Air Pollution Still a Problem

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Emissions of many air pollutants have declined or stabilized in industrial countries in recent years, the product of national regulations and international protocols over the past three decades that restrict the worst contaminants. Pollution levels are still unhealthy, however, particularly in light of new studies suggesting that the health risks from air pollution are greater than scientists believed even a decade ago. And in developing countries, especially nations undergoing rapid industrialization, most air pollutants are present at levels that are now causing significant numbers of deaths.

The World Health Organization (WHO) refers to six contaminants that are harmful to human health: carbon monoxide, lead, nitrogen dioxide, sulfur dioxide, ground-level ozone, and suspended particulate matter (usually in dust and smoke).[1] The six pollutants, whose mixture over the world's cities can vary widely, are generally the product of fossil fuel use in factories, power plants, and motor vehicles or the result of burning biomass such as forests or post-harvest crop stubble. (The WHO definition does not include carbon dioxide, which is implicated in climate change. A separate source of contaminants, indoor air pollution, is also not covered here.)

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Because data on contamination are uneven for urban areas globally, a comprehensive assessment of the quality of air worldwide is difficult. But a World Bank survey of more than 100 cities in industrial and developing countries that had data on emissions of sulfur dioxide or nitrogen dioxide found that the air in many urban areas remains unhealthy.[2] Some 29 percent of the cities listed recorded sulfur dioxide emissions (often associated with power plants) above maximum levels allowable under WHO guidelines, and 71 percent had nitrogen dioxide emissions (often associated with automobile use) that exceeded WHO maximums.[3]

In general, developing countries are less likely to meet WHO standards. Chinese cities are particularly hard hit. More than 80 percent of Chinese cities in the World Bank list had sulfur dioxide or nitrogen dioxide emissions above the WHO threshold.[4] And nearly half of the Chinese cities with excessive sulfur emissions registered levels at more than double the WHO standard.[5]

The health impacts of air pollution are more serious than was assumed through most of the twentieth century. Studies have found that the smallest particles of smoke and dust—less than 2.5 microns in size, about one fortieth the diameter of a human hair—pose the greatest risk to health.[6] This led scientists to conclude in studies in 2002 and 2004 that growing up in a city with polluted air is about as harmful to a person's health as growing up with a parent who smokes.[7]

Emerging evidence suggests that rapidly increasing rates of asthma may be linked to air pollution. Asthma appears to be correlated with high levels of ground-level ozone. In a southern California study, thousands of children in 12 communities—6 heavily polluted, 6 with relatively clean air—were monitored over five years.[8] Those active in sports in the communities with polluted air were three to four times more likely to have asthma as less active kids in communities with cleaner air.[9]

Studies in the Czech Republic and Mexico City found that the risk of infant death is doubled when pollution levels are the highest.[10] And lead, which is added as an anti-knock agent to gasoline in many countries, can damage the kidneys, nervous system, brain, and cardiovascular and reproductive systems. In children, it has been linked with reduced intelligence, lack of focus, and behavioral problems.[11]

Meanwhile, a 2000 World Bank study projected that on average 1.8 million people would die prematurely each year between 2001 and 2020 because of air pollution.[12] (See Table 1.)

Although air pollution is concentrated in cities, it can move well beyond them. Acidic lakes in Scandinavia have long been linked to pollution from factories in the United States, for example.[13] Recently, scientific attention has focused on the "Asian Brown Cloud"—a two-mile-thick collection of soot, fly ash, and sulfuric acid that has been parked over South Asia for more than a decade. The U.N. Environment

Table 1. Projected Premature Annual Deaths due to Urban Air Pollution, Total and by Economic Group or Region, 2001–2020

Region	Premature Deaths
	(thousand per year)
Established market economies	20
Former socialist economies	200
China	590
India	460
East Asia and the Pacific	150
Latin America and the Caribbean	130
South Asia	120
Middle East Crescent	90
Sub-Saharan Africa	60
World	1,810

Source: World Bank.

Programme (UNEP) reported in 2002 that this cloud had killed tens of thousands of people in the past 10 years, including 52,000 in India alone in 1995.[14] Originating from forest fires, wood-burning stoves, and a sharp increase in fossil fuel burning that has accompanied economic expansion in South Asia, the pollution has reportedly cut the amount of sunlight reaching Earth's surface by 10–15 percent.[15]

Smog has serious economic effects as well, especially in farming, where it is known to reduce crop yields. Ozone, which decreases plants' capacity to engage in photosynthesis, tends to reach its highest levels in the summer and in crop-growing regions around cities. More than half a dozen comprehensive studies in the United States and Europe since the 1980s have shown that yield reductions from ozone are economically significant.[16] A 2002 study of European farming, for example, determined that ozone was costing farmers more than 6 billion euros annually.[17]

The experience of industrial countries in tackling air pollution suggests that major advances are possible. A 1999 Princeton University review of 17 studies from five continents found a strong correlation between reductions in lead levels in gasoline and blood lead levels.[18] And when transportation policies that discouraged car use during the 1996 Olympic Games in Atlanta, Georgia, reduced vehicle-related pollutants by about 30 percent, the number of acute asthma attacks and health insurance claims fell by 40 percent, while pediatric emergency admissions to area hospitals dropped by 19 percent.[19]

Mounting evidence of the damage from air pollution and of the effectiveness of abatement policies has led to various efforts to phase out leaded gasoline and reduce sulfur levels in fuels globally. The world's leading engine manufacturers called for the elimination of lead by 2005.[20]

In 2002, a global Partnership for Clean Fuels and Vehicles was established at the World Summit on Sustainable Development.[21] UNEP, one of the partners, has spearheaded the cause in Africa in particular and announced in 2004 that more than 50 percent of the gasoline sold in sub-Saharan Africa was now lead-free—a major advance for a continent that has been slow to address the lead issue.[22]

Meanwhile, the American Academy of Pediatrics, alarmed at evidence that pollution in the United States continues to pose a serious health risk to children, called in December 2004 for stricter emissions standards for ozone, nitrogen dioxide, and particulate matter; higher fuel economy standards; the promotion of alternative fuels; and support for public transportation, carpooling, walking, and cycling.[23]

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