

Do we really want clean air? The present – and future indicatives

Project Chambers, 18 May 2007

- 1 Thankyou chairman
 Good afternoon everyone. Thankyou for inviting us. I admire your stamina because I worry that we are developing pollution fatigue, almost inured to the omnipresent adulterated air and the intransigence of those who could commit to urgent radical action.

- 2 Health for all in the 21st Century must include access to clean water, air and food. That now presents us with significant challenges on all 3 fronts. If you could move from the Hong Kong air shed to say, one which looks like this (Himalayas or Artic) then the levels of inflammatory cells in your body would fall dramatically.

- 3 This image shows the hourly concentrations of air pollution in a typical Hong Kong district. Daily population exposures to a typical Hong Kong air pollution day is a major driver of fundamental damage to body tissues, illness, deaths and economic losses.

- 4 I would like to walk through with you, once again, some issues related to the evidence-base for action, responsibility and accountability.

- 5 Some of the evidence about the threat is dramatic. The lack of environmental protection in the pre and post war years in industrial Western countries result in catastrophic pollution episodes, the best known of which is the great London smog of 1952. I remember the headlines. 4000 excess deaths over 5 days from a surge in particulates and SO₂. The result was comprehensive clean air legislation; a process which is still continuing.

- 6 Of course historically public health legislation was often opposed in Britain and other countries and no less in Hong Kong. In the mid 19th century districts like Tai Ping Shan were described as being full of “so much filth and nuisances”. A succession of Colonial Surgeons (today’s Director of Health) pleaded for sewage, drains and scavenging. We are still waiting for the sewage system!

- 7 Things got even worse and the government brought in a consultant, of course, Sir Osbert Chadwick nephew of the legendary public health pioneer Sir Edwin Chadwick. His report in 1882 on the Sanitary Condition of Hong Kong is a seminal piece of work and a good read today. It was opposed and almost totally ignored by the Legco and government.

- 8 12 years later bubonic plague ripped through South China with 80,000 cases between here and Canton and 2 million caused by infected ships travelling worldwide.
- 9 The frustrated Colonial Surgeon of the day, Dr PBC Ayres, said “What all my reports could not do, the epidemic has done”. Just like the great London smog.
- 10 Today anthropogenic activity and air pollution go hand in hand, principally from power generation, manufacturing and transportation.
- 11 Just as with the failure to heed warnings about the plague, or London smog, from the viewpoint of social and environmental justice, we are courting disaster here because of a continuing ruthless trade-off between sulphur rich cheaper dirty fuel on the one hand and the health of people of all ages on the others.
- 12 The most visible evidence of this is the loss of our geographic as well as political and ethical horizons. You are so familiar with the contrast between these views, but not so many children who today can have little in the way of appreciation of Hong Kong’s beautiful topography, local weather systems, vibrant colours – all are muted or totally concealed by a curtain of particles and photochemical compounds.
- 13 This exponential curve of increasing haze days, with visibility reduced to less than 8 kilometres, is nothing less than the current epidemic curve for pollution induced heart and lung disease and premature deaths in this town.

Despite the Chief Executive’s denials, you should be in no doubt that this trend in declining visibility is a serious health hazard to the whole community.

- 14 The injury caused to lungs and arteries by pollutant particles and gases are largely silent and unobserved but they can be measured at the individual clinical level and ...
- 15 ... at the population level. This is work in progress, but we can demonstrate that better visibility reduces deaths in Hong Kong. Most days (69%) are of poor to only moderate visibility. The daily mortality risk slope shows a steep declining gradient as visibility improves towards the horizon.
- 16 Hong Kong’s evidence base on pollution health effects is acknowledged to be one of the strongest in the world. On that basis our research is now

mostly funded from the US, not as previously from local sources. The 1993 headline says “children breathe easier”. I recently stumbled across this clipping from 1993 in which I look so relatively youthful I’m unrecognisable. Working with the EPD we were excitedly explaining to the media how the modest restriction of sulphur in fuel actually reversed the damage to the respiratory health of primary school children. Unfortunately its been mostly downhill ever since.

- 17 I made no apology for repeating this story because it emphasises the massively favourable cost-benefit ratios of prescriptive, that is mandatory, interventions. On a single day, 1st July 1990, we substantially cleared the air of SO₂, ...
- 18 ... with declines of 80% in Kwai Chung and 45% across the whole territory; a remarkable phenomenon given that the sulphur restriction was quite modest. We had a unique natural experiment with a single pollutant reduction.
- 19 Incidentally stripping sulphur from fuel oil also removes other substances like transition metals Nickel and Vanadium and we now believe that Nickel may be the bullet which damages pulmonary and circulatory systems.
- 20 Oddly enough a similar event took place in Dublin in the same year with a ban on coal sales and an immediate and massive decline in particulates, and a reduction of 1 in 20 deaths mainly from heart and lung disease. Any such effect from a medical treatment would be regarded as an absolute sensation.
- 21 In Hong Kong children’s lung function improved progressively over a two year period. (The slide shows declining prevalence of bronchial hyper-responsiveness in non-asthmatic non-wheezing 8 to 10 year olds, in Kwai Tsing and Southern districts. Both showed a decline, with the biggest decline in the most polluted district. This adjustment in this physiological abnormality continued for 2 years.
- 22 and at the other end of the life span there was a marked attenuation of deaths from heart and lung disease in the next cool season and for the next 5 years. (The expected cool season peak in deaths did not appear in the first winter after the intervention. The reduction in mortality ranged from 1.8% up to >4% in older people. We observed that this single modest air quality intervention avoided 600 deaths year. It is important empirical evidence of the direct health benefits of pollution abatement.
- 23 Our analyses of population health effects are still incomplete and the burden of disease both from short and long term effects is predictably

much larger than currently measured. One example would be the potential harm to the unborn foetus with DNA damage and impairment of growth.

24 In Hong Kong we don't have long term cohort studies in children and adolescents but in new reports from the US we can see that lung function at age 18 shows substantial permanent reduction in children living within less than 500 metres up to 1000 metres of freeways. It is important to note that the average levels of particulate exposure in these children was only about 20% or less of average roadside levels in Hong Kong. We are exposing our young people to a major health hazard.

25 The legacy of this kind of injury is a life-long problem. Lung function is a very robust predictor of health survival and life expectancy. With poorer lung function survival curves decay at a faster rate and from that we can estimate life years lost. Dr McGhee is interested to use methodology currently adopted by the Europeans to derive this impact measure for the Hong Kong community. How would you value a lost life year?

26 Do we need more evidence before action?

It is disturbing and perplexing that the government still seems to think so.

27 Adherence to the Hong Kong 1987 obsolete AQOs rather than at least a planned progressive move to the WHO guidelines is itself a major threat to public health.

28 The difference in the scale of estimated risk and the resulting advisories is shown by this example conversion of pollutant concentrations on 8 Jan 2007.

- With the Hong Kong scale for PM we are in the high bracket, but severe zone on the WHO scale.
- For sulphur dioxide the difference is between low and very high categories.

29 Another perspective is the avoidable serious morbidity represented by the daily risk of admission to an HA bed with lung disease. Achieving the targets provided by WHO would shift this concentration response curve well to the left.

30 In June last year we used the issue of visibility to present an integrated picture of the potential to reduce the burden of disease and costs on our community if we reduced Hong Kong's average pollutant levels to those proposed in the WHO guidelines. The conservatively estimated benefits

would include avoidance of 6.8 million doctor visits, 64,000 bed-days, about 1,600 deaths and \$2 Billion in health related costs each year.

- 31 The monetisation of that preventable fraction is based on pollutant concentrations, the excess risks per $10 \mu\text{g}/\text{m}^3$ and the gazetted or other costs of care and willingness to pay to avoid illness and death.
- 32 The summation looks like this. On the left we have direct health care costs and productivity loss totalling 2 Billion yearly. On the right the statistical value of lives lost and Willingness To Pay to avoid an symptom day (coughing) or serious illness (eg hospital admission for heart and lung disease); totally over 19 Billion.
- 33 Why given these massive external costs of a failed environmental policy is government action muted. Why is it not regarded as a true medical emergency?
- 34 Clearly it is a failure of risk communication in the public health function. Perhaps one aspect of the problem is the issue of attribution. In the SARS epidemic we had a well defined epidemic curve but also an almost unique clinical syndrome and isolation of novel corona virus.
- 35 Here is the annual epidemic curve for air pollution deaths. It too is well defined but not socially visible in the same way. Risk estimates for air pollution and health are based in part on
 - clinical signs
 - molecular biology

but mainly epidemiology – that is by detection of shifts in whole population trends rather than just individuals. Although this is strong, consistent and biologically plausible information unfortunately body bags do not carry the label “Killed by air pollutants”.

- 36 Where is air quality heading? The EPD keeps repeating that roadside and general levels of particulates have fallen. I do not believe this is true. These are 9 year curves statistically fitted to the EPD data. Essentially they are flat, possibly increasing. We need both science and transparency here, not contrived simple arithmetic and cherry picking.
- 37 The reason the curves are flat is because we do not have a comprehensive strategy on energy efficiency, cleaner fuels and mandatory abatement measures to name a few.

- 38 In our urban planning we prefer expanding roadways to railways. The new Central-Wanchai by-pass, increasing traffic by 7,500 vehicles/hour on the bypass spells the end of clean air prospects for central for every.
- 39 When prominent expatriates like the Hong Kong philharmonic conductor Edo de Waart announce their departure because their families are sick we are sorry. But policy should not be based on concern for foreign or business residents, but rather by the predictable harm to 10,000's of children whose parents are not socially mobile – even if they want to be.

The other headline announces the forthcoming Sustainable Development Council public consultation, curiously restricted to only three issues (1) Bad Air Alerts, (2) Electronic Road Pricing and (3) Demand side change in consumption. Why is that? There are many other issues, not least the urgent adoption of new air quality objectives.

Toronto is quoted as the model, but the Toronto Public Health Department has consistently argued that alerts are invalid unless they are based on sound scientific Air Quality Standards. They battled for that for more than six years and are just now launching the new system. We need to do the same. There are many other issues: valid alerts are very difficult to create with high multiple pollutants; there is a lack of empirical evidence for cost-benefit in terms of exposure reduction.

- 40 If we do have High Pollution Alerts will we be prepared to cancel major events sports and cultural events as well as ordinary activities of daily living?

Will we cancel Happy Valley, Dragon Boats, the New Year Fireworks?

Every year we have a big debate about the Standard Chartered marathon. We do, desparately, need to promote exercise in this town but there is a boundary for benefit.

Perfect miles cannot be run in polluted air. Even supreme athletes are susceptible to pollution, as was the great Steve Ovett in the 1984 Los Angeles Olympics. He was hospitalised. Beijing could be extremely unlucky with its air quality in 2008.

- 41 Whether you walk or run 2 miles or 26 miles 385 yards you need clean air.
- 42 On marathon day the 4th of March the levels were high but lower than average for part of the race time. The following week the levels were 50% to 100% higher.

43 I said

“athletes risk heart problems by running in Hong Kong’s intensely polluted air”

William Ko said

“That was a negative approach”

I agree; of course it is a negative view. We should not sound disingenuously positive about potentially serious threats to the future health of young people.

44 William Ko said

“We will make announcements at the start about the air pollution index so people know”

This is not William’s fault, but in terms of health protection it is nonsense. He has been badly let down by our environmental managers. We have demonstrated very clearly that the present API is not a valid instrument of risk communication.

Peter Sullivan CEO Standard Chartered said

“I think the levels of pollution are a concern for everyone, but ... cannot be fixed overnight”

Well its not true; we’ve seen that it can be fixed in an extremely expeditious fashion. I support what William and Peter are doing 200% in their efforts to stimulate sports in Hong Kong; but I also say that people in prominent leadership positions should make a clear and unequivocal statement to the Executive of this government that if we want to be a premier venue we need premier air quality.

45 What should we do next? Like Larry Feign’s satirical cartoon, one view is “let’s all shut up and make money”. At present it’s pretty much business as usual.

46 From our perspective we are trying to support the translation of public health research into policy and practice.

47 There are major questions of accountability

- Why does a major and universal threat to health not prompt radical and urgent action? Is this due to:
 - Ignorance or cynicism?
 - Different value systems in which intangible costs are not monetized or otherwise valued?

- ***Political philosophy which holds that external costs of population health injuries are readily and justifiably discounted?***

- 48
- Air quality in Hong Kong and the PRD is out of control and neither clinical science nor epidemiology has made any meaningful impact so far on decision- making in environmental health and some are even trying to deny the evidence.
 - *The evidence is lost in translation*
 - Air pollution and health exposes the biggest weakness in the *public health function*
- 47
- A philosophy of evidence-based health protection is seriously lacking in the HKSAR government
 - No Director of Health or SHW has ever issued an advisory on air pollution and health
 - There is no one in government with responsibility for air pollution from a *public health viewpoint*