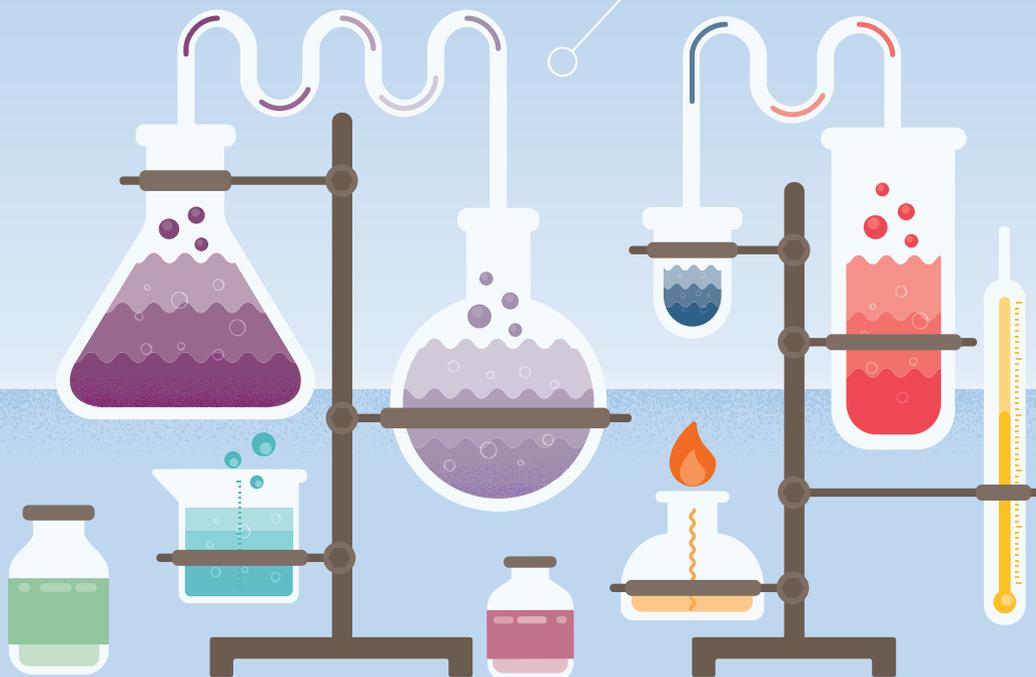


FLAME RETARDANTS

WHAT YOU
NEED TO KNOW



science and policy
for a healthy future

What are flame retardants?

Flame retardants are man-made chemical substances that are added to combustible products to prevent them catching fire and to slow down the spread of fire. The term “flame retardant” refers to the function for which the chemicals are used and not to a family of chemicals with similar structures.

There are hundreds of flame retardants with different molecular structures and properties, often grouped according to their chemical structures.

Some flame retardants are persistent, meaning that they do not easily break down. As a result they remain in the environment for many years. This means that people can still be exposed today to chemicals banned in the past. These persistent flame retardants can then build up in the bodies of humans and animals over time.

Certain flame retardants known to affect human health and the environment have now been banned. There are concerns that some of the newer flame retardants used to replace banned chemicals also cause negative health effects.

How are flame retardants used?

Flame retardants are used in a variety of products to meet fire safety standards. They are primarily used in plastics, textiles and rubber products in the following four major areas:

Electronics and electrical devices: Flame retardants are added to electrical cables, plugs, fuse boxes, circuit boards, computers, laptops, phones, televisions and other household appliances.

Building and construction materials: Flame retardants are used in facade facings and insulation material such as polystyrene and polyurethane insulation foams.

Furnishings: Flame retardants are added to foam, upholstery, mattresses, carpets, curtains, and fabric blinds.

Surface coating: Flame retardants are used in cars, airplanes, trains and ships on seats, seat covers and fillings, floorings, linings, insulation, bumpers and overhead compartments.

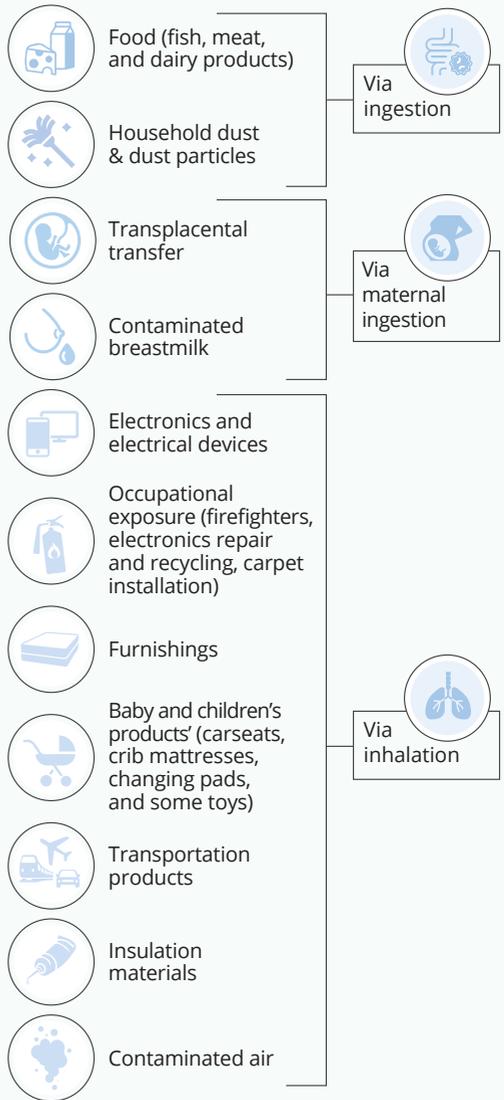
How can flame retardants enter your body?

Flame retardants are released into the environment during product manufacturing, use, disposal, recycling, and in the event of a fire, when materials and products burn. They can then contaminate the air, water and soil, as well as food grown in contaminated soils. People may be exposed to flame retardants in the following ways:

- Consuming contaminated food, in particular oily fish, meat, milk and dairy products. Some flame retardants are highly persistent and build up in living organisms, thereby contaminating the food chain.
- Accidentally swallowing dust contaminated with flame retardants that have leached from products and furnishing in the household. Young children are more likely to swallow dust when crawling and playing on the floor.
- Breastfed infants are exposed to flame retardants that have accumulated in the bodies of their mothers over time and that are then released in the mother's breastmilk.

- Breathing in flame retardants released from consumer products directly into the air. Flame retardants spread through our indoor spaces as fine particles suspended in air.

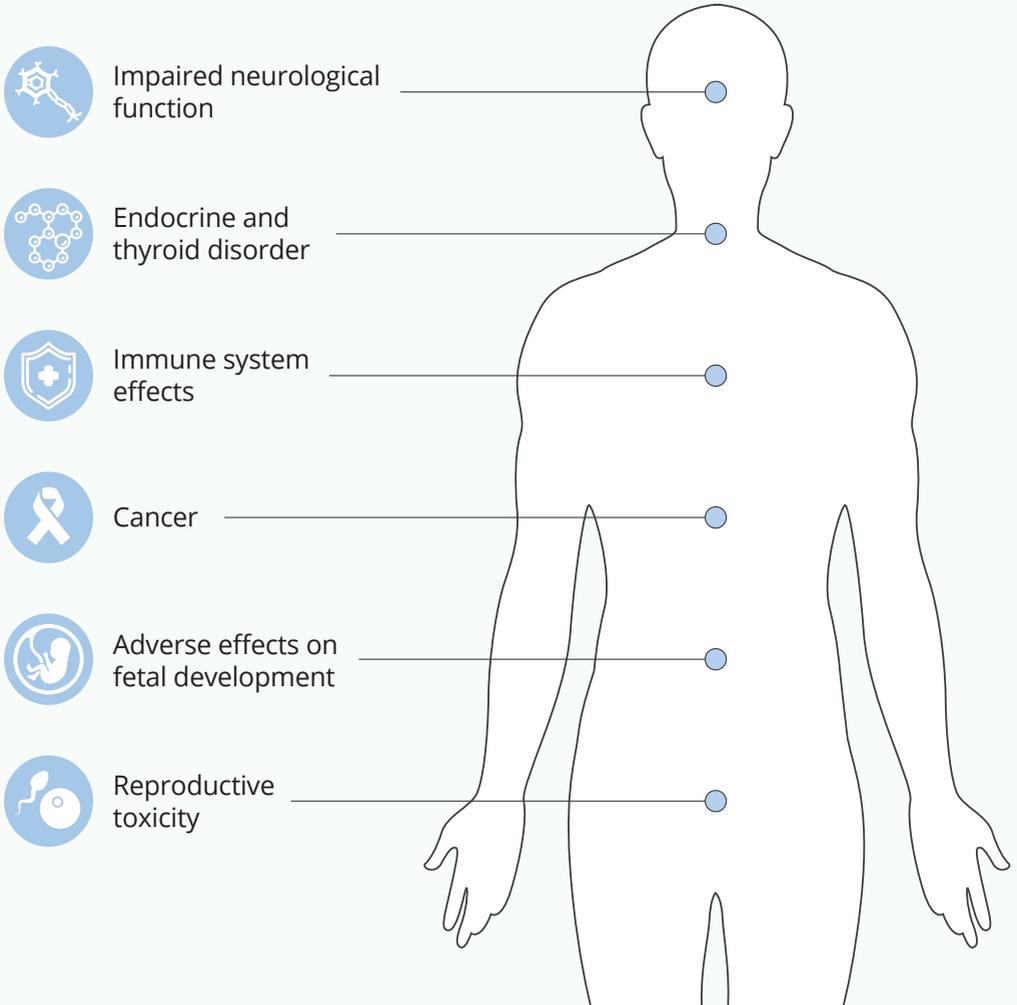
Some workers, such as firefighters, have a higher risk of getting exposed than the general population because they wear flame retarded clothing and may inhale flame retardants released during fires. In addition, workers in the electronics production, repair and recycling sectors, and some construction sectors are likely to face higher levels of flame retardants in their daily lives.



How might flame retardants affect health?

Growing evidence suggests that some flame retardants can affect the nervous system both pre-birth and during childhood. Polybrominated diphenyl ethers (PBDEs) have been linked to neurotoxicity through disruption of the hormone system, while polybrominated biphenyls have been linked to cancer, immunosuppression and endocrine and reproductive disorders. Both substances are now banned in the European Union.

Many different flame retardants have been used over time, implying that in their daily lives people are exposed to multiple flame retardants at once, along with a variety of other chemical substances. The effects of mixtures of flame retardants on health are not well understood.



UNDERSTANDING CHEMICAL RISK

The risk of harm from any chemical results from the hazard associated with the chemical, combined with exposure to the chemical. Hazard refers to the properties of the chemical that make it toxic, meaning it can cause harm to human health. Exposure describes the amount of a chemical that an individual comes into contact with, as well as the frequency of exposure. The term threshold is used to indicate the concentration, or level, of a chemical to which people can according to current knowledge be exposed without suffering negative health effects. Exposure up to this level is considered safe. Some chemicals can cause health effects at any concentration and are considered as having no threshold. For such chemicals, no level of exposure is safe.

How can you reduce your exposure to flame retardants?

If you are concerned, you can take the following steps to reduce your exposure:



✓ **Keep** household dust levels down, by wet mopping and vacuuming with a high efficiency particulate air (HEPA) filter



✓ **Wash** your hands often



✓ Try to **purchase** baby products and wooden furniture filled with cotton, polyester, or wool, instead of polyurethane foam



✓ **Ventilate** your house properly to reduce dust



✓ **Use** a minimum of carpeting and draperies



✓ **Look** for furniture labelled "Flame Retardant Free" or "Free of Halogenated Flame Retardants"

Human exposure to flame retardants in Europe

Some flame retardants can be measured in blood or breast milk, and others in urine. In general, higher levels are found in children than adults, as children inhale contaminated dust and consume contaminated breastmilk.

Human biomonitoring analyses can confirm whether you have been exposed to flame retardants, but cannot be used to predict potential health effects. However, such analyses are not routinely available at a doctor's office because they require special equipment and expertise. Detecting flame retardants in an individual does not necessarily mean that their health has been harmed. This depends on whether the particular substance is hazardous, their levels in the body, the time period of exposure and the age and health of the individual.

Not all flame retardants are dangerous to health. Some flame retardants are already banned due to health risks, while others are the focus of ongoing studies to understand possible risks.

Human exposure to chemicals is measured through human biomonitoring. This involves taking samples of blood, urine or hair and measuring the concentration of a chemical in the sample. The measurement reflects the total amount of a chemical in the body at a certain moment, representing past input from all possible sources. Samples are preferably taken from a large number of people, in order to get a picture of the variability of exposure in the general population and in certain social groups that may have been exposed to high levels of a chemical. Besides measuring exposure, health effects and individual susceptibility can also be investigated using human biomonitoring.



What is HBM4EU doing on flame retardants?

HBM4EU, the Human Biomonitoring Initiative in Europe, is working to answer the following questions on flame retardants to understand possible risks to human health.

- ✓ Have bans of specific flame retardants reduced the exposure of European citizens?
- ✓ What is the exposure of the EU population to flame retardants that are used today?
- ✓ What are the main sources of exposure to flame retardants?
- ✓ How does the use of flame retardants, lifestyle choices and location across Europe affect people's exposure to flame retardants?
- ✓ How does exposure differ between men and women and between children and adults?
- ✓ Are current regulations in the European Union effective?

How is the European Union protecting citizens?

To protect public health, the European Union has taken measures to prevent citizen exposure to some hazardous flame retardants and to reduce exposure to others.

- ✓ A small number of flame retardants are banned under the **Stockholm Convention** on persistent organic pollutants (POPs), both within the EU and at the international level. For some, we see a sharp decline in concentrations in the environment.
- ✓ The **European Food Safety Authority assesses the risks posed by brominated flame retardants in food**. EFSA provides scientific advice and risk assessments on brominated flame retardants for EU risk managers to help them assess the need for regulatory measures as regards the safety of BFR-contaminated food.
- ✓ Flame retardants are regulated under chemical and food legislation, such as REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) and CLP (Classification, Labelling and Packaging), to ensure a high level of protection of health.

Most recently, the **Chemicals Strategy for Sustainability** sets out a range of actions to protect citizens and the environment from chemicals, including banning the most harmful chemicals in consumer products - allowing their use only where essential - and accounting for the cocktail effect of chemicals when assessing risks from chemicals.

Finally, the European Commission supports research projects, like HBM4EU, that investigate people's exposure to PFAS and possible effects on health.

 For further information on flame retardants, please see the [infographic on the HBM4EU webpage](#).

www.hbm4eu.eu



HBM4EU coordinator:
German Environment Agency hbm4eu@uba.de

Knowledge Hub coordinator:
European Environment Agency hbm4eu@eea.europa.eu



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 733032.