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Air Pollution:
A Threat to Children's Health in Indonesia

THE BIGGEST ENVIRONMENTAL RISK TO HEALTH!

Burning or fuel combustion is the main source of many air pollutants harmful to human health. The most harmful air pollutant for health is fine particulate matter, particles less than 2.5 microns in diameter ($PM_{2.5}$). At high concentrations $PM_{2.5}$ can be seen as smoke or haze, but even causes health effects at concentrations too low to be visible. The World Health Organization (WHO) recommends keeping exposures below 10 micrograms per cubic meter ($\mu g/m^3$) to protect health; the Indonesian government guidelines recommend a limit of 15 $\mu g/m^3$.

91% of the world's population[1] lives in areas where outdoor particle pollution levels are higher than guidelines established by WHO.

In Southeast Asia, $PM_{2.5}$ levels across the entire region – including urban and rural areas - are more than twice the recommended level, and nearly 40% of the population is exposed to household smoke pollution from solid fuels.[2] Some cities in the region have nearly 6 times the recommended level.[2] As a result, around 424,000 people die prematurely each year from air pollution-related illness in Southeast Asia.[3]

In Indonesia, major sources of smoke pollution include peatland fires, motor vehicles, coal-fired electric power generation, dust, open burning, and biomass burning for cooking and heating.[4] With 28% of Indonesian households still depending on solid fuels to meet their household energy needs, many of Indonesia's poorest citizens are regularly exposed to air pollution levels as much as 20 times higher than the WHO guidelines.[4] Additionally, exposure to secondhand smoke from tobacco is of increasing concern.[11] Peatland fires are a particularly important source of air pollution in Indonesia and across Southeast Asia, affecting daily ambient air quality and resulting in severe haze episodes during the dry season. During haze episodes, the entire region can experience higher outdoor air pollution levels. For example, in 2015, 69 million people in Southeast Asia were exposed to unhealthy air for nearly two months. During this episode, the Indonesian government reported over 500,000 additional cases of respiratory illness, and experts estimated that the increased air pollution exposure caused up to an additional 100,000 deaths across the region.

AIR POLLUTION AND HEALTH IN INDONESIA[3]

#3

risk factor for death in children <5

4000

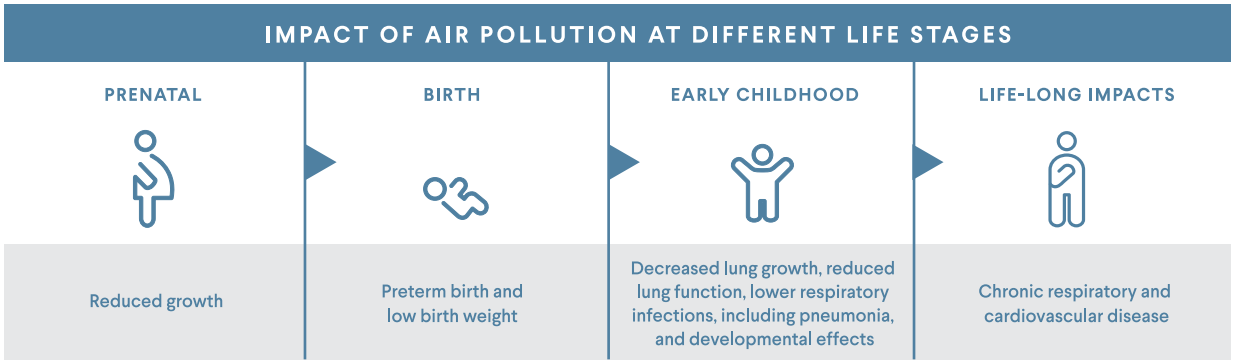
air pollution related child deaths every year
(does not include haze episodes)

Damage Begins Before Birth and Continues Throughout Children's Lives

Health-damaging exposure to air pollution can start in the womb, when pregnant mothers are exposed. Exposure continues after birth, throughout childhood and into adulthood. Babies born to mothers exposed to high levels of pollution during pregnancy are more likely to experience reduced growth while in utero, low birth weight, and be delivered preterm. These early life effects also increase the risk of health problems throughout life, including cardiovascular disease, type 2 diabetes, and obesity.[6–10]

Exposure to air pollution throughout infancy and childhood is associated with negative respiratory effects, including greater vulnerability to acute lower respiratory infections like pneumonia as well as more severe childhood asthma. Half of pneumonia deaths are linked to air pollution.[11] Childhood exposure to air pollutants is also associated with decreased lung growth and function[12], which are sustained through the child's lifetime.[13]

Long-term exposure to air pollutants are also linked to chronic respiratory effects in adulthood like COPD (chronic obstructive pulmonary disease) and lung cancer as well as cardiovascular disease, cerebrovascular disease, and death.[5,6]



All Kinds of Smoke Can Affect Child Growth and Development

Scientific evidence consistently links exposure to smoke particles from combustion with stunted growth and pregnancy outcomes. While most of the evidence comes from studies of tobacco or household solid fuel use, all combustion-source PM2.5 pollution contains similar chemical compounds and would be expected to have similar effects on child health.

- Babies whose mothers smoked tobacco or were exposed to environmental tobacco smoke (ETS) while pregnant are more likely to be born smaller and lighter.[14–18] Similarly, children of mothers who smoked were also found to be shorter than those of non-smoking mothers.[19]
- More recent studies show that pregnant mothers exposed to elevated levels of particulate matter from either outdoor or household air are more likely give birth to smaller and lighter babies and deliver preterm.[20–22]
- Children in homes where solid fuels are burned for cooking and/or heating are more likely to be born at a low birthweight and have stunted growth throughout childhood.[23]
- Emerging research from Indonesia provides limited but compelling local evidence linking maternal exposure to air pollution and child growth.[24]

Beyond height and physical development, stunting has long term impacts on children and their communities, including diminished cognitive development, and reduced economic productivity.[3,25,26] Even at lower levels of exposure, air pollution has also been found to be linked with neurodevelopment disorders like autism, and early onset of neurodegenerative diseases including Alzheimer's disease.[27]

Southeast Asia is home to one third of the world's 151 million children under 5 years of age who are stunted, or too short for their age.[1] In Indonesia, the Ministry of Health recently estimated that stunting affects 36.4% of all children under the age of 5 in the country[23] – this is higher than the average of all lower middle-income countries (31.5%).[28]

Beyond Masks: Improving Air Quality Will Protect Children's Health

Masks are a short-term, reactive approach to minimizing risk that do not address the underlying causes of air pollution. There is limited evidence that masks are an effective measure to protect children from harm caused by living in places with elevated levels of air pollution. While there may be extreme situations when the use of masks may offer some protection as a short-term measure, a proactive, preventive approach is required to improve children's health. Improving air quality will require increased investment in air quality measurement and management, as well as an intersectoral approach to tackle the leading sources of pollution. Studies demonstrate that when the short- and long-term health and social development costs of air pollution are considered, air pollution prevention measures are extremely cost-effective.

ACTIONS NEED TO BE TAKEN TO:

Prevent peatland fires

Promote clean household energy

Seek alternatives to burning of open waste and agricultural residues

Ensure smoke free environments for women and children

Develop and enforce stricter emissions regulations for industry and vehicles

Vital Strategies

Vital Strategies is a global public health organization that works with low- and middle-income countries to develop evidence-based public health policies, manage programs efficiently, strengthen public health systems, conduct research, and design strategic communication campaigns for policy and behavior change. After making major progress on other major global health challenges such as tobacco and road safety, Vital Strategies is now applying its tested approaches to environmental health. Environmental Health division uses the tools of public health to develop the technical capacity of governments and civil society to address environmental threats beyond the traditional span of public health control – reducing air pollution, mitigating climate change, and improving water, sanitation, and transportation systems.

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UNICEF advocates for the protection of children's rights, to help meet their basic needs and to expand their opportunities to reach their full potential. UNICEF Indonesia has an 'evidence to policy action' agenda for air pollution and its impacts on children's health, which involves high-level research, capacity building and advocacy through partnerships. UNICEF Indonesia raised its focus on air pollution and children's health in the wake of the 2015 peat land and forest fires and the resultant transboundary haze event. UNICEF Indonesia is broadening its remit to include all sources of exposure, focusing on environmental health in urban contexts. This will entail a multi-sectoral approach.

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