

PRESS RELEASE

How Much Pollution Are You Really Exposed To?

New study uses sensors to measure individuals' exposure to PM_{2.5}, including indoors

HONG KONG, 8 June 2017 – In the first study of its kind in Hong Kong, Civic Exchange and The City University of Hong Kong used newly developed sensors to track individuals' exposure to certain pollutants, as they moved from home, to work, to leisure activities around the city. The research was supported by Morgan Stanley, which provided both sponsorship and volunteer hours by its Hong Kong employees.

Our researchers found that Hong Kongers were exposed to high levels of pollutants indoors, particularly in homes, which is an area that is not normally studied. Civic Exchange hopes that its report, "Monitoring Personal Exposure to PM_{2.5} in Hong Kong with Next Generation Sensors," will be the first step in greater research on this crucial issue.

In a dense city where pollution-related health issues are a growing concern, more detailed data is needed so that researchers and the government can find solutions to protecting public health.

ABOUT THE STUDY

More than 70 volunteers each carried sensors the size of a lunch box 24 hours a day, for several days. These Personal Exposure Kits (PEK) measured each individual's exposure to PM_{2.5}, fine particles largely produced by vehicles. PM_{2.5} are small enough to be breathed deeply into the pulmonary tract, reaching the lungs, making them particularly dangerous to health. The volunteers lived in a variety of districts (from Hong Kong Island, to Kowloon, to the New Territories and Outlying Islands) and used a variety of transportation (including buses, taxis, MTR and ferries).

Our volunteers' readings differed greatly from – and were generally more alarming than – the Hong Kong Government's own pollution figures. The government's Air Quality Health Index (AQHI) is based on 16 fixed stations, which measure outdoor pollutants across larger neighborhoods, but do not address indoor or individual pollution exposure.

KEY FINDINGS

- Our volunteers' PM_{2.5} exposure were generally much higher than readings by the nearest government air monitoring station. Hong Kong may be significantly underestimating its residents' true pollution exposure risk.
- Our volunteers' PM_{2.5} exposure during commuting exceeded limits set by the World Health Organization (WHO). However, they fell within Hong Kong's own Air Quality Objectives, which are more less stringent.
- Time at home made up about half of the volunteers' time over a 24-hour period, and reached 81% during weekends. In total, the volunteers in this study spent more than 85% of their time indoors – including at home, at work, and other indoor environments.

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- PM_{2.5} exposure at home was significantly higher than in the office, and even slightly higher than on transportation.
- Pedestrians, in particular, were consistently exposed to about double the WHO's recommended limit of PM_{2.5} exposure.

RECOMMENDATIONS

- The Government should inform the public on pollution management in households, given the high level of PM_{2.5}. In May 2017, the Environmental Protection Bureau launched a series of Cantonese, Putonghua and English videos on the matter, which Civic Exchange welcomes as a good first step.
- Hong Kong's official Air Quality Objectives should be tightened to meet WHO standards.
- More studies should be conducted on individual pollutant exposure, using a much larger and more varied body of volunteers than this initial pilot study.
- New generation sensors should be developed into something smaller, lighter, and capable of providing real-time or personalized data to the individual.

QUOTES FROM TODAY'S SPEAKERS

"You can check the EPD [Environmental Protection Department] website for today's hourly readings of air pollution levels in different districts, but that's really not enough. We breathe in air every minute, and are exposed to pollution not just when we're outdoors, but when we're at home, in offices or taking the MTR. We need to have better understanding of the different microenvironments in the city that individual citizens experience, and also find out the reasons why some indoor exposure risk is so high."

– *Dr. Zhi Ning, Assistant Professor at The City University of Hong Kong's School of Energy and Environment. Co-author of this report.*

"In Hong Kong, many people refer to the Government's Air Quality Health Index to understand the current state of air pollution. Yet, our study demonstrates that we are often exposed to higher levels of air pollution than what is being reported. Knowing the personal level of exposure to air pollution in different locations and at different times would help us avoid polluted hot spots and better protect us from health problems."

– *Mr. Simon Ng, Civic Exchange Fellow and former Chief Research Officer. Co-author of this report.*

ABOUT US

Simon Ng is a Fellow at Civic Exchange, an independent, public policy think-tank based in Hong Kong. Mr. Ng has deep roots with the organisation, dating back almost to Civic Exchange's founding in 2000, and was previously its Chief Research Officer. He is now an independent consultant working on air quality and urban transportation issues.

Dr. Zhi Ning is an Assistant Professor at The City University of Hong Kong's School of Energy and Environment, which was founded in 2009 as the first educational institution in the region to specialize in tackling sustainability and energy issues. Dr. Ning has more than 70 international publications and multiple U.S. and China patents in PM_{2.5} and gas monitoring and control.

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About Civic Exchange

Civic Exchange is an independent, non-partisan public policy think-tank established in Hong Kong in 2000. With a vision to shape a liveable and sustainable Hong Kong, Civic Exchange's mission is to engage society and influence public policy through research, dialogue and the development of practical solutions. Civic Exchange undertakes research in three major areas: air quality, nature conservation and the urban environment, with an overarching framework of promoting wellbeing.

For more information, go to <http://www.civic-exchange.org>

About the School of Energy and Environment

When it was founded in 2009 at the City University of Hong Kong, the School of Energy and Environment became the only educational institution of its type in the region specialising in tackling sustainability and energy issues.

For more information, go to <http://www.cityu.edu.hk/see/>

MEDIA CONTACTS & IMAGES

The full report is available on the Civic Exchange website: www.civic-exchange.org

Graphics and images are available at <http://bit.ly/AirSensor>

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