Clear the air for children

EXECUTIVE SUMMARY

unicef 70
70 YEARS FOR EVERY CHILD

Executive summary and key messages

Around 300 million children currently live in areas where the air is toxic – exceeding international limits by at least six times.

Using satellite imagery of outdoor air pollution, this study found that around 300 million children currently live in areas where outdoor air pollution exceeds international guidelines by at least six times. In total, around 2 billion children live in areas that exceed the World Health Organization annual limit of 10 μg/m^3 (the amount of micrograms of ultra-fine particulate matter per cubic metre of air that constitutes a long term hazard).

Air pollution is linked directly with diseases that kill. In 2012, air pollution was linked with 1 out of every 8 deaths, globally – or around 7 million people. Around 600,000 of those were children under 5 years old, globally. Almost one million children die from pneumonia each year, more than half of which are directly related to air pollution.

Air pollution can considerably affect children's health. Studies have shown that air pollution is strongly associated with respiratory conditions such as pneumonia, bronchitis and asthma, among others. It can also exacerbate underlying health issues and prevent children from going to school, and there is emerging evidence that it can disrupt physical and cognitive development. Left untreated, some health complications related to air pollution can last a lifetime.

Air pollution is worsening in many parts of the world. As countries continue to industrialize and urbanize, energy, coal and fuel use tends to increase. A recent publication from the World Health Organization (WHO) indicates that urban outdoor air pollution has increased by about 8 per cent between 2008 and 2013. Projections are unfavourable. According to the Organisation for Economic Co-operation and Development (OECD), under-five mortality could be 50 per cent higher than current estimates by 2050 as a result of outdoor air pollution. Another study published in *Nature* found it could be even worse – doubling by 2050.

Children are uniquely vulnerable to air pollution – due both to their physiology as well as to the type and degree of their exposure.

Air pollution can seriously affect the health of the foetus. Pregnant mothers are advised to avoid air pollution – just as they should avoid smoking or breathing secondhand cigarette smoke. Studies have shown that chronic exposure to high levels of particulate matter (PM2.5 – which consists of particulate matter with a median diameter of less than 2.5 microns, approximately one thirtieth the width of average human hair) is associated with higher rates of early foetal loss, preterm delivery – and lower birthweight.

Children's lungs are in the process of growing and developing, making them especially vulnerable to polluted air. The cell layer on the inside of the respiratory tract is more permeable among young children. Children's respiratory airways are also smaller than adult airways, so infections are more likely to cause blockages than in adults. Children breathe twice as fast, taking in more air per unit of body weight, compared to adults.

Furthermore, children's immune systems are still developing, especially at young ages. During early childhood, children are highly susceptible to viruses, bacteria and other infections. This both increases the risks of respiratory infection and reduces the ability of children to combat it.

Moreover, the effects of air pollution on a child can have lifelong health implications. Air pollution can impair the development of children's lungs, which can affect them through to adulthood. Studies have shown that the lung capacity of children living in polluted environments can be reduced by 20 per cent – similar to the effect of growing up in a home with secondhand cigarette smoke. Studies have also shown that adults who were exposed to chronic air pollution as children tend to have respiratory problems later in life.

Poor children are among the most at risk.

Globally, air pollution affects children in low- and middle- income countries more. Up to 88 per cent of all deaths from illnesses associated with outdoor air pollution and over 99 per cent of all deaths from illnesses associated with indoor air pollution occur in low- and middle-income countries. Asia currently accounts for the vast bulk of total deaths attributable to air pollution. The proportions, however, are changing. In Africa, increasing industrial production, urbanization and traffic is causing the rapid rise of outdoor air pollution. As this happens, the number of African children exposed to outdoor air pollution is likely to increase, especially as the continent's share of the global child population is set to increase markedly. By mid-century, more than one in three children globally is projected to be African.

Outdoor air pollution tends to be worse in lower-income, urban communities. Lower-income areas are often highly exposed to environmental pollutants such as waste and air pollution. Factories and industrial activity are also more common near lower-income areas, and there is often less capacity to manage waste. This can result in burning, including of plastics, rubber and electronics, creating highly toxic airborne chemicals which are highly detrimental to children. Poorer families are also less likely to have resources for good quality ventilation, filtration and air conditioning to protect themselves from harmful air.

Indoor air pollution is most common in lower-income, rural areas. Over 1 billion children live in homes where solid fuels are used in cooking and heating. While outdoor air pollution tends to be worse in poor urban communities, indoor air pollution tends to be worse in rural communities where biomass fuels are more frequently used in cooking and heating due to lack of access to other forms of energy. Eighty-one per cent of rural households in India use biomass fuel, for instance, because it is relatively inexpensive and readily available. Even at national levels, income is linked with the use of solid fuels for household energy needs: Thailand – with a per capita income of US$5,816 – uses biomass to meet 23 per cent of household energy needs, while the United Republic of Tanzania – with a per capita income of US$864 – uses biomass to meet 95 per cent of household energy needs.

A lack of adequate health services and poor initial health makes the poorest children even more at risk. When a child is sick, lacks good nutrition or does not have access to clean water, adequate sanitation and hygiene, respiratory infections, such as pneumonia are more common and potentially more deadly. A body's defences require good overall health. A lack of access to health care not only prevents treatment, but can also mean that conditions could go undiagnosed in the first place.

Reducing air pollution is one of the most important things we can do for children. Research shows that reductions in air pollution have led to improvements in children's respiratory functions. A World Health Organization study estimates that meeting global air quality guidelines for PM2.5 could prevent 2.1 million deaths across all age groups per year based on 2010 data. It could also improve the overall health of millions more, help to reduce the incidence of acute and chronic respiratory infections among children, and reduce complications during pregnancy and childbirth. Finally, studies show it could improve children's physical and cognitive development, helping them to lead longer and more productive lives.

The benefits of reducing air pollution extend well beyond child health – actions and investments that reduce air pollution can also help grow economies and combat climate change.

Climate change already threatens the well-being of children. Cutting back on fossil fuel combustion and investing in renewable energy sources can help reduce both air pollution and greenhouse gases that contribute to climate change. The multiplier effect of reducing fossil fuel combustion on the well-being of children stands to be enormous.

Reducing air pollution can also significantly help improve productivity and economic performance. As this report shows, air pollution matters greatly to health; the relationships between improved health, cognitive and physical development, higher incomes and improved economic performance are well documented. Furthermore, reduced air pollution can also help lower health expenditures at household and government levels – which add up to billions of dollars of savings at the national level. An OECD study shows that the total annual costs of air pollution currently account for approximately 0.3 per cent of global GDP, and are expected to increase to approximately 1 per cent of GDP by 2060. A World Bank/Institute for Health Metrics and Evaluation study found that deaths from air pollution cost the global economy about US$225 billion in lost labour income and more than US$5 trillion in welfare losses in 2013.

Reducing air pollution is crucial to making progress on the Sustainable Development Goals. Reducing air pollution will directly influence our progress in achieving the Sustainable Development Goals (SDGs). Issues relating to air quality are mentioned in four places in the SDGs: in the Declaration itself, as well as in three of the SDGs: SDG 3) *Good Health and Well-being*, SDG 11) *Sustainable Cities and Communities* and 12) *Responsible Consumption and Production*. Reducing air pollution also indirectly affects progress on a multitude of SDGs, including SDGs 1, 2, 6, 7, 9, 13 and 15. Further, it helps reduce poverty and food insecurity, improve water quality and preserve forests and

Ways in which air pollution relates to the Sustainable Development Goals

Reducing air pollution can help families become healthier, save on medical expenses, and improve productivity.

Air pollution can cause crop damage and affect food quality and security.

Air pollution poses a major threat to human health. It is linked to respiratory infection and cardiovascular disease. It causes increases in population morbidity and mortality.

Pollutants such as sulphur dioxide (SO2) and nitrogen oxide (NOx) from open fires and the combustion of fossil fuels mix with precipitation causing harmful acid rain that can compromise water quality.

Electricity from renewable energy rather than fossil fuels offers significant public health benefits through a reduction in air pollution.

Power generation, industry and transportation are large contributors to air pollution. A new focus on decreasing energy consumption and on improving sustainable and public transportation could progressively reduce pollution.

Urban areas significantly contribute to air pollution. Making cities sustainable could progressively improve the air quality.

Chemicals released into the air increase air pollution and contribute to harmful effects on human health. Responsible production and consumption could help to reduce these harmful chemicals.

Combustion of fossil fuels plays a key role in the process of climate change, which places food, air and water supplies at risk, and poses a major threat to human health.

Emissions from combustion of fossil fuels mixed with precipitation cause acid rains that pose a major threat to forests and ecosystems.

ecosystems. It is also often related to developing sustainable cities, cleaner energy sources, responsible production and consumption, and combatting climate change.

Protecting children from air pollution requires actions to reduce air pollution, reduce children's exposure to it and better monitor it.

Children should be kept away from anything that harms them - we need to minimize children's exposure to air pollution. Even though the toxic cocktail of chemicals in air pollution is largely invisible to the naked eye, these elements are deadly and affect children's health and well-being. Minimizing exposure requires actions by families and individuals, as well as communities and governments. These can include providing better ventilation, as well as insulation, depending on the source of pollutants in homes; the provision of cleaner cookstoves; and preventing exposure to tobacco smoke. They can include greater knowledge and awareness of how to protect oneself and one's family. Finally, they can include better urban planning and making sure that polluting sources such as factories and highways are not built within the immediate vicinity of schools and playgrounds.

We also need to focus efforts on reducing air pollution. Reducing air pollution will translate into millions of saved lives, and lead to better, healthier lives for our children and future generations. At the governmental level, actions should be implemented to reduce fossil fuel emissions, and increase investments made in sustainable energy and low-carbon development. These include commitments made as part of the COP21 Climate Change Paris Agreement and Nationally Determined Contributions (NDCs). Within communities, better management of community resources, including safe waste disposal, better public transportation options, and information and knowledge on reducing pollution, is needed.

We need better monitoring of air pollution. Air quality can fluctuate rapidly in every environment. For example, cooking or heating with biomass in the home can cause a rapid spike in indoor air pollution. Urban outdoor pollution spikes during rush hour in most cities. Waste-burning tends to be practised at certain times of the day in many places. Monitoring systems can help individuals, parents, families, communities and local and national governments become more aware of how air pollution might affect them, and adjust to immediately prevailing conditions to minimize exposure. These measures will not in themselves stop the problem of air pollution – but they are a necessary and important first step. The more we know about air pollution, the better we can figure out how to protect children from its negative effects.

For a full list of references, please see *Clear the air for children - The impact of air pollution on children* (2016).


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Division of Data, Research and Policy
3 United Nations Plaza
New York, NY 10017, USA

climate@unicef.org
www.unicef.org/environment

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