



## Executive summary

# Group A *Streptococcus* and acute rheumatic fever in Aotearoa New Zealand

A summary of current knowledge in Aotearoa New Zealand

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## Overview

This review aims to summarise what we know about the processes that lead to group A streptococcus (GAS) infection, acute rheumatic fever (RF) and rheumatic heart disease (RHD) in Aotearoa New Zealand. It has been produced by the OPMCSA, supported by an expert panel, and has been provided to the Ministry of Health to inform their rheumatic fever workstream. It has a primary focus on the Aotearoa New Zealand knowledge base and lessons learned from previous initiatives, but places this in an international context where appropriate. It does not contain recommendations.

The areas covered in the full report are:

- How GAS infection leads to RF and RHD, including emerging evidence of the possible role of skin infections.
- The global context for RF and RHD, including Aotearoa New Zealand's position within this context.
- How GAS infection, RF and RHD are monitored in Aotearoa New Zealand.
- Current rates and trends of GAS infection, RF and RHD in Aotearoa New Zealand.
- Data on the uneven burden of RF and RHD affecting Māori and Pacific peoples, including evidence for the drivers of these inequities.
- Indirect risk factors associated with RF.
- Lived experience of people with RF and RHD and their whānau.
- The financial and social costs of the high disease burden.
- The range of interventions that have been tried and whether there is evidence of effectiveness.
- Future developments in this area, including vaccines, new diagnostic tools and drug development/reformulation.
- Research priorities to fill in knowledge gaps.
- AMR considerations associated with treatment and prevention of these diseases.

Note that the review is largely focused on local studies and evidence, both published and gleaned from conversations with experts within the research and medical community, so most information is from Aotearoa New Zealand. Where evidence is from overseas, this is explicitly stated.

## Executive summary

Despite Aotearoa New Zealand's government previously setting reduction targets and establishing multi-agency approaches to reduce the incidence of acute rheumatic fever (RF), rates of this disease have remained stubbornly high. Certain subgroups of the population – namely, young Māori and Pacific peoples – are burdened with rates otherwise only seen in low-income nations or within Indigenous populations. The evidence that previous interventions have not resulted in sustained decreases in RF rates highlights the need to re-evaluate the evidence base and redouble efforts in areas that may make a difference.

There are four points of intervention for tackling problems associated with RF in Māori and Pacific people aged 3-30 years:

- **Preventing Group A streptococcus (GAS) exposure.** This is also referred to as primordial prevention, which reduces GAS infections caused by social and environmental determinants and may also include biomedical interventions. Reducing the risk of GAS transmission and infection will be the most significant way to prevent more adverse health outcomes.
- **Preventing RF.** This is also referred to as primary prevention which attempts to diagnose, manage and treat GAS infection. We know that for some people the more times a person has GAS infection, the more likely they develop RF, so early effective diagnosis and treatment of GAS infection in high-risk groups is critical.<sup>1</sup>
- **Preventing RHD.** This is also referred to as secondary prevention, a strategy to prevent reinfection by GAS, at least until they have passed the age group who are at risk, therefore preventing another episode of RF. Each episode of RF damages the heart so those who have had RF once need to be targeted to prevent another episode.
- **Minimising complications of RHD.** This is also referred to as tertiary intervention, which relates to medical management and interventions that optimise the outcomes for a person with RHD.

Within this context, this review highlights the following:

### 1. How RF triggers lead to disease is not fully understood

- How RF is triggered is not fully understood, which provides barriers to implementing effective primary prevention approaches. The evidence to date suggests a substantial focus on treating GAS sore throats hasn't made a sustained significant difference to RF rates, although there are significant regional successes.
- Observed associations between RF and GAS skin infections suggests a role in development of RF which may be significant. Further work is required to determine whether treating GAS skin infections with antibiotics will lead to a reduction in RF.
- Changes to rates of RF need to be interpreted in the context of some key risk factors changing for high-risk groups (e.g. housing conditions, access to primary healthcare and poverty) which may change the baseline against which the intervention is measured.

### 2. Risk factors for RF are complex but can guide interventions

- Evidence supports a more targeted intervention approach based on family history of RF, ethnicity, level of socio-economic deprivation and age.
- There is evidence to suggest that improving socio-economic and living conditions would reduce RF risk, and this would have broader positive impacts on health for the individual and their whānau. There is significantly more work to be done to reduce the RF risks associated with housing and poverty, especially household crowding.
- Other risk factors relating to health and nutrition, and compromised skin integrity, have weaker evidence and the mechanisms are not understood well enough to inform interventions yet.

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<sup>1</sup> Lorenz, N., Ho, T.K., McGregor, R., *et al.* (2021). Serological profiling of group A streptococcus infections in acute rheumatic fever. *Clinical Infectious Diseases*. <https://doi.org/10.1093/cid/ciab180>

- The 2021 fall in RF rates for Pacific populations needs evaluation – whether this is explained by reduced travel between Aotearoa New Zealand and the South Pacific should be investigated in order to understand whether this travel is a significant risk factor.

### **3. It's not only overrepresentation for other risk factors that leads to higher RF rates for Māori and Pacific peoples**

- The evidence demonstrates that irrespective of deprivation level, the risk for RF is higher for Māori and Pacific peoples. Complex factors, which may include racism in the healthcare sector that causes barriers to access and inequity in quality of treatment, are understood to contribute to the burden of disease experienced by Māori and Pacific peoples.
- Evidence of the lived experience of Māori and Pacific peoples navigating the healthcare system to deal with GAS infection, RF or RHD provides important insights to guide interventions and reduce some of these barriers to accessing care and healthcare delivery.

### **4. A greater focus on active case finding for latent RHD may improve disease outcomes**

- Evidence shows that 80% of patients presenting with RHD never presented with RF and that around 2% of people in cohorts at high risk of RF might have latent RHD.<sup>2</sup>
- Emerging evidence indicates that giving antibiotics to prevent relapse of RF (secondary prophylaxis) improves outcomes for people with latent RHD. This suggests that active case finding using echocardiography and effective secondary prevention services could be an effective way to reduce the poor health outcomes associated with RF and RHD (subject to resourcing requirements and meeting Ministry of Health screening criteria).
- It would be useful to audit a sample of initial RHD patients not previously hospitalised for RF to see if diagnostic opportunities had been missed with prior health encounters.

### **5. Going forward, the approach to RF/RHD prevention and control should be holistic, collaborative, Māori- and Pacific-led and underpinned by a national strategy which includes local context in its application**

- One intervention alone is unlikely to significantly reduce the incidence of GAS and RF and it is likely that a coordinated suite of interventions is needed.
- Features of multipronged approaches where significant reductions in RF rates were achieved in Costa Rica, Cuba, the French Caribbean and Tunisia, included:
  - Improving living and socio-economic conditions.
  - Free and easy access to healthcare to remove barriers to receiving primary care.
  - The use of a one-off benzathine benzylpenicillin injection instead of a 10-day course of oral antibiotics to treat GAS throat infection to improve antibiotic adherence.
  - A centralised RF patient register and patient management system to coordinate a robust secondary prophylaxis service.
- Barring the roll-out of a vaccine, RF remains a complex disease which will not be eliminated until poverty, household crowding, racism and barriers to accessing health services are tackled.<sup>3</sup> Inequities need to be addressed and framing should not just be that individuals are responsible for their own health outcomes when structural issues are at play.<sup>4</sup>
- Australia has the Endgame Strategy, which is the blueprint to eliminate RHD in Australia by 2031. The Endgame Strategy includes resourcing an Aboriginal and Torres Strait Islander national

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<sup>2</sup> Oliver, J., Robertson, O., Zhang, J., *et al.* (2021). Ethnically disparate disease progression and outcomes among acute rheumatic fever patients in New Zealand, 1989–2015. *Emerging Infectious Diseases*, 27(7), 1893-1902. <https://doi.org/10.3201/eid2707.203045>

<sup>3</sup> Shaio, M.-F. (2021). The impact of racism on rheumatic fever rates. *Kai Tiaki: Nursing New Zealand*, 27(1), 36-37.

<sup>4</sup> Anderson, A. and Spray, J. (2020). Beyond awareness: Towards a critically conscious health promotion for rheumatic fever in Aotearoa, New Zealand. *Social Science & Medicine*, 247, 112798. <https://doi.org/10.1016/j.socscimed.2020.112798>

implementation unit to coordinate work, deliver resources, and link communities and researchers.<sup>5</sup> Successes and failures of this strategy could inform equivalent initiatives in Aotearoa New Zealand.

- A nationally coherent strategy could be adapted to local contexts; research into this is well-advanced.

## 6. Monitoring and surveillance of RF and RHD rates and outcomes is inadequate

- Evidence highlighted in this report shows that monitoring and surveillance of GAS infection, RF and RHD needs to be significantly improved.
- This is of particular importance to determine the effectiveness of interventions on RF rates and outcomes.
- Interventions require better design to enable robust monitoring of impact, and future interventions require robust monitoring and evaluation from the outset.
- A national RF register would be a key step in improving data related to RF rates and outcomes, and enabling robust monitoring of the effectiveness of interventions.
- Experts have been calling for a national register for many years.<sup>6</sup> This was announced as part of the 'Healthy Homes and Hearts Rheumatic Fever Initiative' but has not yet been implemented.<sup>7</sup> Work is currently underway to explore what such a patient management system might look like.
- A series of recommendations were made in a Ministry of Health-commissioned surveillance sector review by Oliver *et al.* 2014, though most have not yet been implemented.<sup>8</sup> This provides detailed advice on how to utilise existing datasets to establish a national register.
- Using innovative IT solutions to de-silo data, share records with patients and whānau, integrate lab results for a fast response and support patient follow-up could support better outcomes

## 7. Biomedical research offers medium term potential for prevention and treatment

- Research into a vaccine offers a promising avenue for prevention of GAS infections.
- Research into new methods of formulation and delivery of antibiotics offers hope for improved compliance with long-term treatment regimens.

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<sup>5</sup> Wyber, R., Noonan, K., Halkon, C., *et al.* (2020). Ending rheumatic heart disease in Australia: The evidence for a new approach. *Medical Journal of Australia*, 213, S3-S31. <https://doi.org/10.5694/mja2.50853>; *ibid.*

<sup>6</sup> Oliver, J., Pierse, N. and Baker, M.G. (2014). Improving rheumatic fever surveillance in New Zealand: Results of a surveillance sector review. *BMC Public Health*, 14(1), 528. <https://doi.org/10.1186/1471-2458-14-528>; Bennett, J., Anderson, A., Malakai'Ofanoa, P.A., *et al.* (2021). Acute rheumatic fever—a preventable, inequitable disease: A call for action. *The New Zealand Medical Journal*, 134(1535), 93-95. ; Bennett, J., Zhang, J., Leung, W., *et al.* (2021). Rising ethnic inequalities in acute rheumatic fever and rheumatic heart disease, New Zealand, 2000–2018. *Emerging Infectious Diseases*, 27(1), 36. <https://doi.org/10.3201/eid2701.191791>

<sup>7</sup> New Zealand Labour Party. (2020, 4 October 2020). *Healthy homes and hearts in rheumatic fever initiative* [Press release]. Retrieved from <https://www.scoop.co.nz/stories/PO2010/S00043/healthy-homes-and-hearts-in-rheumatic-fever-initiative.htm>

<sup>8</sup> Oliver, J., Pierse, N. and Baker, M.G. (2014). Improving rheumatic fever surveillance in New Zealand: Results of a surveillance sector review. *BMC Public Health*, 14(1), 528. <https://doi.org/10.1186/1471-2458-14-528>

## Acknowledgements

### Our panel

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- Dr Matire Harwood (Ngāpuhi) (co-chair), University of Auckland and Papakura Marae Health Clinic
- Dr Anneka Anderson (Kāi Tahu, Kāti Māmoe), University of Auckland
- Professor David Murdoch, University of Otago
- Dr Dianne Sika-Paotonu, University of Otago
- Professor Jack Heinemann, University of Canterbury
- Dr Kristin Dyet, ESR
- Associate Professor Mark Thomas, University of Auckland and Auckland DHB
- Distinguished Professor Nigel French, Massey University
- Dr Sharon Gardiner, Canterbury DHB
- Associate Professor Siouxsie Wiles, University of Auckland



*The Kotahitanga panel and OPMCSA staff. From left to right: Kristin Dyet, Ellen Rykers, Siouxsie Wiles, Rachel Chiaroni-Clarke, Mark Thomas, Dianne Sika-Paotonu, Nigel French, Juliet Gerrard, Jack Heinemann, Matire Harwood, Sharon Gardiner, George Slim, Anneka Anderson, David Murdoch.*

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