

The incidence of acute rheumatic fever in New Zealand, 2010–2013

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Rheumatic fever is a major health priority for the current Government, and remains perhaps the most extreme example of an avoidable health disparity in this country. There is now substantial research underway to identify the causes of rheumatic fever in New Zealand, and to assess approaches to reduce the incidence and impact of this disease. Much of this research has been funded by a collaborative partnership between the Human Rights Commission (HRC), the Heart Foundation, CureKidz, Te Puni Kokiri and the Ministry of Health as part of the Rheumatic Fever Research Partnership programme.

As part of this effort, we have updated and built-on previous work in this area^{2,4} by estimating the burden of acute rheumatic fever (ARF) across multiple demographic and geographic strata between 2010–2013. To identify cases, we requested National Minimum Dataset (NMDS) hospitalisation data from the Ministry of Health pertaining to all hospitalisations in which a primary diagnosis of ARF was made (ICD-10-AM codes: I00–I02). Secondly, we requested public health notification data (EpiSurv) from the Institute of Environmental Science and Research for all new cases of reported ARF. We then merged these datasets together, and excluded those who a) had a recorded history of ARF (prior to 2010) or chronic rheumatic heart disease (RHD) (any time prior to the ARF diagnosis date), or b) were recorded as being a non-New Zealand resident at the time of their ARF. Following exclusions, a final set of n=733 remained for further analysis.

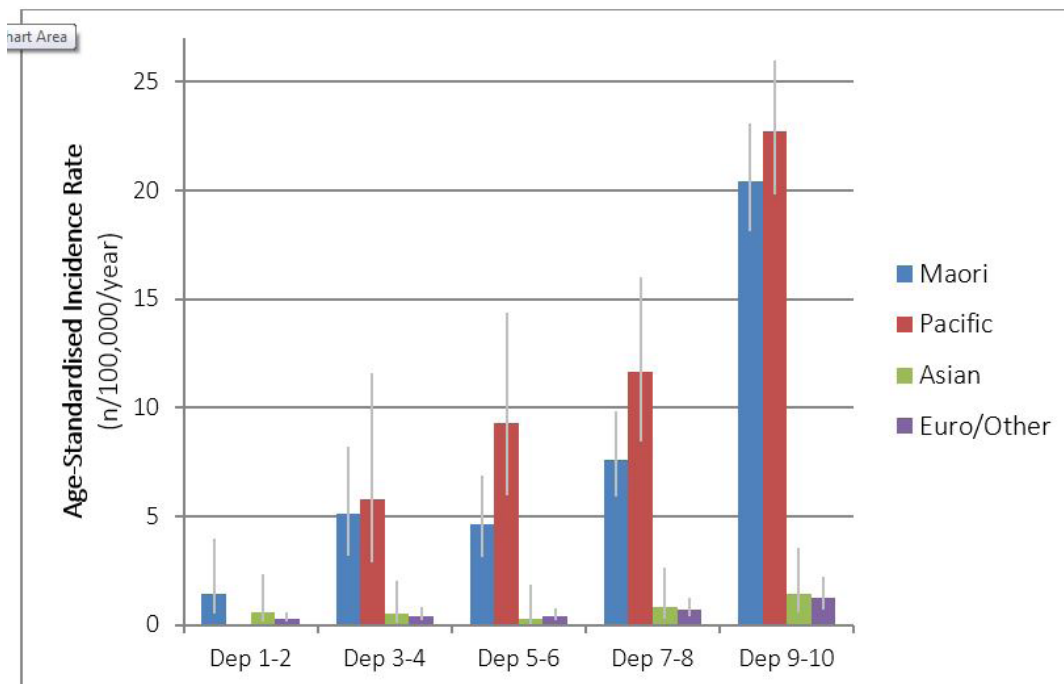
Ethnicity, geographic location (Census Area Unit) and date of birth/age were determined from both the hospitalisation and notification datasets, with hospital-

isation data preferred to notification data when a case was recorded in both datasets. Ethnicity was determined using a modified version of the total ethnicity approach.⁵ Patient age was determined from date of birth (NMDS) or age at diagnosis (EpiSurv) data. The geographic location of each patient was attributed based on the Census Area Unit where they lived at the time of ARF incidence. Deprivation was determined using the NZDep index.⁷ Rurality was set using a simplified version of the Urban/Rural Profile Classification.⁸

We quantified the incidence of ARF separately by ethnicity, age group, deprivation, rurality and geographic location (DHB and Census Area Unit). In addition to descriptive analyses, we calculated crude and age-standardised incidence rates (per 100,000) using relevant Census population data as the denominator.

Our observations based on this updated data were, to a great extent, neither new nor unique;^{2,3} rather, they confirm the profound continuing inequity between population sub-groups. While ARF is uncommon in the general population, it differentially affects some population sub-groups over others: more than 9 out of every 10 cases occur among Māori or Pacific New Zealanders, with Māori nearly 30 times more likely to be diagnosed with ARF than the European/Other population (age-standardised relative risk [RR]: Māori 28.8, 95% CI 21.3–38.9)—and Pacific more than 40 times as likely (RR: 43.3, 95% CI 31.9–58.7). We also noted that those residing in the most deprived areas were more than 30 times as likely to be diagnosed with ARF compared to those residing in the least deprived areas (RR: 33.3, 95% CI 19.1–58.1). Rurality appeared to have a somewhat protective effect—with those living in

Figure 1: Age-standardised incidence of acute rheumatic fever (2010-2013), by deprivation quintile and ethnic group.



rural areas nearly half as likely to sustain ARF compared to those living in urban areas (RR: 0.58 95% CI 0.44–0.75). Females also appeared to have slightly less risk of ARF compared to males (RR: 0.80, 95% CI 0.70–0.93).

Since Māori and Pacific New Zealanders are more likely to reside in areas of high deprivation compared to other ethnic groups,⁷ it is intuitive to assume that differences in ARF incidence by ethnicity are conflated with level of deprivation, particularly given the likely role of poverty-related exposures in the aetiology of this disease. However, when stratifying disease incidence by deprivation level, we found that Māori and Pacific New Zealanders remain substantially more likely to be affected by this disease regardless of NZDep decile (Figure 1)—suggesting that while deprivation is certainly an exposure of great importance, it is unlikely to be the sole

explanatory factor for this ethnic inequity.

These observations were made for the period 2010 to 2013. We note that the Ministry of Health has reported⁹ a reduction in the number of ARF cases between 2014 and 2015. Whether this apparent reduction in disease burden is a real phenomenon—catalysed by interventions such as the national throat-swabbing programme—or a transient phenomenon remains to be seen, and will only be confirmed in retrospect.

The observations reported here are part of a wider study that is exploring the significance of RHD detected by echocardiography in high risk populations without a prior recognised episode of ARF. These data will be used in the development of a risk prediction model, which will allow us to simultaneously combine the effects of our predictors (eg, ethnicity, deprivation) and then identify (and quantify) those groups who are most at risk of developing ARF.

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