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Pollution, health and development: the need for a new paradigm

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Abstract

Background: Pollution is the largest cause of death in low- and middle-income countries. WHO estimates that 8.9 million persons die each year of diseases caused by pollution – 94% of them in poor countries. By comparison, HIV/AIDS causes 1.5 million deaths per year, and malaria and tuberculosis cause fewer than 1 million each. Diseases caused by pollution are very costly.
Prevention: Pollution can be prevented. In high-income countries, legal and technical control strategies have been developed and yielded great health and economic benefits. The removal of lead from gasoline increased the mean IQ of all American children and has generated an annual economic benefit of $213 billion.
Unmet need: Despite its enormous human and economic costs, pollution has been overlooked in the international development agenda. Pollution control currently receives <0.5% of development spending.
Solution: We have formed The Lancet-GAHP-Mount Sinai Commission on Pollution, Health and Development. This Commission will develop robust analyses of the impacts of pollution on health, economics, and development. It will inform heads of state and global funders about the enormous scale pollution's effects. The ultimate goal is to raise the priority of pollution and increase the resources allocated to control of this urgent public health problem.

Keywords: children's environmental health; global health; health economics; pollution; sustainable development goals.

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Pollution and health

Environmental pollution is a major cause of disease, disability and death. The World Health Organization (WHO) estimates that in 2012, household air pollution caused 4.3 million deaths, ambient air pollution caused 3.7 million deaths and polluted water caused 842,000 deaths worldwide (1–3). Contaminated soil at active and abandoned mines, smelters, industrial facilities and hazardous waste sites killed tens of thousands more (4). By comparison, HIV/AIDS causes 1.5 million deaths per year, and malaria and tuberculosis cause fewer than 1 million deaths each (5).

Pollution causes a wide range of acute diseases as well as chronic, non-communicable diseases in persons of all ages (6). Thanks to recent advances in epidemiology, we now know that the diseases caused by the various forms of pollution include asthma, diarrhea, neurodevelopmental disorders, and birth defects in children, and heart disease, stroke, and cancer in adults.

Toxic chemicals and pollution

Toxic chemicals are increasingly important components of pollution. Many thousands of new chemicals have been invented in the past 50 years. They are used in a vast array of products, are widely disseminated in the global environment and are detectable today in the bodies of most people. Many have never been adequately tested for safety (7). Toxic chemicals are linked to a wide range of diseases. Chemical contamination in low- and middle-income countries (LMICs) is increasing rapidly (8, 9). Globalization of the chemical manufacturing industry, the recycling industry and other heavy industries is a powerful driver of this trend. These polluting industries are relocating to poor countries where production costs are low and environmental regulations and public health infrastructure are often absent. Workers and communities in these countries are increasingly exposed to toxic chemicals, often under highly uncontrolled conditions. Examples include the Bhopal disaster in India (10); the continuing global trade of 2 million tons per year of newly produced asbestos

(11); the shipment into poor countries of 45 million tons per year of e-waste (12); informal recycling of car batteries for lead scrap in third world mega-cities; the enormous releases of mercury to the environment from artisanal gold mining; and the 2015 explosion in a chemical storage facility in Tianjin, China.

Patterns of pollution and of the diseases related to pollution change as countries move through development. Reflecting the globalization of heavy industry and the increasingly wide global distribution of toxic chemicals and hazardous pesticides, this transition moves from household air pollution (HAP) and water pollution in the world's least developed countries to urban air pollution and pollution of air, water and soil with toxic chemicals in more highly industrialized countries (13). Countries passing through development are simultaneously exposed to both old and new forms of pollution and thus are at risk for a double burden of disease (13).

Pollution and poverty

Pollution is closely linked to poverty. An estimated 8.4 million (94%) of the 8.9 million deaths caused each year by pollution occur in low- and middle-income countries (LMICs) (1–3). In countries at every level of income, polluting industries and hazardous waste sites are disproportionately located in poor, minority and marginalized communities, a phenomenon termed "environmental injustice" (14).

Pollution is undercounted

The health impacts of pollution are undercounted. In calculations of the Global Burden of Disease, the various components of pollution have usually been considered separately, one at a time, each apart from the others (6). This disaggregated approach reflects the typical approach to environmental research, which focuses on one pollutant at a time. It is consistent also with the structures of public health and environmental protection agencies in countries around the world that typically have separate bureaus dealing with air, water and solid waste. This approach has enabled great gains in scientific knowledge of the health effects of pollution, but an unintended consequence of this fragmented approach is that it minimizes the total burden of pollution and hence fails to give pollution the full attention it deserves in planning and policymaking.

Pollution is very costly

The diseases caused by pollution impose great economic costs on countries around the world, including direct medical costs, opportunity costs reflecting the diminished productivity of populations damaged by pollution, and costs to health care systems (15). In the US, the annual cost of diseases in children caused by environmental pollution is estimated to be US$ 76.6 billion (16) and the cost of occupational diseases and injuries is US$ 250 billion (17).

Pollution can be controlled

High-income countries have identified and controlled many of their worst problems of pollution. They have developed effective strategies that have reduced incidence and prevalence of the diseases caused by pollution. The most effective of these strategies, such as the removal of lead from gasoline, national bans on asbestos and mandatory stack scrubbers on polluting industry, combine legal, administrative and engineering strategies and control pollution at its source. These actions provide a blueprint for future control of pollution in LMICs. They can be replicated in LMICS to enable these countries to leapfrog over pollution and avoid the environmental disasters that have plagued industrial development in Western Europe, North America, Japan, and Australia.

Pollution control can yield great economic benefits. The removal of lead from gasoline has generated an estimated benefit in each annual US birth cohort since 1990 of US$ 213 billion (range US$ 110 to US$ 318 billion) (18), a cumulative benefit of more than US$ 3 trillion. This benefit principally reflects the enormous increase in national economic productivity that followed the 2–5 point gain in population mean IQ that was the consequence of widespread reduction in children's blood lead levels.

Pollution control is under-resourced

Despite its enormous human and economic costs and the proven effectiveness of pollution control, environmental pollution has been largely overlooked in the global health and international development agendas. Environmental pollution receives <0.5% of global development spending (19, 20).

Need for a new paradigm

Need exists to develop a new paradigm for pollution control at the international level and in countries around the world, a paradigm that elevates pollution in the global health and international development agendas and catalyzes the dedication of a level of resources to pollution control that is commensurate with the great magnitude of the problem.

The Commission

To create a new paradigm that will move pollution control more toward the center of the global public health and international development agendas, The Lancet, in partnership with the Global Alliance on Health and Pollution and the Icahn School of Medicine at Mount Sinai, has launched a high-level Commission on Pollution, Health and Development.

Commissioners have been drawn from many backgrounds including health, economics, policy and engineering; from academia, government and international agencies; and from diverse geographical backgrounds. The Commission includes a nobel laureate, former heads of state, and representatives of international agencies including the World Bank, the United Nations Environment Programme (UNEP), and the World Health Organization (WHO). The work of the Commission is expected to last for about 18 months and the Commission's final report is expected around December 2016.

The goals of the Commission are: [1] to educate key decision makers in countries around the world about the enormous scale of the effects of pollution; [2] to influence policy makers to take immediate action to address health and economic problems associated with pollution; and [3] to bring pollution control into the center of the global health and international development agendas.

The Commission plans to produce a detailed report that will be directed to Heads of State and to international donors, governmental and private. This report will begin by reviewing the various types of pollution and the diseases that they cause. It will present analyses country-by-country of the types of environmental pollution and of the burden of disease that each causes. Next, the report will present data on the economic costs of pollution. The third section will focus on environmental injustice and highlight the disproportionate burden of disease that pollution imposes on the poor and the disenfranchised. In the fourth section, the report will review policies and strategies for pollution control – legal, administrative and technical solutions – and will examine successes and failures in pollution control – what works and what does not work. The report will close with a presentation of the Commission's final conclusions and main recommendations.

The Commission plans to especially direct its conclusions and recommendations to Heads of State because the problems associated with environmental pollution cross the boundaries of multiple governmental agencies and ministries. To solve these problems, it is therefore necessary to bring together multiple agencies within governments, including agencies overseeing health, environment, finance, transport, energy and planning. Only Heads of State have the power to forge the strong interagency partnerships that are needed to develop bold, forward-looking, cross-sectoral solutions to the enormous health and economic problems of pollution.

Conclusion

Pollution is not the inevitable consequence of development. LMICS need not experience widespread pollution that degrades the environment, undermines social cohesion, and condemns future generations to continuing poverty and endless poor health. Pollution is a problem that is solvable in our lifetime. Investment in pollution control is a highly cost-effective way to improve human health, enhance return on investment in international development and accelerate economic development.

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