

Climate change and global child health: what can paediatricians do?

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A little over a decade ago, the Lancet Climate Commission concluded that anthropogenic climate change threatens to undermine the past 50 years of gains in public health and, conversely, that a comprehensive response to climate change could be 'the greatest global health opportunity of the 21st century'.¹ In a recent review, experts quantified the impact of climate change on health and estimated that heatwaves between 2000 and 2016 had resulted in 5.3% lower outdoor manual productivity and that economic losses from climate change related events in 2016 alone totalled almost US\$129 billion.²

Historically, major excess mortality peaks have been related to extreme weather events, such as the Bangladesh cyclone of 1991, Venezuela floods and mudslides of 1999 and Myanmar cyclone of 2008. These three extreme weather events alone accounted for more than 300 000 deaths.² It is estimated that Hurricane Maria affecting Puerto Rico in 2017 was associated with excess mortality with estimates ranging between 2700 and 4600 deaths.^{3,4}

In addition to direct effects and increased risks of climate change associated disasters such as drought or floods, global climate change has been associated with major changes in infectious diseases risks. The annual numbers of cases of dengue fever have doubled every decade since 1990, with 58.4 million apparent cases in 2013, accounting for more than 10 000 deaths.⁵ Other infectious diseases, such as yellow fever, chikungunya, Mayaro and Zika viruses, are probably similarly responsive to climate change.²

Children pay a disproportionate price for climate change, with some estimates

suggesting up to 88% of the burden of disease related to it.⁶ Such excess risks are related to a combination of physiological vulnerability, especially among young children, as well as risk of exposure. In a study of nearly 500 000 deaths in the Catalonia region of Spain during the warm seasons of 1983–2006, Basagaña *et al*⁷ evaluated the association between the occurrence of extremely hot days (days with maximum temperature above the 95th percentile) and mortality. They documented 50% excess mortality among infants in the perinatal period during these extremely hot days (relative risk of death from conditions originating in the perinatal period was 1.53 (95% CI 1.16 to 2.02).

The risk-magnifying effect of climate change has a large impact on food systems, which are already facing increased pressure from the demands of a growing global population, increased urbanisation and loss of biodiversity. Food security will be increasingly threatened, as climate change influences both the quality and quantity of food we are able to produce.⁸ For example, global wheat production could reduce by 6% for each 1°C rise in temperature.⁹ Lloyd *et al* developed a statistical model to project moderate and severe stunting in children aged < 5 years at the national level in 2030 in 44 countries under low and high climate change scenarios, controlling for economic factors.¹⁰ Their estimates indicated that climate change-attributable stunting ranged from 570 000 under the best-case scenario to > 1 million under the poverty/high climate change scenario.¹⁰ Natural disasters also increase these mortality risks through direct effects and population displacement. Some 160 million children live in extreme drought zones, and an additional 500 million children live in areas with extreme flood risks.¹¹ The WHO projects that there could be additional 77 000–131 000 deaths among children under 5 years of age in 2030 if no mitigation strategies are put in place.¹²

Notwithstanding denial by some, there is remarkable consensus among academia and professionals that climate change is both real and an existential threat for the planet. While there are remarkable examples of adaptation and resilience, effective change

will require concerted and extensive multi-sectoral efforts at scale, as defined by the Paris Climate Change Treaty.¹³

What role can paediatricians and paediatric associations play in this regard? There is widespread thinking that the mitigation strategies for climate change are an issue for governments and multilateral organisations. Others have focused on personal and institutional actions and leading by example through collective efforts to reduce energy consumption and waste within home and work environments.^{14 15} These are actions that paediatricians can promote in their homes, clinics and hospitals. There is a clear need to do more and lead by example. Paediatricians have a special responsibility for children and must become engaged in strategies to address climate change, the environmental sustainability of health systems and the resilience of population health to environmental change.¹⁶ Concerted efforts in this regards must include extensive continuing medical education activities by professional bodies and paediatric associations to include climate change. For example, climate change-related information and learning materials must be included within global child health teaching modules and open-access courses as well as residency training programmes. National, regional and global paediatric associations must include educational activities on climate change and health within their conferences and programmes for educating delegates. These must be organised in the most eco-friendly manner with a minimal carbon footprint.

Importantly, given the disproportionate effects of climate change on children, paediatricians and paediatric associations must become strong advocates to exert pressure on governments, corporations and private sector institutions to adopt mitigation strategies for climate change. Additionally, appropriate and robust research should be facilitated to help children and families.¹⁷ To illustrate, future research should also determine if the burden of climate change on children is gender, age and socioeconomic status specific and if inequities exist. Healthcare professionals may be well positioned as health educators (and trusted sources of information) to raise awareness about climate change and health among their patients and in their communities. These advocacy efforts and actions can begin locally but rapidly extend to city-wide actions, regions and indeed nationally. Developing and monitoring estimates for the contribution of climate change and environmental factors to child health and mortality must move from the pages of scientific journals¹⁸ to mainstream debates and action.

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Amid the doomsday scenarios that rapid climate change foretells, there is room for optimism that collective action can bring about change. With the sustainable development goals that have been signed into a global compact by 193 countries of the world,¹⁹ there are unprecedented opportunities to make real and lasting strides in towards better health and well-being for generations to come (starting with our children of today). Paediatricians can play a pivotal role in translating research to practice and leading a global movement that can address many determinants of planetary health and health inequities within a generation.

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