

WOOD STOVES & YOUR HEALTH

What you need to know.

Contact us to find out more:

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THE HEALTH EFFECTS OF HEATING WITH WOOD

Heating a home with wood is still a common practice, particularly in rural BC. Many think wood is green fuel since it comes from a renewable source, but appliances like wood stoves and wood fireplaces can emit significant levels of hazardous substances.

An old woodstove can emit approximately 50 grams of particulate matter in an hour. Wood smoke not only affects health, but it also damages crops, reduces visibility and is a major source of air pollutants and odor-related complaints.

Residential wood burning is a growing concern in many communities across BC. Hardest-hit are valley communities where temperature inversions prevent wood smoke from being dispersed. An inversion occurs when warm upper air acts like a lid, holding down surface air and smoke close to the ground.

Cold nights with little wind cause smoke and air pollutants to remain stagnant at ground level for a long period of time.

Pollutants are emitted both indoors and outdoors and can seep into other people's homes through cracks, windows and ventilation systems.

Wood smoke contains such major pollutants as carbon monoxide (CO), nitrogen oxides (NOx), particulate matter (PM) as well as toxic volatile organic compounds (VOC) like benzene, formaldehyde, benzopyrene and polycyclic aromatic hydrocarbons (PAH).



MAJOR POLLUTANTS IN WOOD SMOKE

Particulate matter, a mixture of microscopic particles of varying composition, is considered a toxic substance under the Canadian Environmental Protection Act. Inhaling it can lead to respiratory problems and even to death for those with a pre-existing heart or lung disease.

Carbon monoxide is a colorless, odorless, poisonous gas that can reduce blood's ability to supply oxygen to body tissues. Inhaling high levels may cause fatigue, headaches, dizziness, nausea, confusion and, in severe cases, unconsciousness and death.

Nitrogen oxides can lower resistance to lung infections. In particular, they can irritate the upper airways and cause shortness of breath, especially in people with lung diseases like emphysema and asthma.

Volatile organic compounds (VOC) can cause respiratory irritation and illness. Some VOCs, such as **benzene**, **dioxins** and **furans**, are known to be carcinogenic. Prolonged exposure to **polycyclic aromatic hydrocarbons** is also believed to pose a cancer risk.

Formaldehyde can cause coughing, headaches and eye irritation as well as trigger asthma attacks.

VOCs like **hydrocarbons** and **acrolein** can damage the lungs and cause eye and respiratory tract irritation respectively.



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WOOD SMOKE & ASSOCIATED HEALTH EFFECTS

While young children, the elderly, and people with pre-existing heart and lung diseases are at higher risk, even healthy individuals are susceptible to diseases caused by wood smoke.

Long-term exposure to pollutants emitted by wood smoke could result in:

- Impaired or decreased lung function in children
- Increased severity and frequency of symptoms of asthma and COPD
- Increased emergency room visits and hospitalizations due to asthma
- More frequent pre-term birth and more babies with low birth weight
- More childhood respiratory illnesses like bronchiolitis and ear infections
- Increased risk of heart attack or stroke and increased blood pressure for those with risk factors for heart disease

Short-term exposure could lead to:

- Increased rates of heart attack for those with risk factors for cardiovascular disease
- Increased incidence of irregular heart beat (cardiac arrhythmia)
- Worsening of symptoms of obstructive respiratory illness
- Irritation of the airways and reduced lung function



ALTERNATIVE HOME HEATING

Gas fireplace: safe, popular, looks like real wood fire, burns cleaner, easy to start, inexpensive to operate, a good source of heat, ensures less heat loss up the chimney

Electric fireplace: can be installed anywhere, requires no vent, plugs into 120V outlet, comes with an adjustable thermostat

Pellet stove: the most efficient, is less polluting and emits less than 1 gram of PM per hour

Certified wood-burning fireplace: meets federal emission standards and offers high fuel efficiency. Available in various sizes and styles that will fit most masonry fireplaces and is a good source of heat with very little smoke. (Note: In several BC communities, wood-burning appliances have been banned in new buildings and homes.)

Certified wood stoves: provide better heat, use less wood, and burn more of the combustible gases that would otherwise become smoke. Come in two types: *catalytic* and *non-catalytic*. Both produce less smoke, less creosote build-up, and fewer emissions, resulting in only 6 grams/hour of PM compared to 50 grams/hour from old woodstoves.

IF YOU HAVE TO BURN WOOD, BURN IT RIGHT!

Wood smoke pollutes the air we breathe, but there are ways to reduce the volume of indoor and outdoor emissions. Here are some tips to improve the safety and efficiency of your wood-burning appliance.

Preparing your wood

- Burn only dry, seasoned wood containing no more than 20% moisture. Using only seasoned wood can reduce your wood consumption by 25%.
- Hardwoods dry slowly, requiring 6-12 months of seasoning after splitting. Wood split into pieces 10-15 cm (4-6 in) in diameter burns better because more surface area is exposed to flame.
- Stack and store wood outside, a foot or more above the ground and away from buildings. Stacking pieces loosely in crosswise fashion allows for good air circulation and hastens drying.



- Cover the top to protect from precipitation, but leave the sides open to air.
- Bring wood into your home in small amounts as needed.

Burning your wood

- Start your fire with kindling—preferably, using softwoods like pine and fir that are low density, ignite easily, burn fast and hot, and heat the firebox and flue quickly. Note that, while ideal for kindling and starting fires, softwoods form creosote easily due to high resin (sap) content.
- Open the damper—it increases air circulation and improves burning. Smoke is a sign of oxygen starvation and/or incomplete burning.
- Maintain small, hot fires—they produce much less smoke than those left to smolder. Hardwoods are denser, take longer to ignite; they burn slower but more evenly, produce more heat but less smoke than softwood logs of the same size.
- Do not bank your fire overnight. This creates excessive emissions, promotes the formation of creosote and can cause serious indoor air pollution.



Never burn:

- materials not intended for household wood-burning appliances such as plastics, cardboards and Styrofoam.
- woods that came from salt water—chlorine combines with smoke to produce carcinogens such as dioxins and furans.
- pressure-treated or painted wood, particle board, and plywood.
- green wood or wet wood.



BUYING AND MAINTAINING YOUR WOOD STOVE

- Consider a high-efficiency wood stove, fireplace or insert that is CSA B-415 or US EPA certified and have it professionally installed. High-efficiency appliances can cut emissions by up to 70% and burn up to one third less wood while delivering the same amount of heat.
- Annually clean your wood-burning appliance and have it inspected by certified WETT technician. Properly burning fire should give off only a thin wisp of white steam as you glance at your chimney top.
- Install and maintain a smoke alarm and carbon monoxide detector in your home and/or attached garage to provide early warning signs of potentially dangerous situations.

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