

## **PATTERNS OF ECONOMIC AFFLUENCE AND ENVIRONMENTAL DEGRADATION IN HOUSTON, TEXAS**

**Judith A. Cherni**

*Imperial College of Science, Technology and Medicine, Centre for Environmental Technology, London, UK*

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### **Summary**

The relation between urban industrial air pollution and ill-health, particularly in highly economically developed cities, has been recognized for years now; yet severe urban contamination continues to cause damage particularly to children's health. Plausible evidence is provided in this paper that changes in both the quality of natural environments and the status of residents' health is strongly related to social structures that have promoted unprecedented economic growth which had resulted in widespread air pollution. Whereas political and economic institutions have consistently and successfully promoted growth, neither health care institutions nor pollution regulations have fundamentally been able to protect residents from the risks of hazardous emissions produced in massive industrialization.

The case of the city of Houston in Texas, USA illustrates not only dramatic and unregulated economic growth, but also severe air contamination, while having, paradoxically, some of the best health care facilities in the world. The city displays extraordinary affluence due to the oil business. However, wealth in the city stands in stark contrast to environmental and health degradation. Houston shows among the highest national levels of air pollution and poorest public health. Significant political and economic structural changes are needed in order to achieve a cleaner urban environment and to protect the health of the residents

## **1. Introduction**

Since Rachel Carson's book (1962), there has been a series of influential publications that have highlighted a tension between growth and the environment, although concern over the relationship between air pollution and ill-health, particularly in large cities, had already existed for some time. The linkage between air pollution in highly urbanized areas and ill-health was already recognized and studied in the nineteenth century. However, only since the 1970s have scientists systematically focused on the problems of escalating industrial and other economic activities and air pollution in cities, and the subsequent disarrangement in ecological and human functions.

Today, the unhealthy environment of many large cities reminds us of tragic episodes of air pollution in the 1950s and related mortality in the past. This chapter discusses the case of industrial air pollution and ill-health in highly economically developed cities. It provides plausible evidence that it is a misconception to assume that further wealth brought by economic growth in industrialized countries will necessarily result in social and ecological improvements such as sustainable urban environments and decent public health. This point is analyzed with reference to Houston, a city that, under unrestricted growth and free enterprising, epitomizes the economic American success-story after the Second World War. Houston is famous for its gigantic petrochemical industry and for its Houston Medical Center which comprises advanced technology, professional excellence and numerous specialized hospitals. The city is also well known for international trade, real estate development and the seat for international finance.

However, impressive achievements and successful economy in Houston have concomitantly brought severe atmospheric pollution. The current degraded quality of the natural environment, as well as deficient access to health care in Houston, are indicative that the path of producing further wealth and relying on technology may not be sufficient or appropriate to promote urban sustainability. Therefore, in order to approach sustainability in cities in relation to the issue of air pollution and health in particular, the paper looks into national and international factors which have crucially affected the strategic option of industrialization and economic growth. It discusses the degree of environmental protection; and characterizes public health care in Houston. Before touching on those aspects of the urban sustainability problematic, however, the health effect of air pollution in large industrialized cities will be briefly discussed.

## **2. Air Pollution and Ill-Health in Cities**

Undoubtedly, the absolute concentration of industrial urban pollution has decreased noticeably since the 1950s, and its characteristics have certainly changed in relation to the type of air contamination registered in the past. Yet, in the last fifteen years, the similarly insidious impact of lower levels of air pollution on health, and the damage that new pollutants cause, have been increasingly recognized. The recurrence in the 1990s of remarkably high levels of air pollution together with severe health consequences suggests that air pollution in European and American industrialized, industrializing and post-industrialized cities remains nowadays as much of a problem as it was in the 1940s and 1950s.

On the 39th anniversary of the 1952 Great London Fog, atmospheric conditions in the city closely resembled those of the days of the pea-souper. In December 1991, inversion conditions prevailed and pollution from car exhausts combined with freezing temperatures to produce smog that exceeded levels in many of the world's dirtiest cities. Motorists in London were urged by the government to stop driving as winter air pollution reached the highest levels since records began in 1976. The Department of the Environment clearly announced the health risks from high levels of air pollution "the high levels of nitrogen and sulfur dioxide will continue making it dangerous for asthmatics, bronchitis sufferers, elderly people and babies to go outdoors until tomorrow". "The day Britain choked", as one newspaper called it, caused an estimated 160 excess deaths while hundreds more experienced breathing difficulties.

Both mobile and stationary sources of emission have been found to contribute significantly to the total USA-wide annual incidence of cancer. Considering both direct emissions to the atmosphere and secondary formation, mobile sources had been estimated to be responsible for approximately 58% and stationary sources approximately 42% of total annual cancer incidence. The relative contributions of point and area sources to total area-wide lifetime individual risks are consistent with the character of a study of six American geographic locales. In five less-industrialized cities, the chemical 1,3-butadiene, a recognized major carcinogen, was estimated to contribute between 6% and 24% of the total cancer incidence, all attributable to motor vehicles. However, in the sixth, a heavily industrialized city, over 48% of the total cancer incidence was attributed to 1,3-butadiene. Of the 1,3-butadiene related cancer incidence in this city, over 80% was attributed to chemical manufacturing plants and less than 20% to motor vehicles.

A strong correlation between the number of deaths and presence of high levels of total suspended particulates or PM-10 or sulfur dioxide was uncovered for the London winters of 1958-1972. Significantly, the strength of the correlation remains despite the fact that absolute levels of mortality and air pollution were lower than in earlier years' winters. It has been argued that in cities with high levels of air pollution mortality rates are higher than in less polluted cities. In Athens, Barcelona, Caracas, Mexico City, Paris and Tokyo, triggers such as sulfur dioxide, airborne allergens, ozone pollution and nitrogen dioxide have been correlated with mortality from respiratory problems, increase in emergency visits to hospitals, with asthma attacks, frequent cardiovascular disease, and with general respiratory symptoms.

The number of young children with asthma admitted to hospital in Britain has increased 13 fold since 1960. In July 1994, the biggest asthma outbreak ever registered anywhere in the world occurred over much of England. The scale of the outbreak almost certainly meant pollution was a factor. The asthma epidemic is remarkable also in other countries. In Finland, military records show that between 1961 and 1989 the proportion of new recruits with asthma suddenly and dramatically increased 20 fold.

High levels of school absenteeism in Utah Valley, USA, were associated with exposure to high concentrations of PM-10 emitted by an integrated steel mill. Hospital admissions in Barcelona, Spain, increased when air pollution was very high, and 48% out of all patients admitted were suffering from asthma or bronchospasm emergencies.

A 20% higher risk of children developing respiratory problems in Mexico City was found when they were exposed to an ozone pollution peak of  $> 0.13$  PPM, for two consecutive days in 1988.

It is apparent that, in large cities in the developing world, industrialization and other urban processes have produced similar outcomes to those in the developed countries. Mexico City has frequently been identified as one of the most polluted areas in the world. Not surprisingly, almost half of all babies have dangerous levels of lead in the blood.

There is evidence to suggest that one out of three children living in the Chilean capital, Santiago, suffers from bronchitis, and visits to doctors for the treatment of respiratory problems are higher than the annual average world-wide. In the Brazilian city of Sao Paulo, which, unlike the rest of the country, is highly industrialized, respiratory disease is prevalent and is the most common cause of death for children under the age of four. Among people aged 60 and over in Sao Paulo, around 14% of deaths are caused by respiratory problems, compared with an average of 8.6% for the rest of Brazil.

The review in this section has pointed at the very possible connection between rising air pollution in cities and increased incidence of ill-health and mortality in industrialized, industrializing or post-industrialized cities (i.e. Mexico City, Athens, Los Angeles, Houston, London). Considering the current poor state of the urban environment in many large cities, and the rising evidence of a relationship between air pollution and ill-health, particularly in children, a number of issues need to be confronted.

For example, why has the environmental balance in cities so frequently been disrupted? Why has official environmental protection been so slow to incorporate adequate measures against obvious air contamination? How do we explain the fact that, although increasing urban air pollution is directly attributable to industrial, transport and urban activities, these have not been curbed accordingly in order to protect the environment and health? How does the health care system provide for the danger of exposure to toxic air? The relationship between air pollution and ill-health in large cities is complex and it involves more than bio-medical factors.

Promoting urban sustainable environments in cities involves an adequate social understanding of what causes environmental and other problems. A “disintegrated” view of the problem will only mislead us because crucial political dimensions of the configuration of environmental pollution and ill-health remain hidden from view.

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## Biographical Sketch

**Judith A. Cherni** is currently a Fellow Research Lecturer at the Department of Environmental Science and Technology in Imperial College London. She has a Ph.D. from the London School of Economics and published book chapters and articles on the subject of globalization, modern risks, and local change. Her recent book *Economic Growth versus the Environment. The Politics of Wealth, Health and Air Pollution* (2002, Macmillan) raises questions about the politics of air pollution and ill-health from a multidisciplinary perspective in developed economies. She has written on the globality of environmental hazards and is also working on the issue of energy and sustainability in poor rural areas in developing countries.