Health Effects from Air Pollution on Children

Yun-Chul Hong, Seoul National Univ.
Eunhee Ha, Ewha Womans Univ.
Why Children?

- Children are very susceptible
- The evidence is clear: air pollution has a devastating impact on children’s health
Children’s Exposure to Air Pollution

Fig. 1. Proportions of children under 5 years living in areas in which the WHO air quality guidelines (PM$_{2.5}$) are exceeded, by country, 2016

Population above Air Quality Guidelines (PM$_{2.5}$):
- Above 90%
- 75–99%
- 50–75%
- 10–50%
- Under 10%
- Data not available
- Not applicable

Source: [10].
- Children are especially vulnerable during fetal development and in their earliest years, while their lungs, organs and brains are still maturing.

- They breathe faster than adults, taking in more air and, with it, more pollutants.

- Children live closer to the ground, where some pollutants reach peak concentrations.

- Newborn and infant children spend most of their time indoors, where they are more susceptible to household air pollution.
Children’s Burden of Disease

543,000 deaths
in children under 5 years

52,000 deaths
in children aged 5-15 years

7 million deaths
More than 50% of acute lower respiratory infection (ALRI) in children under 5 years in LMICs
Health Effects on Children

- Adverse birth outcomes
- Infant mortality
- Neurodevelopment
- Childhood obesity
- Lung function
- ALRI, pneumonia
- Asthma
- Otitis media
- Childhood cancers
- Relation between early exposure and later health outcomes
Critical role of health professionals
Critical role of health professionals

**Be informed**
All health professionals should consider air pollution a major risk factor for their patients and understand the sources of environmental exposure in the communities they serve. They should be informed about existing and emerging evidence on the ways in which air pollution may affect children’s health.

**Recognize exposure and related health conditions**
Health professionals have an important role in identifying causative risk factors in order to prevent disease. A health care provider can identify air pollution-related risk factors by asking pertinent questions about the child’s or pregnant mother’s environment.

**Research, publish and disseminate knowledge**
Health professionals can conduct research on the effects of air pollution on children’s health and publish the results of studies of the causes, mechanisms and effects of environmental exposure of children, as well as on potential treatment, prevention and management. They can use this evidence to inform social and behaviour change communication strategies.
Critical role of health professionals

Prescribe solutions, and educate families and communities
Health professionals can “prescribe” solutions to air pollution-related problems, such as switching to clean household fuels and devices. In contexts in which there are significant barriers to adopting clean household energy, health care professionals can recommend “transitional” solutions that offer some incremental health benefit, and they can provide resources and information on relevant government and non-profit programmes to help reduce exposure.

Educate colleagues and students
By training others in the health and education fields, health professionals can increase the reach of their messages on the health risks of air pollution and strategies to reduce exposure. Health professionals can engage their colleagues in their workplace, local health care centres, at conferences and in professional associations. They can support the inclusion of children’s environmental health in curricula in post-secondary institutions and particularly in medical, nursing and midwifery schools.

Advocate solutions to other sectors, policy- and decision-makers
Health professionals are well positioned to share their knowledge with decision-makers, including members of local governments and schools boards, and with other community leaders. Health professionals can accurately convey the health burden of air pollution to decision-makers, conduct health-based assessments, support improved standards and policies to reduce harmful exposure, advocate for monitoring and emphasize the need to protect children at risk.
Action for Addressing Air Pollution to Protect Children

- Public policy is essential
- Approaches must be complementary and mutually reinforcing
- The early years, starting in pregnancy, are the best time to invest in a child’s health
Acknowledgments

Marie-Noel Brune Drisse (WHO HQ)

Lesley Brennan, Fiona Goldizen, Amalia Laborde and Peter Sly (WHO CC)

Virginia Arroyo Nebreda, Julia Gorman, Irene Martinez Morata and Paige Preston (WHO interns)

Irena Buka, Francesco Forastiere, Tom Luben and Sumi Mehta (Initial Reviewers)

And Many Others