Climate change and chemical exposure can damage newborns' hearts, say experts

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The complex interplay of rising temperatures and exposure to polluting compounds and chemicals can damage children's hearts, experts have warned.

Experts at the University of Exeter have contributed to a new statement from the American Heart Association (AHA). The statement explores the impacts of global warming, maternal heat exposure, airborne pollutants, lead, endocrine-disrupting compounds, and exposure to more than 300,000 registered synthetic chemicals on the heart health of newborns, infants, children, and adolescents.

It addresses questions including: Has industrialization and rapid technological advancement severely exposed the next generation to grave cardiovascular compromise? Do we still doubt the reality of climate change, global warming, and the consequences of thousands of tons of chemicals released into the environment every day? How vulnerable are infants' and children's hearts to these environmental exposures?

The statement, published in *Circulation*, is based on contributions from experts at the University of Exeter, as well as the Baylor College of Medicine, Northwestern University, University of South California, University of Colorado, Cambridge Health Alliance, New York University, and the University of Eastern Finland.

Andrew Agbaje, an award-winning physician and professor of clinical epidemiology and child health at the University of Eastern Finland and Honorary Research Fellow at the University of Exeter, said, "Evidence suggests that climate change increases the incidence of congenital heart defects, particularly conotruncal and septal defects, largely explained by maternal heat exposure during pregnancy. Moreover, airborne particulate matter pollution may contribute to an increased incidence of Kawasaki Disease and worsen the risk of congenital heart defects.

"Infants and children exposed to lead metal are at risk of high blood pressure and premature kidney disease. Similarly, exposure to endocrine-disrupting chemicals, such as bisphenols and phthalates, increases the risk of high blood pressure and dyslipidemia which are risk factors for

premature cardiac and vascular damage."

Dr. Barbara Entl, the Science and Medicine Advisor of the AHA summarized the Top Things to Know about Environmental Exposure and Pediatric Cardiology. The ninth of the 10 listed points noted that "per- and polyfluoroalkyl substances, utilized for waterproofing and flame-retardant purposes and as indirect food additives, also exhibit associations with elevated lipid levels."

A commentary titled "Environmental Risk Factors Go Mainstream in Pediatric Cardiology," written by Professor Philip J. Landrigan, highlighted areas of future focus:

1. There needs to be an acceleration of research in environmental cardiology
2. Cardiologists and all health care professionals need to be aware of the pervasive impact of environmental factors on cardiovascular health
3. The most effective strategy for slowing climate change and reducing air pollution is rapid, wide-scale transition away from coal, gas, and oil to clean, renewable energy
4. International actions are of particular importance for protecting the health of children in low- and middle-income countries where 60% of global chemical and plastic production is now concentrated. A key strategy could be a legally binding Global Chemicals Treaty developed and implemented under United Nations auspices.

In summary, Professor Agbaje agrees with Professor Landrigan that pediatric cardiologists, health workers, medical societies, and public health organizations should continue advocating for national and continental governments, such as the European Union, to end pollution.

Elected officials are to be well-advised on the disastrous links between air pollution, climate change, and pediatric heart health. The release of chemicals into children's environments should be tightly regulated, with special attention paid to new and untested chemicals.

Professor Agbaje said, "We can join hands individually and at societal levels to protect children's heart health."

More information: Justin P. Zachariah et al, Environmental Exposures and Pediatric Cardiology: A Scientific Statement From the American Heart Association, *Circulation* (2024). DOI: 10.1161/CIR.0000000000001234

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