

Early childhood development and air pollution

Hong Kong Early Childhood Development
Research Foundation
Dinner Lecture

26th November 2009

Anthony J Hedley



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School of Public Health, University of Hong Kong

Health for all in 21st Century

The human right to

Clean Water



Clean Air



Clean Food



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Where is Hong Kong's pollution coming from?

- ***Hong Kong generated pollutants dominate measurements at monitoring stations for 53% of the time****
- ***In terms of population-time-exposures we are gassing our children on a daily basis***

***[Based on data from Dr Alexis Lau, UST
(accessible at www.civic-exchange.org)]**

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The HEI Environmental Index: a barometer for the health risks of Hong Kong

<http://hedleyindex.sph.hku.hk>



**SCHOOL OF PUBLIC HEALTH
THE UNIVERSITY OF HONG KONG**
香港大學公共衛生學院



CIVIC EXCHANGE

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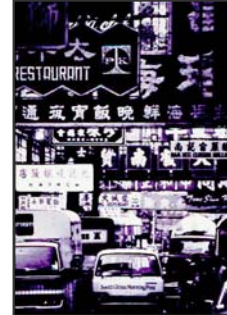
Human activities and air pollution: the insatiable quest for productivity



Power



Manufacturing



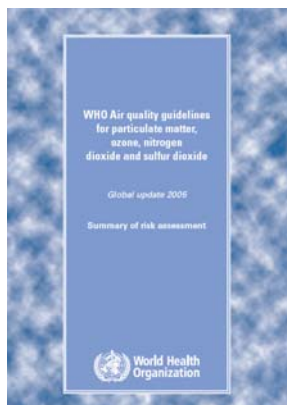
Transportation



Marine and port traffic

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Consistency

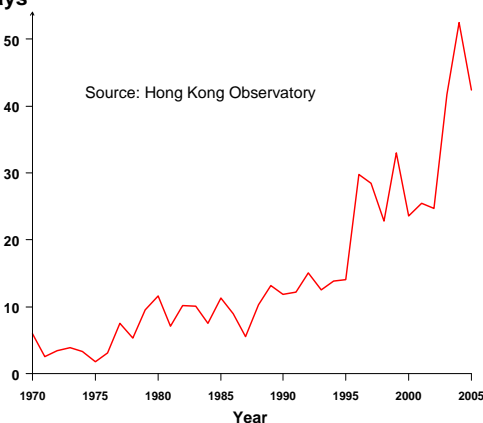


- WHO reviewed thousands of reports
- WHO AQG: a definitive multinational consensus statement
- Asia and Hong Kong strongly represented

Inconsistency

Hazy days

Number
per year



The HKSAR government declares it needs more information on the health effects of air pollution

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Hong Kong: a typical November day



High pollution, low visibility

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Hong Kong needs expert HEALTH control in environmental management

- The Health Bureau and the Department of Health are not involved in the risk assessment or management of air pollution in Hong Kong.
- WHY?
- ***This is a systemic problem in governance which is a hazard for child health***

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THURSDAY, NOVEMBER 5, 2009

South China Morning Post

FOUNDED IN 1903
MORNING POST CENTRE, DAI FAT STREET, TAI PO

Pollution policies should be left to competent authorities

Evidence is mounting worldwide of widespread injury to many body tissues and organs from air pollution. The brain is one victim, as pointed out by Walter de Havilland's reference to German research ("Traffic fumes and dementia", October 24).

The brain may be harmed directly or through damage to its blood vessels by air pollutants. These injuries will begin in the most sensitive younger members of the community and the resulting health effects may have a long latent period.

As a result, we are stoking up a huge potential legacy of illness and health care needs in successive generations of children which future governments, rather than the one now defaulting on air quality management, will have to contend with.

In the meantime, we are continually fed misinformation. The latest is the assertion by someone in the Environmental Protection Department ("Strong likely to stay for another few days", October 26) that "the roadside index is less relevant for most people because they spend only a

short time each day at such locations". This is untrue, and worse, it amounts to sickening cynicism. Using government data and a separate study funded by the government, we can show conservatively that a large proportion of population time, more than 50 per cent to 60 per cent, is spent at more heavily polluted ground-level locations.

Roadside pollution and its health effects are known to extend through a wide radius from the sources and, in Hong Kong, will have an impact on schools, hospitals, transport, shop and office workers, plus roadside residents.

It takes about 20 minutes for roadside pollutants to induce abnormal changes in blood vessels.

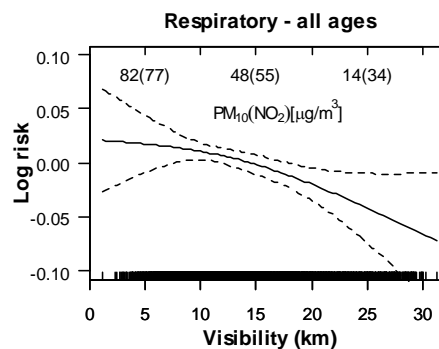
If we want rational policies for air quality management then it is time that the licence to pontificate on environmental health matters be removed from the directorate of the EPD and placed firmly in the hands of informed health authorities. Anthony Hedley, school of public health, University of Hong Kong



A growing body of evidence suggests air pollution harms many organs, including the brain. Photo: David Wong

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The daily risk of death is strongly associated with visibility



Hong Kong's lost horizon is life shortening for those most vulnerable

Estimated dose-response relationships for visibility at lag 0-1 days. The levels of visibility at 5km, 15km and 25km corresponding to concentrations of PM₁₀(NO₂) in μg/m³ were 82(77), 48(55) and 14(34) respectively.

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Sunday Morning Post

APRIL 29, 2007

Ideas to cut causes of smog aired, but for one leading figure they're too late

Bad-air alarm proposed to protect health

Quintus Chan

A new colour-coded air pollution alert system similar to the common warning system - with mandatory actions at the highest level - is proposed in Hong Kong's first public consultation paper on short-term.

Mandatory actions could include reducing a day in pollution warning activity and making businesses to take voluntary action such as halting vehicle use or having employees work from home.

The paper envisages the common old idea of electronic road pricing should be considered again and use of eco-friendly light bulbs promoted.

Prepared by the semi-official Council for Sustainable Development, the paper says the alert would tend to be issued in advance of high levels of air pollution but acknowledge that could cause problems in the event of a false alarm.

Channel experts said the current daily air pollution index readings were only educational and were not prompting people to take positive action.

"In present, children, the elderly and people with respiratory diseases are advised not to exposed outdoors for the extreme when the index reaches above 100. There are only positive actions," a source said.

"There is a sense of helplessness among the public where high-AQI days are announced, because they have no option but to carry on with normal daily activities."

He said a "stop and moving forward alert system" was needed, like minimum warning signals which were simple and easy to understand.

There about a colour-coded scheme, where green means the air quality is good, amber means some action must be taken, and red means urgent action must be taken.

"Of course, we should consider what needs to be done should there be a later alert. There is already some movement in taking action in the high alert, but the idea of the black emergency warning signal is better, people go home. We need more housing and reducing pressure on the alert system."

The council's paper, to be launched next month, cited the example of Toronto, where a strong alert is issued when periods of poor air quality are expected.

On high-wind days, people in Toronto are advised to wear masks, avoid outdoor activities, while those with breathing and heart problems are requested to pay special attention to a worsening of their symptoms.

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de Waart and son Sebastiaan, here, at home in Wisconsin. The boy has needed hospital treatment for asthma. Photo: Wisconsin State Journal

HK orchestra chief moves family to US to escape pollution

Conductor de Waart is moving his family out of Hong Kong after just seven years here, to protect them from the "horrible" pollution.

The Dutch conductor, who has reportedly directed his orchestra in the city since taking up the baton of the Hong Kong Philharmonic Orchestra in 2004, is in the middle of relocating the family home to the United States.

de Waart and his wife Barbara, a singer, have bought a house in her home town of Madison, Wisconsin, and were there last week looking at schools for their two children.

He will be based in Madison with the children, who start school in September; de Waart will divide his time between there, Hong Kong and international touring.

His five-year contract as chief conductor and artistic director - he has an option on a further five years - requires him to work with the orchestra for at least a year.

de Waart's four-year-old son Sebastiaan who has some asthma problems, "he said, 'We have been at the doctor an unbelievable number of times - 30 or 40 times - and even stayed over at the hospital in Happy Valley for two nights about four months ago. It was just horrendous. The air quality is terrible in Hong Kong. I don't know what, at the end of the day, it does to little kids who grow up there, and we just start want to take them out of it. It's that simple."

de Waart said the move had been 50 per cent motivated by their concern for their children and 50 per cent by the fact that "you can just walk out of the city and see the mountains. During times in Amsterdam, San Francisco and elsewhere, he found these cities "quite cheerful".

"Hong Kong is an incredible and everything city and I would not say it's the worst in the world, but you lose your overall picture of what life is all about."

"And I don't think that for you and for your wife it's as horrendous as for someone like me, I would like them to leave Hong Kong and take on the grass, I hear something here."

In a report in the Wisconsin State Journal on April 25, de Waart, 45, was quoted as saying that the city was "incredibly polluted" and it was "pretty stressful" to go to school.

But as Sebastiaan and Olivia, 4, were already Chinese international school, de Waart said he would not leave them to go to school in the United States.

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South China Morning Post

Monday, June 27, 2005

Scientists have launched a project to save the clay figures being corroded by air pollutants, writes Chan Siu-sin

Terracotta army in a battle for survival



"If nothing is done now, in 100 years the warriors may have corroded to such an extent that the pits will look just like a coal mine"



Pollutants in the air have eaten into the Xian terracotta warriors, corroding their features. Photos: Giuseppe San Terracotta Warriors and Pottery Museum



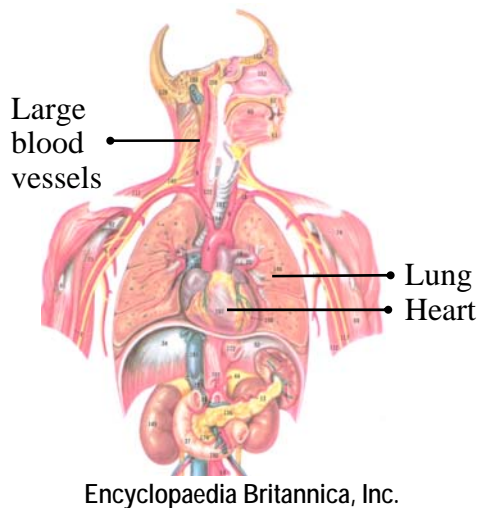
OLD SOLDIERS

- Created during Qin dynasty (221BC to 206BC)
- Discovered on March 29, 1974, when farmers drilled for water in Xuying village, Lintong county
- Museum opened in October 1979
- Warriors are buried on Qin's world heritage site in 1987

What hope for child health in a corrosive environment?

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The Silent Epidemic: Air pollution targets vital organs



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In a silent epidemic: the problem of attribution

Risk estimates for air pollution and health are based on

- clinical observation
- molecular biology
- epidemiology

but body bags in the mortuary do not carry the label

“Killed By Air Pollutants”



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The 2008 Olympics: a model for harm reduction

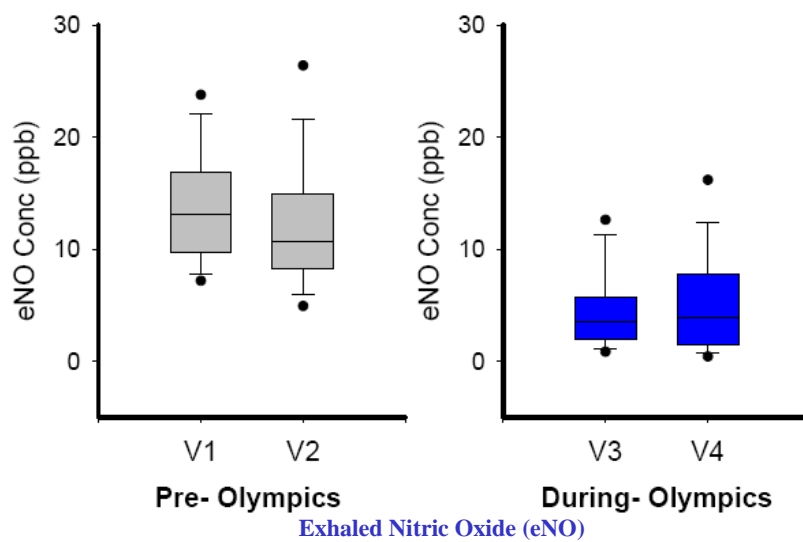


Cyclists pass the national Olympic stadium in Beijing, a city noted for its high levels of pollution

Source: British Medical Journal 2009; 338:b2532

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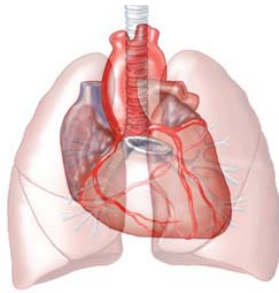
Olympic clean up reduced lung inflammation



Zhang J et al. 2008 Rutgers University

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Air pollution in Hong Kong reduces cardiopulmonary fitness in children



In Kwun Tong compared with Shatin, primary school children had lower maximal oxygen uptake (VO_2 max) during exercise

Yu ITS, Wong TW, Liu HJ.
Journal of Occupational and Environmental Medicine 2004; 46:946-52

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The Hong Kong air quality intervention 1990

Before

Kwai Tsing

After



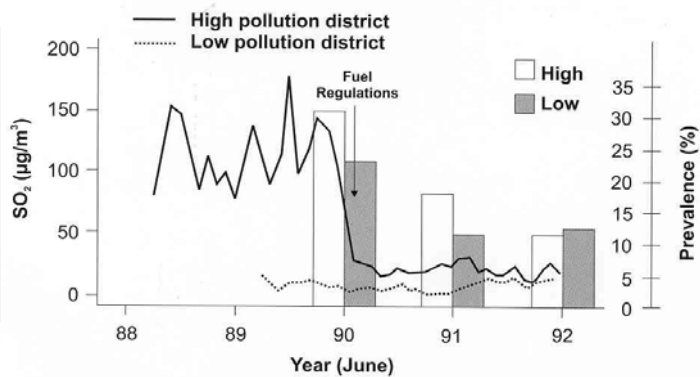
On July 1st 1990 the Environmental Protection Department restricted the sulphur content of fuel to 0.5% by weight
It reduced deaths from heart and lung disease by 600 a year

Source: Photographs by EPD Hong Kong

A J Hedley et al 2002 Lancet 2002

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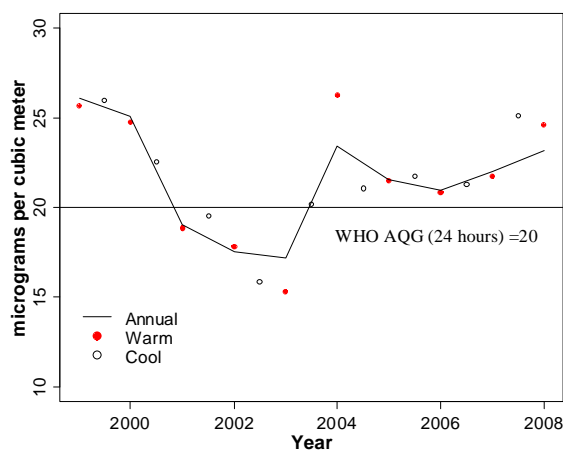
Improved respiratory health of primary school children reduction in bronchial hyper-reactivity



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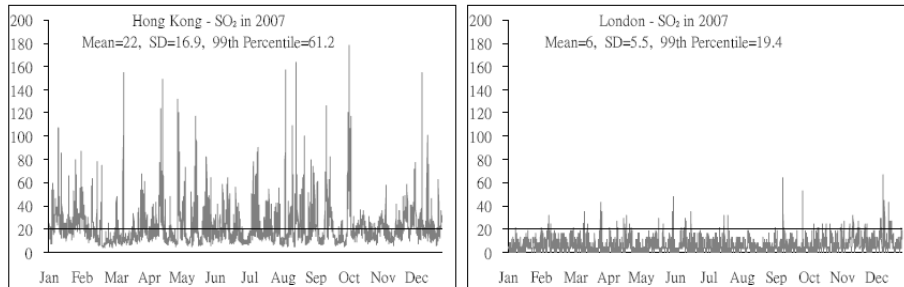
Sulphur dioxide is a major health hazards in Hong Kong

Sulphur dioxide (1999-2008) roadside stations



Annual, warm and cool season average of SO₂ (1999-2008)

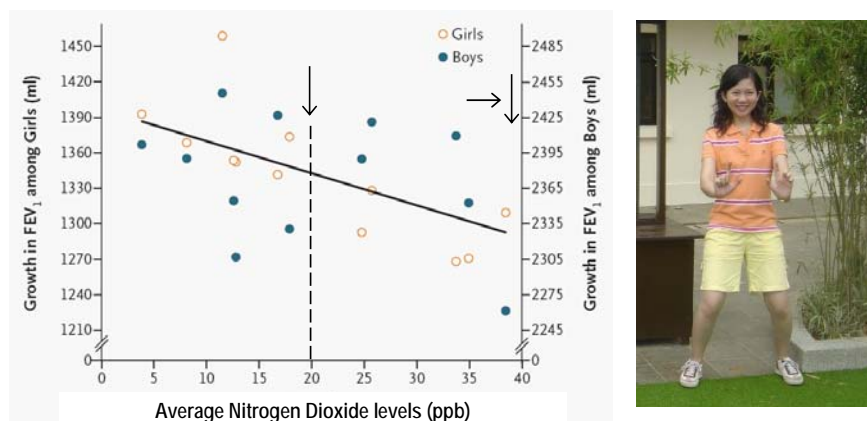
Comparison of hourly SO₂ concentrations London and Hong Kong 2007



Data of London Marylebone Road station, a roadside station located at the centre of London with the most number of air pollutants being simultaneously measured (UK National Air Quality Archive <http://www.airquality.co.uk/index.php>)

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Reduction in lung growth and function in adolescents with exposure to NO₂ in southern California



Gauderman WJ et al. *New England Journal of Medicine* 2004; 351:1057-67

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The Arup report: an exercise in misinformation

Pollutants	Averaging Time	Arup:		WHO 1:		WHO 2:	
		Short-term AQOs proposed by Arup		WHO short-term guidelines or interim targets before Arup modifications		WHO AQGs	
		($\mu\text{g}/\text{m}^3$)	#	($\mu\text{g}/\text{m}^3$)	#	($\mu\text{g}/\text{m}^3$)	#
SO ₂	10-min	500	3	500	0		
	24-hour	125	3	125	0	20	0
PM ₁₀	24-hour	100	9	100	3	20	3
PM _{2.5}	24-hour	75	9	75	3	10	3
NO ₂	1-hour	200	18	200	0	40	0
O ₃	8-hour	160	9	160	0	100	0
To be achieved by		Not specified					

*Estimated from our model

**WHO 24-hour IT2

***WHO 24-hour IT1

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Clean air: “A long term aspirational goal”

- Our minister for the environment has summed up the government’s policy and lack of political will on air quality:
- Achieving cleaner air is

“a long term aspirational goal”

Edward Yau Tang Wah

- ***This is a recipe for impaired health related quality of life for Hong Kong children and signals a serious lack of accountability***

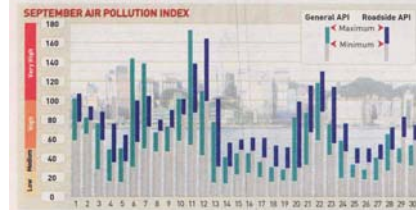
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Pollution threats to child health are a medical emergency

School of Public Health

Sunday Morning Post

A SOUTH CHINA MORNING POST PUBLICATION OCTOBER 26, 2003



HK's smog a medical emergency, says scientist

Richard Holdcroft

As the central government this week announced sweeping new measures to combat air pollution, an internationally respected local scientist described Hong Kong's air quality as nothing short of a medical emergency.

Anthony Hedley, of Hong Kong University's department of community medicine, returned this week from a World Health Organisation meeting held in Bonn, Germany, to draw up air quality guidelines for the 21st century. Data gathered in Hong Kong featured prominently in the deliberations in Bonn.

Professor Hedley, who served on the advisory panel that reviewed the guidelines, said it was high time the government stopped pretending that pollution levels stipulated in our air quality objectives were safe. He said the new WHO guidelines, slated for release in December, are expected to be 200 to 300 per cent more stringent than those currently in use in Hong Kong.

"But even those are just numbers," he said. "It is now generally accepted that there are no safe minimum exposure levels."

Professor Hedley said that by

using these absolute guidelines to assess proposed developments, such as new roads, Hong Kong continued to raise pollution levels dangerously high.

But he reserved his strongest criticism for those who described pollution as an unavoidable cost of progress, saying that our health was effectively being stolen and sold by powerful economic inter-

ests that exert control over the government through, for example, the functional constituencies.

"We all want progress, yes, but at what price - our children's lungs?"

Professor Anthony Hedley
HKU Department of Community Medicine

from chronic inflammatory changes in our pulmonary and cardiovascular systems. I can feel it right now, can't you? My eyes are stinging, and I am wheezing."

Professor Hedley also called on scientists in the public sector to speak out.

The government regarded academics in the private sector as "a damn nuisance", he said, so if those in the public sector could not afford to be critical "then where does the advocacy come from?"

Earlier in the week, the mainland's Academy on Environmental Planning said it estimated that more than 1,000 people die from air pollution each day in China. And the State Environmental Protection Administration announced in Beijing that government measures to combat air pollution would include blacklisting of heavily polluted cities for foreign investment.

Professor Hedley called on the Hong Kong government to show more leadership in combating air pollution together with mainland authorities.

Nobody in the government had a clear lead to tackle air pollution, he said, and as long as this was the case he expected progress to be limited.

8-page special

POLICY ADDRESS 99

CHUNG KONG, THURSDAY, OCTOBER 7, 1999

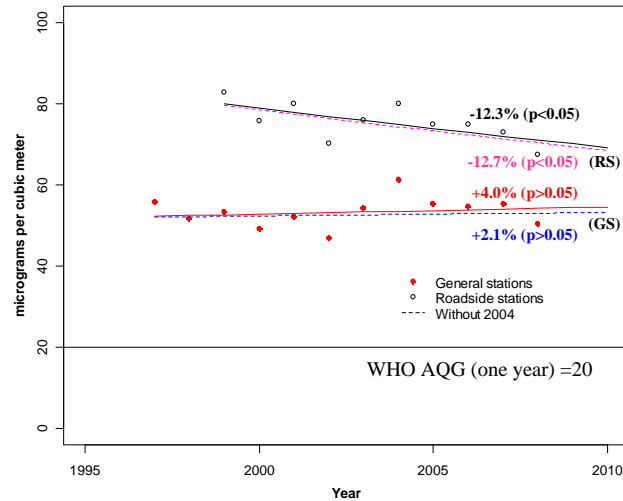
Tung pledges to reduce air pollution within four years

INSIDE

Casino not an option for SAR

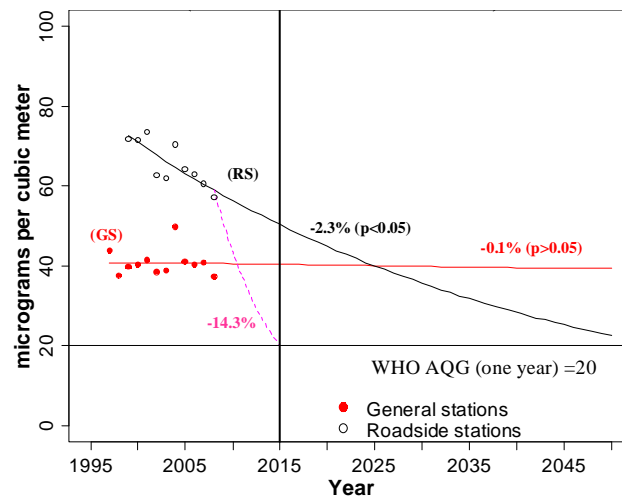
Where are we heading with pollution?

Respirable suspended particulates (1997-2008)



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RSP average trend in warm season (1997-2008) with estimation of slope required to reach WHO AQG by 2015



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Pollution is a cause of environmental inequity and injustice in Hong Kong

- ***Impaired lung growth***
- ***Chronic airways disease***
(cough, phlegm and wheeze)
- ***Exacerbation of asthma***
- ***Doctor consultations***
- ***Days off school***
- ***Admission to hospital***
- ***Shorter lives and poorer quality of life***



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Arup discounted the child health benefits over 50 years

- In their economic analysis of the costs and benefits of air pollution controls Arup discounted the benefits as well as the costs over 50 years.
- ***Hong Kong parents and children should be told this and allowed to make a choice between discounted and non-discounted benefits as the basis for environmental management***

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The Arup report adopted by Government is a direct threat to child health in Hong Kong

- Failure to take an ***evidence-based*** approach to ***health protection***
- Failure to take a ***precautionary*** approach to identifying the ***benefits of clean air to children***
- ***Hong Kong children and adolescents will breathe filthy air for many years to come-if we do not win this argument***

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