pennsylvania
DEPARTMENT OF HEALTH

NANO- AND MICROPLASTICS

Nano- and microplastics (NMPs) are pieces of plastics containing polymer mixtures, plastics additives, and impurities included during production or manufacturing processes. NMPs are characterized by size (typically between 1 and 1,000 micrometers for microplastics and less than 1 micrometer in size for nanoplastics), shape, and chemical and polymer composition. NMPs enter the environment through improper disposal of plastics that degrade over time, unintentional means such as normal wear and tear of polymer-containing products when they are used or laundered (e.g., washing synthetic-based clothing), or intentionally added NMPs in consumer products. NMPs are pervasive in the environment and have been widely detected in freshwater, marine and drinking water, soil, air, fish, and shellfish, as well as human blood and tissue.

HOW DO NANO- AND MICROPLASTICS GET INTO MY BODY?

NMPs are ubiquitous in the environment. You ingest NMPs by drinking water or eating foods that are contaminated with NMPs. NMPs have been detected in indoor and outdoor air and can be inhaled.

ATSDR 2020[1]

WHAT CAN NANO- AND MICROPLASTICS DO TO ME?

There is not enough known about potential health effects from NMPs exposure in humans and studies analyzing possible health effects are limited. Since NMPs is a term for particles that can have many different shapes, chemical or polymer compositions and sizes, well-designed toxicological studies evaluating all the potential effects of different types of NMPs are ongoing.[2] From the very limited database of toxicity studies, research has shown that NMPs may affect male reproduction, liver inflammation, and immune effects; however, the concentration or duration of exposure required to elicit those effects are not fully understood. Occupational health research from workers in plastics industries have shown NMPs exposure may cause respiratory symptoms and impaired pulmonary function.[2] More research is necessary to fill data gaps regarding human health effects, especially vulnerable life stages such as pregnancy, early life, and childhood.[3]

WHAT ARE THE ENVIRONMENTAL REGULATIONS FOR MICROPLASTICS?

There are currently no regulations for NMPs in drinking water or food. You can be exposed to NMPs in the workplace during manufacture and processing of plastics, cutting and sanding polymer fibers or plastics and plastic composite materials, extrusion 3-D printing, and degradation of synthetic fibers and carpeting material in office settings.[4] While there are regulations for some chemicals that are used to synthesize or manufacture plastics, there are currently no occupational exposure limits for NMPs.

WHAT CAN I DO?

- Avoid microwaving food in plastic containers.
- Use a filtration method, such as activated carbon filters in pitchers or refrigerators, for drinking water and water used in cooking. Filtered tap water significantly reduces microplastic exposure when compared to unfiltered or bottled water.
- Buy clothes that use natural fibers instead of synthetics.
- Use natural flooring products.
- Vacuum your home regularly.
- Microplastics have been detected in many types of food but most often seafood and shellfish. Reducing consumption of seafood, especially shellfish, will decrease exposure to microplastics.

If you have any questions, contact us:
Phone: 717.787.3350
Fax: 717.772.6975
Email:
env.health.concern@pa.gov

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1. ATSDR Annual Report 2020. https://www.atsdr.cdc.gov/2020atsdrannualreport/index.html
2. Zarus, et al. 2021. A review of data for quantifying human exposures to micro and nanoplastics and potential health risks. Sci Total Environ. 756:144010. doi: 10.1016/j.scitotenv.2020.144010.
3. Sripada, et al. 2022. A children's health perspective on nano- and microplastics. Environ Health Perspect. 130(1):15001. doi: 10.1289/EHP9086.
4. Murashov, et al. 2021. Nano- and microplastics in the workplace. J Occup Environ Hyg. 18 (10-11):489-494, DOI: 10.1080/15459624.2021.1976413.