

# New Study Shows Disturbing Amounts of Plastic in Baby Poop

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## STORY AT-A-GLANCE

- Evidence shows there is more polyethylene terephthalate in the feces of infants than in adults, and it is found in the first stool of newborn babies
- Analysis shows infants consume thousands of plastic particles when they are fed from plastic baby bottles. Bottled water is another route of exposure to plastic chemicals
- Recycling plastic has not proven logistically feasible, and evidence shows recycled plastic increases the risk of phthalate exposure
- Based on findings from one study, you may be consuming as much as one soup spoon of plastic each year and as much as the size of a standard lifebuoy every 10 years

A recent study published in *Environmental Science and Technology Letters*<sup>1</sup> showed there was more polyethylene terephthalate in the feces of infants than there was in adults. This may not be surprising since past testing has demonstrated the ubiquitous nature of plastics.

When researchers want to evaluate the spread of a toxin, they analyze ants as they are found in nearly every corner of the Earth. In 2014, a group of researchers published data<sup>2</sup> demonstrating plastics were embedded in the cuticle of ants sampled from France, Spain, Morocco, Hungary and Burkina Faso. They wrote that chronic exposure to the pollutants resulted in the plastics easily trapped within the insect cuticle.

Two years later<sup>3</sup> they published a follow-up paper in which they tested samples from the remote regions of the Amazon rainforest. Although the presence of phthalate pollution varied between species, the presence suggested pollution travels in atmospheric particles over long distances suggesting “there's no such thing as a ‘pristine’ zone.”<sup>4</sup>

When testing humans, the Norwegian Institute of Public Health<sup>5</sup> found 90% of those tested from 2016 to 2017 had plasticizers in their urine. Plasticizers are a colorless, odorless chemical<sup>6</sup> that is composed mostly of phthalates.<sup>7</sup> More than 90% of the participants<sup>8</sup> had eight different plasticizers known to leak into food from packaging or come from body care products, such as hand cream, toothpaste, and shaving products.

Because these chemicals are not strongly bound to the product, they tend to leach out and dissipate into the surrounding environment. This includes the drinking water and food. The National Toxicology Program finds that phthalates are “reasonably considered to be a human carcinogen,”<sup>9</sup> and yet, the politics and regulations surrounding plastics have allowed them to remain in many of the products that you use today.

The price that society will pay for the ubiquitous use and distribution of plastic particles has yet to be quantified. Evidence suggests the long-term exposure to endocrine-disrupting chemicals like phthalates poses a significant danger to health and fertility.

Some even suggest that we are on course for an infertile world by 2045.<sup>10</sup> Finding 10 times more polyethylene terephthalate in infant poop than adults are one indicator of the dire circumstances plastics has created.<sup>11</sup>

## **Infants Are Pooping More Plastic Than Adults**

In one pilot study,<sup>12</sup> researchers sought to define the magnitude of a human exposure to microplastics. They evaluated the concentrations of polyethylene terephthalate (PET) and polycarbonate (PC) microplastics in 10 adult, three meconium and six infant feces samples collected in New York state. Disturbingly, the researchers found PET in meconium samples, which is a baby's first stool.<sup>13</sup>

The researchers collected the stool samples from the infants' and newborns' diapers. To ensure they were counting microplastics that originated in infants and newborns, they only analyzed the stool for PET and PC, which are distinct from the polypropylene plastics that diapers are made of.<sup>14</sup>

What they found was alarming. The PET concentration in infant stool was 10 times higher than what was found in adult samples. The PC levels appeared to be similar between the two groups. Yet, even meconium samples contained both PET and PC, which suggested that babies have plastic in their system that is absorbed from their mother.

This supports past studies<sup>15</sup> that found microplastics in newborn meconium and in human placentas collected after cesarean section births. How this will affect human health is still being studied. There are up to 10,000 different plastic chemicals, 2,400 of which are known to have a negative impact on human health.<sup>16</sup>

Additionally, microplastics may contain heavy metals and are also known to grow communities of human pathogens that contain viruses, bacteria and fungi. On their own, phthalates are endocrine-disrupting chemicals which have been connected to metabolic problems like obesity<sup>17</sup> and to reproductive challenges.<sup>18</sup>

Infants and children are vulnerable to endocrine-disrupting chemicals as their bodies are still developing. Kurunthachalam Kannan, Ph.D., an environmental health scientist at New York University School of Medicine and researcher of the pilot study, commented:<sup>19</sup>

*"Unfortunately, with the modern lifestyle, babies are exposed to so many different things for which we don't know what kind of effect they can have later in their life. I strongly believe that these chemicals do affect early life stages. That's a vulnerable period."*

## **Millions of Microscopic Plastic Particles in Baby Bottles**

The data from the pilot study adds to a growing body of evidence that babies exposed to microplastics may experience negative consequences. Since the plastic is found in an

infant's feces, it may mean that the gut is also absorbing some of these particles that could end up in other organs, including the brain.

In one study<sup>20</sup> published in 2017, researchers demonstrated that carp could absorb nanoparticles of plastic, which then penetrated the blood-brain barrier in the fish and resulted in behavioral disorders.

While this study was done on a different species, a peer-reviewed article published in the American Journal of Public Health<sup>21</sup> concluded that exposure to ortho-phthalates can impair brain development and increase a child's risk of learning, attention and behavioral disorders.

One of the primary objects from which infants can absorb plastic is plastic baby bottles. In 2018, the baby bottle market was valued at \$2.6 billion.<sup>22</sup> The plastic segment accounted for 44.1% of the overall share. In one published study,<sup>23</sup> John Boland, Ph.D., from Trinity College Dublin, analyzed the release of microplastics from plastic baby bottles.<sup>24</sup>

To collect their data, the bottles were initially cleaned and sterilized. Once the bottles air dried, the scientists added heated purified water that had reached 150.8 degrees Fahrenheit (70 degrees Celsius). This is the temperature the World Health Organization recommends for making baby formula.<sup>25</sup>

Bottles were then added to a mechanical shaker for one minute, after which the team filtered the water and analyzed the contents. They discovered the bottles leached a wide range of particles that numbered up to 16.2 million plastic particles per liter of water.

The average number per liter of water was 4 million particles. When the experiment was repeated with the baby formula, the results were the same. Based on how often infants eat, the researchers predicted that infants up to 12 months may be exposed to 14,600 to 4.55 million microplastic particles daily.

## **Common Polymer PET in Water Bottles Leach Phthalates**

There is a campaign by the PET manufacturers association to defend the use of PET. On their website they tell consumers that<sup>26</sup> “drinking water from a PET bottle that has been left in a hot car, frozen, used more than once, or repeatedly washed and rinsed does not pose any health risk.”

The industry magazine,<sup>27</sup> Food Safety,<sup>28</sup> publishes similar statements, claiming that safety is inherent because the FDA has approved it for contact with food and beverages for 30 years and it doesn’t produce dangerous substances “under conditions of normal use, including being subjected to hot cars or placed in a freezer.”<sup>29</sup>

It seems the plastic industry is taking a page from the tobacco<sup>30</sup> and sugar industries,<sup>31</sup> denying culpability and promoting the product until the evidence is irrefutable – or, in the case of plastics, until humans are no longer fertile.<sup>32</sup>

And yet, for anyone who has read independent studies, like the one above studying babies’ exposure from formula fed from plastic baby bottles, you know this is not true. While PET “does not contain BPA, phthalates, dioxins, lead, cadmium or endocrine disruptors,” according to PETRA,<sup>33</sup> over 10 years ago researchers studying PET water bottles found they leach endocrine-disrupting chemicals.<sup>34</sup>

One study from Goethe University in 2009 reported in ABC Science,<sup>35</sup> also demonstrated that endocrine-disrupting compounds were leaching from PET plastic bottles. Shanna Swan, epidemiologist at the University of Rochester, commented on this study, which found levels of estrogenic compounds at “surprisingly high levels” in water bottles:<sup>36</sup>

*"This is coming at a good time because the use of bottles for consuming water is getting very bad press now because of its carbon footprint. It's just another nail in the coffin of bottled water, the way I see it."*

But, despite another nail in the coffin over 10 years ago, sales of bottled water have continued to soar, polluting the environment and human health.<sup>37</sup>

## **DARPA Pushing More Plastic in the Food Supply**

Apparently, there is not enough plastic pollution in the food supply, so the Defense Advanced Research Projects Agency (DARPA) awarded Iowa State University and partners a \$2.7 million grant to create a process that would make food from plastic and paper waste.<sup>38</sup>

The intention is to use this to feed the military men and women who have dedicated their lives to defending this country. They believe the ability to turn the paper and plastic waste products into a consumable could help with short-term “nourishment” and improve military logistics for extended missions. They estimate the total award could reach \$7.8 million before the project ends.<sup>39</sup>

The system is aiming to convert plastic waste into fatty alcohols and fatty acids and paper into sugar that would then be bioprocessed by single cell organisms into an edible mass that is rich in protein and vitamins. In other words, the hope is that microorganisms can convert the endocrine-disrupting chemicals found in plastic to vitamins and proteins.

DARPA also awarded Michigan Tech<sup>40</sup> researchers \$7.2 million to turn plastic waste into protein powder and lubricants. Battelle, a large research firm, announced in February 2021 that DARPA had awarded an undisclosed amount to create a process that “quickly convert[s] energy-dense waste into a useful substance to support expeditionary operations and stabilization missions.”<sup>41</sup>

DARPA wants to turn plastics that leach hazardous chemicals, which researchers have found threaten human health,<sup>42</sup> into food stuff for the U.S. military. However, in an era where fake meat is valued over regeneratively and biodynamically grown real meat,<sup>43</sup> it doesn't take much to imagine that the next step could be plastic food for all.

## **Recycling Plastic Increases Risk of Phthalate Exposure**

Although many call for recycling plastic to reduce the problem, it is questionable as to whether it's a viable answer since there's growing evidence that recycling has only a minor impact under the best of circumstances. While ramping up recycling has been

suggested, the executive director of the Basel Action Network, Jim Puckett, told Rolling Stone magazine:<sup>44</sup>

*“They really sold people on the idea that plastics can be recycled because there’s a fraction of them that are. It’s fraudulent. When you drill down into plastics recycling, you realize it’s a myth.”*

He went on to describe the results of a study in 2017 that showed 91% of the plastic manufactured since 1950 has never been recycled.<sup>45</sup> In addition, the reporter from Rolling Stone wrote:<sup>46</sup>

*“Unlike aluminum, which can be recycled again and again, plastic degrades in reprocessing, and is almost never recycled more than once. A plastic soda bottle, for example, might get downcycled into a carpet.”*

As well as not being a viable answer logistically, one study<sup>47</sup> published in 2014 in the journal Environment International showed that recycling contributes significantly to childhood phthalate exposure increasing a child's overall exposure to di-n-butyl phthalate (DBP).

Based on findings from the WWF International Study, Reuters<sup>48</sup> created an illustration showing how much plastic a person would consume over time from exposure to food, beverages and dust. According to these estimations, you could be consuming enough plastic to pack a soup spoon every week, enough for a heaping dinner plate every year and as much as the size of a standard lifebuoy every 10 years.

You can help by supporting legislation aimed at holding companies accountable for the pollution they create. These bills need your support since the industry has deep pockets and players are notorious for extensive lobbying and public-relations expertise. It's also important to remember that you have a significant impact by making simple changes in your daily life. Below are simple strategies that can help:

Don't use plastic bags

Bring your own mug for a coffee drink;  
skip the lid and straw

Bring water from home in a glass water bottle	Make sure the items you recycle are recyclable
Store foods in glass containers or Mason jars	Bring your own leftovers container when eating out
Avoid processed foods and bring your own vegetable bags for fresh produce	Request no plastic wrap on your newspaper and dry cleaning
Use nondisposable razors, cloth diapers and rags	Avoid disposable utensils and straws
Buy infant and pet toys made of wood or untreated fabric	

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