The Plasticene: Age of Plastics

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A clear-eyed look into the history and future of plastic products we use in our daily lives can be unsettling. Where did they come from? What were their impacts along the way? Where are they going and what are the consequences?

I looked recently at lifecycle hazards associated with polyvinyl chloride (PVC) plastic and its additives, from production to disposal and recycling, in "Polyvinyl chloride in health care: A rationale for choosing alternatives". I undertook this project on behalf of Health Care Without Harm, one of SEHN's coalition partners for over 20 years, and its companion organization, Practice Greenhealth. Since 1996, we have aimed to transform health care worldwide to reduce its environmental footprint and promote it as a leader in the global movement for environmental health and justice. Health care institutions are major consumers of products and materials and by critically examining purchasing policies through a lens of public environmental health and safety as well as product function they are in a strong position to influence larger markets.

Polyvinyl chloride is a versatile, high-volume, synthetic plastic with many different formulations. The material is commonly used in building materials, including flooring, pipes, carpet backing, and wall coverings. Office furniture, supplies, and packaging can be made of PVC. Health care-specific uses include PVC-based IV bags, blood bags, urine bags, tubing, oxygen masks, catheters, and disposable gloves.

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Polyvinyl chloride is one of about ten different kinds of high-volume plastic polymers responsible for unprecedented health and safety risks globally as production increases along with rapid development of petroleum and natural gas feedstocks. Global plastic production is now more than 400 million metric tons annually. Since 1950 in the aggregate we have produced about 8.3 billion metric tons, and at least 90 percent is still in existence. Adding to the scope of the problem, recycling markets have been upended in recent years since China no longer accepts waste plastic from foreign countries and only a small fraction of all plastic is being recycled.

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In January the National Academy of Sciences sponsored a workshop to explore emerging technologies to advance research and decisions on the environmental health impacts of microplastics floating throughout the world's freshwater and marine environments, in sediments, soil, food, humans and wildlife. Presentations are available online and a workshop summary will soon be released.

In addition to the well-known often deadly impacts of ingestion of plastic fragments in marine organisms, scientists are just beginning to study the human and wildlife health impacts of microscopic plastic particles that can cross tissue barriers while harboring unique mixtures of microorganisms and chemicals.

The politics of plastics are contentious. Aggressive development of abundant feedstocks for plastic polymers from conventional and unconventional oil and gas production (fracking) has sparked the construction of massive new plastics manufacturing facilities in Appalachia and the Gulf Coast. These activities are adding substantially to greenhouse gas emissions driving climate change while increasing air pollution in regions with poor air quality that is already harmful. One bright spot: former SEHN board member Sandra Steingraber, along with colleagues in New York, assembled a compendium of studies documenting risks and harms from fracking. Their efforts, including relentless organizing, were key contributors to the decision to ban fracking for natural gas in New York.

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We are a long way from a circular economy of plastics where we eliminate the plastics we don't need, re-design polymers so that the plastics we do need are reusable, recyclable, or compostable and circulate the plastics we use to keep them out of the environment. But as long as it's cheaper to make virgin material with abundant feedstock because the public and environmental health costs of extraction and manufacturing are passed onto the general public there will be few incentives driving the needed transformation. In her review of the history of plastic production, SEHN board member Rebecca Altman asked what it means that "the genius and hubris of plastic has been absorbed by every living thing." We are finding out.