

## PROGRESS IN DEVELOPING NEW AND FASTER TB BREATH TEST

Health researchers from the University of Otago Christchurch are investigating a unique breath test for tuberculosis (TB) - a disease that continues to kill more than two million people every year world-wide and is again becoming more prevalent in developed countries like New Zealand.

In a study, published in the international journal *Tuberculosis*, the researchers have described a number of volatile TB bio-markers, which could be used to identify TB much more quickly rather than current laboratory-based tests.

Dr Mona Syhre from the Department of Pathology visited Tanzania earlier this year to carry out preliminary investigations into this new method of diagnosing TB. The scientists wanted to confirm if their TB biomarkers could be detected in real life situations. This was achieved by using a type of large African "sniffer" rats, called Giant Gambian rats which are owned and trained by Apopo, a Belgian Humanitarian Organisation.

Dr Syhre says: "Our visit to Tanzania was quite successful as we showed that the rats were able to identify which samples had been spiked with our TB biomarkers. This is the first time our results have been tested outside the lab, and means we can go onto the next stage of our investigations."

Dr Mona Syhre spiking TB biomarkers into samples.



This will entail visiting either Gambia or Papua New Guinea where there are many TB patients, and testing sputum samples 'spiked' with the biomarkers using a special GC/MS machine. Dr Syhre says using 'sniffer' rats is not a long term practicality in relation to developing a simpler TB test, and the lab tests will provide more confirmation.

The exciting results are supported by a \$50,000 Proof of Concept grant from the University of Otago's commercialisation arm, Otago Innovation Limited.

Dr Syhre and her colleague, infectious diseases specialist Professor Steve Chambers, have made it their goal to find a quicker, cheaper and simpler breath test, as TB still infects around nine million people every year and is the leading cause of death for people with HIV/AIDS.

"If successful this will make a huge difference in speeding up diagnosis and treatment," says Professor Chambers.

"We're very excited about the progress so far and the prospects for these studies. This is a prime example of how laboratory-based health research can provide new directions for innovation and have direct health benefits," says Professor Chambers.

This research has also been funded by the Health Research Council and Lotteries Health Research.



"Sniffer rat" testing TB sputum samples in Tanzania



University of Otago, Christchurch, August 2008



## Connecting with the Community

It is a great pleasure for me to introduce the August 2008 newsletter, which connects the University of Otago, Christchurch with our community. Our vision is to be: "A research-led campus with an international reputation for excellence." We are proud to be the top rated of the four Schools of Medicine in the country, and part of New Zealand's top rated University for research.

One of the major challenges for our health system is the growing lack of health professionals, including doctors, nurses, radiation therapists, laboratory staff and many others. We are anticipating that there will shortly be a recommendation for a further increase in the number of New Zealand Government funded medical students that our medical schools train. To teach the growing numbers of students will require further staff.

A critical factor in the recruitment and retention of clinical academic staff is the opportunity to obtain research funding to support their research. The Health Research Council of New Zealand spends about \$10 per person on health research. The equivalent figures for Australia are \$35 per person, for the United Kingdom \$54 per person, and over \$100 per person in the United States. These figures do not include research overheads or the much higher rates of philanthropic support in other countries. The Auckland and Otago Medical Faculties are working together to get this research funding predicament addressed.

Dollar for dollar, health research funding in New Zealand produces more research than in almost any other country. Within New Zealand, Health Research Council funded projects give the greatest returns of any research funding bodies in New Zealand. The benefits of health research exceed the research benefits; indeed the flow on effects to health services, while hard to measure, may be greater.

Our links with the Canterbury District Health Board continue to improve. I would like to especially thank Gordon Davies, who will be retiring from his position as Chief Executive Officer for the CDHB at the end of the current year. Gordon has done a great job for Canterbury. We are looking forward to working with the new CEO of the Canterbury District Health Board, so we can all contribute to improving the health of our community.



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## HEALTH IMPACTS OF WINTER AIR POLLUTION

Serious air pollution in Christchurch, mainly from wood smoke, does have an impact on the respiratory health of young people, but the immediate effect is not major according to a new study.

The study, which has recently been published in *Environmental Health*, examined the respiratory and physiological effects of particulate air pollution on the lung function of 93 male secondary students, 26 of whom had asthma, who were boarding at Christ's College.

Each boy measured their lung function morning and evening throughout the winter, and those with asthma noted the use of their reliever. Researchers also tested students in more detail on very high pollution days.

Lead investigator and respiratory physician Dr Michael Epton says the study, by the Canterbury Respiratory Research Group, the Geography Department of the University of Canterbury, LandCare Research, and Ecan, arrived at a number of significant conclusions.

"Principally we show that air pollution, as measured by particulate matter in smoke or PM10, does affect the health of boys who have problems with asthma. Although the health impact isn't great, there were small decreases in lung function during very high pollution days," he says.

"The majority of students, on the other hand, who didn't have respiratory problems were not affected. However all students coughed slightly more on high pollution nights."

Dr Epton says this shows air pollution does not cause serious immediate health problems for this age group, which is the good news, but this may not be the case for older adults with chronic respiratory conditions, such as bronchitis or asthma. These results cannot be generalised across all age groups he says. Neither does it measure the long term cumulative effects of air pollution in Christchurch.

Other findings indicate that exposure to wood smoke pollution can be directly measured in urine, with urine tests of the same group of students clearly showing an increase in 1-hydroxypyrene levels during high pollution days.



Dr Michael Epton, Canterbury Respiratory Research Group

"This is the first time that this urine test has been used to detect exposure to wood-smoke pollution in New Zealand," Dr Epton says. There may be further opportunities to use this test as a biomarker for exposure to significant wood smoke as exists in Christchurch.

"Another important result which contradicts an urban myth is that you cannot escape the health effects of air pollution by going inside and slamming the door; indoors is just as polluted as outdoors. Our tests showed there was very little difference in the concentrations of PM10, PM2.5 and PM1 particulates between indoors and outdoors."

The researchers are very grateful for all the hard work the boys and staff of Christ's College put in for this study. "They were really enthusiastic and supportive, which made the project much easier to coordinate".

This research was funded by the Health Research Council of New Zealand and was part of a larger project entitled "Health and Air Pollution in New Zealand - Christchurch Pilot Study" (HAPiNZ) funded by the Health Research Council of New Zealand, the Ministry of the Environment, and the Ministry of Transport



## THICK MELANOMA: THE PROBLEM CONTINUES

New Zealand has a high rate of melanoma by international standards and the most dangerous type of skin cancer is usually associated with thick melanomas (more than 3mm) which are often nodular in shape.

Public health researcher Professor Ann Richardson and colleagues Lynn Fletcher, Dr Mary Jane Sneyd, Associate Professor Brian Cox, and Dr Tony Reeder have just completed a study investigating whether there has been any decrease in the incidence of thick melanomas in New Zealand since 1994, with greater focus on early detection strategies.

"Regrettably the answer is no," says Professor Richardson, "the more dangerous thick melanomas didn't show any decrease from 1994-2004."

"There was a possibility that early detection strategies and greater public awareness may have had an impact on thick melanomas, by detecting melanomas before they became thick, but so far that's not the case."

Professor Richardson is suggesting two possible reasons for the lack of progress in fighting this difficult disease, which in 2004 resulted in 249 deaths. She says it may be too early to see an impact on thick melanomas from the detection strategies, or the strategies may not identify some melanomas early enough.

"I think we have to continue to monitor the situation," says Professor Richardson. "This study is a baseline to work from regarding these thicker melanomas."



Nodular thick melanoma

"But I would also support a re-examination of our early detection strategies to see if they could improve recognition of thick melanomas."

It is not always easy to identify a thick melanoma, especially nodular melanomas, as they are often not dark or irregular in shape. In fact similar issues are now surfacing internationally with a number of other countries also finding that thick melanomas have not declined as hoped, even though early detection strategies are being used.

This research was funded by the Cancer Society and the University of Otago.

