



# Bulletin

THE UNIVERSITY OF HONG KONG

Volume 6 Number 1 October 30, 2004

**Going for Gold –  
The University prepares  
for 2008 Olympics**

THE UNIVERSITY OF HONG KONG  
Pokfulam Road, Hong Kong

### Sir Richard Doll, Regius Professor of Medicine in Oxford 1969-1979

Richard Doll, widely considered to be the father of modern epidemiology, has made enormous contributions to our understanding of the preventable causes of cancer over the last five decades.

Born in Britain in 1912, his research has succeeded in saving millions of lives. In 1950 his publication with Sir Austin Bradford Hill, of a case control study established the definitive link between smoking and lung cancer.

Later, by establishing long-term cohort studies of the health of British doctors he and Richard Peto were able to identify additional risk factors for others cancers and heart disease.

In this lecture the 91-year-old professor talked about the importance of epidemiology as one of the oldest areas of medical science 'and for some the most important'.

Although epidemiology expanded to cover all sorts of uses after the First World War it did not gather pace until the end of World War II. The breakthrough, however, did not come until 1947 when Doll and Bradford Hill were asked to find out what had caused the dramatic increase in mortality from lung disease.

"It had increased 20 times in the 30 years from 1920 to 1950 in England and Wales," he said.



They discovered cigarettes to be the culprit and also linked it to several other diseases, including cancer of the mouth, lung and oesophagus, heart disease, peptic ulcer and asthma.

The research was conducted on doctors because they were easy to track over a period of 20 years or more. "And we chose wisely. When we showed that doctors were dying from smoking they took our results seriously and passed the information on to their patients."

He closed the study after 50 years because there were so few smokers left. The great majority, including himself, had given up.

"But now we had clear evidence of the benefit of stopping at any age." For those who give up around age 30, he found, hardly any harmful effect could be detected. Stopping at 50 reduced the risk by about half but giving up after 60 failed to improve health prospects at all. Lifetime smoking, he found, knocked ten years off life expectancy.

His results also showed the extraordinary result that modern medicine has on surviving from 70 to 90 years of age. "It nearly tripled between 1951 and 2000 in non-smokers."

For 25 years he has been interested in the relative contribution of different factors to the causes of cancer. "We now know that much more cancers are caused by viruses than we thought, particularly Hepatitis B and Human Papilloma Virus. Bacteria and parasites, like *Helicobacter Pylori*, which can cause stomach cancer, are also important."

But one thing he found that certainly causes cancer is obesity. It has been implicated in cancers of the breast, kidney, large bowel and other organs.

In his long career he has also drawn a link between alcohol consumption and breast cancer. But there is some good news; he has concluded that electrical cables do not cause cancer and that one glass of wine a day can cut the risk of coronary heart disease.

## Hong Kong Coastline Gasps for Air

Air pressure fluctuations in coastal areas can initiate a process of underground 'breathing' that causes the soil under the surface to absorb or repel air. Consequently, like every living organism that inhabits them, coastal areas need to breathe. But in Hong Kong, where coastlines are reclaimed and paved over, that can present a problem.

The interaction between the sea and land is crucial to the breathing process, according to University scientists who for the first time described this interchange in an article published in *Geophysical Research Letters*.

Air exists in the soil between groundwater levels and the surface. When tides come in, the groundwater level rises, pushing the air in the soil to the surface. When the tide recedes, air is drawn from the surface into the soil.

"This breathing process is happening all the time," said Dr Jimmy Jiao Jiu Jiu, Associate Professor in the Department of Earth Sciences who, with PhD student Li Hailong, conducted the research.

"But in Hong Kong, rapid urbanisation has created a lot of real problems. A lot of areas are

covered by paved surfaces, which have very poor permeability, and the air cannot get in or out very freely."

Buckled concrete is one result of this. The air pressure under the surface can be so great, particularly when heavy rains occur at the time of quickly rising tides, that the pavement heaves up – a problem seen in Hong Kong.

Another problem occurs when pavement prevents air from getting in as the tide quickly recedes. This creates a vacuum, which sucks out fine materials such as silts and fine sand. Dr Jiao has a photograph of an engineer standing in an underground hole created by this effect that was two metres square. The surface area can collapse into holes like this.

Reclamation also contributes to the problem. Dr Jiao said some reclamation sites were filled by extremely permeable rock boulders and some incorporated buried old sea walls, unlike natural coastlines where sand, earth and other materials were less permeable and could absorb water waves from fluctuating tides. Reclaimed coastlines enabled tidal waters to move inland up to a few hundred metres from the shore. And inevitably, they were covered in paved surfaces, further aggravating the problem.

"The air gets trapped and because of that we have very high pressure when the sea level rises up and very low pressure when the sea level falls down," Dr Jiao said.

"So far as we know only Hong Kong has this problem. Few places in the world have experienced such intense urban growth as Hong Kong has over the last half century. This has created some environmental and engineering problems but at the same time also offered unprecedented opportunities for novel research."

That does not mean other areas are immune from the effects of pavement and reclamation, though. Dr Jiao pointed out many coastal areas around the world were highly developed, although at a pace less rapid than Hong Kong.

"Coastal breathing is a natural process. Anywhere we modify it, then we have problems," he said.

However, these problems could be reduced by being aware of the problem, he said. Land could be reclaimed by choosing the fill materials and structures carefully and applying surfaces that allow an exchange of air. Another solution is to install pressure release holes at specific sites in paved areas.

Dr Jiao added that the findings might have application in biology, in terms of studying the effects of coastal breathing on plants and animals.

