

Waste Burning - Why it Matters and What You Can Do

Did you know that smoke from “clean trash” is harmful??



Long-term exposure to fine particulates (“pm2.5” or smaller) is thought to cause and contribute to **lung cancer**. This particulate matter (PM) is the very fine soot/dirt in the smoke from burning waste—even just burning paper. If the long-term concentration of PM for a typical urban community increases by only 1%, **the risk of developing a lung cancer increases by about 14%**. So if you can smell smoke in town most days, and that practice continues for years (i.e. “long-term”), your community might be at increased risk.



Long-term exposure to fine PM also causes and contributes to respiratory disease, such as **asthma, COPD, and pneumonia, heart disease and death**—with the greater the exposure, the greater the incidence. Whether these outcomes are associated with the larger smoke particulates that you can see, is unclear.



Acute exposure, such as happens during temporarily worsened air pollution in urban communities, is associated with increased **premature deaths (from heart and lung disease), hospital visits, increased asthma and bronchitis symptoms, and increased susceptibility to respiratory infections such as pneumonia**. So the number of days that smoke is smelled in town might make a difference in community health.

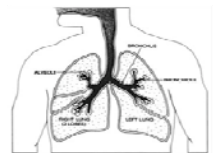
These studies weren't carried out for rural Alaska waste burning, so we don't know for sure how the studies translate here. We do know that people in four Alaska Native Villages who burned their trash near home were **twice as likely to have a cough, from 5 to 17 times more likely to suffer faintness, and 5 to 10 times more likely to experience numbness**, than people who didn't burn. The more people burned the more likely they were to get the symptoms.



All of that is just the dirt pieces of smoke!! --Meaning the physical impact of “dirt/soot” getting deep in our lungs.

So what about the contaminants ??

There are so many contaminants, and each can have different potential effects. Here are just some sample facts. Toxicological studies on **dioxin** showed the potential for health risks within 26 feet of a burnbarrel **from just 15 minutes of waste burning**. And **Acids and other chemicals** emitted by trash fires can cause **severe bronchio-constriction in asthmatics and can increase the breathing difficulty of those with emphysema**.



Hazardous Air Pollutants (HAPs) found in open waste burning include uncombined ultrafine particulates, polycyclic aromatic hydrocarbons (PAHs), volatiles and semi-volatiles, carboxyls, dioxins, and PCB's, and heavy metals such as mercury, lead, and cadmium. Here is just a small number of **sample chemicals** your community is likely breathing when they breathe dump or burnbox smoke: 1,3-Butadiene; 2-Butanone; Benzene; Chloromethane; Ethylbenzene; m,p-Xylene; 2,4,6-Trichlorophenol; 2,4-Dichlorophenola; 2-Methylnaphthalene; Acetophenone; Naphthalene; Crotonaldehyde, etc., etc.



You should know: Different chemicals can contribute to or cause different health impacts. Some chemicals don't do much at all unless a threshold exposure is reached, while with others there may be no safe threshold. Not all chemicals will cause a health symptom. And there are many more chemicals that we don't know anything about their health impacts. Another unknown is how different combinations of chemicals impact health. Is there a combined effect (called a synergistic effect) that is different than the effects caused by chemicals individually? Different people respond differently to chemicals. Finally, the open burning waste studies are nearly all for single family “backyard burning” scenarios, not community-wide full wastestreams. The result? We can't tell you the exact list of health effects your community might be at risk for from open burning. We can just tell you some health effects for

which it makes sense your community is at risk for, especially if people are breathing smoke regularly. You can examine your wastestream, see what is being burned, determine who is being exposed and estimate how much and how often, and make an even better guess.



What are examples of health impacts from exposure to contaminants ? Dioxins can cause **cancer, immune dysfunction, IQ deficit, reproductive effects**, and much more. The absorption of heavy metals has been linked to **birth defects, interference with red blood cell production, liver and kidney deterioration and loss of coordination**. Flame retardants (PBDE's) damage the nervous and reproductive systems and are being banned in Europe. Halogenated hydrocarbons have been associated with **blood abnormalities, low white cells and leukemia as well as liver damage** from continued exposure to high doses. Styrene gas is very readily absorbed through the skin as well as through breathing. High doses can cause **deep unconsciousness and death, and the gas can damage the eyes and mucous membranes**. See the bottom of this page on where to go for which types of wastes produce which chemicals, and what potential risks those chemicals present.

What Can You Do?



Fortunately there is a lot you can do to protect your community's health from the smoke. Here are strategies that villages are trying all over Alaska. Select as many strategies as you can do. The more you do, in general the less your risk.

Preventing Folks From Smelling the Smoke:

Don't Burn - Evaluate first whether you really need to burn your waste. Do you have the space, operational features, or community involvement needed to not burn (or to burn less)?



Burn hours - Keep "burn hours". Don't let the community enter the dump during that time.

Burn at Night - When people, especially children, are more likely inside.



Burn downwind - Burn when the wind is blowing away from town and other activities.

Size for storage - Calculate your volume well enough so that you can store wastes during unfavorable wind conditions.



Masked Operator - No one should light the fire except the operator, and they should wear a mask.

Siting - Locate your burning as far as possible from humans.



Think mobile or mini burning station - If your site is close to town or town is downwind a lot, consider locating your burnbox away from the dump. You can use a burnbox on track wheels or sled to move it to different places depending on the wind.

Think high! - At the dump, smoke at face level will create greater exposure. A high stack or elevated cage might help in diluting smoke in the air overhead. That is a reason factory stacks are so high!

Reducing Smoke Toxicity:

Collect! - A collection program is one of the best ways to reduce health risks. It keeps people away from the smoke source (so they breathe less), AND it gives collectors/operators a chance to make sure that really bad wastes don't get placed in the burnbox - like batteries, fluorescent lights, electronics, etc. For more information about starting a collection program



Exposed dump

<http://www.zendergroup.org/docs/collection.pdf>

Separate! - Take out your toxic wastes. You can't get contaminants in the smoke if they weren't in the waste. It doesn't take care of the health risks from the smoke dirt/soot, but it does remove or reduce contaminant health risks.



Reduce and Reuse - Removing wastes from the wastestream helps too. If you have a smaller volume of waste, then you can burn less often. Try a "share shed" for everything usable-- clothes, leftover paints, toys, computers, etc.

Don't use Used Oil as a starter - Used oil contains lots of contaminants that can cause cancer and other diseases. It is much better to use a well-designed burnbox and dry wastes, such as paper and wood, as starters. If you still need to use the oil, use it sparingly.

Educate!- When all else fails, education can make perhaps the biggest difference in the level of health impacts your village faces. Convincing folks to keeping children away from the dumpsite, pay for a collection service, separate out their toxics, and reduce and reuse can reduce health risks a lot.



Burn Tips to further reduce smoke toxicity:

Contain the waste - Contained fires are more likely to produce less toxic smoke



Burn hot - a more complete burn generally creates less toxic smoke and the smoke is present for a shorter time. For hotter fires, use vents, allow ash to settle out through grates, and don't overfill.

Burn and cool quickly - Temperatures between 300F to 1200F create substantial levels of dioxins and furans. The less time within that range the better. If you can safely quench ash or otherwise cool, do so.

Burn dry - Dry wastes will become hot more quickly and not smolder -both will create less toxic smoke. *Cover* your wastes in the collection bins and burnbox to keep out snow and rain. Shovel any snow off.

Waste Burning Types



There are two common burnbox types -- a closed box with vent and chimney stack, or an open cage design. They can be bought, or made. Both of these types emit toxic smoke. To get non-toxic smoke you need to use an "incinerator" that complies with the Clean Air Act.

Otherwise, no matter what your design is, it is considered "open burning". Incinerators burn hotter (1800 F and higher) and they have treatment technologies that trap or dissolve contaminants. The problem is they require a lot of fuel, need a full-time operator, and use parts that must be ordered regularly. The result is they cost several hundred dollars per household per month. A few villages use smart-ash burners or other forced air units. You should know that smart ash burners are not approved for community solid waste burning. However, they *might* provide a cleaner smoke than burnboxes. The tradeoff is fuel use and the need for more operator hours, including intensive waste loading requirements. What burnbox should you use? It depends on such issues as whether you: can operate heavy equipment, need box mobility, have purchasing funds, and how well the community separates wastes.



The Fine Print

The actual risk that your community faces depends on many, many factors. And it varies with the person and their health status and habits and heredity. We don't know exactly the extent or type of open burning health risks because so few studies have been carried out. But we can assume that if a harmful contaminant is in a waste, or gets formed when burned, and if your community breathes that smoke, they will be at potential risk.

Where to Go

More details on health risks, selecting a burnbox type, burn tips, and proper siting considerations, can be found on documents and links on our site: <http://zendergroup.org/burning.html> . If you are interested in reducing waste burning health risks and would like free assistance in implementing any of these suggestions, or in evaluating your community's health risks, contact us at 277-2111 or lzender@zendergroup.org .