

Your patients are exposed to second-hand smoke...

What are the risks? What can you do? What can you say?

In 2003, Quebec's 1 700 000 smokers, or about 26% of Quebecers 12 years old and over, smoked over 8 billion cigarettes. Second-hand smoke (SHS) generated in the ambient environment is the main source of indoor air pollution in most closed spaces. The harmful effects of tobacco on active smokers have been well established since the 1950s. However, it is only in the last 20 years that conclusive scientific evidence has demonstrated how non-smokers who inhale tobacco smoke can be affected.

This PPM reviews levels of exposure to second-hand smoke in Quebec, the nature of this pollutant, as well as the risks for exposed adults and children. You will also find suggestions for what to do to raise awareness among the population and to encourage people to protect themselves.

In Canada, Quebecers are the most exposed to second-hand smoke

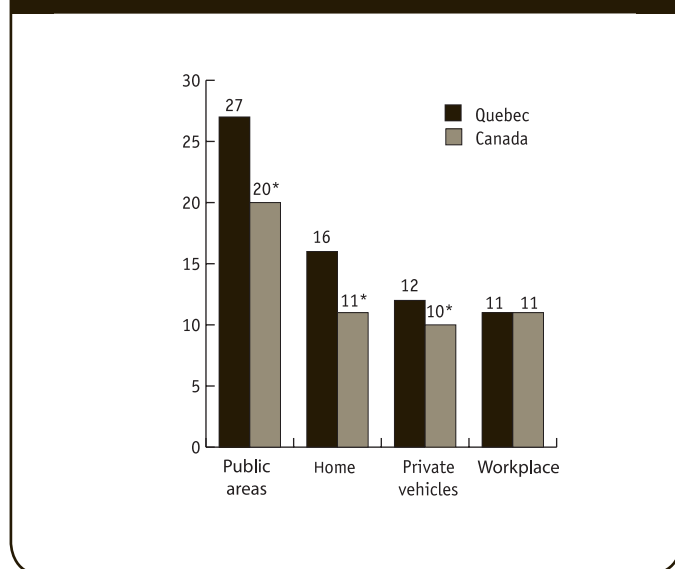
Over 40% of non-smokers in Quebec and 33% of non-smokers in Canada reported being exposed to second-hand smoke on most days or every day in at least one place, in the month preceding the Canadian Community Health Survey (CCHS). Public places were the sites most often reported, followed by the home, private vehicles, and workplaces (Figure 1).

Men and young people aged 12 to 19 years were the groups most often exposed in all places listed in Canada.

In public places, over a third of young 12- to 19-year old Quebecers were exposed. This difference was even greater when comparing exposure in Montreal and the Quebec City region to other Canadian cities. There can be differences of up to 20% for youth aged

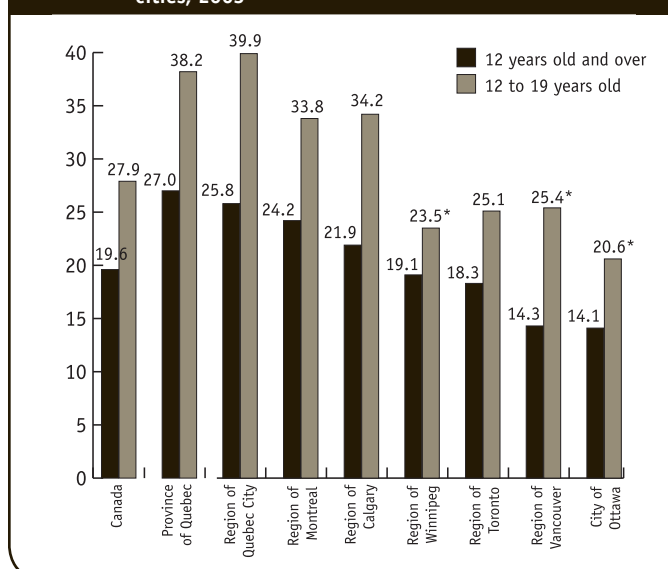
12 to 19 and for all individuals aged 12 and over (Figure 2). The cities of Ottawa and Vancouver, where smoking is forbidden in all public places, are where the population is least exposed in public places. Finally, in Quebec, 25% of children aged 0 to 11 are exposed to SHS at home; the Canadian average is 14% and in British Columbia it is 6%. The latter is the province where the rate is lowest.

Figure 1. Prevalence of exposure to second-hand smoke, 12 years old and over, Quebec and Canada, 2003 *



Data from the Canadian Community Health Survey, Cycle 2.1, 2003. Health Canada. Graphic by the Direction de santé publique de Montréal, Agence de développement de réseaux locaux de services de santé et de services sociaux. * Values that are significantly different between Québec and Canada, p<.05.

Figure 2. Exposure to second-hand smoke in public places: Canada Province of Quebec, Montreal and other Canadian cities, 2003



Data from the Canadian Community Health Survey, Cycle 2.1, 2003. Health Canada. Graphic by the Direction de santé publique de Montréal, Agence de développement de réseaux locaux de services de santé et de services sociaux, data from the CCHS. * Coefficient of variation between 15% and 25%.

The dangers of second-hand tobacco smoke

Cigarettes burn at a lower temperature when they are not being inhaled. Combustion is slower at this lower temperature and the smoke that is released, sidestream smoke, contains the same 4 000 chemicals as smoke that is directly inhaled, but in much greater concentrations. The same 50 carcinogens are also present. Carbon monoxide (CO), a potentially deadly gas that reduces the amount of oxygen in the body, is 2.5 to 14.9 times more concentrated in sidestream than in mainstream smoke; the amount varies by type of cigarette and brand. Formaldehyde, a carcinogen, is 50 times more concentrated in sidestream than in mainstream smoke. N-Nitrosodimethylamine, a probable carcinogen, is 20 to 130 times more concentrated. This substance is one of six for which the Commission de santé et sécurité au travail (CSST) considers there is no

permissible exposure level, and for which no level of exposure in the workplace is safe. Moreover, particles from sidestream smoke are smaller and thus penetrate deeper into the lungs⁽¹⁾.

Two-thirds of the smoke produced by a burning cigarette is released into the air; the rest is exhaled by the smoker. The effects of tobacco smoke on health are linked to duration of exposure and concentration of pollutants in second-hand smoke. These concentrations vary depending on the proximity of smokers, number and type of cigarettes lit, and volume and ventilation of the room. About 70% of non-smokers say they are bothered by second-hand smoke, either by its unpleasant odour, and eye or respiratory tract irritation. However, based on current knowledge, it is the increased risk of cardiopathy, ischemic heart disease, and cancers that are of greatest concern⁽²⁾.

Mortality due to SHS

Mortality attributable to smoking was estimated based on mortality data, data on prevalence of exposure to second-hand smoke at home, and on estimated relative risks for various pathologies following exposure to second-hand smoke. In 1998, 13,295 Quebecers died from smoking, including 359 deaths (3%) attributable to passive smoking. In all, 223 people, 136 men and 87 women died of ischemic heart disease, and 136 others—97 men and 39 women—of lung cancer due to exposure to second-hand smoke at home. These data are probably underestimated since they only consider the two principal pathologies caused by SHS at home, and do not include exposure in public places and in the work place.

Risks in adults

Deaths due to heart disease

In the short term, a 20-minute exposure to second-hand smoke increases the pulse rate, causes blood pressure to rise, vasoconstriction, levels of CO in the blood to increase, and enhances platelet aggregation. Non-smokers are extremely sensitive to carcinogenic substances such as benzopyrene, which promotes the formation of arterial plaque. Non-smokers appear to have less resistance to these toxins than do smokers, for whom this additional exposure represents only a fraction of total exposure. Exposure lasting about 30 minutes alters the endothelium-preventing normal vasodilatation. A passive smoker who is subjected to a very smoky environment is at similar risk of heart disease as someone who smokes one to nine cigarettes a day. Moreover, this risk becomes apparent quickly in the years early following exposure.

Second-hand smoke increases mortality due to ischemic heart disease by 30% among the non-smoking spouses of people who smoke at home. An association between effect and exposure has been demonstrated, and the risks of death due

to ischemic heart disease increase 20% to 70% depending on the extent of exposure. The high incidence rate of ischemic heart disease means this pathology causes the highest number of deaths linked to second-hand smoke. The risk of stroke is considered to be suggestive, but few studies have been published on this topic and an association between dose and effect has not been proven.

Deaths due to cancers

In a monograph published in 2002, the WHO's International Agency for Research on Cancer (IARC) working group classified second-hand smoke as a Group-A carcinogen, the highest risk category. According to the California Environmental Protection Agency's latest review, over 50 epidemiological studies published in the last 24 years show conclusively that the risk of lung cancer is 20% to 30% higher among non-smoking spouses who live with smokers, and that the risk increases to 80% in people who are exposed both at home and at work⁽²⁾. However, the risk is about 10 times lower than among active smokers. Workers in bars, billiard rooms, bowling alleys, bingo halls and betting establishments

TABLE 1. Effects of exposure to second-hand smoke in adults

CAUSAL ASSOCIATION
<i>Effects on the cardiovascular system</i>
Death due to ischemic heart disease
Acute and chronic morbidity from coronary heart disease
Changes in blood vessels
<i>Carcinogenic effects</i>
Lung cancer
Nasal sinus cancer
Breast cancer
<i>Effects on the respiratory system</i>
Eye and nose irritation
Asthma induction and exacerbation of asthma attacks
SUGGESTIVE OF CAUSAL ASSOCIATION
<i>Effects on the cerebrovascular system</i>
Increased risk of stroke
<i>Carcinogenic effects</i>
Nasopharyngeal cancer
Cervical cancer
<i>Effects on the respiratory system</i>
Chronic respiratory symptoms
Exacerbation of cystic fibrosis
<small>Adapted from the California Environmental Protection Agency⁽³⁾</small>

are exposed to very high concentrations of SHS. Air concentrations of nicotine represent SHS exposure levels that are 1.5 to 11.7 higher than in restaurants. The estimated lifetime lung cancer mortality risk among these workers is 1.0 to 4.1/1000; the level of acceptable lifetime exposure to a carcinogen set by American government standards is .3/1000. In these extreme conditions, workers were exposed to concentrations that were so high, the lifetime risk of dying of lung cancer was 14/1000, 47 times greater than the acceptable level according to this standard⁽³⁾.

Three epidemiological studies established a definite causal link with sinus and face cancers, for a relative risk of 1.7 to 3. Causality is probable for nasopharyngeal carcinoma, particularly in women, and suspected for all head and neck cancers. To date, breast cancer study results were conflicting and we had been unable to conclude that there is an association between second-hand smoke and breast cancer. However, the latest review of the California Environmental Protection Agency based on new studies now states a definite causality between exposure to tobacco smoke and breast cancer, particularly with pre-menopausal exposure. The risk then increases from 26% to 90%⁽²⁾.

Respiratory diseases

Adults are more likely to develop asthma. Among people who already have asthma, symptoms, use of treatment and hospitalisations increase. Symptoms improve after decreasing exposure. Chronic respiratory symptoms such as cough, phlegm production, wheeze and chronic obstructive pulmonary disease are potentially linked to exposure to second-hand smoke⁽²⁾.

Risks in children

Table 2 presents the harmful effects of SHS exposure in children before and after birth, as well as the causative relationship established. The risk that a non-smoking pregnant woman exposed to second-hand smoke give birth to a low-weight baby is 38% higher; this risk is linked mostly to CO and not to nicotine. The risk of intrauterine growth retardation is estimated to be 11% higher for children of mothers exposed to SHS⁽¹⁾. The risk of sudden infant death is 94% greater if a child is exposed to second-hand smoke after birth; the risk factors post-natal exposure and exposure during pregnancy are independent from each other. The risk also increases if the mother smokes before the child's birth and if the father is a smoker⁽²⁾. An increased risk of spontaneous abortion is considered probable^(1,2).

In young children, second-hand smoke increases the risk of lower respiratory tract infections (bronchitis, pneumonia) 1.5 to 2 times higher. Otitis media is 62% more common⁽²⁾. Second-hand smoke exposure has been shown to induce asthma in children and increase the intensity and frequency of attacks, with a clear association between effect and exposure⁽²⁾.

TABLE 2. Effects of exposure to second hand smoke on the reproductive system

CAUSAL ASSOCIATION
<i>Effects on development</i> Low birth weight Sudden infant death syndrome
<i>Effects on the respiratory and auditory systems</i> Acute lower respiratory tract infections (bronchitis and pneumonia) Induction and exacerbation of asthma Chronic respiratory symptoms Middle-ear infections (otitis)
SUGGESTIVE OF CAUSAL ASSOCIATION
<i>Effects on reproductive system</i> Spontaneous abortion, premature labour Intrauterine growth retardation Adverse effects on fertility and fecundability Menstrual cycle disorders
<i>Effects on development</i> Adverse impact on cognition and behaviour Allergic sensitization Decreased pulmonary growth
<i>Effects on the respiratory system</i> Exacerbation of cystic fibrosis
<small>Adapted from the California Environmental Protection Agency⁽³⁾</small>

Causal association or suggestive evidence?

Several experimental studies and prospective cohort and case-control studies have demonstrated the effects of SHS on health. **Causal association** is considered certain if an association between effect and exposure to SHS has been observed in studies where randomness, possible biases and confounding factors were eliminated with a reasonable degree of confidence. It is considered **suggestive evidence of causal association** if an association between effect and exposure to SHS is plausible but randomness, possible biases and confounding factors have not been eliminated with a reasonable degree of confidence. Data are insufficient to causally involve second-hand smoke in several pathologies that are known to be linked to active smoking. Table 1 and Table 2 present the harmful effects of SHS in adults and children as well as the strength of the causative relationship as determined in the scientific literature.

Conclusion

It is now undeniable that second-hand smoke is dangerous for passive smokers and that eliminating exposure to second-hand smoke would benefit population health. Tougher laws should be enacted to protect the population, especially workers, from exposure to this pollutant in public places as well as at work. In addition, better public education on this issue provided by health professionals will help reduce exposure at home and in vehicles. The public should also be encouraged to go to non-smoking restaurants, especially in the company of young children. It is important to remind patients that second-hand smoke is not just annoying; it is a danger that should be avoided.

What you can do

- Always assess exposure to SHS.
- Consider this risk especially in the presence of the pathologies listed in Tables 1 and 2.
- Remember this risk especially when pregnant women and young children are consulting.
- Recommend that workers who work in smoky places ensure their rights are respected. They can get help by calling 1 877 416 8222, the ministère de la Santé et des Services sociaux's tobacco control service.
- Encourage smokers to quit and refer them to smoking cessation centres at 1 888 853 6666. These centres provide free services throughout Québec.

What you can say

- That SHS causes life-threatening diseases in adults as well as children.
- That SHS aggravates diseases in adults and children.
- That the danger is real and it is important to protect adults and children.
- Not to allow smokers to smoke in their presence or in the presence of their children, at home or in a vehicle.
- To avoid places where they could be exposed, such as bars and restaurants, especially if they have children with them.
- To support non-smoking establishments.
- To encourage smokers to smoke outside their homes and vehicles.

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<http://www.dhs.ca.gov/tobacco/documents/FedOHSHAets.pdf>

All references are available on <http://www.santepub-mtl.qc.ca/Publication/pdfppm/ppmapril05ref.pdf>

Ventilation or filter: equally ineffective

At this time, there is no proof that increasing ventilation or using air filters that can reduce the concentration of second-hand smoke in the air eliminates the risks associated with this type of exposure ^(4,5).

To help your patients get more information on SHS

Health Canada. Second-hand Smoke

<http://www.hc-sc.gc.ca/hecs-sesc/tobacco/facts/shs.html>

Canadian Council for Tobacco Control (CCTC). ETS

http://www.ncth.ca/ncth_new.nsf/MainFrameSet?OpenFrameSet

Santé et Services Sociaux Québec. Fumée de tabac dans l'environnement. Campagne d'information sur la « Fumée de tabac dans l'environnement »

http://www.msss.gouv.qc.ca/sujets/santepub/tabac_environnement.html

Non-Smokers' Rights Association (NSRA). Second-Hand Smoke.

http://www.nsra-adnf.ca/news_info.php?cPath=23&news_id=104&language=en

Physicians for a Smoke-Free Canada

http://www.smoke-free.ca/Health/pscissues_secondhandsmoke.htm

List of restaurants in Quebec that are totally smoke-free and offer table service

<http://www.info-tabac.ca/restaurants.htm>

Quit to Win! Challenge. Smoke-free Family Objective

http://www.defitabac.qc.ca/english/sffo/sffo_intro.asp

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