

## Avoidable early life environmental exposures



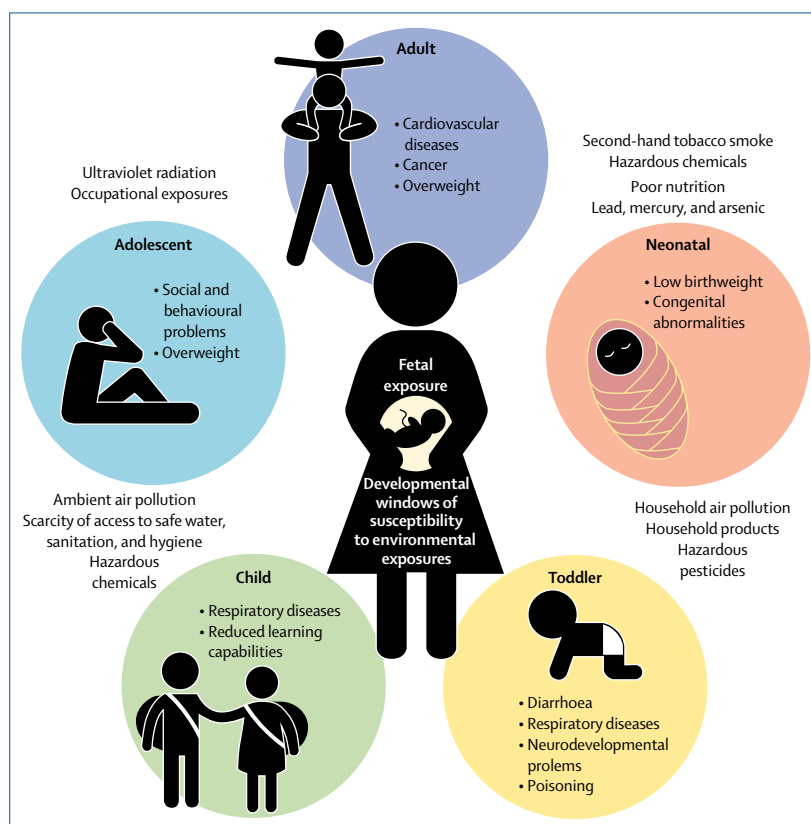
“It is easier to build a strong child than to repair broken men”, is a statement widely attributed to Frederick Douglass, whose early years in slavery had given him a poor start in life. Our early years matter because the environment shapes our future health and resilience to unhealthy environments later in life. The risks to a child’s health if the mother is obese, smokes during pregnancy, or develops pre-eclampsia or gestational diabetes, or if the child’s diet is high in sugar, salt, and trans-saturated fat, are well known.<sup>1</sup> However, the unrecognised risks to the health of future generations are increasingly concerning. WHO<sup>2</sup> has published an Atlas on children’s health and the environment, noting that “26% of the deaths of 5.9 million children who died before reaching their fifth birthday could have been prevented through addressing environmental risks—a shocking missed opportunity”.

Environmental risks such as air pollution, contaminated food and water, and exposure to environmental toxic substances, can affect developing organs and physiological systems at all critical life stages, from the embryo through childhood and into adolescence (figure). The ability of tissues to repair damages and the opportunities to reverse any detrimental effects decreases with age. Although the prevalence of morbidities such as asthma and obesity are increasing in childhood, the effects of some conditions caused by the environment might not manifest until many years later. For example, in low-income and middle-income countries, an adverse environment during childhood might prevent 43% of children from reaching their full neurocognitive potential.<sup>3</sup>

An assessment of disease risk at different life stages indicates that governmental health policies should focus on the health of young people, especially since adolescents account for nearly one fifth of the world’s population.<sup>4</sup> Although the UN General Comment 4 of the Convention on the Rights of the Child states that “adolescents are in general a healthy population group”,<sup>5</sup> they can be on a high-risk trajectory to develop non-communicable diseases,<sup>6</sup> even if they appear outwardly healthy. Importantly, many adolescents at high risk do not have access to primary health care because of their place in society and thus are unlikely to be informed about the risks to their health. Moreover,

we now understand that individuals can pass the risk of non-communicable diseases to their children, for example via epigenetic mechanisms. These biological processes can occur before the mother knows she is pregnant and accesses health care, and so the cycle of risk is perpetuated.

A new WHO initiative aims to highlight how early life exposure to environmental toxic substances can be avoided and has proposed a plan to address the issue. WHO already has detailed information on various environmental toxicants from many reports<sup>7</sup> and their initiative calls for this information to be better communicated to all health-care professionals, alongside new WHO-supported educational packages. Public health departments and communities need to be better informed about how exposure to toxicants



**Figure: The effects of environmental hazards across generations**  
Environmental exposures in early life can have immediate effects on health or accumulate over time to increase disease risk later. Exposure can start in the womb and can have effects throughout life. Children and adolescents are exposed to various hazards from the environments in which they live, learn, work, and play. Children are especially susceptible to these exposures because of their developing systems and behaviours. Adapted with permission from WHO.<sup>2</sup>

during early life is of concern and can be minimised or avoided altogether. At an individual level, education of men and women before they conceive a child is an ideal opportunity to promote awareness of healthy habits. Daily exposure to environmental toxicants can cause bioaccumulation, which, in a pregnant mother, can expose her unborn child to higher than expected concentrations of toxicant and produce additive effects—this phenomenon occurs even if the level of exposure to or concentration within the mothers' body of the toxicant is considered safe, if an acceptable level of exposure is known. Additionally, fathers are not excluded: bioaccumulation of toxins can affect offspring development via epigenetic effects on the sperm.<sup>8</sup>

The Sustainable Development Goals<sup>9</sup> can be achieved through environmental prevention of diseases without an additional burden on resources. The WHO avoidable early environmental exposures initiative emphasises that the unrecognised health risks are most damaging to the human population. An absence of overt developmental abnormalities, however, does not necessarily imply all is well. Recognition of the importance of exposure to hazardous environmental factors should be a core component of the training of health-care professionals. This training should be coupled with primary prevention measures set by governments to protect populations and public education to reduce individual exposure, which are essential to ensure the future health of the global population.

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We declare no competing interests.

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