

# Wood Smoke: Background (presentation by Alma Hyslop)

## Doctors and Scientists Against Wood Smoke Pollution

As a society, we made a choice that people must not be exposed to secondhand cigarette smoke against their will. Given what we now know, it is time to extend this attitude to wood smoke.

<https://woodsmokepollution.org/>

## Sam Harris: The fireplace delusion

The case against burning wood is every bit as clear as the case against smoking cigarettes. Indeed, it is even clearer, because when you light a fire, you needlessly poison the air that everyone around you for miles must breathe. Even if you reject every intrusion of the “nanny state,” you should agree that the recreational burning of wood is unethical and should be illegal, especially in urban areas. By lighting a fire, you are creating pollution that you cannot dispose. It might be the clearest day of the year, but burn a sufficient quantity of wood and the air in the vicinity of your home will resemble a bad day in Beijing. Your neighbors should not have to pay the cost of this archaic behavior of yours.

<https://www.samharris.org/blog/item/the-fireplace-delusion>

## Utah Physicians for a Healthy Environment: 17 reasons to ban wood burning

1. All pollution is not created equal. Wood smoke is the most toxic type of pollution in most cities, more dangerous than auto pollution and most industrial pollution. Lighting a wood fire in your house is like starting up your own toxic incinerator.
2. Lifetime cancer risk is 12 times greater for wood smoke compared to an equal volume of second hand cigarette smoke.
3. Burning 10 lbs. of wood for one hour, releases as much PAHs (polycyclic aromatic hydrocarbons) as 6,000 packs of cigarettes.
4. Toxic free-radical chemicals in wood smoke are biologically active 40 times longer than the free radicals in cigarette smoke.
5. Wood smoke is the third largest source of dioxins, one of the most intensely toxic compounds known to science.
6. The very small size of wood particles make them seven times more likely to be inhaled than other particulate pollution.
7. Wood smoke easily penetrates homes of neighbors creating concentrations up to 88% as high as outdoor air.
8. If you smell wood smoke, you know you are being harmed. The sweet smell comes from deadly compounds like benzene.
13. Wood smoke is the only pollution emitted right where people spend most of their time. It disperses poorly, is not evenly distributed and stays in the air longer because of its small size. Concentrations can be 100 times higher for neighbors of wood burners than what is captured at the nearest monitoring station. Real local “pollution victims” are created even when overall community levels are low.
16. Long ago most communities passed ordinances protecting people from second hand cigarette smoke. Ironically those laws protect people at places they don’t necessarily have to be

(restaurants, stores, buildings, etc). But in the one place they have to be, their own home, they have no protection from something even worse—wood smoke. People should have just as much protection from wood smoke as from cigarette smoke and for all the same reasons. We don't allow people to blow cigarette smoke in your face, why should we allow people to blow wood smoke into your home?

17. Wood burning is not even close to carbon neutral over the short term, the next few decades, and it is that time frame that will make or break the climate crisis. Burning wood is extremely inefficient. Per unit of heat created wood produces even more CO<sub>2</sub> than the fossil fuels do. Furthermore, the black carbon particulate matter released enhances the absorption of radiant heat in the atmosphere, making global warming worse, and prematurely melts already imperiled mountain snow pack.

<http://uphe.org/priority-issues/wood-burning/wood-burning-quick-facts/>

### **Ontario: protecting children from tobacco smoke**

Motor vehicles with children inside

You must not light or use a tobacco product in a motor vehicle with anyone inside under 16 years of age. The law applies to both moving and parked vehicles – even if a window, sunroof, rooftop, door, or other feature of the vehicle is open.

Children's playgrounds and publicly owned sports fields

It is illegal to smoke on and within 20 metres of children's playgrounds and publicly owned sport fields and surfaces (e.g., areas for basketball, baseball, soccer or beach volleyball, ice rinks, tennis courts, splash pads and swimming pools that are owned by a municipality, the province or a postsecondary education institution)

<https://www.ontario.ca/page/smoke-free-ontario>

### **Ontario Ministry of the Environment and Climate Change, on particulate matter:**

Approximately 39% ... of PM<sub>2.5</sub> emitted in Ontario in 2012 came from [the] residential sector.

Exposure to fine particulate matter has been associated with hospital admissions and several serious health effects, including premature death. People with asthma, cardiovascular or lung disease, as well as children and elderly people, are considered to be the most sensitive to the effects of fine particulate matter. Adverse health effects have been associated with exposure to PM<sub>2.5</sub> over both short periods (such as a day) and longer periods (a year or more).

<http://airqualityontario.com/science/pollutants/particulates.php>

### **The World Health Organization, on particulate matter:**

PM<sub>10</sub> and PM<sub>2.5</sub> include inhalable particles that are small enough to penetrate the thoracic region of the respiratory system. The health effects of inhalable PM are well documented. They are due to exposure over both the short term (hours, days) and long term (months, years) and include:

- respiratory and cardiovascular morbidity, such as aggravation of asthma, respiratory symptoms and an increase in hospital admissions;
- mortality from cardiovascular and respiratory diseases and from lung cancer.

Susceptible groups with pre-existing lung or heart disease, as well as elderly people and children, are particularly vulnerable. For example, exposure to PM affects lung development in children, including reversible deficits in lung function as well as chronically reduced lung growth rate and a deficit in long-term lung function (4). There is no evidence of a safe level of exposure or a threshold below which no adverse health effects occur. The exposure is ubiquitous and involuntary, increasing the significance of this determinant of health.

[http://www.euro.who.int/\\_data/assets/pdf\\_file/0006/189051/Health-effects-of-particulate-matter-final-Eng.pdf](http://www.euro.who.int/_data/assets/pdf_file/0006/189051/Health-effects-of-particulate-matter-final-Eng.pdf)

### **Region of Waterloo Public Health: The Health Effects of Wood Smoke:**

Emissions from wood burning can affect outdoor and indoor air quality. Outdoor air pollution has been associated with a wide range of adverse health effects and the scientific literature to date indicates that most sources, including wood smoke, appear to play a role in these effects. Smoke from outside can also seep into buildings, including nearby homes, and affect indoor air quality.

The health effects of wood smoke exposure include eye, nose and throat irritation, increased respiratory symptoms, exacerbation of asthma, and increased hospital admissions for lower respiratory infections. As with exposure to other substances, the health effects would be dependent on the degree of exposure to wood smoke, and would be influenced by factors such as the duration, magnitude and frequency of exposure.

While occasional exposure to wood smoke may cause minor and reversible problems (even with persons with respiratory disease), regular and continued exposure to this and other sources of smog may cause more significant health risks. The harmful pollutants associated with wood smoke can impact the health of otherwise healthy people. Young children, the elderly, and people with pre-existing cardio-pulmonary disease are most likely to be affected.

The best way to minimize the risk of health effects is to minimize the production of the air pollutant itself; in this case, wood smoke.

<http://chd.region.waterloo.on.ca/en/researchResourcesPublications/resources/WoodSmoke.pdf>

### **The Lung Association: Expert Opinion on Residential Wood Burning**

Breathing in wood smoke can cause increased respiratory symptoms, increased hospital admissions, exacerbation of asthma and COPD, and decreased your ability to breathe normally. If you have a lung disease, breathing in wood smoke can make your disease worst and cause a flare-up.

Environment Canada and Health Canada have identified many hazardous chemical substances in wood smoke, including:

PM<sub>2.5</sub> (inhalable particulate matter less than 2.5 microns in diameter) - PM<sub>2.5</sub>, which consists of a mixture of microscopic particles of varied size and composition, has been declared a toxic

substance under the Environmental Protection Act. These particles can be inhaled deep into the lungs, leading to serious respiratory problems, including excess mortality, especially among those with pre-existing cardiopulmonary illness.

Carbon Monoxide (CO) - can reduce the blood's ability to supply necessary oxygen to the body's tissues, which can cause stress to the heart. When inhaled at higher levels, CO may cause fatigue, headaches, dizziness, nausea, confusion and disorientation and, at very high levels, lead to unconsciousness and death. Fire Prevention Canada advises that CO detectors be installed in every home that has a combustion appliance or an attached garage.

Oxides of Nitrogen (NOx) - can lower the resistance to lung infections. In particular, nitrogen dioxide can cause shortness of breath and irritate the upper airways, especially in people with lung diseases such as emphysema and asthma.

Hydrocarbons (HC) - can damage the lungs.

Volatile organic compounds (VOCs) - can cause respiratory irritation and illness. Some VOCs emitted by wood-burning appliances, such as benzene, are known to be carcinogenic.

Formaldehyde - can cause coughing, headaches and eye irritation and act as a trigger for people with asthma.

Polycyclic aromatic hydrocarbons (PAHs) - Prolonged exposure to PAH's is believed to pose a cancer risk.

Dioxins and furans- Some dioxins and furans are carcinogenic.

Acrolein - can cause eye and respiratory tract irritation.

**The Canadian Lung Association recommends that you don't burn wood in residential setting.**

<https://www.lung.ca/news/expert-opinions/pollution/residential-wood-burning>

**South Coast Air Quality Management District [California]: Fire pit decision, 2013**

The particulate emissions rate per minute from one beach bonfire is equal to that from:

Three average big-rig diesel trucks; or

The secondhand smoke from 800 cigarettes. Wood smoke contains many of the same toxic chemicals as secondhand cigarette smoke.

Also, one fire pit in one evening emits as much fine particulate pollution (PM2.5) as one big-rig diesel truck driven 564 miles.

Smoke does disperse and is diluted as it travels downwind from a fire pit. An air quality model indicates that the concentration of PM2.5, the key harmful ingredient in wood smoke, decreases by about 98 percent at a distance of 700 feet from a fire pit, SCAQMD officials said.

Fine particles in wood smoke contain cancer-causing chemicals as well as common combustion pollutants such as nitrogen oxides. Numerous health studies during wildfires, and in communities where large amounts of wood or other biomass is burned, show that wood smoke causes respiratory irritation and an increase in hospital admissions for respiratory problems.

Fine particles also can aggravate chronic heart and lung diseases and are linked to premature deaths in people with these conditions.

<http://www.aqmd.gov/home/library/public-information/2013-news-archives/fire-pit-board-decision>