



OVERVIEW OF SECONDHAND SMOKE (SHS) IMPACTS ON HEALTH

1) Physical properties of secondhand smoke

Secondhand smoke (SHS) consists of two types of smoke: the part inhaled and exhaled by a smoker and the smoke emanating from the incandescent end of a burning cigarette, pipe or cigar. SHS is a complex mixture of thousand of gaseous and tiny (fine) solid particles.¹ Two third of smoke emanating from a burning cigarette are not inhaled by the smoker, but are released into the environment contaminating the air breathed-in by people in the surroundings.² In a closed space, 85% of the smoke would originate from lit cigarettes or other tobacco products.³ Certain harmful chemicals found in SHS are colourless and odourless, and thus not always easily noticeable.

Smoke emanating from the incandescent end of a cigarette is the product from an incomplete combustion occurring at low temperatures, which leads to the production of certain chemicals.³ Gram for gram, this smoke is more toxic than the smoke inhaled directly from the cigarette by the smoker.^{4,5}

SHS contains :

- Twice the amount of nicotine;
- 2 times more carbon monoxide;
- 51 times more formaldehyde;
- 44 times more ammonia than that inhaled directly a smoker.⁶

Secondhand smoke contains a greater fraction of fine particles, which when inhaled are carried more deeply into the lungs.⁷ An individual standing 50 centimeters from a light cigarette can inhale up to 10 times more carbonyl compounds than a smoker inhales directly.⁸

1 **National Research Council (NRC).** *Environmental Tobacco Smoke. Measuring Exposures and Assessing Health Effects.* National Academy Press, Washington, D.C., pp.337, 1986.

2 **U.S. Department of Health, Education and Welfare.** *Smoking and Health: A Report of the Surgeon General.* Rockville, Maryland: U.S. Department of Health, Education and Welfare, Public Health Service, Office of the Assistant Secretary for Health, Office on Smoking and Health, 1979

3 **Canadian Centre for Occupational Health and Safety (CCHST/CCOHS).** OSH answers. Environmental Tobacco Smoke (ETS): General Information and Health Effects. http://www.ccohs.ca/oshanswers/psychosocial/ets_health.html (viewed November 2004)

4 **International Agency for Research on Cancer (IARC).** Tobacco Smoke and Involuntary Smoking. IARC Monograph, v.83, June 2002.

5 **Health Canada.** *The facts: secondhand smoke.* Healthy Environments and Consumer Safety Branch. Tobacco Control Programme, 2004. www.hc-sc.gc.ca/hecs-sesc/tobacco/facts/health_facts/second_hand.html (viewed February 2004).

6 **Collishaw N. et al.** « Tobacco Smoke in the Workplace: An Occupational Health Hazard », *Canadian Medical Association Journal* 131(10), November 1984, pp. 1199-1204.

7 **California Environmental Protection Agency Report: Health Effects of Exposure to Environmental Tobacco Smoke (1997).** www.oehha.ca.gov/air/environmental_tobacco/finalets.html

2) Chemical properties of secondhand smoke (SHS)

Secondhand smoke (SHS) contains over 4000 chemical substances, of which at least 50 are known to cause cancer.⁹ SHS also contains several chemicals that are known to be mutagenic.¹⁰ Fine solid particles, mainly “tars” and nicotine, make up 10 % of SHS.¹¹ Carbon monoxide is the main gas found in SHS.¹¹

People exposed to SHS breath in, among other things:

- **ACETALDEHYDE** - a flammable, highly toxic and irritating liquid;
- **ACETONITRILE** - a toxic compound used in making plastic, rubber, acrylic and insecticides;
- **FORMIC ACID** - a liquid used in making cloth and leather and a powerful irritant;
- **ACROLEIN** - a toxic liquid with irritating and carcinogenic vapours;
- **AMMONIA** - an alkaline compound used in making explosives, fertilizers and disinfectants;
- **METHYL CHLORIDE** - a toxic gas used in making rubber and paint solvents;
- **HYDROCYANIC ACID** - a poison used in implementing the death penalty;
- **FORMALDEHYDE** - an irritating gas used as a disinfectant, and a recognized carcinogen;
- **METHANOL** - a toxic alcohol used in making antifreeze, fuel, resins and drugs;
- **CARBON MONOXIDE** - an asphyxiant that reduces oxygenation of living tissue;
- **NICOTINE** - a botanical insecticide (one packet of cigarettes contains enough nicotine to kill you outright if absorbed in a single dose);
- **NITROUS OXIDE** - a group of irritating and sometimes toxic gases that, when combined with hydrocarbons, produce smog;
- **PROPIONALDEHYDE** - a liquid used as a disinfectant;
- **PYRIDINE** - a flammable liquid used in bactericides and insecticides;
- **HYDROGEN SULPHIDE** - a gas produced naturally by decomposing matter.

3) Health effects

Exposure to tar and other organic compounds found in SHS can induce the development of various cancers, while the exposure to carbon monoxide can prevent complete oxygen transport to the heart leading to atherosclerosis and cardiovascular incidents.¹²

Lung cancer

According to recent data,¹³ SHS is responsible for the death from lung cancer of more than one hundred (136) non-smokers in Quebec.

8 **Centre national de documentation sur le tabac et la santé.** « Faits saillants - La fumée de tabac dans l'environnement : Ses conséquences générales pour la santé », mars 1996. p.3-4.

9 **Health Canada.** *The facts: secondhand smoke.* Healthy Environments and Consumer Safety Branch. Tobacco Control Programme, 2004. www.hc-sc.gc.ca/hecs-sesc/tobacco/facts/health_facts/second_hand.html (viewed February 2004)

10 **Panamerican Health Organization.** *Profits over People: Tobacco Industry Activities to Market Cigarettes and Undermine Public Health in Latin America and the Caribbean.* World Health Organization, November 2002.

11 **Canadian Centre for Occupational Health and Safety (CCHST/CCOHS).** OSH answers. Environmental Tobacco Smoke (ETS): General Information and Health Effects. http://www.ccohs.ca/oshanswers/psychosocial/ets_health.html (viewed November 2004)

12 **Direction générale de la santé.** Rapport du groupe de travail sur la réduction du risque tabagique. Ministère de l'Emploi et de la Solidarité. République Française, septembre 2001.

13 **Makomaski I, Kaiserman M.** Mortality Attributable to Tobacco Use in Canada and its Regions, 1998. *Canadian Journal of Public Health, Vol. 95(1), Jan. - Feb. 2004.*

Comprehensive studies have shown how various exposure factors contribute to the risk of developing lung cancer. A non-smoker living with a smoker has an additional 25% risk of developing a lung cancer, when compared to a non-smoker living in a non-smoking household. Similarly, a person exposed to SHS only in social venues (restaurants, bars et casinos) has a risk level that is 17% higher.^{14,15,16,17} Lastly, a person exposed to SHS in the workplace environment, sees the risk level jump from 17% to 50% higher than that of a non-exposed person.⁴ Bar and casino workers have been evaluated to comprise the group of workers being over-exposed to SHS.

Cardiovascular accidents and strokes

Any exposure to SHS makes the blood thicker and stickier, and this causes blockages in veins and arteries;¹⁸ the heart rate increases, the heart's oxygen supply drops and blood vessels contract.¹⁹ It is therefore not surprising to realize that SHS is seen as a major cause of heart disease and death from heart disease.²⁰

Recent studies show that SHS causes 10 to 20 times more deaths by heart and coronary diseases than by lung cancer. In 1997, more than 300 non-smoking Quebecers died as a result of ischemic cardiopathies brought on by exposure to SHS in the home.²¹ According to Health Canada and other medical authorities, a 30-minute exposure to SHS can lead to the onset of physical reactions closely related to heart diseases and heart attacks.^{19,22,23} It is therefore not surprising that a significant decrease in the number of hospitalizations attributable to heart attacks has been observed following implementation of complete smoking-bans in restaurants and bars.²⁴ Most bar and billiard-hall employees spend all of their work-shift in smoke-filled environments. Studies have revealed that such workers may have a 47% higher risk of suffering from coronary incidents than people not exposed to SHS.²⁵ A vast English study has shown that non-smokers still exposed to SHS, such as most workers in the hospitality sector, have a 60% higher risk of having a heart attack than un-exposed workers. Incidentally, non-smoking but exposed workers have a risk equivalent to that of a person who smokes 1 to 9 cigarettes per day.²⁶ Suffice it to say, that there is sufficient epidemiological data to confirm that involuntary exposure to SHS constitutes a preventable risk factor for cardiovascular and coronary disease.

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15 Anderson K, Kliris J, Murphy L, *et al.* Metabolites of a Tobacco-Specific Lung Carcinogen in Nonsmoking Casino Patrons. *Cancer Epidemiology Biomarkers & Prevention* Vol. 12, 1544-1546, December 2003.

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23 Health Canada. *The facts: secondhand smoke.* Healthy Environments and Consumer Safety Branch. Tobacco Control Programme, 2004. www.hc-sc.gc.ca/hecs-sesc/tobacco/facts/health_facts/second_hand.html (viewed February 2004)

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Breast cancer

Recent developments seem to point to a causal effect between routine exposure to SHS and the onset of breast cancer. Studies have revealed that women exposed to SHS, such as those working in establishments with mere designated smoking areas, may be more likely to develop breast cancer than women unexposed to SHS.^{27,28} This is particularly preoccupying, as 2/3 of the 160 000 workers in Quebec's hospitality sector (hotels, restaurants and bars) are women.²⁹

Respiratory illnesses, irritations and other cancers

Evidence points to the fact that workers in bars and other workplaces, where the air is usually contaminated by SHS, have a higher risk of developing asthma and other respiratory conditions such as bronchitis and wheezing.^{30,31} Exposure to SHS is also linked to a higher risk of developing various other cancers (uterus, sinus of the nose, bladder) and of suffering severe irritations of the eyes, throat and middle ear.³²

Children exposed to SHS suffer more infections.³³ Among the childhood diseases caused or aggravated by SHS are pneumonia, bronchitis, middle ear infections, asthma, tonsillitis and inflamed intestines.³⁴ More than a third (35%) of all sudden infant deaths are linked to the mother's smoking.³⁵

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