

Amherst Board of Health Toxic Chemicals – Overview and Resources

This summary was prepared by the Amherst Board of Health and the Public Health Department about the potential impact of toxic chemicals on human and environmental health. It includes additional resources and links to websites with information for the general public about alternatives to toxic chemicals.

Background

Few of the 70,000 chemicals in commercial use today have been thoroughly examined for their potential risks to human health.¹ Further, scientific evidence points to the fact that many of the chemicals currently used in pesticides, cleaning agents, and other types of industrial solvents, as well as those released in the process of chlorine bleaching, contain potentially harmful substances and toxins that can impair health. In addition, research²⁻⁴ indicates that regular exposure to these chemicals over a long period may be responsible for the increased incidence of certain diseases. This list includes cancer, birth defects, nervous system disorders, developmental and reproductive disorders, and the weakening of the immune system. Human susceptibility to toxic chemicals and the rate of disease and death in the U.S. associated with exposure to toxic chemicals varies with social class,⁵ ethnicity/race,⁵ and age,⁶ further contributing to health inequities in our society.

Existing Legislation

The 1984 Hazardous and Solid Waste Amendments to the Resource Conservation and Recovery Act of 1976 (RCRA) focus on waste minimization, phasing out land disposal of hazardous waste, and corrective action for releases. The Toxic Substances Act (1976) and the Lautenberg Chemical Safety Act (2016) regulate the nation's primary chemicals. Some chemicals are most toxic at the lowest levels of exposure⁷. Yet regulations still assume that toxic effects emerge at a threshold level and increase with the dose. Since existing environmental regulations based on risk assessment are inadequate to protect human and environmental health, a proactive approach is needed to address the use of these chemicals. When an activity is plausibly linked to the causation of harm to human health or the environment, precautionary measures should be taken even if some cause-and-effect relationships are not established scientifically at this time.

Toxic Chemicals Definition, Types and Effects

Toxic and hazardous material refers to any substance or material, in whatever form, which because of its quantity/concentration and/or chemical, corrosive, explosive, reactive, toxic, infectious, and radioactive characteristics - either separately or in combination with any substance or substances - constitutes a potential threat to the health, safety and welfare of human beings or to the environment when improperly stored, handled, treated, transported, disposed of, used, or otherwise managed. This definition includes any substance designated by its manufacturer, distributor, or importer as possessing any health or physical hazard(s) pursuant to [29 CFR 1910.1200](#), as well as any substance which is determined to be hazardous waste according to [310 CMR 30.100](#). Massachusetts regulation [310 CMR 30.120](#) describes the characteristics of hazardous wastes (i.e., ignitability, corrosivity, reactivity, toxicity), and [30.130](#) includes lists of named hazardous wastes.

Endocrine-disrupting chemicals interfere with the way the body's hormones work. They have been linked to adverse human health outcomes including changes in fertility and reproductive function, nervous system abnormalities and metabolic issues.

Pesticides are substances or mixtures of substances that prevent, destroy, repel or mitigate pests or defoliate, desiccate, or regulate plants. These include herbicides, insecticides, fungicides, and rodenticides.

Neonic pesticides (neonicotinoids) are insecticides derived from nicotine that are highly water-soluble and persistent in the environment. Neonics impact ecosystems and affect human neurodevelopment and reproductive health.⁸

PFAS (Per- and poly-fluoroalkyl substances) – known as “forever chemicals” – are a family of chemicals that do not break down easily and can contaminate soil, water, air, and food. PFAS can build up in the blood level of people and animals who are repeatedly exposed to them. Exposure to sufficiently elevated levels of certain PFAS may cause various health effects, including developmental effects in fetuses and infants, affecting the thyroid, liver, kidneys, certain hormones, and the immune system. Some studies suggest that cancer risk may also exist in people exposed to higher levels of some PFAS.⁹

In addition to these named chemicals, some products and activities release **dioxins** – persistent organic pollutants (POPs) – that take a long time to break down once they are in the environment. Dioxins have been linked to cancer, reproductive disorders, and developmental problems in children.¹⁰

Solutions

Without a ban on chemicals that cause harm, one option includes limiting their use, especially around the most vulnerable populations.¹¹ The Town of Amherst has made a commitment to avoiding the use of toxic chemicals or other potentially dangerous substance whenever possible. The Board of Health supports the Town's practice of using cleaning solvents, paints, degreasers, and pesticides with minimal toxins in and around town buildings and on town property.

In addition, alternative, less toxic products are affordable and effective. The links below contain information about safer alternatives to products that contain toxic chemicals.

- Environmental Protection Agency (EPA) - [Safer Choice](#)
- Mass OSD - [Environmentally Preferable Products and Services Guide](#)
- Mass OSD - [Sustainable Purchasing Policies](#)
- Ecology Center, Ann Arbor MI - [Purchasing for Safer Cities](#)
- Occupational Health and Safety Administration (OSHA) - [Transitioning to Safer Chemicals](#)
- World Health Organization (WHO) - [Chemical Safety](#)
- Agency for Toxic Substances and Disease Registry (ATDSR) - [Toxic Substances Portal](#)
- Toxic Use Reduction Institute at UMass Lowell - [TURI](#)
- Targeting Environmental Neuro-Development Risks - [Project TENDR](#)

References:

1. **Schettler, T., Solomon, G., Burns, P., and Valenti, M.**, 2001. *Generations at Risk: How Environmental Toxins May Effect Reproductive Health in Massachusetts*, Greater Boston Physicians for Social Responsibility and Massachusetts Public Interest Research Group (MASSPIRG) Education Fund, February 2.
2. **Adeola, F.O.** 2021. *Global Impact of Chemicals and Toxic Substances on Human Health and the Environment*. In: Haring, R., Kickbusch, I., Ganten, D., Moeti, M. (eds) *Handbook of Global Health*. Springer, Cham. https://doi.org/10.1007/978-3-030-05325-3_96-1
3. **Grandjean, P. and Landrigan, P.J.**, 2014. Neurobehavioural effects of developmental toxicity. *The lancet neurology*, 13(3), pp.330-338.
4. **Carpenter, D.O.**, 1998. Human health effects of environmental pollutants: new insights. *Trends in Levels and Effects of Persistent Toxic Substances in the Great Lakes*, pp.245-258.
5. **Sexton, K.**, 1997. Sociodemographic aspects of human susceptibility to toxic chemicals: Do class and race matter for realistic risk assessment? *Environmental Toxicology and Pharmacology*, 4(3-4), pp.261-269.
6. **Bouldin, R.M., Meldrum, H., Blanch-Hartigan, D., McCormick, J., and Coloma, V.**, 2020. Attitudes and Actions towards Toxic Chemicals: An Environmental Health and Risk Perception Survey of Massachusetts Childcare Providers. *Children, Youth and Environments*, 30(2), pp.147-164.
7. **Lanphear, B.P.**, 2017. Low-level toxicity of chemicals: No acceptable levels? *PLoS biology*, 15(12), p.e2003066.
8. **Ospina, M., Wong, L.Y., Baker, S.E., Serafim, A.B., Morales-Agudelo, P. and Calafat, A.M.**, 2019. Exposure to neonicotinoid insecticides in the U.S. general population: Data from the 2015–2016 national health and nutrition examination survey. *Environmental Research*, 176, p.108555.
9. **Sunderland, E.M., Hu, X.C., Dassuncao, C., Tokranov, A.K., Wagner, C.C. and Allen, J.G.**, 2019. A review of human exposure to poly- and perfluoroalkyl substances (PFASs) and present understanding of health effects. *Journal of exposure science & environmental epidemiology*, 29(2), pp.131-147.
10. **World Health Organization**, 2001. *Dioxins & their Effects on Human Health, Fact Sheet No. 225*. Jan. 30, 2001. http://www.who.int/inf_fs/en/fact225.html
11. **Gross, L., Birnbaum, L.S.** (2017) Regulating toxic chemicals for public and environmental health. *PLoS Biol* 15(12): e2004814 <https://doi.org/10.1371/journal.pbio.2004814>