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Tuberculosis research refutes common misconceptions about the disease

University of Otago public health researchers say New Zealand's tuberculosis rate is not increasing and migrants and refugees are not spreading the disease locally to any significant degree, as many people believe.

A comprehensive study of the epidemiology of tuberculosis in New Zealand was published this week as two papers in the New Zealand Medical Journal. The research carried out by Otago University's Wellington School of Medicine and Health Sciences' researchers, in collaboration with a non-University researcher, showed that New Zealand tuberculosis prevention and control efforts were having reasonable success, although several major concerns remained.

Lead author Dr Dilip Das says "analysis of tuberculosis notifications and population data shows that for the past two decades the incidence rate was stable at 10 cases per 100,000 people. This refutes the common belief that tuberculosis is increasing in New Zealand."

This study found the majority of tuberculosis cases were in recent immigrants from developing countries. However, there was no indication that migrants were spreading the disease locally to any significant degree. Dr Das pointed out that this finding refuted another popular misconception that migrants were spreading tuberculosis widely in the community.

A positive finding from the study was the continuing decline in tuberculosis incidence rates in young European New Zealanders. This rate has now dropped below 0.5 cases per 100 000 for Europeans under 40 years of age. Study co-author Dr Michael Baker says this is probably the lowest tuberculosis rate in New Zealand's history.

By contrast, tuberculosis incidence rates remain disproportionately high in Maori and Pacific people and have failed to decline in some populations. Rates for NZ born Maori under 40 years increased slightly from 7.0 per 100,000 in 1995-99 to 7.7 per 100,000 in 2000-04. Rates for New Zealand born Pacific people under 40 years increased from 18.6 to 23.8 per 100,000 over the same period. Occasional outbreaks of tuberculosis in New Zealand predominantly affect Maori and Pacific people.

"The persisting high rates of tuberculosis in young Maori and Pacific people is possibly our most concerning finding" says Dr Baker. "These continuing high rates show we have been unsuccessful in breaking the cycle of ongoing tuberculosis transmission in these

communities. We need to find ways of addressing such health inequalities if we want to succeed in lowering tuberculosis incidence in our society as a whole.”

He Kainga Oranga (the Housing and Health Research Programme) at Otago’s Wellington School of Medicine and Health Sciences is continuing research to investigate why tuberculosis remains unevenly distributed across the population.

“One of the ways in which tuberculosis is associated with poverty is through household crowding,” says Dr Baker, who is also the Co-Director of He Kainga Oranga. This research programme is continuing work to measure the impact of household crowding on the risk of tuberculosis and other infectious diseases. Its ongoing research aims to find out whether reducing household crowding will lower the incidence of tuberculosis and other infectious diseases.

The study also looked at other factors responsible for the resurgence of tuberculosis in other countries, notably the contribution of HIV/AIDS and multi-drug resistant tuberculosis (MDR-TB). Fortunately, these factors are not making a significant contribution to tuberculosis incidence in New Zealand. Another positive finding was a decreasing case fatality and mortality from tuberculosis.

Dr Das says there is scope for further reduction in the incidence of tuberculosis. Stricter migrant screening policies and procedures, introduced in November 2005 by New Zealand Immigration Service, are expected to reduce the rate in the long term. Prompt diagnosis and treatment remains a key measure to control the spread of tuberculosis. There is a need for health professionals to be vigilant and consider tuberculosis as a possibility when people present with suggestive symptoms, particularly if they have migrated to New Zealand from a developing country within the previous five years.

Dr Baker says the epidemiology of tuberculosis means that New Zealand will need to maintain and probably increase efforts to control this disease in the future.

“At least a third of the world’s population is infected with tuberculosis, so it will continue to be a challenge for immigration services and those caring for migrants. Recent outbreaks in Palmerston North and Christchurch illustrate the effort needed to manage this disease within New Zealand.” Says Dr Baker.

Other findings reported in the papers:

New Zealand's tuberculosis incidence rate peaked during the Second World War (159 cases per 100,000 population in 1943). After the war, the rate declined steadily until the mid-1980s when it reached a rate of about 10 per 100,000 per year and has remained at that level since then.

Despite recent highly publicised outbreaks in Palmerston North and Christchurch, the rate of tuberculosis in New Zealand has not risen in recent years. The current rate of tuberculosis is 8.2 per 100,000 (for the 12 months up to and including August 2006). This compares with 9.3 per 100,000 in 2005, 10.0 per 100,000 in 2004, 11.3 per 100,000 in 2003, 10.3 per 100 000 in 2002, 10.0 per 100,000 in 2001 and 9.8 per 100,000 in 2000.

Tuberculosis rates in NZ are slightly lower than in the UK (12 per 100,000) but higher than Australia, Canada and the USA (5 to 6 per 100,000).

In New Zealand, tuberculosis incidence rates vary enormously according to ethnicity. While Europeans have the lowest age standardised rate (2.0 per 100,000), people of 'Other' ethnicity (non-European, non-Maori and non-Pacific) have the highest (73.1 per 100,000). Maori (21.1 per 100 000) and Pacific people (73.1 per 100,000) have rates in between. Compared to the rate in Europeans, the rates in Maori, Pacific and people of 'Other' ethnicity were approximately 10, 22 and 36-fold higher, respectively, between 1995 and 2004.

Comparing 2000-2004 with 1996-1999, tuberculosis rates decreased significantly for Europeans and people of 'Other' ethnicity, while there was no such decrease for Maori and Pacific people.

Tuberculosis incidence rates increased with socio-economic deprivation being 4 times higher in the most deprived 20% of areas compared with the least deprived 20%, over the 2000-2004 period.

Tuberculosis incidence rates generally increase with age. A higher-than-average rate was seen in the two age-groups – in elderly people > 70 years (14.5 per 100,000) and in young adults 20-29 years of age (18.0 per 100,000) for the 2000-2004 period.

In New Zealand, about 60% of tuberculosis occurred in people who had migrated from high-tuberculosis-incidence countries in Asia, Africa and the Pacific. Migration of infected people from these countries and subsequent development of tuberculosis in some of them was found to be the driving force behind the non-decline in the incidence rate.

Migrants did not spread tuberculosis to NZ born people to a significant degree. This conclusion is based on the continuing decline in tuberculosis rates in the NZ born

population despite an increase in the number of migrants with tuberculosis in NZ.

HIV/AIDS and multi-drug resistant tuberculosis (MDR-TB) are not significant contributors to the incidence of tuberculosis in New Zealand. Only 1.2% (45/3,772) of tuberculosis cases notified over 1995-2004 were also infected with HIV.

The case-fatality and mortality rate from tuberculosis is decreasing in New Zealand. Over the 1995-99 period 8.0% of cases died, decreasing to 5.3% in 2000-2004.

Transmission of animal tuberculosis (*Mycobacterium bovis*) from infected animals (e.g. possums) to human is not a significant issue here, accounting for only 2.7% of cases over the 1995 to 2002 period.

Some background information of tuberculosis and its control:

Tuberculosis is a bacterial disease, which usually spreads by airborne droplets generated by a cough or sneeze of an infectious patient.

Contrary to common belief, tuberculosis is not highly infectious. It is far less infectious than some other airborne disease like measles or chickenpox.

Most of the people who get infected with tuberculosis bacteria do not develop the disease. Tuberculosis bacteria can remain dormant inside the body for many years – sometimes decades. This is called latent tuberculosis infection or LTBI. People with LTBI are non-infectious and otherwise healthy. The dormant bacteria might reactivate ('wake up') and cause disease when the body's immunity declines for some reason. In many, who develop the disease now, the transmission of bacteria occurred many years ago. However, development of the disease soon after acquiring infection does occur and occasionally results in an outbreak.

Prompt diagnosis and treatment of tuberculosis disease is important for curing patients, and preventing further transmission of infection and outbreaks. Detection and treatment of recently acquired LTBI is important for preventing development of the disease in infected people.

However, the main challenge to tuberculosis control in New Zealand, as in other developed countries, is the high global prevalence of LTBI in developing countries. This burden manifests itself in a high prevalence of LTBI in migrants from these countries and is a further reminder of the urgent need to increase tuberculosis prevention and control at a regional and global level.

Pre-emigration screening for tuberculosis of people from high-incidence-countries is

another control strategy. The New Zealand Immigration Service introduced stricter medical and chest Xray policies and procedures in 2005. However, it cannot be a total solution, as the screening does not detect latent tuberculosis infection (LTBI). At the time of migration, many migrants only have LTBI and are not detected by screening. Some of them develop the disease months or years after arrival in New Zealand.

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