Is it time to pilot a test and treat programme for reducing the stomach cancer burden and inequalities in NZ?

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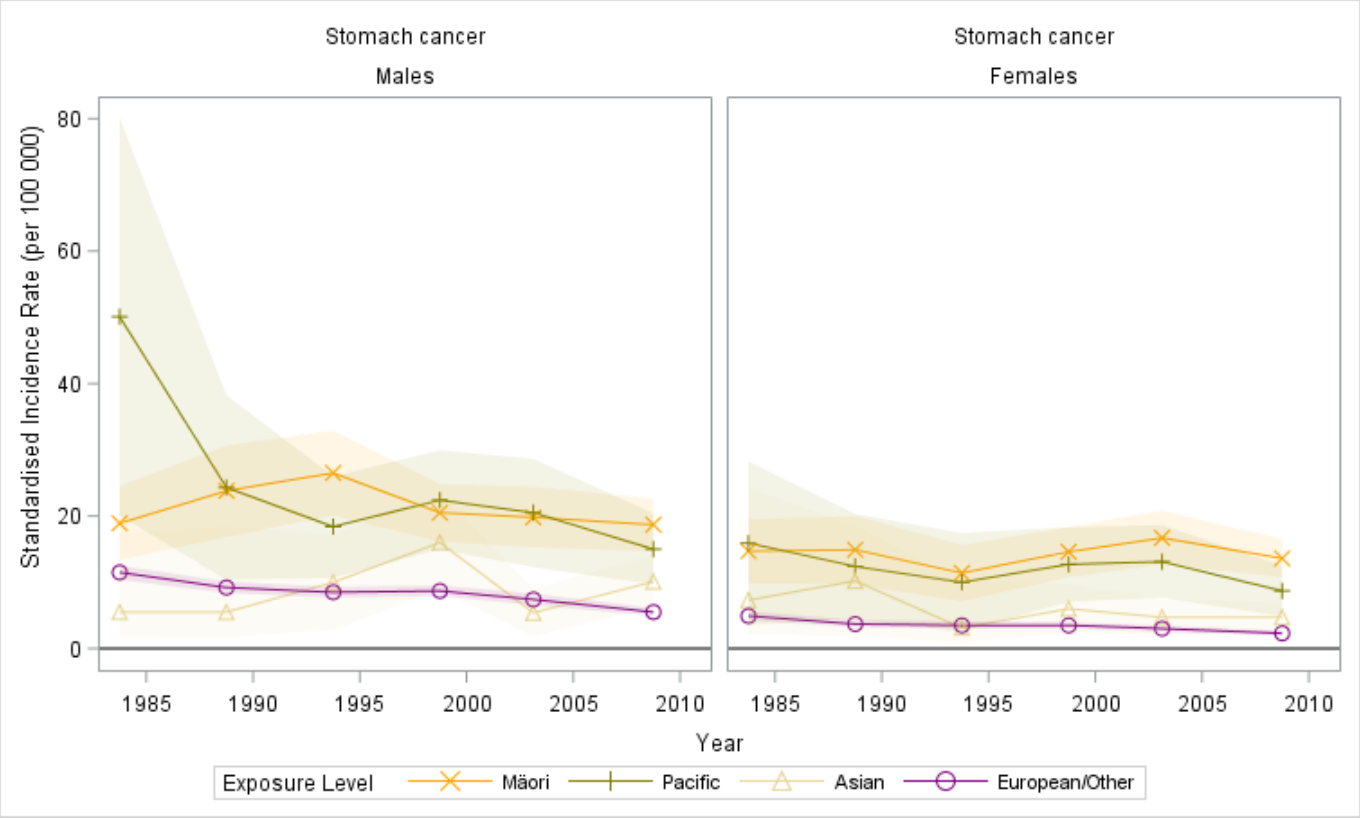
We have just published a modelling study on stomach cancer prevention in the international journal BMC Infectious Diseases (1). This blog briefly examines how a possible population screening programme, that tests and treats for infection by the bacteria *Helicobacter pylori* in the stomach, may be a cost-effective way to reduce the stomach cancer burden and ethnic inequalities in stomach cancer incidence and mortality in New Zealand.

The rate of new cases of stomach cancer presenting each year have declined over time but these improvements remain slow and stomach cancer continues to be more common among Māori and Pacific peoples (2) (Figure 1).

Figure 1: Stomach cancer incidence rates over time by sex and ethnicity, New Zealand Census Mortality and CancerTrends Study, 1981-2011 (2,3) (Data explorer)



Stomach cancer is one of the greatest contributors to ethnic inequalities in mortality and cancer incidence in New Zealand (NZ). In 2006-2011, stomach cancer was 3.4 times more common in Māori men and 5.8 times greater in Māori women compared to the European/Other ethnic groups. Stomach cancer made up 9% of the excess cancer deaths in Māori men compared to European/Other, and 7% in Māori women (2) (see Appendix).

In a previous blog we described how infection with the bacteria *H. pylori* contributes to the majority of ethnic inequalities in stomach cancer – for example 50%+ in Māori men and 71%+ in Pacific men. The World Health Organization recommends all countries consider screening for *H. pylori* to prevent stomach cancer. Globally there are increasing calls for *H. pylori* eradication, yet little has been done toward this goal in NZ.

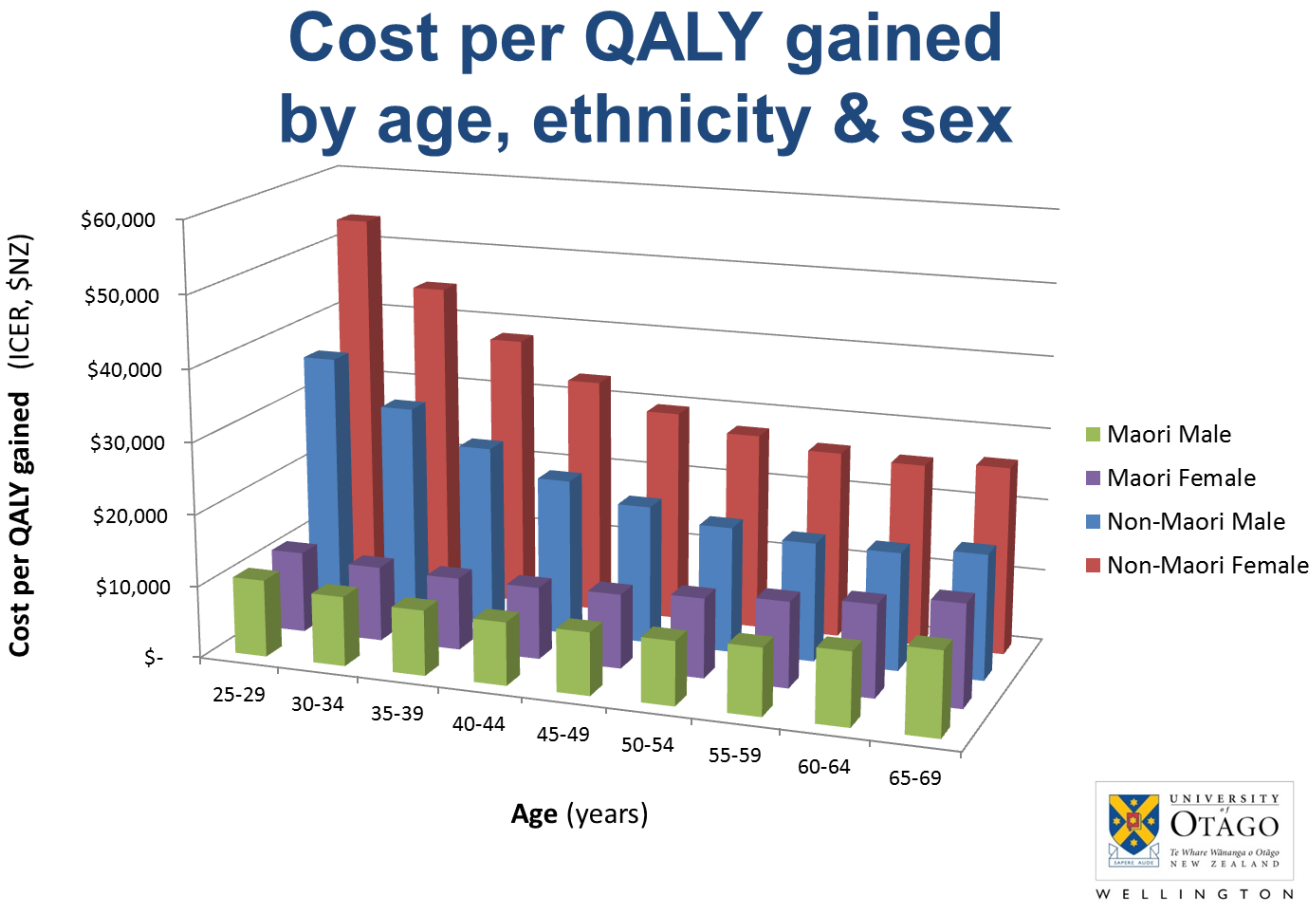
The NZ health system needs to consider the value of adding *H. pylori* screening to existing health services, and to do so, *H. pylori* screening should be assessed against a number of different criteria (cost-effectiveness, population impacts, equity impacts, feasibility). Important questions such as “Is *H. pylori* screening likely to be cost-effective?” and “Will *H. pylori* screening reduce ethnic inequalities in stomach cancer burden?” need to be answered.

We have just published a cost-utility analysis in the international journal BMC Infectious Diseases (1). This study shows how much a screening programme might cost in NZ. We defined population screening as a serology blood test (or a faecal antigen test) for the total adult population, aged 25-69 years old. Positive tests were followed-up with a primary care appointment for triple therapy (which includes two antibiotics and omeprazole). We also costed a retest (faecal antigen) of treatment success and a second-line treatment where there was antibiotic resistance. For the effect of triple therapy, we used a one-third reduction in stomach cancer from a meta-analysis of randomised controlled trials (4). We allowed for differences in stomach cancer epidemiology, sensitivity of screening tests, *H. pylori* resistance, and screening coverage (based on the coverage of the cardiovascular risk assessments in primary care in NZ). After these adjustments we modelled an overall 17%

reduction in future stomach cancer cases with a wide uncertainty interval (6%-29%). The health gains and costs are discounted at 3% per annum (i.e. one quality-adjusted life-year [QALY] gained in 10 years is equivalent to a 0.74 QALY gain now), and applied to the population alive in 2011 modelled out over the rest of their lives.

Nation-wide screening for *H. pylori* for all 25-69 year olds was estimated to cost an extra $293 million (95% uncertainty interval [UI] of $272–$314 million) with health gains of 14,200 QALYs (95%UI: 5,100–26,300). The cost per each QALY gained was $24,600 ($11,300–57,400) in the total population but this differed greatly by age, sex and ethnicity (Figure 2). A targeted screening programme for Māori only, was substantially more cost-effective at $12,000 ($5,700–27,600) per QALY gained, primarily because of the higher rates of stomach cancer incidence in Māori.

Figure 2: The incremental cost-effectiveness ratio (ICER) of a population screening programme that tests for and treats *H. pylori*, with comparison of cost-effectiveness by age, sex and ethnicity (6).



There are many considerations in designing a systematic strategy for implementing a population screening programme (5). In this study we have focused on the size of health gain, the extra costs and the cost-effectiveness (not such dimensions as affordability, acceptability of the programme to policy-makers, clinicians and the public, etc). Nevertheless, *H. pylori* screening was clearly cost-effective for Māori and Pacific peoples in our model, using a common rule of thumb where 'cost-effective' is where an intervention costs less than GDP per capita per QALY gained'. This was despite the lack of precise data

on the effectiveness of the *H. pylori* test and treat approach.

Further research is still needed to help clarify the precise benefits and adverse effects of population screen and treat programmes. RCT findings from screening programmes already set up in other countries could be regularly reviewed by NZ health authorities. Globally, several consensus statements have recommended *H. pylori* screening and treatment for high risk populations (6). There is a reasonable case for NZ policy-makers to consider piloting test and treat programmes for population groups with high rates of stomach cancer; such as Māori and Pacific peoples in NZ (and potentially also for recent immigrants from high prevalence countries). A pilot could be designed to provide local information on the effectiveness, feasibility and acceptability of *H. pylori* screening.

Further research and policy questions:

Internationally:

- How precise and effective is the test and treat approach in asymptomatic populations in reducing incidence and mortality from stomach cancer?
- What are the adverse effects of a population *H. pylori* screening programme?
- When is the best age range to test and treat for the greatest health gains and greatest cost-effectiveness in lowering stomach cancer incidence?
- What is the long-term efficacy of vaccine strategies at reducing *H. pylori* acquisition and stomach cancer incidence? (7)

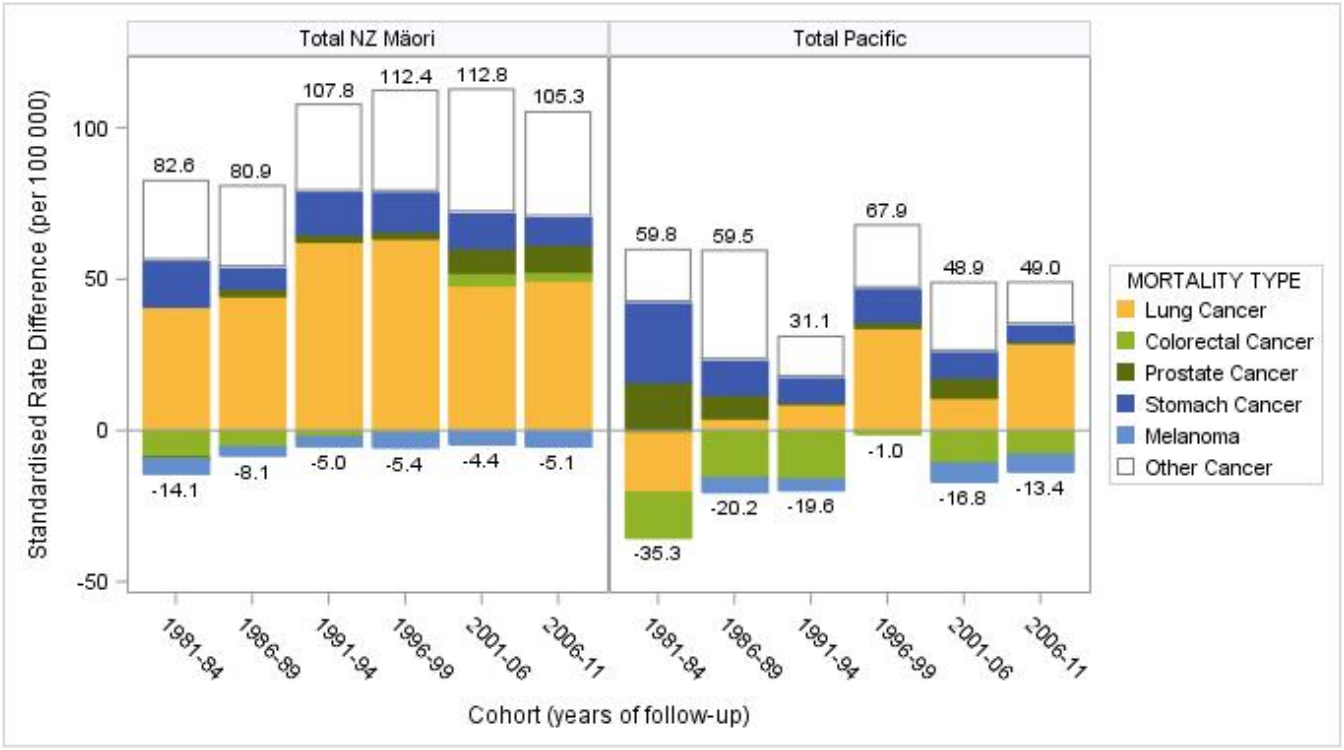
New Zealand

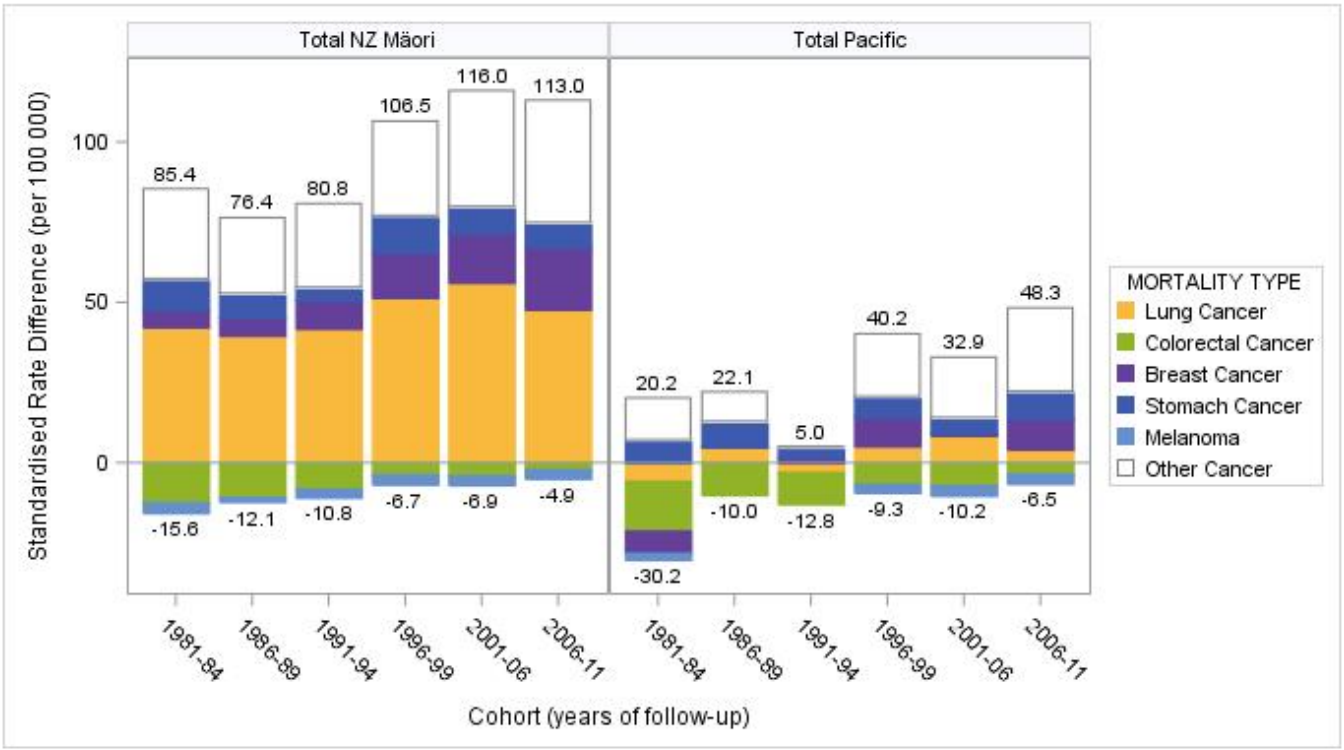
- How does the prevalence of *H. pylori* infection currently vary in NZ by age, year of birth, ethnicity and location? Eg, perhaps using the NZ Health Survey to collect such data.
- What is the feasibility of testing and treating for *H. pylori?* Eg, adding a faecal antigen test to the bowel cancer screening test in NZ? Or perhaps adding a serology test to the routine cardiovascular blood tests?
- What are the best predictors of having *H. pylori* infection? Can risk prediction be used in general practice to identify patients at increased risk of stomach cancer who need to be screened for *H. pylori*?
- How does *H. pylori* screening rank in a list of ‘next most important things to do to improve Māori health’ especially among Māori communities? What would the health service stop doing to free up the resources for *H. pylori* screening?

For further information on this study there is the full free text journal article at BMC Infectious Diseases (1), or see the presentation from the conference Campylobacter, Helicobacter and Related Organisms held in Rotorua (Nov 2015).

Appendix

Figure 3: Absolute inequalities in stomach cancer mortality (rate differences in dark blue) and how these inequalities have changed over time in Māori and Pacific peoples; males above, females below, New Zealand Census Mortality Study / CancerTrends, 1981-2011 (2).





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