

What doctors want patients to know about microplastics

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In the unseen corners of our daily lives, tiny particles are quietly accumulating and finding their way into the food we eat, the water we drink, and even the air we breathe. These minuscule invaders, known as microplastics, have become an inescapable part of our environment. And understanding the implications of these microscopic fragments is becoming increasingly important.

The AMA's What Doctors Want Patients to Know™ series gives physicians a platform to share what they want patients to understand about today's health care headlines.

In this installment, Philip Kuriakose, MD, a hematologist and medical oncologist at the Henry Ford Cancer Institute in Detroit, discusses what patients need to know about [microplastics](#) and the implication on your health.

Henry Ford Health is a member of the [AMA Health System Program](#), which provides enterprise solutions to equip leadership, physicians and care teams with resources to help drive the future of medicine.

Microplastics come from many sources

Microplastics are tiny pieces of plastic, smaller than 5 millimeters, that are created as part of commercial and industrial products as well as from larger pieces of plastic degrading over time. Microplastics can be dangerous due to their small size, as they are able to permeate and become embedded in our tissues.

These microplastics “come from direct sources, such as what we use in our day-to-day lives,” Dr. Kuriakose said. For example, this can be “shaving creams, cosmetics, water bottles, food items and inhalation products,” such as inhalers for asthma.

Microplastics can also be absorbed due to “a secondary wave of exposure, such as from plastics that are ubiquitous in the products we use every day, in the places we live and the things we breathe,” he said. “The environment gets polluted when these get degraded over time because of temperature or rain, and all of us risk being exposed to them at different paths.”

They are ingested or inhaled

“Oftentimes, the way we end up being exposed to these microplastic or nanoplastic materials (defined as plaster particles less than 1 micrometer) is by ingestion or inhalation, at times across the skin barrier,” Dr. Kuriakose said. Due to their small size, we cannot see them and therefore “we breathe in these products or we swallow them, ingest them, as part of food or drinks that we consume.”

“When we breathe, they go into our lungs and either get embedded within the lung tissue or get absorbed into the circulation and then are taken through the liver to different parts of the body system,” he explained. “Likewise, when we drink or eat these in our food and water, they end up interfacing with the cells that line our stomach and intestines and either cause regional damage by embedding locally or, at times, get absorbed into the circulation from there.”

There are many health risks

Whether you are exposed to microplastics through ingestion or inhalation, there are health risks to keep in mind. For example, [microplastics in arteries have been tied to higher risk of cardiovascular problems](#).

The list of potential risks can “be quite broad including something as simple and obvious as allergies developing, perhaps by modulation of our immune system,” Dr. Kuriakose said. “When children are born and exposed to microplastics, even in the womb, their developing

immune system might be impacted adversely and therefore could potentially develop immune-based disorders, such as autoimmune diseases.”

“One could have asthma if it’s in the lungs. There is also a potential for developing inflammatory states of the bowel—such as [irritable bowel syndrome](#) or [inflammatory bowel disease](#),” he said. “And it could impact metabolic pathways in endocrine organs and possibly germ cells, adversely impacting fertility.”

Additionally, microplastics can affect “stem cells, bone marrow and other organs, leading to cancer development,” Dr. Kuriakose stated, adding that “there could perhaps even be damage to nerve cells and neurons in the brain, leading to early dementia.”

It is important to note that research on the health impacts of microplastics is relatively new and many important knowledge gaps remain, including lack of data on the extent of exposure to microplastics in humans.

Be aware for children and older adults

It is believed that “during embryogenesis—in the first eight to 10 weeks of conception, or in a developing fetus or infant—you are more vulnerable to microplastics,” Dr. Kuriakose said, noting “that a major portion of the brain’s development is completed between 2 to 5 years of age, and so you’re more vulnerable to the adverse impacts of anything that is not visible when exposed at a very young age.”

“Microplastic and nanoplastic materials are not visible, and they can permeate through membranes, which places you more at risk for organ damage,” he said. “Then on the flip side, at an older age, we have less reparative mechanisms, so if a mutation were to develop at that age, we’d be less able to suppress the mutation than a child might.”

“So, it’s a plus-minus on both sides, where you might be more impacted as a child because you’re growing, you also have better surveillance mechanisms and better ways to suppress cells that mutate,” Dr. Kuriakose said. “Whereas in an older individual, that mechanism is less present, and so could lead to an adverse effect even at that age, especially if you have other things going on with advanced age.”

One example: If you have vascular dementia that is beginning to set in, you have a vascular compromise of your [coronary arteries, and heart disease](#) and exposure to microplastics may contribute to the onset of comorbidities such as irritable bowel disease or asthma that decreases overall health and quality of life.

It's not commonly tested for

“Most physicians don’t go looking for microplastics in a standard setup,” Dr. Kuriakose explained. “In clinics ... we typically don’t go in with a machine or a method to try to detect microplastics, it’s more to detect if there are any adverse events that are occurring that could be related to microplastics.”

“But you can, as a research mechanism, use certain spectroscopic techniques, including electronic and thermal, to help sort out whether or not there are microplastic materials circulating in your bloodstream or in organs,” he explained. “Those can be done, but it’s not something we’ve been talking about doing on a routine basis.

“Which perhaps we should be, much like when a patient who comes in with a strong [family history of breast cancer](#)—we don’t think twice before checking for something like the *BRCA* gene mutation,” Dr. Kuriakose said.

Try to use less plastic

One key thing to keep in mind to reduce the chances of ingesting or inhaling microplastics is preventing it from entering the environment in the first place by “trying to use less plastic,” Dr. Kuriakose said. Everyday choices matter. “Even instances such as when you go shopping at the grocery store, take your reusable bag with you for your purchases.”

“The utensils that you use should not have plastic in them as much as possible,” he said. “As much as you can reduce the use of things with plastic in them and reusing others, is important.” Instead of plastic utensils, use silverware or utensils made from cardboard, bamboo, or other compostable materials.

Another example is opting for reusable water bottles instead of plastic water bottles.

Cook at home when possible

Food can also play a major role in exposure to microplastics, so try to make food at home and reduce your use of [ultraprocessed foods](#).

This is “a very important part of intervention to minimize exposure, not just for plastic, but even for other reasons,” Dr. Kuriakose said. “As much as it is feasible, try to use food that is bought in the raw and cooked at home by you.”

In addition to creating more plastic waste from the packaging that ultraprocessed foods may come in, ultraprocessed foods are associated with poor diet quality, including high sodium and added sugar consumption, and higher risk of several chronic diseases.”

“For families living in urban areas, try to have a small kitchen garden if you can,” he said. And “if you want to eat a certain amount of food, use only that much. Don’t take more than what you need, which then leads to less being bought and when less is bought, less is manufactured.

“By not overproducing we can decrease our reliance on artificial and synthetic ways of manufacturing food,” Dr. Kuriakose added.

While eating less processed and raw ingredients is a healthier option, there are many challenges patients face in doing so. These include lack of knowledge or support to make changes, confusing and misleading information, difficulties in changing ways of cooking and in translating healthy eating messages into balanced food choices, the cost associated with healthier food options, lack of confidence in cooking skills, cultural acceptability, speed of preparation, family acceptability, and lack of access to supermarkets with fresh and whole food options.

Be aware, but don’t worry

While it is important to raise awareness about microplastics, patients should not “be scared to the point of paralysis,” Dr. Kuriakose said. “That’s important because, ultimately, when

you get too anxious about anything, you could let the worry overpower you and add yet another layer of damage to your body.”

He emphasized “the first step is to be aware of microplastics and their associated harm, and then use the knowledge gained to intervene appropriately.”

“Do common sense things that are practical to feel reasonably assured that your exposure will be minimized,” Dr. Kuriakose said. But “don’t break your head to go for zero exposure because you’ll never get there as an individual. As a society we can, but as an independent person, nobody might.”

One practical step is to turn off the A/C when it isn’t needed. “Just open your windows,” he said. This is important because it helps us use less energy and provides the body with more exposure to fresh air.

Next steps on microplastics

While patients should talk to their physicians about microplastics, “keep in mind that the answer you get might be a very general one,” Dr. Kuriakose said. “It’s not because they want to skirt the issue, it’s just that we don’t have very good data on things as they are and what needs to be done beyond these generalities.”

Another positive step is to consider joining or creating a forum “that supports and seeks to get support for doing more research on the state of existence of microplastics in human life and human health and even animal health and what can be done about it,” Dr. Kuriakose said. “Much like how we have interest groups for this cancer and that disease—this can go a long way.”