Removing chemical used to make Teflon-like coatings has led to fewer low birth weights and less brain damage

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Government and industry efforts since 2003 to phase out chemicals used to make non-stick coatings, such as Teflon, have prevented more than 118,000 low-weight births and related brain damage in the United States.

This is the main finding of a new report—based on analysis of new mothers' blood samples gathered for a national health study—published Nov. 23 in the *International Journal of Hygiene and Environmental Health*.

Scientists behind the research, conducted at NYU School of Medicine, say that studies have long linked the chemicals—famous for keeping food from sticking to pans—with high blood pressure, birth defects, and lower-than-normal birth weights. These damaging health effects were major factors behind a 2006 agreement between the Environmental Protection Agency (EPA) and American manufacturers to curtail and eventually eliminate the harmful chemicals' production in 2014.

The study authors estimate that the drop in chemically linked low-birth weight babies saved the nation at least $13.7 billion by reducing infant hospital stays and the number of children in need of long-term care after cognitive damage; and by improving the prospects of children going on to achieve higher education levels and get better-paying jobs.

"The evidence is overwhelming that the EPA-industry accord to phase out chemicals once used in nonstick coatings has been a major success in protecting children's health," says study lead investigator and health epidemiologist Leonardo Trasande, MD, MPP, an associate professor at NYU Langone Health. "This policy designed to lessen human exposure has spared thousands of newborns from damage to their health and saved U.S. taxpayers over a billion dollars in unnecessary health care costs."

Before 2006, the principal danger to fetuses and pregnant women, researchers say, came from chemicals used in the manufacture of the coating called perfluorooctanoic acid, or PFOA. Not occurring naturally in the environment, PFOA chemicals accumulate in the blood of marine mammals and in most humans exposed to them. Research over decades has linked even a nanogram (one-billionth of gram) increase in PFOA

per milliliter of blood to an 18.9 gram reduction in birth weight.

A healthy newborn typically weighs about 8 pounds (3,600 grams), experts say, and a low birth weight—associated with potential brain damage—is considered anything less than 5.5 pounds (2,500 grams).

Trasande cautions that while the EPA-industry accord has greatly diminished blood PFOA levels, products manufactured before the phase-out are still in circulation. He also says that the health impact for chemical replacements for PFOA, related chemicals called perfluorinated compounds (PFCs) remain unknown. Both sets of chemicals are endocrine disruptors, a set of chemicals shown by recent studies to interfere with natural hormone function, says Trasande.

Senior study investigator Teresa M. Attina, MD, PhD, also of NYU Langone, says the detrimental health effects seen with the original nonstick chemical formulation warrant more thorough safety testing of PFCs before any more of them receive government approval.

For the new study, funded entirely by NYU Langone, the research team looked for PFOA levels in blood analyses kept on participants in the National Health and Nutrition Examination Survey. Since 1999, NHANES, as it is known, has gathered information about the prevalence of and risk factors for major diseases by annually surveying 5,000 volunteers.

Survey results showed that blood PFOA levels in women of child-bearing age, from 18 to 49, continued to rise from 2003 to 2008, when median levels peaked at 3.5 nanograms per milliliter. But the trend, investigators say, reversed in 2009, a few years after the phase-out was introduced, and hazardous blood levels began dropping from a median 2.8 nanograms per milliliter to 1.6 nanograms per milliliter by 2014.

Computer models were then used to project the percentage of low-weight births that could have been prevented from specific PFOA chemical exposure and to calculate the estimated health costs and lost income. According to the team's analysis, the number of low-birth weight babies in the United States attributable to such PFOA exposure dropped from a highpoint of 17,501 in 2008 to 1,491 in 2014.

More information: Julia Malits et al, Perfluorooctanoic acid and low birth weight: Estimates of US attributable burden and economic costs from 2003 through 2014, *International Journal of Hygiene and Environmental Health* (2017). DOI: 10.1016/j.ijheh.2017.11.004

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