

## Health Effects of Burning Trash



Urban waste incinerators burn very hot and destroy many of the dangerous waste chemicals. Most of the remaining toxins are captured in the smokestack using high technology. What is left over is discharged high into the atmosphere where it can be diluted before it is breathed. In our rural burnboxes and burnbarrels, emissions are not treated and the smoke stays low in the atmosphere where it does not get diluted.

**Just 2 to 40 household burn barrels emit many of the most dangerous toxins at the same level as emitted from a 200-ton per day incinerator facility that serves 20,000 households.**



A healthy person may suffer non-specific reactions from burnboxes or barrels including *burning eyes, headaches, nausea, fatigue, dizziness and other symptoms*. Some may develop an allergic hypersensitivity if the dose is high enough.



**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.**

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. The irritation of the lungs can reduce the amount of oxygen available to the heart and lungs—and can be dangerous for elders and those with heart disease.

**Acute effects from burning some wastes can be very serious. It takes only five ounces of burning PVC to give off enough hydrogen chloride gas to kill someone in an average-size room in just ten minutes.**

Even if you do not suffer immediate effects, the damage to your health can be more serious the longer you are exposed to the smoke. The effects can include *damage to your lungs, nervous system, kidneys and liver*. Chronic diseases like bronchitis, emphysema and most cancer can take 20 years to develop and can be caused by low exposures to smoke and toxins which originally appeared harmless.

**Children can be at much greater risk. Because of their body size, they inhale more air per pound of body mass than do adults, and can absorb a proportionately larger "dose" of toxins.** Also, children's bodies are more susceptible to damage from the mercury, lead, cadmium and other heavy metals found in the smoke because their nervous systems are not fully developed.



## What to do about dioxin and other chemicals released during burning:

**Dioxin** is one of the most hazardous chemical compounds to breathe and it causes cancer. It is almost always formed when burning garbage. The only requirements for it to form are: Heat over 400 °, Chlorine, and Organic material. Temperatures of 600° to 1200 ° will form the most dioxin, and at over 1800° very little is formed.

- ◆ **Increase the source-people distance:** Toxicological studies on dioxin showed the potential for health risks *within 26 feet* of the source of open burning from just *15 minutes* of burning. **As the burning continues, the impact area widens.** If people in your community insist on home burning, **move the barrels** (or pass an ordinance) so that they are 50 ft (or more) from houses. Locate burnboxes far away, and keep people from the dump during a burn.



- ◆ **Make it short:** A hotter fire will burn quicker, reducing the ultimate size of the smoke impact zone. See [www.ccthita-swan.org/pdf/burnbarrelsDEC.pdf](http://www.ccthita-swan.org/pdf/burnbarrelsDEC.pdf) and [www.ccthita-swan.org/Tutorials/burnbox.cfm](http://www.ccthita-swan.org/Tutorials/burnbox.cfm) for hotter fire designs and tips. Less waste and more frequent burns make a shorter fire, and thus a smaller zone as well. Cooling ash more quickly also reduces dioxins — because ash will be in the range of optimal dioxin-formation temperatures for a shorter time.

- ◆ **Take out the plastic:** You can lower the amount of dioxin formed and its toxicity by taking out sources of chlorine. **One of the highest sources of chlorine is PVC.** It is 56% chlorine. Some studies show that the amount of PVC in waste is the most important predictor of dioxin emissions (although others state that reducing PVC is futile as there will always be enough chlorine in other wastes to form dioxin). PVC is in plastic containers that are labeled #3, in PVC pipes, many children's toys, vinyl flooring and siding, and vinyl furniture covering. **PVC also forms hydrochloric acid** - which besides damaging the burnbox, is a major irritant to eyes and lungs, and potentially lethal. These types of wastes are easy enough to **take out before burning.**



- ◆ **Make it brown:** Another source of chlorine is white paper products, including plates, napkins, cardboard, and office paper. These products are almost always bleached with chlorine. These products are more difficult to separate before burning, unless the households separate them beforehand. Promote non-chlorine bleached products in your stores and schools and offices. White paper without chlorine is available.

- ◆ **Junk the mail:** Go door-to-door if you have to and offer to remove people from junk mail lists. Ask them for the catalogs they don't use, find the phone number to remove their names, and ask them to call (or ask them if you can call). Junk mail contains chlorine bleached paper and lots of **heavy-metal** based ink, and no one needs it. Send a postcard with your full name and address to the Mail Preference Service, Direct Marketing Association, P.O. Box 9008, Farmingdale, NY 11735-9008. **Call Equifax** 1 (800) 873 7655 or **Opt Out** 1 (888) 567 8688 to remove name from mailing lists. **Go to** [www.stopjunk.com](http://www.stopjunk.com) , [www.the-dma.org/cgi/offmailinglistdave](http://www.the-dma.org/cgi/offmailinglistdave) , [www.afandpa.org](http://www.afandpa.org) .



- ◆ **Write manufacturers** of commonly bought products in your Village and tell them to switch to non-chlorine bleached, soy-based ink, and #1 and # 2 plastics. **Write your lawmakers too.** Address letters from the Tribe and City - it will pull more weight.

## Chemicals From Solid Waste Burning And Associated Health Effects

Waste	What to look for	What it contains	Why it is bad	What to do
<p>PVC</p> 	<p>#3 bottles and jugs, Children's toys, vinyl tubing, flooring and siding materials, drainpipe, a variety of food, household, pharmacy and cosmetic products, Vinyl furniture</p>	<p><b>Polyvinyl chloride</b> forms <b>dioxins</b> when burned and <b>hydrochloric acid</b>. It may contribute to dioxin formation from other wastes because it has so much chlorine. The more chlorine a dioxin, furan, or PCB has, the more toxic its effects.</p>	<p>Hydrochloric acid can irritate and burn your lungs and cause fluid build up and possible ulceration of your respiratory tract. It also will shorten the life and reduce function of your burnbox. Dioxin can cause cancer, immune dysfunction, IQ deficit, reproductive effects, and much more.</p>	<p>Don't burn it, encourage stores to stock glass bottles when available, or only #1 and #2 plastic containers. Reuse toys and tubing. Bale plastics to landfill or use as insulation, wind barrier, etc.</p>
<p>Polystyrene and styrenes</p> 	<p>Foam cups, bait containers, meat trays, egg cartons, some packaging "peanuts", yogurt and deli containers, clear plastic cookie trays, plastic forks and spoons, photographic film,</p>	<p>Polystyrene (Styrofoam) releases styrene and <b>benzene</b>, a carcinogen. When burned, <b>dioxins</b> and <b>chlorinated furans</b> are formed, which are also carcinogenic.</p>	<p>Styrene gas is very readily absorbed through the skin, respiratory system and gastrointestinal tract. High doses can cause deep unconsciousness and death. The vapor can damage the eyes and mucous membranes. It accumulates in the body throughout your life.</p>	<p>Don't use Styrofoam or plastic utensils. Switch to alternative products. See <a href="http://www.ciwmb.ca.gov/FoodWaste/Compost/Biodegrade.htm">http://www.ciwmb.ca.gov/FoodWaste/Compost/Biodegrade.htm</a> for a list of companies. Have the Store order only products in #1 and #2 plastics (or glass).</p>
	<p>Bleached paper products White packaging materials and paperboards such as frozen food, bakery and pizza boxes, any light-weight white cardboard</p>	<p>Burning these materials releases <b>halogenated hydrocarbons</b> (carbon compounds with chlorine and fluorine). These materials can also release <b>dioxins and furans</b> when burned.</p>	<p>These compounds have been associated with blood abnormalities, low white cells and leukemia as well as liver damage from continued exposure to high doses.</p>	<p>Buy unbleached products. Look for chlorine-free bleach process on the label. Work with the Store to offer non-bleached products - especially those that are used often - like coffee filters.</p>
	<p>Slick colored papers and cardboards, magazines</p>	<p>Synthetic inks contain <b>heavy metals</b>, like lead &amp; cadmium. These metals get carried along with the rest of the smoke, and eventually settle onto plants, water, and soil.</p>	<p>The absorption of heavy metals by humans has been linked to birth defects, interference with red blood cell production, liver and kidney deterioration and loss of coordination.</p>	<p>Soy-based inks and lead-free inked materials are available, although not widely used. The bulk of these materials is from junk mail. Stop junk mail in your community. Go to <a href="http://www.stopjunk.com">http://www.stopjunk.com</a>, or read the previous page of this handout if available.</p>

Waste	Examples	What it contains	Why it is bad	What to do
	Particle board, medium density fiberboard, hardboard plywood	These products contain <b>formaldehyde resins</b> to bond the composite.	Daily long-term exposure to formaldehyde in air may cause dry and sore throat, inflammation of the lung and bronchial tubes, and other breathing problems. Continuous long-term exposure may also affect liver and kidney functions. Formaldehyde has been linked to a type of nose/throat cancer.	Composite woods should not be burned. Better to reuse or mulch. How about a set of building blocks? If they must be burned - burn them separately, quickly, hotly and away from people.
	Cardboard	Cardboard contains a very small amount of <b>urea formaldehyde</b> for adhesive and water-resistant properties. Waxed cardboard contains <b>paraffin</b> , and cardboard used for food stuffs can be impregnated with <b>fungicides</b> .	Exposure to formaldehyde from cardboard is considered to be insignificant. Paraffin can irritate eyes, nose, and throat, and may be contaminated with benzene and other PAH's, which are carcinogenic. Fungicides are toxic and can affect the nervous system.	Regular brown cardboard should be okay to burn, but better to bale or reuse if possible. Waxed cardboard is best not burned inside. Treated cardboard for produce or meats should not be burned near human activity. Reuse, bale as possible.
	Pressure Treated Wood	Can contain <b>arsenic (As)</b> and <b>chromium, creosote, or chlorophenol (PCP)</b> compounds, and can result in the same effects as the burning of heavy metals, PAHS (creosote is 75% PAHs), respectively. Newer products should be less toxic.	<b>As</b> is carcinogenic, and may be an endocrine disruptor. Short-term effects include sore throat & irritated lungs, to vomiting, decreased blood cells, numbness. Creosote - irritation of eyes, nose, throat, with chronic inhalation damage to lungs and skin, see also health effects PAHs. PCP caused rashes, respiratory, neurological changes in exposed workers.	If you have treated wood made before 2004, make sure that it is used where children cannot access it and it is unlikely to be burned. See for example, <a href="http://environment.alachua-county.org/Pollution_Prevention/hazmat/CCA%20REPORT.PDF">http://environment.alachua-county.org/Pollution_Prevention/hazmat/CCA%20REPORT.PDF</a>
	Drapes, furniture foams, carpets, children's clothes, wood finishes, sealants, adhesives, and many others.	<b>Polyurethanes:</b> When burned, these materials will produce clouds of yellow smoke containing varying amounts of hydrogen cyanide and phosgene. Also <b>Poly-Brominated diphenyl ester (PBDE)</b>	Exposure to high concentrations of hydrogen cyanide gas for 30-60 minutes can cause death. Smoke from sealants can kill birds, with their sensitive respiratory systems. Flame retardants (PBDE's) damage the nervous and reproductive systems and are being banned in Europe. 	These wastes should be reused or exchanged at a hazardous materials exchange shed. Non-hazardous, non-liquid (e.g. foams and drapes) can be landfilled, but not burned
	Everything!!	<b>Particulate matter</b> (PM10 and below) are airborne particles in the smoke that can be breathed into lungs. They may or may not be associated with contaminants. Gases include <b>CO</b> and <b>NO<sub>x</sub></b> .	Exacerbate and/or cause respiratory disease, including asthma, bronchitis and emphysema, heart problems and even cancer and premature death. <b>CO:</b> Fatigue, headaches, dizziness, nausea <b>NO<sub>x</sub>:</b> respiratory damage.	<b>PM:</b> Fit your burnbox stack with a fireproof material to capture fly ash. Wet down ash, reduce the waste you burn. Burn hotter. <b>Gases:</b> <i>Stay away from the smoke.</i>

References: <http://www.state.me.us/dep/air/backburn.htm>; <http://www.burnbarrel.org/Science/Science.html>; <http://www.mindfully.org/Pesticide/Dioxin-Report-CEHJ.htm>, <http://www.checnet.org/healthhouse/virtualhouse/index.asp>, For in-depth information on chemicals: <http://www.atsdr.cdc.gov/toxfaq.html>