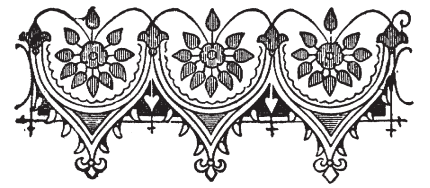


Health & Wellness



Plastic Polluted Planet = Plastic Polluted People



Dr. Kate Thomsen and Silky

It was 15 – 20 years ago when I first heard of the massive Great Pacific Garbage Patch, a “land-fill” in the middle of the ocean that few people knew was there. A dump the size of Texas, it was composed of sneakers, volleyballs, plastic lighters, toothbrushes, water bottles, pens, baby bottles, cell phones, plastic bags, plastic 6-pack rings, plastic straws, and pre-production plastic resin “nerdles” - all floating around on top of the ocean water. Little did I know that the ubiquitous plastic that is part of every facet of our lives would end up being one of the most sinister of all pollutants: throw away commodities recycled by the Earth into toxic particles that contaminate all life forms – even humans.

It turns out that what I thought was a floating landfill was actually a massive area of “chunky soup”. Recognizable plastic debris were floating in a huge vortex of circling currents thick with small and tiny pieces of plastic. The plastic objects had broken down over time by the sun, certain microbes, ocean waves, and storms into microplastics (less than 5mm which is the size of a grain of rice) and nanoplastics (less than 0.001mm in size). Surely, with a little more time, the ocean will biodegrade all of these I thought. Right?

Actually no. The word plastic originally meant “pliable and easily shaped”. The word was repurposed to describe a category of materials made of long chains of molecules called polymers. The first synthetic polymer, cellulose, was invented in 1869. In 1907, Bakelite, the first completely “new to nature” synthetic plastic, was invented and called the “material of a thousand uses”. World War II brought the creation of nylon and plexiglass and since then various types of plastics have been replacing natural materials in every aspect of our lives. But

while Mother Nature is great at recycling natural materials, plastic lasts forever in the environment – a detail that is catching up with us. Plastic debris was first observed in the oceans in the 1960s and concern about disposable items and waste in the 70s and 80s lead to plastic recycling programs. But since the beginning of large-scale plastic production in 1950, only 9% of the world's plastic has been recycled. Of the seven types of plastics currently being produced, only #1 and #2 are routinely recycled. Much of our plastic packaging (especially cosmetics and personal care products) use plastics other than #1 and #2 and this single use packaging makes up 40% of total plastic usage in the world today.

The Great Pacific Garbage Patch is not the only eyesore in our oceans. There is an eastern patch, a western patch, and a North Atlantic Garbage Patch... and they keep getting larger. Microplastics found in these ocean patches are the particles and fibers coming from: synthetic textiles (35%), car tires (28%), city dust (24%), road markings (7%), marine coatings (4%), personal care products (2%) and plastic pellets (0.3%). Some of the microplastics sink into the sediment. A full 70% of ocean microplastic is found at the bottom of the ocean. Microplastics have also been found in snow and stream water samples on Mt. Everest. Most were polyester fibers from the clothing and equipment of climbers. With at least 300 million tons of plastic waste being produced worldwide every year, the 2017 United Nations Ocean Conference estimated that the oceans might contain more weight in plastics than fish by the year 2050.

Land-based plastic litter (including industrial debris, water bottles, plastic bags and microplastics) enter the ocean through storm-water runoff or direct discharge of contaminated water from the coastline. Ocean vessels with commercial containers, as well as military and research vessels have dumped commercial products, equipment and sewerage into the ocean. Discarded fishing gear (traps and nets) make up a large part of the debris.

The breakdown process of plastic takes hundreds to thousands of years and, in the meantime, microplastics have become (deliberately or inadvertently)

food for aquatic organisms, marine birds and fish. Plastic debris can injure marine life through digestive blockages and physical abrasions as well as through chemical poisoning. Toxic chemicals leach out of the degrading plastic (Bisphenol A, phthalates and flame retardants). Other environmental pollutants can adsorb onto plastics (PCBs, DDT, heavy metals, PFAS). Marine life that ingests these toxin-laden plastics have experienced neurotoxicity, altered immune responses, reduced growth rates and death.


These toxic chemicals will travel up the food chain to humans who eat ocean-derived foods. Research in this area is just beginning. One of the first studies, a 2022 study published in *Chemosphere*, showed toxin laden microplastics can be 10 times more toxic to human intestinal cells than either the chemical toxin or the microplastic alone. Bisphenol A (BPA), phthalates and the flame retardant PBDE have been measured in the body fluids of humans and suspected to be present in over 90% of the U.S. population. These endocrine-disrupting chemicals have been associated with cancer, infertility, polycyclic ovarian syndrome, other reproductive and developmental effects, as well as diabetes, heart disease, hypertension, obesity, autism, mood disorders, allergies, and asthma.

The ocean is not the only toxic soup from which we drink. Researchers have found microplastic contamination of agricultural land. Hundreds of tons of microplastics are dumped on farms every year (more than what gets dumped in the ocean) through processed sewage sludge used for fertilizer, plastic mulches and from slow-release fertilizers and protective seed coatings. Research has shown that microplastics have the potential to alter soil bulk density, microbial communities, water holding capacity and other properties that influence plant development. Chinese researchers found that plants are capable of taking up microplastics into their tissues. An Italian study found microplastics in carrots, lettuce, broccoli, potatoes, apples, and pears. Studies of mammals eating microplastics have shown that these microplastics can pass through cell walls, move through the body, accumulate in organs

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What You Can Do to Lower Microplastic Pollution

- Buy items with little or no plastic packaging or use refillable containers
- Choose bar soaps and shampoo bars rather than liquids in plastic bottles
- Learn how to make simple personal care products at home (body scrubs, moisturizers)
- Other biodegradable packaging is coming – look for cardboard, cork, and packaging made from seaweed or mushrooms
- Look for the more recyclable plastics #1 and #2 if you have to buy plastic
- Call or email the companies you buy from and tell them you prefer sustainable packaging – no plastic
- Buy table salt that is free of microplastic contamination
- Support “Extended Producer Responsibility” or EPR legislation in your state (Already passed in Maine and Oregon) where the producer of a product is responsible for the recycling costs of their packaging
- Support the United Nations Environment Assembly (UNEA 5.2) mandate to negotiate a legally binding treaty addressing the full life cycle of plastics, from production to disposal.
- Buy a Guppyfriend laundry bag to launder the synthetic clothes you already have – they will release less microplastics; Check out Ten for the Ocean washing guide
- Do not buy clothes made with synthetics; Fleece clothing made of “recycled plastic bottles” is not a good idea as it rapidly degrades to microplastic fibers
- Search Yelp for “Eco-Friendly Businesses” (<https://www.youtube.com/watch?v=Uav14WvoUzs>): EV Charging Stations, Plastic-Free Packaging, Reusable Tableware, Bring Your Own Container Allowed, Compostable Containers Available
- Be responsible for all your trash; Reduce your waste; Use re-usable items; Recycle as much as possible; Participate in local clean-ups
- Campaign to eliminate: plastic microbeads in personal care products, slow release fertilizers and seed coatings. Support alternatives to plastic mulch such as the one developed at Rodale Institute in PA
- Use GreenScreen Certified (for Safer Chemicals) Certified Standard for: food service ware, firefighting foams, textiles, furniture, fabrics, cleaners, and degreasers.
- Support Global Ghost Gear Initiative (recycles discarded fishing nets)
- Sign the petition #breakfreefromplastic



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and impact the immune system. Microplastics can be aerosolized from water sources or from your clothes dryer and transported by the wind, polluting our air. They can return to the Earth through rain and snow and contaminate our waterways and drinking water. Ingested by sea creatures and taken up by plants, they become part of our food. Microplastics have been found in bottled water, ground water, and tap water; in indoor and outdoor air; in shellfish, clams, oysters, salt, chicken, honey and beer. It has been estimated that we eat, breathe or absorb a credit card size worth of microplastics each week!!

Plastic microfibers have been found in malignant lung tissue biopsies of cancer patients. They have been found in the placentas of unborn babies. A recent study showed lung biopsies of normal lung tissue were contaminated with microplastics in 11 out of

13 patients undergoing surgery. Microplastics have been found in the blood of 80% of people tested. It is suspected that inhalation is the main route of exposure. From there, microplastics find their way to the bloodstream, lodging in different tissues, and causing inflammatory reactions.

I guess what goes around – comes around. Plastics that we overproduce, over-buy and dispose of mindlessly – we end up eating in plants, marine, and animal-based diets – becoming partially plastic ourselves...

Dr. Kate Thomsen's office for holistic health care is located in Pennington, NJ. She is trained in Family Medicine, and Board Certified in Integrative Medicine. She is an Institute for Functional Medicine Certified Practitioner. She has been practicing Functional Medicine for 23 years. For more information see www.drkatethomsen.com or call the office at 609-818-9700.