

A CHINA ENVIRONMENTAL HEALTH PROJECT RESEARCH BRIEF

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Hedley Environmental Index Sheds New Light on Hong Kong's Air Pollution

By Eric Cheng and Luo Rui

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A new online index released by Civic Exchange counts the real-time public health and monetary costs of air pollution.

Hong Kong-based public policy think-tank Civic Exchange has launched the Hedley Environmental Index (<http://hedleyindex.sph.hku.hk>), the world's first web-based tool to monitor real-time economic costs of Hong Kong's air pollution in terms of human health and monetary impacts. The Index is named in honor of Professor Anthony Hedley, the Chair of Community Medicine at the School of Public Health at Hong Kong University, who has long worked on air-related health issues in Hong Kong and Southern China.

After many years of researching the correlation between air pollutants and related health impacts, Professor Hedley recognized the need to close the gap between generating scientific evidence and communicating the risks. The Hedley Environmental Index, using objective and peer-reviewed research, simultaneously educates the public and senior decision-makers in the Hong Kong government about the dangers of air pollution. The government is a particularly important audience because the Environmental Protection Department (EPD) is currently reviewing Hong Kong's Air Quality Objectives for the first time since they were originally adopted in 1987. The Index is useful in this context both for showing the impacts of current levels of pollution, as well as acting as a tool to assess the potential public health benefits for new pollution targets EPD proposes.

The Index reports that air pollution alone cost approximately \$300 million 1,155 premature deaths, 81,023 total hospital bed days and 7.25 million doctor visits in 2008. A cumulative calculation of the five years from January 2004 to December 2008 show the costs at an alarming HK\$12.4 billion, 6,068 premature deaths, 432,698 avoidable hospital bed days and 39.2 million avoidable doctor visits.

HOW DOES THE INDEX WORK?

The Index website has two functions: The Air Quality Tracker and the Hedley Environmental Index. The Index reveals the public health impacts and associated economic costs, as illustrated above, while the Air

Quality Tracker provides real-time data on air pollutants in a transparent and easy-to-understand framework.

In the Hedley Environmental Index, data on the four key air pollutants: particulate matter (PM₁₀), nitrogen dioxide (NO₂), sulphur dioxide (SO₂), and ozone (O₃) are gathered from EPD's three roadside stations and ten general monitoring stations. The data is then plotted in real-time against the World Health Organization's (WHO) hourly and annual Air Quality Guidelines. To delve deeper into the issue, the historical series within the Air Quality Tracker adds a different function allowing visitors to review data starting from 2004 and track the history of each pollutant.

The methodology used by Professor Hedley's team to calculate the public health impacts and directly associated costs is consistent with international best practices and ensures that only those impacts attributed to air pollution are presented in the Index's calculations. By comparing the number of deaths that occur when air pollution exceeds the WHO Air Quality Guidelines, the Index model quantifies increases in health care use and mortality. It should be noted, however, that actual figures in the Index provide a rather conservative estimate, which does not yet account for air pollution's effects on vulnerable groups such as pregnant mothers and young children, the monetary losses of long-term health burdens, or the economic losses of Hong Kong's lost tourism.

In contrast, EPD's Air Pollution Index (API) only presents an average concentration level of the same four air pollutants with no indication of any standards. The API applies a qualitative rating system, vaguely graded from "low" to "severe" as a risk communication tool, but this does not inform the public of the impact to people's health when exposed to unhealthy air.

WHY NOT WHO?

The WHO standards, which are based on the best available worldwide studies on the health effects of air pollution, are incorporated into the Index in order to bridge the communication gap between the API and actual health risks. In general, the average pollutant concentration for one year should not exceed the WHO's annual guidelines. Hong Kong's Air Quality Objectives; however, are 2.5 to 4 times more lenient than those of the WHO Air Quality Guidelines, and yet even these lax levels are regularly breached. At the most basic level, it is individuals who end up suffering due to the health impacts from these low benchmarks. Hopefully, the new information provided by the Hedley Environmental Index will encourage the public to raise their concerns about Hong Kong's current pollution levels and demand emission control measures.

Today Hong Kong's long-standing reputation as the premier center for financial intellectuals and business entrepreneurs in Asia is in jeopardy. According to a survey Civic Exchange survey, 1.4 million Hong Kong residents—or almost 20 percent of the population—are considering leaving to escape serious air

pollution. Moreover, those most likely to leave are the top-earning professionals. Both a 2009 economic forecast by *The Economist* and a recent report by the City of London on Asian Financial Centers singled out air pollution as a distinct concern for the city's future economic plans. With a well-developed economy and infrastructure, Hong Kong has the capacity to raise its air pollution standards to address these air pollution concerns. The Hong Kong government has already acted to reduce emissions from the power sector by requiring all coal-fired power stations to install flue gas desulphurization equipment by 2011. Though this is a step in the right direction, more challenging pollution sources, such as pollutants from marine and road transport, require stricter government regulation and more efforts to push cleaner and greener transport.

For now, the Hedley Environmental Index will continue to monitor current air pollution effects and act as a tool to calculate the potential public health effects of future clean-up initiatives.

Appendix

	Dollar Cost (HK\$ millions)	Premature Deaths	Hospital Bed Days	Doctor Visits (Millions)
2008	2317.3	1155	881023	7.25
2007	2386.44	1137	82345	7.59
2006	2398.3	1159	82973	7.59
2005	2570.49	1269	89562	8.07
2004	2771.53	1349	96859	8.74
Total	12444.89	6068	432763	39.23

Source: Hedley Environmental Index

Eric Cheng is a recent graduate from the University of California, Berkeley now working with Civic Exchange. He can be reached at: e_cheng@berkeley.edu. Luo Rui is a postgraduate student at Peking University's Institute of Environmental Science and Engineering who previously worked with Civic Exchange. He can be reached at: rui.roy@gmail.com.