census subdivision).

Census subdivision – The general term for municipalities (as determined by provincial/territorial legislation) or areas treated as municipal equivalents for statistical purposes (e.g. Indian reserves, Indian settlements and unorganized territories).

Chronic Obstructive Pulmonary Disease (COPD)
– A chronic disease characterized by shortness of breath, cough and sputum production. Symptoms do not usually appear in people younger than age 55. The changes to the lung, however, begin many years earlier. Chronic bronchitis and emphysema are the two most common underlying processes that contribute to COPD.

Carbon Monoxide (CO) – A colourless, odourless, tasteless and at high concentrations, a poisonous gas.

Commuting – Travelling to work outside of the census division of residence.

Criterion – Maximum concentration or level (based on potential effects) of contaminant that is desirable or considered acceptable in ambient air. It is not legally enforceable, like regulatory standards, unless included in a regulatory instrument. In Ontario, it is referred to as Ambient Air Quality Criterion (AAQC).

Exceedance – Violation of the air pollutant concentration levels established by environmental protection criteria or other environmental standards.

Extreme heat – High temperatures (more than 10 degrees over the regional average) that last for several weeks.

Fine Particulate Matter (PM_{2.5}) – Particles smaller than 2.5 microns in diameter caused mainly from fuel combustion, condensation of hot vapours and chemically-driven gas-to-particle conversion processes. These are fine enough to penetrate deep into the lungs.

Morbidity – State of being ill or diseased.

Nitrogen Dioxide (NO₂) – A reddish-brown gas with a pungent and irritating odour. Nitrogen dioxide reacts in the air and contributes to the formation of fine particulate matter in the atmosphere. It also plays a major role in atmospheric reactions that produce ground-level ozone, a major component of smog. Nitrogen dioxide can irritate the lungs and lower the resistance to respiratory infection. People with asthma and bronchitis have increased sensitivity to NO₂.

Ozone exceedance day – A day on which there is at least one hour with an ozone concentration greater than the one-hour Ontario AAQC of 80 ppb (parts per billion).

Ozone or ground-level ozone(O₃) – Colourless, odourless gas formed from chemical reactions between nitrogen oxides and reactive hydrocarbons in the presence of sunlight near the earth's surface. Ozone is a major component of smog. In Ontario, elevated concentrations of ground-level ozone are generally recorded on hot and sunny days from May to September, between noon and early evening.

ppb – Parts (of contaminant) per billion (parts of air) – by volume.

Premature deaths – Death that occurs at a younger age than would be expected according to known statistics.

Respiratory diseases – Includes a variety of diseases that affect the respiratory system, including asthma, chronic obstructive pulmonary disease, influenza, pneumonia, bronchitis and emphysema.

Sulphur Dioxide (SO₂) – A colourless gas that smells like burnt matches. Approximately 70% of the SO₂ emitted in Ontario comes from smelters and utilities. Health effects caused by exposure to high levels of SO₂ include breathing problems, respiratory illness, and the exacerbation of respiratory and cardiovascular disease. Sulphur dioxide also damages trees and crops.

Trans-boundary pollution – Polluted air and water, or any other contaminated waste that is generated in one country and transmitted to others.

Walkable community – Is one that is designed for walking and encourages citizens to walk more often and use their vehicle less.

95% confidence interval – Indicates the interval or range within which the true population percentage probably

lies. The reason for using confidence intervals is due to the uncertainty, or sampling error, associated with using results obtained from a sample to draw conclusions about the entire population from which the sample was drawn. The confidence interval (in our case, a 95% confidence interval) can also be interpreted as being 95% likely to include the percentage value we would have obtained if we had studied every member of the target population. For example, our report states that the percentage of Simcoe Muskoka survey respondents reporting that they spend at least some time walking to work, school or to do errands in a typical week was 78% (CI: 74.1%, 82.1%), which means that there is a 95% chance that the actual or true percentage of people that spend at least some time walking to work, school or to do errands in a typical week falls between 74.1% and 82.1%. Smaller confidence intervals imply greater precision, or less sampling error.

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