New Zealand Institute
for Public Health and
Forensic Science

# RHEUMATIC FEVER IN NEW ZEALAND 2015–2024

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**PREPARED FOR:** **Ministry of Health**

**CLIENT REPORT No:** **FW25030**

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**PUBLISHED:** **27 February 2026**

This report is available on the PHF Science Digital Library

Published: 27 February 2026

Suggested citation:
New Zealand Institute for Public Health and Forensic Science (PHF Science).
Rheumatic Fever in New Zealand 2015–2024.
Porirua: PHF Science; 2026

Client Report: FW25030

# ACKNOWLEDGEMENTS

This report was prepared as part of a Ministry of Health contract for scientific services.

Thanks to the following people for their contributions to this report:

- clinicians and public health service staff who notify and investigate cases of acute rheumatic fever;
- diagnostic microbiology laboratories throughout New Zealand who participate in the national laboratory-based surveillance of rheumatic fever by referring group A *Streptococcus* isolates to PHF Science for *emm* typing;
- Dr Catherine Jackson and Dr Bryn Thompson, National Public Health Service, and Associate Professor Julie Bennett, University of Otago, for external peer review.

## Disclaimer

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# ABBREVIATIONS

| Abbreviation | Description |
|---|---|
| Anti-DNase B | Anti-deoxyribonuclease B |
| ARF | Acute rheumatic fever |
| ASO | Anti-streptolysin O |
| CDCM | Communicable disease control manual |
| CRP | C-reactive protein |
| DHB | District health board |
| ECG | Electrocardiogram |
| ESR | Erythrocyte sedimentation rate |
| GAS | Group A streptococcal or group A *Streptococcus* |
| iGAS | Invasive group A streptococcal |
| IU/mL | International units per millilitre |
| NHI | National health index |
| RHD | Rheumatic heart disease |
| ULN | Upper limit of normal |

# SUMMARY

Acute rheumatic fever is a serious condition that can lead to rheumatic heart disease. In New Zealand, rheumatic fever disproportionately affects Māori and Pacific children aged 5–14 years from socioeconomically deprived areas. This report summarises the epidemiology of rheumatic fever in New Zealand from 2015 to 2024 based on information recorded in the national notifiable disease database EpiSurv, with a focus on confirmed and probable initial episode rheumatic fever cases.

Between 1 January 2015 and 31 December 2024, there were 1446 rheumatic fever cases notified to EpiSurv. Of these, 1177 (81.4%) were confirmed or probable initial episodes and 91 (6.3%) were confirmed or probable recurrent episodes. The rate of confirmed and probable initial episode rheumatic fever peaked in 2018 at 3.0 per 100,000 population (149 cases), decreased significantly during the COVID-19 pandemic (to 1.3 per 100,000 in 2021) and returned to pre-COVID-19 levels with a rate of 2.8 per 100,000 in both 2023 and 2024. The incidence of confirmed or probable recurrent episodes peaked in 2024 at 0.4 per 100,000 (19 cases).

Pacific peoples and Māori children and young people continue to be the population groups most affected by rheumatic fever. In 2024, the highest rate of initial episode rheumatic fever was among Pacific peoples aged 5–14 years (76.7 per 100,000, 51 cases), followed by Pacific peoples aged 15–24 years (28.2 per 100,000, 18 cases,) and Māori aged 5–14 years (25.5 per 100,000, 46 cases). This compares with only one case in children of European or Other ethnicity aged 5–14 years.

The Northern Region had the highest rates of confirmed and probable initial episode rheumatic fever, accounting for 61.5% (724/1177) of cases from 2015 to 2024. Rates were highest in Counties Manukau District. In 2024, the Northern Region had the highest rate of initial episode rheumatic fever (4.9 per 100,000), followed by Central and Midland regions (2.0 and 1.8 per 100,000, respectively). Rheumatic fever initial episodes were rare in the South Island, with fewer than nine cases notified annually between 2015 and 2023, and 11 cases notified in 2024.

A review of case classification assignment found that more cases were classified as confirmed or probable than met the criteria for these classifications, however the difference was consistent over the time period analysed. The rheumatic fever case definition was revised in 2025. Applying the 2025 case definition to cases notified from 2015 to 2024 identified a similar number were classified as confirmed and probable cases as for the previous case definition. The impact of the new definition on surveillance trends will be assessed in future reports.

This report also summarises *emm* types for group A *Streptococcus* isolates associated with rheumatic fever cases. There was a wide diversity of *emm* types among the small proportion of cases with this information available. *emm* typing of group A *Streptococcus* isolates associated with rheumatic fever cases ended in late 2024.

# INTRODUCTION

Rheumatic fever and its long-term sequela rheumatic heart disease (RHD) are serious illnesses triggered by an autoimmune response to group A streptococcal (GAS) infection. New Zealand has a high incidence of acute rheumatic fever (ARF) compared to other high-income countries where rheumatic fever is rare [1]. In New Zealand, rheumatic fever predominantly affects Māori and Pacific peoples, particularly children and young adults aged 4–19 years [2].

RHD is a cause of premature death in New Zealand with an average of 143 deaths per year for the period 2000–2016 [3], giving an average mortality rate of 3.4 per 100,000. During this period, the mortality rate for RHD was roughly nine times higher for Māori and Pacific peoples than for those of European or Other ethnicity [3].

Rheumatic fever prevention has been a key priority for the New Zealand Government, the Ministry of Health and other partners, since 2011.The implementation of the Rheumatic Fever Prevention Programme in 2011, along with other public health initiatives, appeared to reduce rheumatic fever rates initially, though this was not sustained [4, 5]. In 2024, rates remain high, and inequities persist.

In 2023, Health New Zealand | Te Whatu Ora released the Rheumatic Fever Roadmap, 2023–2028, which outlines national priorities for prevention, early detection and support for people living with RHD [4]. The Roadmap builds on the findings of the 2021 evidence review on GAS and ARF published by Office of the Prime Minister's Chief Science Advisor [6]. It is also an important component of New Zealand's response to the World Health Assembly's 2018 resolution calling for coordinated global response on ARF and RHD [7].

This report provides an epidemiological summary of rheumatic fever in New Zealand from 2015 to 2024, based on cases notified to public health services and recorded in the national notifiable disease database, EpiSurv. It describes trends in initial and recurrent rheumatic fever episodes, with a particular focus on confirmed and probable initial episode cases. First episode hospitalisations coded as ARF are also used to monitor ARF trends in New Zealand; these are published by Health New Zealand | Te Whatu Ora and use a different methodology to that used in this report [8].

# METHODS

## SURVEILLANCE METHODS

### Notifications

Rheumatic fever is a notifiable disease in New Zealand. Rheumatic fever can be classified as initial episode (no known history of rheumatic fever), or recurrent episode (an episode in a person with a known history of rheumatic fever or previously diagnosed RHD). Cases are recorded in the national notifiable disease database, EpiSurv.

The diagnosis of rheumatic fever is a clinical one, based on the Jones criteria [9], which are divided into major and minor manifestations (Table 1). The New Zealand modification of the Jones criteria allows echocardiographic evidence of carditis and aseptic monoarthritis as major criteria. The case classifications for initial and recurrent episode rheumatic fever used during the period 2015–2024 are in Appendix Table 4 and Table 5.

**Table 1. Jones criteria for the diagnosis of rheumatic fever in New Zealand, 2015–2024**

| **Major manifestations** |
|---|
| • carditis<br>• polyarthritis or aseptic monoarthritis (as defined in the National Heart Foundation Guidelines)<br>• erythema marginatum<br>• chorea (can stand alone for ARF diagnosis)<br>• subcutaneous nodules |
| **Minor manifestations** |
| • polyarthralgia<br>• fever<br>• elevated acute phase reactants: erythrocyte sedimentation rate (ESR) or C reactive protein (CRP)<br>• prolonged PR interval |
| Notes:<br>• if carditis is present as a major manifestation, a prolonged PR interval cannot be considered an additional minor manifestation;<br>• if polyarthritis or monoarthritis is present as a major manifestation, polyarthralgia cannot be considered an additional minor manifestation. |

### Evidence of preceding GAS infection

In order to establish whether there was serological evidence of preceding GAS infection we examined the titre fields in EpiSurv, and if the upper limit of normal (ULN) titre levels were exceeded (defined as ASO titre of ≥480 IU/mL or anti-DNase B titre of ≥680 IU/mL), the case was deemed to have serological evidence. If the titre field values were both below the ULN levels or blank, the case was considered not to have serological evidence of a preceding infection.

### Case classification

Cases were analysed in this report according to the case classification recorded in EpiSurv by the public health service.

## ANALYTICAL METHODS

### Dates

Information presented in this report is based on data recorded in EpiSurv as at 15 April 2025. Any changes made to EpiSurv data after this date are not reflected in this report. Case numbers are reported according to the earliest date (i.e., the earliest of onset, hospitalisation, or notification date).

### Population rate calculations

The 2015–2024 mid-year population estimates published by Statistics New Zealand were used to calculate the incidence rates for the total population. All rates are presented as the number of cases per 100,000 population. Rates are not calculated where a category has fewer than five cases. Calculating population rates from fewer than five cases produces unreliable rates.

### Ethnicity

Multiple ethnicities can be recorded for a single case in EpiSurv. The analysis prioritises ethnicity classifications in alignment with the Ministry of Health's national ethnicity data protocols (2017) [10]. The advantage of the prioritised ethnicity approach is that statistical analysis and comparisons between ethnic groups are relatively straightforward. Ethnicity is prioritised in the following order: Māori, Pacific peoples, and European or Other ethnicity. Denominator data used to determine disease rates for ethnic groups is based on the proportion of people in each ethnic group from the 2018 'estimated resident population' applied to the 2015–2024 mid-year population estimates.

# RHEUMATIC FEVER TRENDS 2015–2024

## TOTAL RHEUMATIC FEVER NOTIFICATIONS

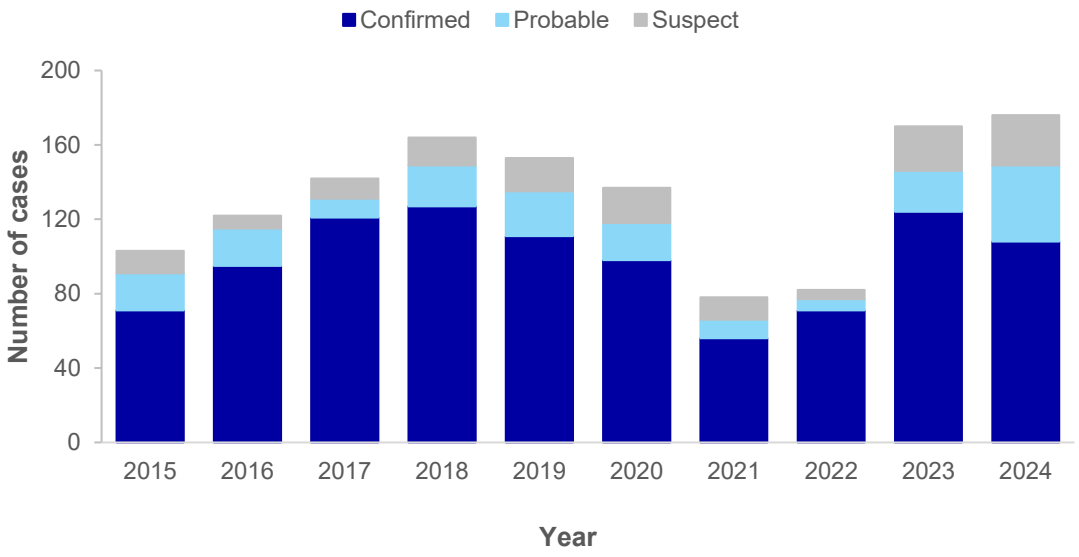
There were 1446 confirmed, probable, or suspect cases of rheumatic fever notified from 2015 to 2024. Of these, 1329 (91.9%) cases were initial episodes, and 117 (8.1%) were recurrent episodes.

## INITIAL EPISODE RHEUMATIC FEVER

The number of initial episode rheumatic fever cases increased from 2015 to 2018 then declined sharply during the COVID-19 pandemic before increasing again in 2023 and 2024 (Figure 1). The 2024 total of 176 cases is the highest number of rheumatic fever cases notified in the past 10 years. Suspect cases accounted for 15% of cases in 2024.

Given the low specificity of the suspect category and potential variability in how it is applied over time, this report largely focuses on confirmed and probable cases, which is a higher proportion than any other year from 2015 to 2023.

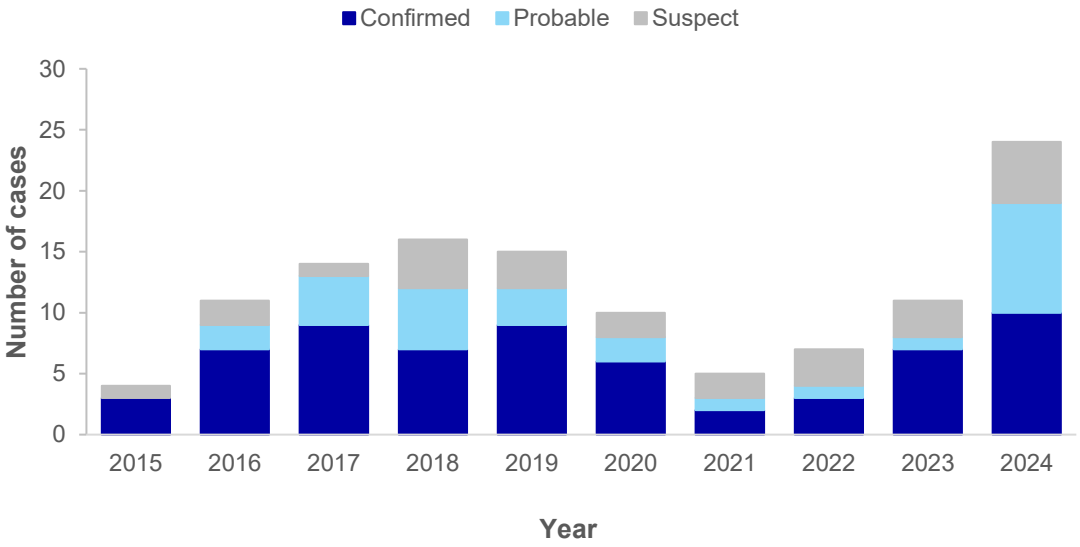
**Figure 1. Number of initial episode rheumatic fever cases by year, 2015–2024**



## RECURRENT EPISODE RHEUMATIC FEVER

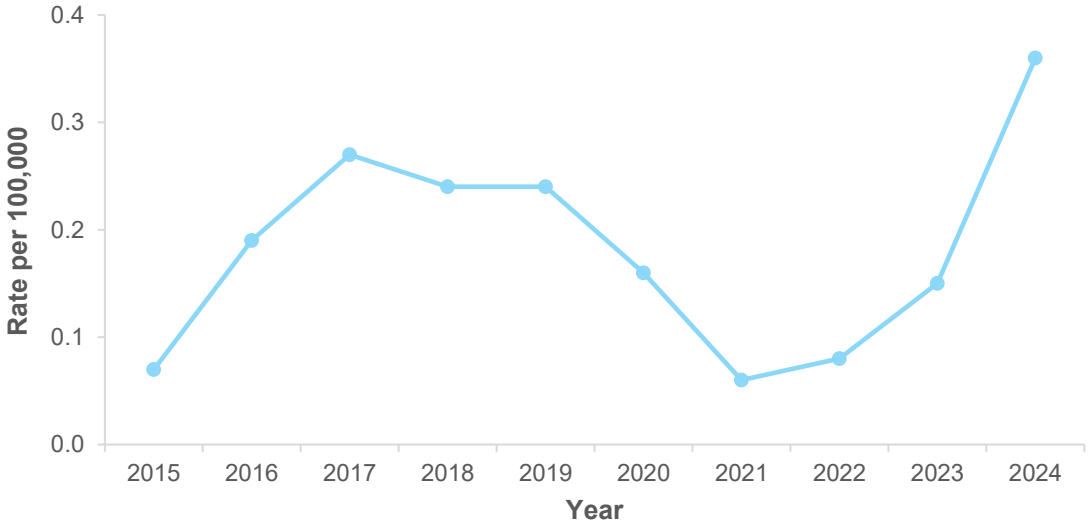
There were 117 (63 confirmed, 28 probable and 26 suspect) recurrent episode rheumatic fever cases notified from 2015 to 2024, ranging from 4 to 24 cases per year (Figure 2).

**Figure 2. Number of recurrent episode rheumatic fever cases by year, 2015–2024**




The annual rate for confirmed and probable recurrent episode rheumatic fever cases increased from less than 0.1 per 100,000 (3 cases) in 2015 to 0.3 per 100,000 in 2017 (13 cases) before decreasing again to 0.1 per 100,000 (3 cases) in 2021. The highest incidence rate for the 10-year period was in 2024 with 19 cases (0.4 per 100,000) (Figure 3).

**Figure 3. Recurrent episode rheumatic fever rates by year, confirmed and probable cases, 2015–2024**

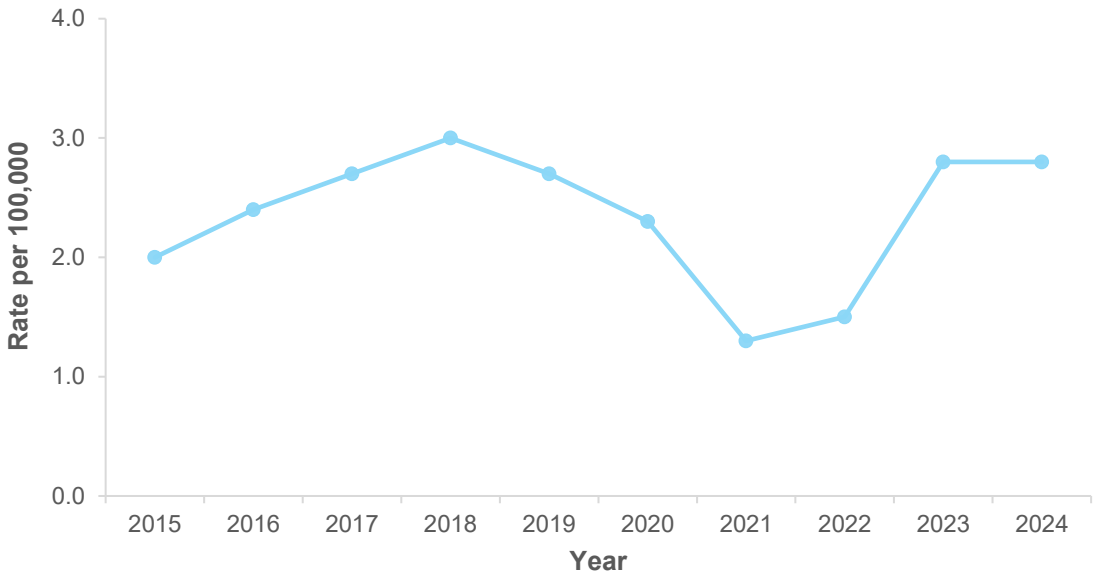


## CONFIRMED AND PROBABLE INITIAL EPISODE RHEUMATIC FEVER

This section of the report will focus on the 1177 confirmed and probable initial episode cases between 2015 and 2024.

The annual rate of confirmed and probable initial episode rheumatic fever cases increased from to a peak of 3.0 per 100,000 in 2018 (149 cases), decreasing to 1.3 per 100,000 in 2021 (66 cases). The rate increased again in 2023 and 2024, with a rate 2.8 per 100,000 (146 and 149 cases, respectively) for both years (Figure 4).

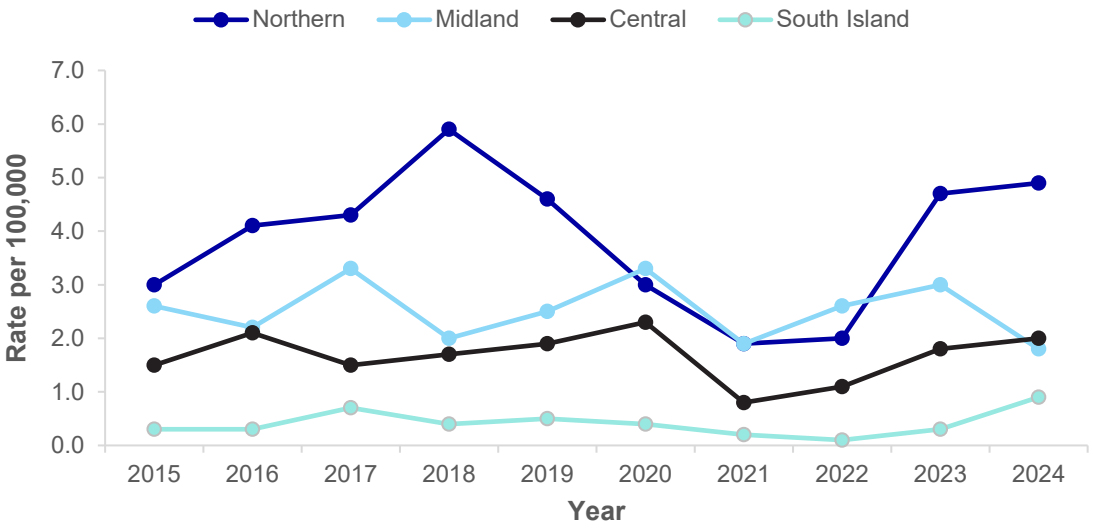
**Figure 4. Initial episode rheumatic fever rates by year, confirmed and probable cases, 2015–2024**




### Initial episode rheumatic fever by region

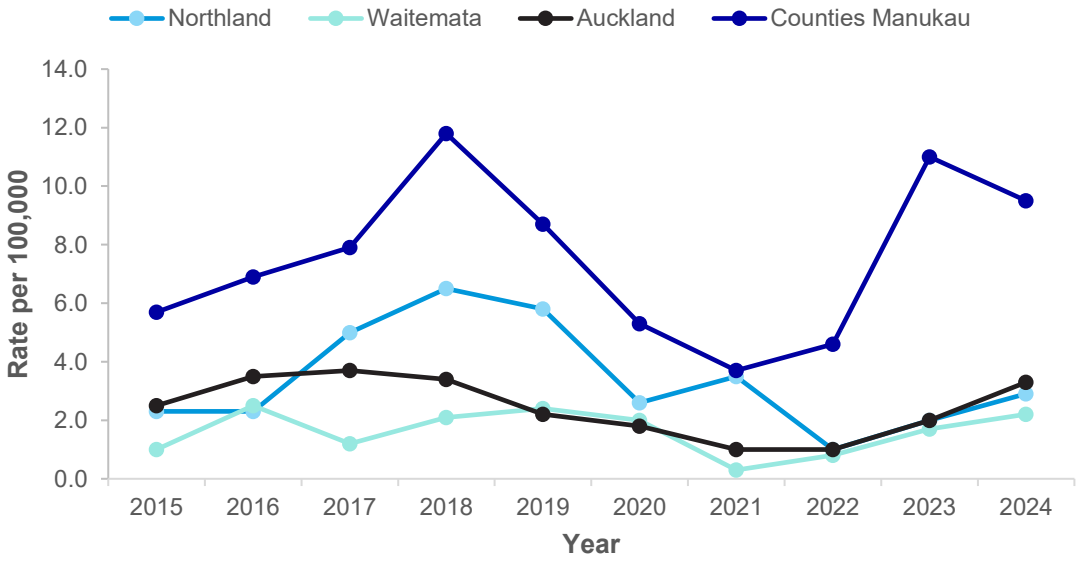
Between 2015 and 2024, the Northern Region had the highest incidence of rheumatic fever overall, with a peak of 5.9 per 100,000 in 2018 (Figure 5). It accounted for 61.5% of all cases during the period, thus driving the national peak in cases seen in 2018. The South Island had the lowest incidence, though a notable increase was observed in 2024. Rheumatic fever incidence decreased in all regions during the COVID-19 pandemic (2020–2022) and has increased again since.

**Figure 5. Initial episode rheumatic fever rates by region, confirmed and probable cases, 2015–2024**




Within the Northern Region, trends were largely driven by Counties Manukau District (Figure 6). The rate in Counties Manukau peaked in 2018 at 11.8 per 100,000 and while the rate decreased to 3.7 per 100,000 in 2021, it increased again in 2023 and 2024 to 11.0 and 9.5 per 100,000, respectively. The rate in Northland also peaked in 2018.

**Figure 6. Initial episode rheumatic fever rates by district, Northern Region, confirmed and probable cases, 2015–2024**



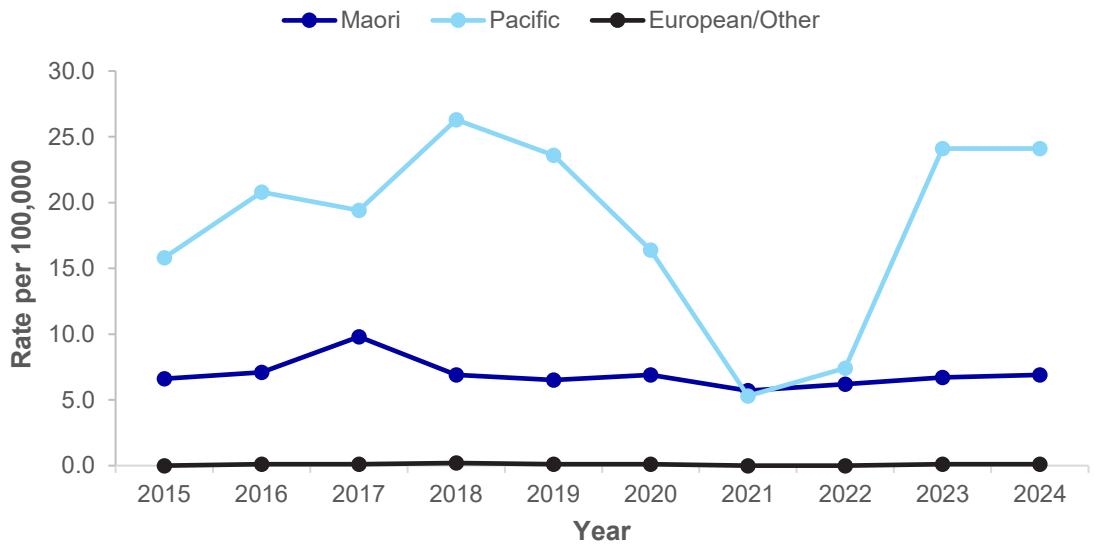

Rates are not shown for districts outside the Northern Region due to the small number of cases per year. Outside the Northern Region, the districts with the highest cumulative number of cases for 2015–2024 were Waikato (106 cases), Bay of Plenty (64 cases), and Capital and Coast (49). The number of cases by district can be found in Appendix Table 6.

## Initial episode rheumatic fever by prioritised ethnicity

Overall, Pacific people experienced markedly higher rates of rheumatic fever than other ethnic groups for most years, with a peak incidence of 26.3 per 100,000 in 2018 (Figure 7). Rates among Pacific people decreased sharply during the COVID-19 pandemic to 5.3 per 100,000 in 2021 but increased again to 24.1 per 100,000 in 2024, similar to pre-COVID-19 levels. Because of the high number of cases among Pacific people, trends within this group contribute substantially to the overall trends seen nationally. Note, using prioritised ethnicity undercounts cases in Pacific peoples as those who identify as both Māori and Pacific peoples are not included. From 2015 to 2024, there were 49 initial episode rheumatic fever cases who identified as both Māori and Pacific peoples in addition to the 613 cases classified as Pacific peoples (based on prioritised ethnicity, an 8% increase).

Māori rates were less affected during the pandemic and ranged from 5.7 per 100,000 in 2021 to 9.8 per 100,000 in 2017. Case numbers among the European or Other ethnic group were consistently low between 2015 and 2024, therefore rates for this group should be interpreted with caution.

**Figure 7. Initial episode rheumatic fever rates by prioritised ethnicity, confirmed and probable cases, 2015–2024**




## Initial episode rheumatic fever by sex

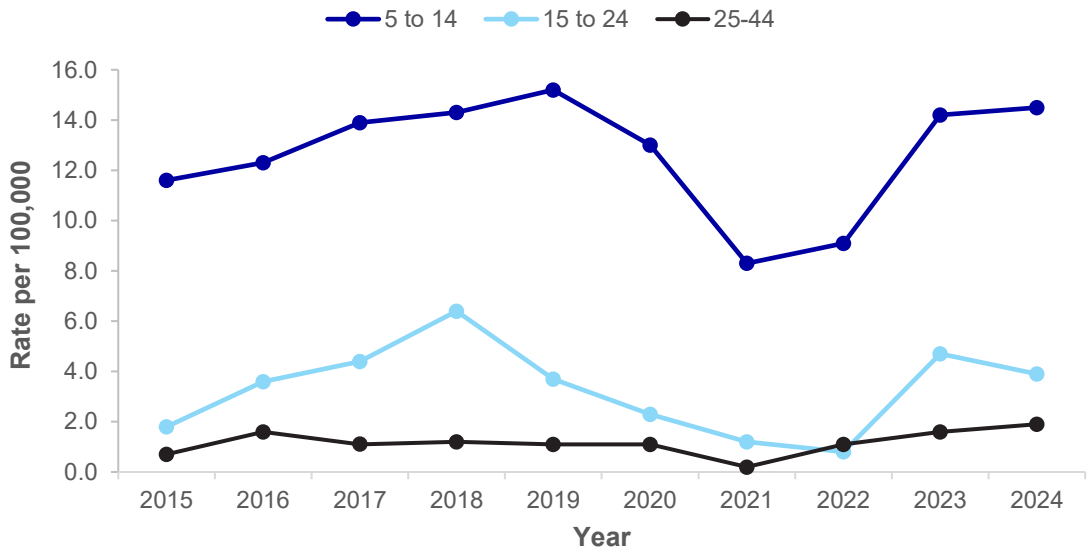
There were more initial episode rheumatic fever cases among males (663 cases, 56.3%) than females (513 cases (43.6%). The number of male cases exceeded that of female cases in every year except 2015 (Appendix

Table 7).

## Initial episode rheumatic fever by age group

Initial episode rheumatic fever rates were consistently highest among children aged 5–14 years, followed by young adults aged 15–24 years between 2015 and 2024 (Figure 8). Rates decreased during the COVID-19 pandemic for both these age groups and returned to pre-pandemic levels by 2024. Rates among those aged 25–44-years remained low from 2015 to 2024. Due to consistently low numbers among children aged 0–4-years and adults aged 45-years and over, rates for these age groups are not shown.

**Figure 8. Initial episode rheumatic fever rates by age group, confirmed and probable cases, 2015–2024**




[1]Those aged 0-4 years and 45 years and over were excluded due to low numbers (<5 cases) across most years.

## Initial episode rheumatic fever by prioritised ethnicity and age group

Figure 9 shows the age-specific rates by ethnic group for initial episode rheumatic fever among Māori and Pacific peoples from 2015 to 2024. The highest rates were among Pacific peoples aged 5–14 years, with a peak rate of 91.4 per 100,000 (58 cases) in 2019. Case numbers and rates by age group, ethnic group, and year can be found in Appendix Table 8.

**Figure 9. Initial episode rheumatic fever rates by age group and ethnicity, confirmed and probable cases, 2015–2024**

## Clinical presentation and basis of diagnosis

Rheumatic fever is a clinical diagnosis requiring fulfilment of the modified Jones criteria along with evidence of a preceding GAS infection.

### *Jones criteria*

Table 2 shows the number of initial episode rheumatic fever cases with each clinical manifestation recorded. Polyarthritis and polyarthralgia cannot be considered both major and minor criteria in the same person and therefore cases reporting both have been included as a "Yes" for polyarthritis and a "No" for polyarthralgia. Similarly, carditis and a prolonged PR interval on ECG cannot be included as both major and minor criteria in the same person and cases reporting both have been included as a "Yes" for carditis and a "No" for prolonged PR interval.

The most common major manifestations recorded were carditis (799/1115, 71.7%) and polyarthritis or aseptic monoarthritis (744/1107, 67.2%). The most common minor manifestations were raised ESR or CRP (1109/1160, 95.6%), and fever (608/1000, 60.8%). Though cases with chorea do not require any other major or minor manifestations to be diagnosed as rheumatic fever, all chorea cases between 2015 and 2024 had a least one additional major or minor criteria recorded.

### *Preceding sore throat*

Just over half (53.6%, 562 cases) of initial episode rheumatic fever cases did not report having a sore throat in the four weeks prior to hospital admission (Table 2). For this group rheumatic fever could not have been prevented through appropriate sore throat management.

**Table 2. Clinical manifestations associated with initial episode rheumatic fever, confirmed and probable cases, 2015–2024**

| Jones criteria | Yes | No | Unknown | Percent[1] (%) |
|---|---|---|---|---|
| **Major manifestations** | | | | |
| Carditis | 799 | 316 | 27 | 71.7 |
| Polyarthritis or aseptic monoarthritis | 744 | 363 | 70 | 67.2 |
| Chorea | 102 | 931 | 144 | 9.9 |
| Erythema marginatum | 109 | 891 | 177 | 10.9 |
| Subcutaneous nodules | 12 | 1004 | 161 | 1.2 |
| **Minor manifestations** | | | | |
| Raised ESR[2] or CRP[2] | 1109 | 51 | 17 | 95.6 |
| Fever | 608 | 392 | 177 | 60.8 |
| Polyarthralgia (except where polyarthritis or monoarthritis is present as a major manifestation) | 0 | 363 | 0 | 0.0 |
| Prolonged PR interval on ECG[3] (except where carditis is present as a major manifestation) | 202 | 110 | 4 | 64.7 |
| **Other** | | | | |
| Sore throat in the four weeks prior to hospital admission | 562 | 486 | 129 | 53.6 |

Cases had more than one manifestation recorded.
[1] Percent refers to the number of cases for which information was known.
[2] ESR = Erythrocyte sedimentation rate; CRP = C-reactive protein
[3] ECG = electrocardiogram

*Supporting laboratory criteria*

The 2014 case definition for rheumatic fever requires serological evidence of preceding GAS infection for a confirmed case, with the exception of cases presenting with chorea. If a case only had a positive throat culture or rapid antigen test, then they were classified as a probable or suspect case.

Table 3 shows the level of supporting laboratory evidence for a preceding GAS infection for notified cases using a hierarchical system where each case is represented only once, starting with elevated titres, followed by a throat culture and then an antigen test. There were 102 cases with chorea and therefore laboratory evidence of preceding GAS infection was not needed for the diagnosis of confirmed rheumatic fever; these have been excluded from Table 3.

The majority (85.6%, 921 cases) of initial episode rheumatic fever cases had elevated antibody titres, while 9.5% (102 cases) had a positive throat culture. For 52 cases (4.8%), the laboratory evidence fields were not completed, or no information was available.

**Table 3. Laboratory evidence of preceding GAS infection for initial episode rheumatic fever, confirmed and probable cases, 2015–2024**

| Laboratory criteria | Number | Percent (%) |
|---|---|---|
| Elevated streptococcal antibody titre[1] | 921 | 85.6 |
| Positive throat culture for GAS | 102 | 9.5 |
| Positive rapid streptococcal antigen test | 0 | 0.0 |
| **Total with possible evidence of preceding or current GAS infection** | **1023** | **94.2** |
| Fields incomplete or no criteria specified | 52 | 4.8 |
| **Total[2]** | **1075** | **100.0** |

Each case is only presented once in the table
[1] Elevated or rising streptococcal antibody titres are necessary for confirming preceding GAS infection. Other laboratory tests, including culture and rapid antigen test, cannot distinguish between infection and carriage.
[2] Excludes 102 cases of chorea as evidence of preceding GAS infection is not required.

# CASE CLASSIFICATION

### Comparison of case classifications based on 2014 and 2025 case definitions

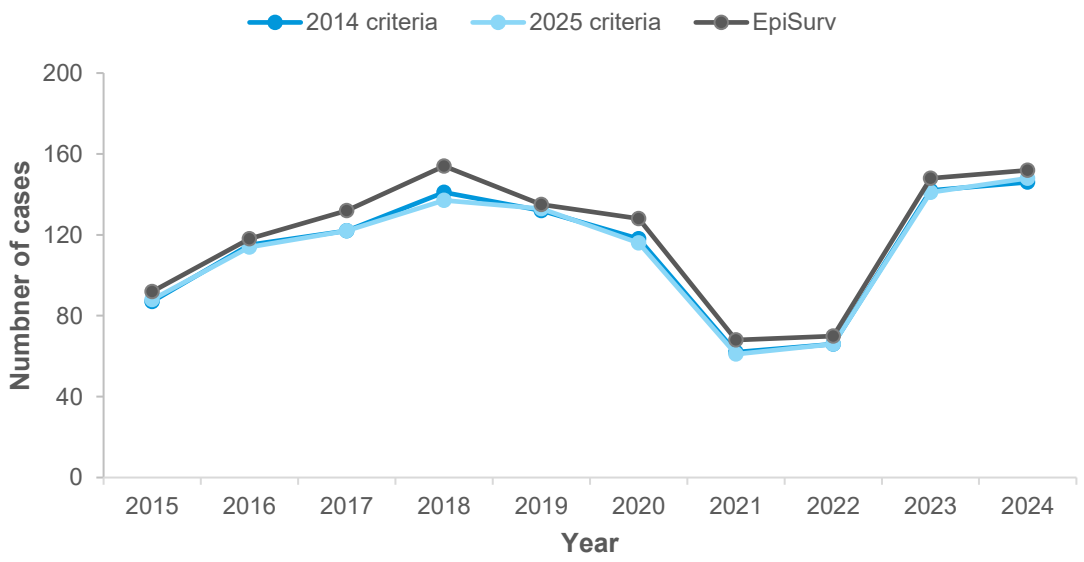
Case classifications as recorded in EpiSurv were compared with the assigned case classification according to the supporting information entered in EpiSurv assessed against the Communicable Disease Control Manual (CDCM) criteria in place during the period 2015–2024.

Cases in EpiSurv were correctly assigned to the 2014 class classification for 1182/1327 (89.1%) confirmed, probable, and suspect cases. Considering confirmed and probable cases only, 88.5% (1042/1177) of cases were correctly assigned.

The rheumatic fever chapter of the CDCM was updated in May 2025 to coincide with the release of the updated Aotearoa New Zealand Guidelines for the Prevention, Diagnosis, and Management of Acute Rheumatic Fever and RHD [9]. A revised case definition was introduced. Key changes were the addition of advanced AV block on ECG as evidence of carditis, decreases to the ULN levels for ASO and anti-DNase B titres as evidence of a preceding GAS infection, and differing requirements for cases with and without carditis with respect to the level of evidence to confirm a preceding GAS infection. Because titre levels and laboratory evidence to support diagnosis are collected in the EpiSurv case report form, the potential impact of these latter two changes on confirmed and probable case numbers can be assessed. The probable case definition was also expanded to include one major and minor criteria, which could make the 2025 case definition more sensitive.

We re-classified cases notified from 2015 to 2024 based on the criteria included in the 2025 case definition and plotted the annual confirmed and probable case numbers against those recorded in EpiSurv and those classified according to the 2014 case definition (Figure 10). Across all years, more cases were classified as confirmed and probable in EpiSurv than met the 2014 and 2025 criteria for these classifications. The number of cases classified as confirmed and probable by the 2014 and the 2025 definitions were very similar each year.

**Figure 10. Initial episode rheumatic fever cases by EpiSurv case classification, and 2014 and 2025 case definitions, confirmed and probable cases, 2015–2024**

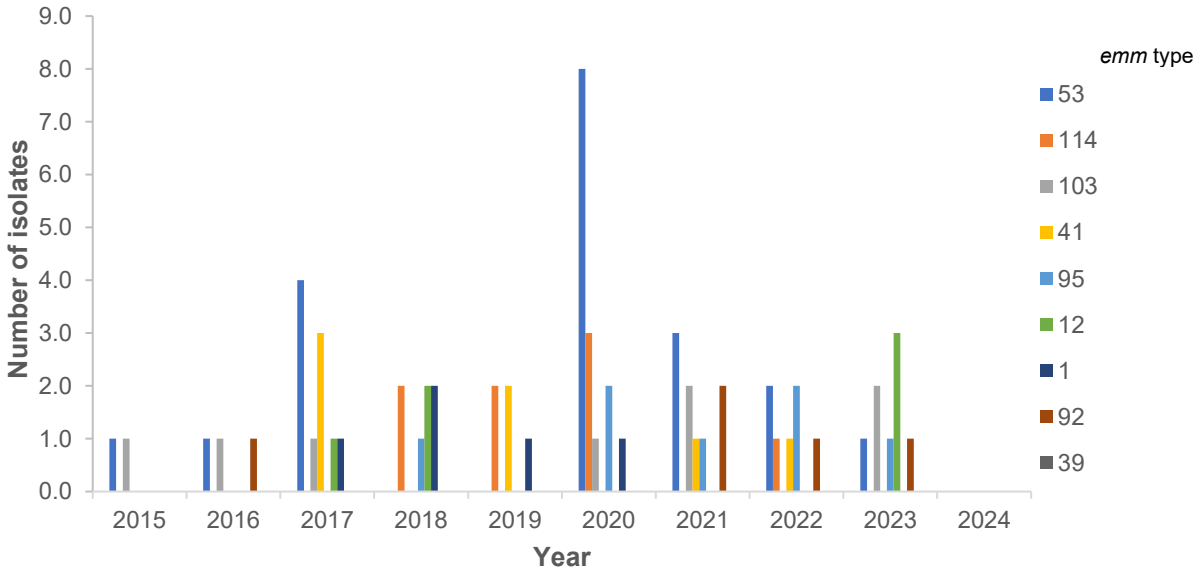


# GAS *EMM* TYPES ASSOCIATED WITH RHEUMATIC FEVER CASES

Between 2015 and 2024, *emm* typing was available for 11.6% (136/1177 cases) of confirmed and probable initial episode rheumatic fever cases. *emm* typing is performed on GAS isolates from rheumatic fever cases, which are only available if cultured from a throat swab around the time of the rheumatic fever diagnosis and sent to PHF Science for typing.

Between 2015 and 2024, there were 51 distinct *emm* types characterised. The most common *emm* types were *emm53* (14.7%, 20 isolates); *emm114 (*5.9%,8 isolates*); emm41, emm103* and *emm95* (5.1%, 7 isolates each); *emm12* (4.4%, 6 isolates each); and *emm1* and *emm92* (3.7%, 5 isolates each) (Figure 11). All other *emm* types were identified in fewer than five cases (Appendix Table 9).

**Figure 11. *Emm* types associated with initial episode rheumatic fever, confirmed and probable cases, 2015–2024.**



# DISCUSSION

This report summarises trends in acute rheumatic fever in New Zealand from 2015 to 2024, with a focus on confirmed and probable initial episode cases.

## Disease incidence trends

Following a peak in 2018, the incidence of initial episode rheumatic fever decreased in 2021 and 2022, two years affected by pandemic public health measures. Incidence increased again in 2023 and 2024, though remained below the 2018 peak. The incidence of recurrent episode rheumatic fever followed the same pattern, although a much larger peak was seen in 2024.

A similar pattern was observed in Australia, with decreases during the COVID-19 pandemic followed by a resurgence in 2023–2024 (3.2 per 100,000 [11]) after the easing of pandemic restrictions [12]. ARF rates in endemic regions in Australia (e.g. the Northern Territory, Western Australia, Queensland, and parts of South Australia) have returned to or exceeded pre-COVID-19 levels, approaching the peaks observed in 2018–2019 [12, 13].

The decrease in incidence during 2021 and 2022 was largely driven by a decrease in cases among school-aged children of Pacific ethnicity in the Auckland region. This decrease was also observed in ARF hospitalisations [8]. Possible contributing factors include school closures and physical distancing measures implemented during the COVID-19 pandemic, which may have contributed to reduced GAS transmission. These measures were particularly prolonged in the Auckland region in 2021. In addition, border restrictions limiting travel between New Zealand and the Pacific Islands may have contributed to a reduction in the diversity of circulating GAS strains. It is also possible that changes in healthcare-seeking behaviour and access to primary care during the pandemic resulted in some under ascertainment of cases.

ARF cases increased in 2023 as COVID-19 pandemic restrictions were lifted. A significant increase in invasive GAS (iGAS) infections was also observed in 2023, especially among Pacific peoples and Māori [14]. The increase in iGAS and ARF at this time indicate transmission of GAS likely returned to previous levels in 2023, having been impacted by the COVID-19 pandemic response measures in place during 2020–22.

There were more initial episode rheumatic fever cases among males than females. The decrease in case numbers during the COVID-19 pandemic years was more pronounced in females than males.

## Ethnic disparities

There are marked ethnic inequities in rheumatic fever incidence, with considerably higher numbers and rates among Māori and Pacific peoples, particularly children aged 5–14 years. In contrast, incidence among the European or Other ethnic group remains consistently low. These inequities have been persistent and longstanding, and result in disproportionately high rates of RHD hospitalisations and deaths among Māori and Pacific peoples [3]. Because this report uses prioritised ethnicity to assess incidence rates, it may underestimate the incidence of ARF among Pacific peoples [15, 16]. Analysis of total response ethnicity increased the number of confirmed and probable initial episode ARF cases in Pacific peoples by 8% over this 10-year period.

A similar pattern of inequity is observed in Australia, where ARF and RHD incidence is much higher among Aboriginal and Torres Strait Islander (First Nations) and Pacific populations compared to other ethnic groups [12, 13]. Indigenous populations in Canada [17] and the United States [18] are also disproportionately impacted by ARF.

Socioeconomic disadvantage, household overcrowding, inequitable access to quality healthcare, and familial or genetic factors are interconnected factors frequently cited as contributing to the increased risk of ARF and iGAS infections in New Zealand for Māori and Pacific peoples [3, 19].

The Rheumatic Fever Roadmap [4] sets out the direction for the prevention and management of rheumatic fever and RHD from 2023 to 2028 in New Zealand. It is focused on reducing inequities, including addressing the primary determinants of disease and ensuring culturally safe, high-quality care for Māori and Pacific peoples.

### Regional trends

The Northern Region reported the highest number of cases of ARF during 2015–2024, accounting for 61.5% of all confirmed and probable initial episode cases. The marked decrease in ARF incidence during 2021 and 2022 was mostly driven by decreases among Pacific children in the Auckland region. Auckland experienced more strict and prolonged lockdowns than other regions in New Zealand during 2021 as part of the COVID-19 pandemic response which may have contributed to this decrease.

Incidence in the other regions decreased during 2021–22 and has increased in 2023 and 2024. Incidence in the South Island is much lower than elsewhere in the country.

### Case classification

A review of the information in EpiSurv found that the reported classification was in accordance with the CDCM case definition for 89.1% of initial episode rheumatic fever cases notified between 2015 and 2024. Discrepancies have also been highlighted in previous years [20], suggesting there continue to be challenges with applying the case definition accurately and/or recording the supporting evidence in EpiSurv.

A new case definition for rheumatic fever was introduced in May 2025. Our analysis of the information in EpiSurv suggests that confirmed and probable case classifications based on the new criteria may not differ substantially from the previous case definition. This analysis did not allow an assessment of the impact of the changes to the diagnosis of carditis, nor of cases that were not notified at all because they did not meet the 2015–2024 definitions. Future analyses of cases notified with the new definitions and a review of whether these would be classified differently under the 2015-2024 definitions will provide insight into the impact of the case definition changes on surveillance trends.

### Group A *Streptococcus emm* types associated with rheumatic fever cases

Of the approximately 12% of cases with GAS typing, *emm*53 was the most common *emm* type, followed by *emm114*, *emm41*, *emm103, emm95*, *emm12*, *emm1* and *emm92*. Of these *emm* types, six were also among the top *emm* types associated with iGAS infections typed by the Invasive Pathogens Laboratory at PHF Science over the same period.

The low proportion of ARF cases with GAS isolates available for *emm* typing limits the utility of these data. For this reason, surveillance *emm* typing of GAS associated with cases of rheumatic fever ended in 2025. *emm*-based surveillance of GAS serotypes is important for understanding the GAS strains causing significant disease and informing GAS vaccine development [21] and this will continue through ongoing monitoring of *emm* types associated with iGAS infections.

# CONCLUSION

Rates of initial episode and recurrent episode rheumatic fever in New Zealand decreased during 2020-22 COVID-19 pandemic but have returned to high levels in 2023 and 2024. Cases have been consistently high in the Northern region, which accounted for over 60% of all initial episode cases in the 10-year reporting period. Rheumatic fever continues to disproportionately affect Pacific peoples and Māori, especially those aged 5–14 years. Reducing rheumatic fever incidence in New Zealand remains a pressing priority.

# APPENDIX

**Table 4: Rheumatic fever case initial episode classification, 2015–2024**

| Classification | |
|---|---|
| Confirmed | Requires **all** of the following:<br>• serological evidence of a preceding GAS infection (i.e. elevated or rising streptococcal titres)<br>• two major, or one major and two minor, manifestations<br>• no known past history of ARF<br>OR<br>• chorea (other major manifestations or evidence of GAS infection not required). |
| Probable | Requires **all** of the following:<br>• evidence of preceding GAS infection from positive throat culture or rapid antigen test<br>• two major, or one major and two minor, manifestations<br>• no known past history of ARF<br>OR<br>• serological evidence of a preceding GAS infection (i.e. elevated or rising streptococcal titres)<br>• one major and one minor manifestation<br>• no known past history of ARF. |
| Suspect | Requires **all** of the following:<br>• strong clinical suspicion of ARF<br>• insufficient signs and symptoms to fulfil diagnosis of confirmed or probable ARF<br>• no known past history of ARF. |

**Table 5: Rheumatic fever case recurrent episode classification, 2015–2024**

| Classification | |
|---|---|
| Confirmed | Requires the following:<br>• serological evidence of a preceding GAS infection (i.e. elevated or rising streptococcal titres), AND<br>• two major, or one major and two minor, or three or more minor manifestations<br>OR<br>• chorea (other major manifestations or evidence of GAS infection not required).<br>AND<br>• a prior confirmed episode of ARF or RHD |
| Probable | Requires **all** of the following:<br>• evidence of preceding GAS infection from positive throat culture or rapid antigen test<br>• two major, or one major and two minor, manifestations<br>• a prior confirmed episode of ARF or RHD<br>OR<br>• serological evidence of a preceding GAS infection (i.e. elevated or rising streptococcal titres)<br>• one major and one minor manifestation<br>• a prior confirmed episode of ARF or RHD |
| Suspect | Requires **all** of the following:<br>• strong clinical suspicion of ARF<br>• insufficient signs and symptoms to fulfil diagnosis of confirmed or probable ARF<br>• a prior confirmed episode of ARF or RHD |

## Table 6. Initial episode rheumatic fever cases by district, confirmed and probable cases, 2015–2024

| District | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 |
|---|---|---|---|---|---|---|---|---|---|---|
| Northland | 4 | 4 | 9 | 12 | 11 | 5 | 7 | 2 | 4 | 6 |
| Waitemata | 6 | 15 | 7 | 13 | 15 | 13 | 2 | 5 | 11 | 15 |
| Auckland | 12 | 17 | 18 | 17 | 11 | 9 | 5 | 5 | 10 | 17 |
| Counties Manukau | 30 | 37 | 44 | 67 | 50 | 31 | 22 | 27 | 68 | 61 |
| Waikato | 8 | 5 | 21 | 9 | 9 | 18 | 9 | 9 | 13 | 5 |
| Lakes | 4 | 5 | 3 | 2 | 4 | 4 | 2 | 3 | 6 | 4 |
| Bay of Plenty | 7 | 7 | 5 | 6 | 9 | 9 | 4 | 7 | 8 | 2 |
| Tairawhiti | 3 | 2 | 2 | 1 | 1 | 2 | 4 | 4 | 2 | 5 |
| Taranaki | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 3 | 2 | 3 |
| Hawke's Bay | 4 | 5 | 2 | 4 | 4 | 6 | 5 | 4 | 4 | 3 |
| Whanganui | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 2 | 0 |
| MidCentral | 3 | 4 | 1 | 2 | 7 | 4 | 2 | 1 | 2 | 3 |
| Hutt Valley | 4 | 3 | 5 | 2 | 2 | 6 | 0 | 2 | 4 | 4 |
| Capital & Coast | 1 | 7 | 5 | 6 | 5 | 6 | 0 | 3 | 6 | 10 |
| Wairarapa | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| Nelson Marlborough | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| West Coast | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Canterbury | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 1 | 2 | 6 |
| South Canterbury | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Southern | 0 | 0 | 3 | 1 | 3 | 2 | 0 | 0 | 2 | 4 |

## Table 7. Initial episode rheumatic fever cases by sex, confirmed and probable cases, 2015–2024

| Year | Male | | Female | |
|---|---|---|---|---|
| | Cases | Percent | Cases | Percent |
| 2015 | 40 | 44.0 | 51 | 56.0 |
| 2016 | 68 | 59.1 | 47 | 40.9 |
| 2017 | 76 | 58.0 | 55 | 42.0 |
| 2018 | 78 | 52.3 | 71 | 47.7 |
| 2019 | 71 | 52.6 | 64 | 47.4 |
| 2020 | 78 | 66.1 | 39 | 33.1 |
| 2021 | 43 | 65.2 | 23 | 34.8 |
| 2022 | 44 | 57.1 | 33 | 42.9 |
| 2023 | 86 | 58.9 | 60 | 41.1 |
| 2024 | 79 | 53.0 | 70 | 47.0 |
| **Total** | **663** | **56.3** | **513** | **43.6** |

## Table 8. Initial episode rheumatic fever cases and rates by prioritised ethnicity and age group, confirmed and probable cases, 2015–2024

| Year | Māori | | | | Pacific peoples[1] | | | | European or Other | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 5–14years | | 15–24years | | 5–14years | | 15–24years | | 5–14years | | 15–24years | |
| | Cases | Rate[2] | Cases | Rate[2] | Cases | Rate[2] | Cases | Rate[2] | Cases | Rate[2] | Cases | Rate[2] |
| 2015 | 34 | 27.6 | 4 | 3.6 | 37 | 57.7 | 8 | 13.4 | 0 | 0.0 | 0 | 0.0 |
| 2016 | 34 | 27.2 | 6 | 5.3 | 41 | 63 | 16 | 26.4 | 1 | 0.2 | 2 | 0.4 |
| 2017 | 43 | 33.7 | 14 | 12.3 | 43 | 64.8 | 14 | 23.1 | 2 | 0.5 | 1 | 0.2 |
| 2018 | 42 | 24.5 | 11 | 7.6 | 47 | 75.2 | 28 | 44.7 | 3 | 0.7 | 3 | 0.7 |
| 2019 | 39 | 22.4 | 10 | 6.9 | 58 | 91.4 | 14 | 22.5 | 2 | 0.5 | 0 | 0.0 |
| 2020 | 45 | 25.5 | 5 | 3.4 | 38 | 58.9 | 10 | 16.1 | 3 | 0.7 | 0 | 0.0 |
| 2021 | 42 | 23.7 | 4 | 2.8 | 13 | 20.1 | 4 | 6.6 | 0 | 0.0 | 0 | 0.0 |
| 2022 | 45 | 25.4 | 2 | 1.4 | 15 | 23.3 | 3 | 5.0 | 0 | 0.0 | 0 | 0.0 |
| 2023 | 39 | 21.8 | 13 | 8.9 | 53 | 81.1 | 17 | 27.5 | 3 | 0.7 | 1 | 0.2 |
| 2024 | 46 | 25.5 | 6 | 4 | 51 | 76.7 | 18 | 28.2 | 1 | 0.2 | 2 | 0.4 |

[1] Use of prioritised ethnicity in analyses undercounts cases in Pacific peoples in particular. Using total ethnicity response increases the total number of cases in Pacific peoples to 662, compared to 613 when using prioritised ethnicity (an 8% increase).
[2] Rate per 100,000 population. The denominator data used to determine disease rates for ethnic groups is based on the proportion of people in each ethnic group from the usually resident 2018 census population to the mid-year population estimates for 2015–2024.

## Table 9. Initial episode rheumatic fever cases by *emm* type, confirmed and probable cases, 2015–2024

| *emm* | 201 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **53** | 1 | 1 | 4 | | | 8 | 3 | 2 | 1 | | 20 |
| **114** | | | | 2 | 2 | 3 | | 1 | | | 8 |
| **103** | | | 3 | | 2 | | 1 | 1 | | | 7 |
| **41** | 1 | | 1 | | | 1 | 2 | | 2 | | 7 |
| **95** | | | | 1 | | 2 | 1 | 2 | 1 | | 7 |
| **12** | | | 2 | 1 | | | | | 3 | | 6 |
| **1** | | | 2 | 1 | 1 | 1 | | | | | 5 |
| **92** | | 1 | | | | | 2 | 1 | 1 | | 5 |
| **39** | | 2 | 2 | | | | | | | | 4 |
| **44** | | | 2 | | 1 | | | | 1 | | 4 |
| **74** | | | 1 | | 1 | 2 | | | | | 4 |
| **91** | 1 | | 1 | | 1 | | | 1 | | | 4 |
| **233** | | | 1 | 2 | | | | | | | 3 |
| **6** | | | 1 | 1 | 1 | | | | | | 3 |
| **82** | 1 | 1 | | 1 | | | | | | | 3 |
| **100** | | 2 | | | | | | | | | 2 |
| **101** | | 1 | 1 | | | | | | | | 2 |
| **116** | 1 | | | 1 | | | | | | | 2 |
| **118** | | | 1 | 1 | | | | | | | 2 |
| **26** | | 2 | | | | | | | | | 2 |
| **52** | | 1 | 1 | | | | | | | | 2 |
| **65** | | | | | 1 | | 1 | | | | 2 |
| **76** | | 1 | | | | 1 | | | | | 2 |
| **77** | | | 1 | | 1 | | | | | | 2 |
| **89** | 1 | | | | 1 | | | | | | 2 |
| **108** | | | | | | | | 1 | | | 1 |
| **11** | | | 1 | | | | | | | | 1 |
| **110** | | | 1 | | | | | | | | 1 |
| **15** | | | | | 1 | | | | | | 1 |
| **22** | | | | | | | | | 1 | | 1 |
| **222** | | | | | 1 | | | | | | 1 |
| **225** | | | 1 | | | | | | | | 1 |
| **238** | | 1 | | | | | | | | | 1 |
| **3** | | | 1 | | | | | | | | 1 |
| **42** | 1 | | | | | | | | | | 1 |
| **49** | | | | | | | 1 | | | | 1 |
| **56** | | | | 1 | | | | | | | 1 |
| **58** | | 1 | | | | | | | | | 1 |
| **63** | | 1 | | | | | | | | | 1 |
| **71** | | | 1 | | | | | | | | 1 |
| **75** | | | 1 | | | | | | | | 1 |
| **78** | | | | | 1 | | | | | | 1 |
| **8** | | | | | | | | | | 1 | 1 |
| **81** | | | | | 1 | | | | | | 1 |
| **85** | | | | 1 | | | | | | | 1 |
| **86** | 1 | | | | | | | | | | 1 |
| **9** | | 1 | | | | | | | | | 1 |
| **90** | 1 | | | | | | | | | | 1 |
| **93** | | | 1 | | | | | | | | 1 |
| **98** | | | 1 | | | | | | | | 1 |
| **99** | | | | | | 1 | | | | | 1 |

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