

Cities and Health

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CITIES in developing countries are increasingly unhealthy places to live, with local governments lacking the capacity to collect and dispose of municipal sewage and solid waste, or control effluents from industry and emissions from transport. Infrastruc-

ture and services are often unable to keep pace with the discharge of pollutants, and the concentration of waste overwhelms the assimilative capacity of natural ecosystems, within city boundaries and often downstream as well, creating problems for rural household and agricultural water use.

These problems will only be compounded as rapid urbanization continues in the next century. In Asia, the urban population is expected to reach 2.5 billion in 2025, three times what it was in 1990, and even now, 87 Asian cities (38 in China, 23 in India) have more than one million inhabitants. Latin America is even more urbanized than Asia, while Africa is slightly less so. Across the world, not only is the number of large cities increasing, but smaller cities are becoming larger at a faster rate.

Of all the costs of urban environmental degradation, damage to human health is by far the highest. This is followed in importance by higher productivity costs, with environmental problems imposing higher costs to producers and consumers. These include the higher costs of supplying clean water due to polluted nearby sources, of transport due to congestion, of repairing and maintaining buildings damaged by air pollution, of higher wages to compensate workers for working in unhealthy environments, and tourism losses. In addition to these local effects, urban areas also generate global environmental costs, specifically the global damage associated with greenhouse gas emissions.

Quantifying Health Impacts

The most direct links between urban environmental degradation and public health are: (a) air pollution and respiratory diseases (see *Box*, page 39); (b) water pollution and water-related diseases such as diarrhea, dysentery, cholera, and typhoid (see *Box*, page 40); (c) solid waste and

such diseases as the plague, carried by rats (although this is far less common than the first two); and (d) toxic waste and toxicity-related cancers and neurological problems. Health impacts can be divided into premature deaths (mortality) and sickness (morbidity), some cases of which may involve hospitalization.

Bank studies estimate that the human costs of air and water pollution in many of the world's major cities run to tens of thousands of deaths, millions of incidents of moderate to severe sickness, and billions of dollars in lost productivity and other damage per year—*per city*. In Africa and in South, Southeast, and Central Asia, water pollution has the severest health impact, while in China, Latin America, and Eastern Europe, the severest impact comes from polluted air. In general, cities in temperate zones and with higher per capita incomes have relatively worse air pollution problems, often in winter; whereas warmer cities with lower income levels and lower rates of access to clean water and sanitation have relatively worse water pollution problems.

At a time when environmental health damage is worsening in many cities, careful quantification of that damage is helping policymakers combine environmental and health decisions with sound economics. Quantification helps set priorities, mobilize public awareness, and encourage communication across different constituencies and interest groups, including environmentalists, health professionals, and anti-poverty NGOs. For example, studies from the mid-1990s showing that thousands of people die every year in New Delhi due to air pollution—and tens of thousands more across India—have been frequently cited in the media, updated by NGOs trained in air pollution modeling, and cited in parliament and in the high courts.

Poverty and the Urban Environment. As described in detail in the *Box* on page 40, the poor bear the brunt of urban environmental degradation: they are less buffered than the non-poor from water pollution, solid and toxic waste, high traffic, and air and noise pollution. In addition, slums lack potable water, sanitation, and drainage; are overcrowded; and are often located closer than



City street in Pakistan.

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Health Impacts of Air Pollution

The two largest health impacts of air pollution are: (i) premature mortality, primarily from exposure to high levels of fine particulate matter; and (ii) excess cases of chronic bronchitis and other respiratory infections, again associated with fine particulates. While ozone, sulfur dioxide, nitrogen dioxide, and atmospheric lead also cause sickness and occasional death, the impacts are generally less severe than those associated with particulates. Such impacts have been estimated through epidemiological work begun in industrial countries in the 1950s, but similar work is increasingly being done in developing countries as well.

A worldwide review of 126 cities in which high levels of particulates exceed World Health Organization (WHO) guidelines estimates that 130,000 premature deaths and 50–70 million incidents of respiratory illness occur each year due to air pollution.^a In East Asia alone, there are more than 10,000 deaths a year in Beijing, 3,000–6,000 in each of ten other Chinese cities, 6,000 a year in Jakarta, and 2,000–4,000 a year each in Bangkok, Seoul, and Manila. There are also 30,000–90,000 cases a year of severe chronic bronchitis in each of these cities. In monetary terms, these costs total 28 percent of urban GDP in Beijing, 8–30 percent in other Chinese cities, 7 percent in Manila and Bangkok, and 4 percent in Seoul. The costs in many cities, such as Jakarta and Bangkok, would be 20–40 percent higher if vehicle costs and the value of time lost in traffic congestion were included.

Elsewhere in the world, air pollution impacts are comparable: 40,000 premature deaths a year in India, 36,000 in the Newly Independent States, 4,000–6,000 in Cairo, 4,000 in Sao Paulo and Rio de Janeiro combined, and 6,400 in Mexico City. The economic value of this health damage represents 3–10 percent of urban income. One recent study has shown that the “environmental costs of fuel use in large cities can be so high that marginal damage costs are comparable with or even exceed (for some fuels) both producer and retail prices.”^b These numbers make urban pollution both a major health and a major economic concern.

These health damage estimates are increasingly being used to compare the cost of pollution abatement with the health benefits gained, and the findings are that the cost of abatement per life saved is extremely low—often \$1,000 or less. Specifically, the rate of return on particulate emission control is so high that it is an extremely cost-effective public health approach to pursue in all cities with high particulate levels.

Notes:

- a. Maddison, David, “A Meta-analysis of Air Pollution Epidemiological Studies,” Center for Social and Economic Research on the Global Environment, University College London, 1997.
- b. Lvovsky, Kseniya and Gordon Hughes, “Addressing the Environmental Costs of Fuels in Developing Countries,” World Bank, presented at a conference of the Association of Environmental Economists, Venice, Italy, June 1998.

other neighborhoods to waste dumps and industrial sites. One study showed that urban slums in Bangladesh have twice the infant mortality rate as the overall urban population, and nearly 50 percent higher infant mortality than rural areas.¹ While these data capture the effects of other factors, including the hygiene and access to medical services of slum dwellers, they are a strong indicator of the environmental insults to public health in slum areas.

Overall, urban cleanup will reduce more sickness and death in the poorest neighborhoods than

elsewhere in cities. Although the poor may have to pay the cost of improved services, this has proven not to be a serious barrier. Worldwide, the urban poor have been willing to pay for improved water supply, sanitation, and solid waste collection, mainly because they are already paying heavily in other ways: in illness from drinking polluted water, in fuel costs from boiling their water, or from buying clean water from private hawkers, often at two to twelve times the price paid to water utilities by the middle and upper classes.

This article notes that health costs resulting from urban air, water, and solid waste pollution can reach 10 percent of urban income.