Dangerous Health Effects of Burning Plastics and Waste at Home
Fact Sheet

Waste that is burned can include paper, cardboard, food scraps and plastics, — essentially any materials that would otherwise be recycled or picked up by a waste collection company. Air emissions from home burning are released directly into the house or the atmosphere without being treated or filtered. You should never burn household garbage, colored paper or ink, or any type of plastic, foam, or other artificial materials. Burning these can release harmful chemicals into your home, yard and community.

How does burning plastic and waste affect people’s health?
Most people who burn their domestic waste that includes plastic, do not realize how harmful this practice is to their health and to the environment. Current research indicates that “backyard-burning” of waste or burning waste in wood stoves is far more harmful to our health than previously thought. It can increase the risk of heart disease, aggravate respiratory ailments such as asthma and emphysema, cause rashes, nausea, or headaches, damage the nervous system, kidney or liver, and damage the reproductive and development systems.

The burning of polystyrene polymers - such as foam cups, meat trays, egg containers, yogurt and deli containers - releases styrene. Styrene gas can readily be absorbed through the skin and lungs. At high levels styrene vapor can damage the eyes and mucous membranes. Long term exposure to styrene can affect the central nervous system, causing headaches, fatigue, weakness, and depression. Not only these people who are burning the trash are exposed to these pollutants, but also their neighbor’s, children and families.

What is the effect on children?
Children have disproportionately heavy exposures to environmental toxicants. Pound for pound of body weight, children drink more water, eat more food, and breathe more air than do adults. The health implication of these findings is that children will have substantially heavier exposures than adults to any toxicants that are present in water, food, or air.

Children’s metabolic pathways, especially in the first months after birth, are immature. Children’s ability to metabolize, detoxify, and excrete many toxicants is different from that of adults. In most instances, they are less able to deal with toxic chemicals and thus are more vulnerable to them.

Children undergo rapid growth and development, and their developmental processes are easily disrupted. Many organ systems in infants and children undergo very rapid change prenatally as
well as in the first months and years after birth. These developing systems are very delicate and are not well able to repair damage that may be caused by environmental toxicants.

_Because children have more future years of life than most adults, they have more time to develop chronic diseases triggered by early exposures._ Many diseases are triggered by early exposures. Those that are caused by toxicants in the environment are now thought to arise through stages that require years or even decades to evolve from earliest initiation to actual manifestation of disease. Carcinogenic and toxic exposures sustained early in life, including prenatal exposures, appear more likely to lead to disease than are similar exposures encountered later.

**Why People Burn their Plastics and Other Waste**

Backyard and inside burning of plastics and other domestic waste is common in many countries in the world. People burn plastics for various reasons—either because it is easier than hauling it to the local disposal site or to avoid paying for regular waste collection service, or — as there exists no municipal waste service – because it is the only way that many rural people have to get rid of their waste. Particularly in Eastern Europe and the NIS, rural municipalities do not have waste collection and disposal services. Indoor plastic burning is often practiced in areas with a low economical level and where citizens use own stoves for cooking and heating, many plastics burn very easily and have a high potential of energy. When stoves are fired with plastics: expensive wood is saved and the garbage is reduced.

**How burning of plastics and other waste harms the environment?**

Pollutants released from burning plastic waste in a burn barrel are transported through the air either short or long distances, and are then deposited onto land or into bodies of water. A few of these pollutants such as mercury, polychlorinated biphenyls (PCBs), dioxins and furans persist for long periods of time in the environment and have a tendency to bio-accumulate which means they build up in predators at the top of the food web. Bioaccumulation of pollutants usually occurs indirectly through contaminated water and food rather than breathing the contaminated air directly. In wildlife, the range of effects associated with these pollutants includes cancer, deformed offspring, reproductive failure, immune diseases and subtle neurobehavioral effects. Humans can be exposed indirectly just like wildlife, especially through consumption of contaminated fish, meat and dairy products.

*Plastic items should not be placed in wood stoves, fireplaces, campfires or trash burn bins. Why?*

Old barrels or wood stoves do not reach high enough temperatures to destroy many of the dangerous chemicals created when plastic burns. Municipal solid waste incinerators such as double chambered incinerators can reach a temperature of 1800 degrees Fahrenheit (982 C),
providing plenty of oxygen to complete the burning process. Barrels and wood stoves only tend to smolder and smoke, releasing plumes of toxic fallout into your home, backyard and the surrounding community. In addition, this leaves you with potentially hazardous ash, which is not appropriate to spread on the soil.

Burning household trash and plastics can emit pollutants such as hazardous air pollutants (HAPs), particle pollution, and volatile organic compounds (VOC). These pollutants can contribute to health problems that may affect homeowners, their families, their neighbors, and the community. While state, local, and Tribal regulations limit the amount of trash burning and backyard burning, dangerous releases of HAPs can occur if a homeowner does not comply with these regulations.

**Burning trash produces many pollutants, including:**

- **Dioxins**
  - Dioxins are released when items containing even trace amounts of chlorine are burned. One burn barrel can produce as much or more than a full-scale municipal waste combustor burning 200 tons a day (EPA).
  - Dioxins are persistent, bioaccumulative toxins (PBTs). They remain in the environment for extended periods of time and increase in concentration as they move up the food chain.
  - Dioxins enter the food chain by settling out of the air into water and onto vegetation. Since most backyard burning occurs in rural areas, dioxins are consumed by cattle and other animals that are eaten as food.
  - Dioxins can cause immune system suppression, disruption of hormonal systems, and cancer.

- **Particle pollution**, also known as particulate matter
  - Particle pollution is released during trash or leaf burning as small bits of ash.
  - Particle pollution can lodge deep in the lungs and cause respiratory problems, cardiac arrhythmia (heartbeat irregularities), and heart attacks.
  - Particle pollution can also impact the young, the elderly, and people with existing conditions such as emphysema, bronchitis, and asthma.
  - Particle pollution can also contain other harmful pollutants such as heavy metals see below for more info.

- **Polycyclic Aromatic Hydrocarbons (PAHs)**
  - PAHs are found in materials that do not combust completely.
  - Some PAHs can cause cancer.

- **VOCs**
  - VOC is released during backyard burning of both leaves and trash.
  - The chemicals in VOC can form ground-level ozone which can cause breathing difficulties, especially with those who are young, elderly, or have existing respiratory problems such as asthma.
• **Formaldehyde**
  o Formaldehyde is released when pressed wood products, paints, coatings, siding, urea-formaldehyde foam, and fiberglass insulation are burned.
  o Exposure to formaldehyde can result in watery eyes, a burning sensation in the eyes and throat, nausea, difficulty in breathing (i.e., coughing, chest tightness, wheezing), and skin rashes.
  o Prolonged exposure to formaldehyde may cause cancer.

• **Hexachlorobenzene (HCB)**
  o HCB is produced during the burning of trash and is a highly persistent toxin that degrades slowly in the air. Therefore, it can travel long distances in the atmosphere.
  o HCB bioaccumulates in fish, marine animals, birds, lichens, and animals that feed on fish and lichens.
  o Based on animal studies, long-term, low-level exposures to HCB can damage a developing fetus, lead to kidney and liver damage, and cause fatigue and skin irritation.
  o HCB is a probable human carcinogen.

• **Hydrochloric acid**
  o Hydrochloric acid is produced when products containing polyvinyl chloride (PVC) are burned.
  o Hydrochloric acid can cause dermatitis, skin burns, rhinitis, laryngitis, tracheitis, hoarseness, choking, bronchitis, pulmonary edema, cough, nausea, vomiting, abdominal pain, diarrhea, dehydration, convulsions, chills, shock, lethargy, stupor, permanent visual damage, and circulatory collapse which may lead to death.

• **Carbon monoxide**
  o Carbon monoxide is produced when leaves are burned and not completely combusted.
  o Carbon monoxide can react with sunlight to create ground-level ozone.
  o Carbon monoxide is absorbed into the bloodstream. It combines with red blood cells and reduces the amount of oxygen the red blood cells can absorb and supply to body tissues.
  o Unborn children, newborn infants, smokers, the elderly, and persons with heart and chronic lung disease are more susceptible to carbon monoxide exposure than the general population.

• **Benzo(a)pyrene**
  o Benzo(a)pyrene is emitted when leaves are burned.
  o Benzo(a)pyrene can cause cancer.

• **Heavy Metals**
  o The ash left over from trash burning may also cause health hazards if buried or scattered in a yard or garden.
  o Heavy metals are often found in the inks of printed materials and plastics.
  o People can be exposed to heavy metals from ash because plants may take up these
metals as they grow in a garden, or these heavy metals may contaminate ground or surface water.

- Children are especially susceptible to heavy metals because they play in the dirt and put their unwashed hands in their mouths.
- The ash may contain heavy metals such as:
  - **Lead**
    - Lead can affect almost every organ and system in your body. Children six years old and younger are most susceptible to the effects of lead. Permanent damage to the brain and nervous system, leading to behavior and learning problems, lower IQ, and hearing problems, Slowed growth and Anemia.
  - **Cadmium**
    - Cadmium can cause lung damage and kidney disease.
  - **Arsenic**
    - Chronic oral exposure to arsenic can cause gastrointestinal problems, anemia, kidney and liver disease, and different types of cancers.
  - **Mercury**
    - Exposure to mercury can result in nervous system and kidney damage as well as developmental damage.
  - **Chromium**
    - Chromium can impact the respiratory system and may cause some types of cancer.