

Pacific Health Review

Making Education Easy

Issue 16 – 2012

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Abbreviations used in this issue

ARF = acute rheumatic fever
RF = rheumatic fever
RHD = rheumatic heart disease

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Dr Api Talemaitoga, Chief Advisor, Community Health Service Improvement, wishes to acknowledge the commentaries and insights provided by Dr Teuila Percival, Dr Satupaitea Viali and Dr Toakase Fakakovikaetau.

Kia orana, Fakaalofa lahi atu, Talofa lava, Malo e lelei, Bula vinaka, Taloha ni, Kia ora, Greetings.

Welcome. This is the sixteenth edition of Pacific Health Review.

Going forward we are taking a new approach by dedicating each issue to a topic of importance to Pacific health. The focus for this edition is rheumatic fever (RF).

The Government has set an ambitious target to reduce the incidence of RF in New Zealand by two-thirds, from 4.2 to 1.4 cases per 100,000 people by June 2017, as part of its delivering Better Public Services results programme. The articles in this issue highlight the ethnic disparities with RF and the very high rates in Pacific children. Achieving the Government's target will require specific initiatives for Pacific children and young people based on evidence and knowledge of how this is best applied in a local context.

We are therefore pleased to be able to bring you expert commentary from three Pacific health leaders who are recognised in New Zealand, the Pacific region and internationally for their work in this area. Dr Toakase Fakakovikaetau, a Tongan paediatrician, won the 2008 Heart Hero Award from ProCor, a global network that promotes cardiovascular health in developing countries, for her pioneering work with Tongan children. Dr Satu Viali, a New Zealand-trained cardiologist and public health specialist in Samoa, is working with international colleagues on research into the use of echocardiography for screening for RHD. Dr Teuila Percival QSO has led Pacific child health initiatives in secondary and primary care in New Zealand for more than a decade.

My thanks to Toa, Satu and Teuila for their valuable contributions to Pacific Health Review. This is the last edition that I will be helping coordinate. We now have a new National Clinical Director, Pacific at the Ministry of Health, Hilda Fa'asalele, who will help coordinate the next issue. I will continue to assist if needed.

We welcome your feedback and comments on this edition of Pacific Health Review and on our proposed thematic approach for future editions.

Dr Api Talemaitoga

Chief Advisor, Community Health Service Improvement
Ministry of Health

Dr Debbie Ryan, Principal Pacific Perspectives, selected the articles and coordinated the commentaries for this edition.
debbieryan@researchreview.co.nz

Rheumatic fever (ARF) and Rheumatic Heart Disease (RHD) are major causes of morbidity and mortality in the Pacific Islands and other developing countries. Virtually unknown in modern developed countries apart from disadvantaged populations, rheumatic fever (RF) and its sequelae are a continuing problem for Pacific and Māori people in New Zealand. The continuing prevalence of RF in New Zealand is a marker of socioeconomic inequity and, importantly, poor healthcare access for Pacific and Māori children and their families. RF in New Zealand is almost exclusively a Pacific and Māori disease. Ethnic disparity is marked with New Zealand child RF rates of 81.2 in Pacific, 40.2 in Māori and 2.1 in Non-Māori/Non-Pacific (Milne, 2012).

There is also concern that the "RF gap" in New Zealand is increasing, with European rates decreasing while Pacific and Māori rates continue to increase (Milne, 2008; Gilbert 2011). In a comparatively rich country such as New Zealand, the continuing high incidence of ARF and RHD is untenable and its reduction and prevention has recently gained political impetus with a commitment of \$24 million dollars over the next 5 years for programmes to prevent RF (MOH, 2012).

If New Zealand fails to prevent child ARF, Pacific and Māori communities will continue to be burdened by RHD in the ensuing decades. RHD is a significant cause of premature death in young adults and the middle-aged, with between 150 and 200 deaths a year (Milne, 2008). The studies by Gilbert et al. (Gilbert, 2011) and Milne et al. (Milne, 2012) in this month's Pacific Health Review describe the considerable medical and surgical morbidity and health services costs.

Secondary prophylaxis with 28-day IM benzathine penicillin has been a success story in New Zealand. RF management registers were established in endemic areas, high compliance was achieved with effective nurse-delivered penicillin and a resultant reduction in recurrences of RF (Newman, 1984; Spinetto, 2010). Initiatives to identify asymptomatic RHD in school-aged children in high-prevalence areas using portable echocardiography have also been implemented in New Zealand and the Pacific region (Webb, 2009; Viali, 2011).

For Pacific Island countries with high prevalence rates, limited health services and widespread geographically isolated populations, implementing screening programmes using low-cost portable ECHO machines and non-expert operators can allow for effective screening and control of RHD (Viali, 2011; Reeves, 2011).

Ultimately, however, the aim must be to prevent RF and RHD. The most promising health sector interventions are improving access to healthcare. Mardani et al. discuss one approach targeting GPs and school communities to increase the percentage of children being swabbed and treated (Mardani, 2011). Relying on families of school-aged children having to access primary care in GP clinics will always be a challenge, with significant barriers particularly for the most disadvantaged such as Pacific and Māori communities in Auckland.

A landmark study designed to address primary care access barriers for school-aged children was carried out by Lennon et al. in South Auckland (Lennon, 2009). The intervention was a school-based sore throat clinic programme with nurse-observed oral penicillin treatment of group A streptococcal pharyngitis. Results showed a 28% reduction in RF. Whilst not reaching statistical significance, a meta-analysis of this study showed that ARF cases could diminish by up to 60% using a school-based clinic programme (Lennon, 2009). Lennon et al. went on to develop this school-based primary care model including skin infection as well as sore throats in a recently completed pilot study in Wiri, South Auckland. Given the evidence that skin-based strep may contribute to RF (Parks, 2012), together with large numbers of serious skin infection and PSGN hospitalisations in children in South

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Auckland, this seems a promising intervention to reduce infectious disease in school-aged children.

Reducing these unacceptable rates of RF has now become a NZ government priority. The extended school-based clinic model piloted and evaluated by Lennon et al. forms one of the important parts of this government strategy. The challenge will be to ensure that the service quality and effectiveness in the different regions where the programme is rolled out over the coming year does not suffer because of implementation haste or funding constraints.

Dr Teuila Percival

MBChB (Auckland), FRACP
Consultant Paediatrician, Kidz First Children's Hospital

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Incidence of acute rheumatic fever in New Zealand children and youth

Authors: Milne RJ et al

Summary: This article accessed ARF hospitalisation data for New Zealand children (5–14 years) and then stratified this by ethnicity and socioeconomic deprivation index and DHB for the years 2000–2009. Māori and Pacific children accounted for 95% of ARF cases. Pacific children had the highest incidence rate of 81.2 (95% confidence interval 73.4 to 89.6), Māori were next with a rate of 40.2 (36.8 to 43.8) and non-Māori/Pacific 2.1 (1.6 to 2.6), with the total NZ child rate of 17.2 (16.1 to 18.3) per 100,000. Māori and Pacific rates increased by 79% and 73%, respectively, in 1993–2009, while non-Māori/non-Pacific rates declined by 71%. A clear socioeconomic gradient was noted with a child living in the most deprived decile having a 150 times greater risk of being admitted to hospital with ARF by 15 years of age.

Comment (Dr Teuila Percival): This article adds to the epidemiological work on ARF, which continues to affect New Zealanders unequally, with almost all cases occurring in Pacific and Māori children and young people. Of concern is the widening gap – with the Māori and Pacific ARF rates increasing, while non-Māori/Non-Pacific rates are decreasing. The geographical or DHB hot spots reflect this disparate ethnic and socioeconomic burden. This epidemiological data assists policy and funding in targeting prevention and intervention as we are seeing in the latest Ministry of Health ARF prevention programme roll-out.

Reference: *J Paediatr Child Health* 2012;48(8):685-91.
<http://tinyurl.com/azngghw>

Early cardiac morbidity of rheumatic fever in children in New Zealand

Authors: Gilbert O et al

Summary: This study reviewed the ARF and RHD cases admitted to the Paediatric Cardiac Unit, Starship Children's Hospital, over a two-year period. This unit is the national Paediatric Cardiac centre, so attracts the most severe cardiac cases in the country.

36 children had 49 admissions with almost 2/3 coming from Auckland and all but one being Pacific or Māori. Six of the children with ARF had heart failure on admission and four of these had fulminant heart failure requiring early cardiac surgery. The mean length of stay for children with ARF requiring surgery was 54 days and for those needing medical care only, it was 28 days. A number of children had other complications including heart block, pericardial effusions, infection and arrhythmias. The most expensive cases were the group with ARF that underwent cardiac surgery in the same admission. The cost for these children was on average \$90,157 per admission.

Previous papers have estimated rheumatic fever medical care costs for New Zealand at \$10.5 million per year.

Comment (Dr Teuila Percival): This interesting study reminds us of the severity of rheumatic fever and RHD. There is considerable morbidity with heart failure, need for early surgery, arrhythmias, later valve repairs and replacements. Healthcare costs are considerable. The cost to children, young people and their families, in terms of lost opportunities, impact on education, sport and vocational aspirations needs also to be considered. This is a concern for Pacific and Māori communities who need healthy young people able to reach their potential. The youngest child in the study aged 5.4 years presented in heart failure but with cachexia and a valve that showed chronic changes. The child had likely been unwell for months prior to coming to hospital. The symptoms of ARF and heart failure can be quite subtle and non-specific but our families and first-line health clinicians need to be aware of important signs and symptoms (such as weight loss in a 5-year-old child) of seriously unwell children.

Reference: *N Z Med J* 2011;124(1343):57-64.

<http://journal.nzma.org.nz/journal/abstract.php?id=4880>

Throat swabbing for the primary prevention of rheumatic fever following health information

Authors: Mardani J et al

Summary: This Flaxmere, Hawkes Bay study set out to determine whether or not sore throat swabbing rates could be increased with key health promotion activities in children aged 5–14 years. The indicator of monthly Hawkes Bay bacterial throat swabs was used. A comparison between Flaxmere children in the target area and non-Flaxmere children was made. The study team also compared data by ethnicity. The throat swabbing rate increased for Flaxmere children significantly during the study period compared to both the previous year for Flaxmere and non-Flaxmere children during the study period. The methods of sore throat swabbing promotion used consisted of promotion of the "sore throats matter" message at the Flaxmere Family Fun Day, written material and guidelines sent to local GPs and parent information for any school where a case of rheumatic fever occurred. The written material was specific for the Flaxmere community. A significant increase in sore throat swabbing also occurred among Māori and Pacific children.

Comment (Dr Teuila Percival): Treatment of Group A streptococcus (GAS) strep throat infection is critical to the prevention of ARF. It requires much better healthcare access for school-aged children than is currently experienced in areas of high ARF prevalence. An awareness of the importance of sore throats, access to health practitioners to assess and treat using the heart foundation guidelines, along with compliance with antibiotics is needed. This study set in Flaxmere aimed to increase throat swabbing and treatment by GPs using GP newsletters including the Heart Foundation Guidelines. Community awareness was the other important strategy, with information sent to parents in schools with any new ARF cases. A small increase was seen in numbers and rates of throat swabs for the target area. Importantly, this increase occurred in Māori and Pacific children.

(TF): Practically no children complain about sore throats in Tonga and they could benefit from this approach of increasing awareness to give more attention to sore throats. It is a very encouraging paper and ideally people need to do this, but in Tonga it might be overloading resources. The ideal environment is the school clinic, which is staffed at all times. It will require a longtime commitment to make an impact on the incidence of ARF or even RHD.

Reference: *N Z Med J* 2011;124(1334):46-51.

<http://journal.nzma.org.nz/journal/124-1334/4659/>



Mortality and hospitalisation costs of rheumatic fever and rheumatic heart disease in New Zealand

Authors: Milne RJ et al

Summary: This study estimated the annual mortality and hospitalisation costs of ARF and RHD for New Zealand. On average, there were 159 RHD deaths each year with a mean annual mortality rate of 4.4 per 100,000. Age-adjusted mortality was 10 times higher for Pacific than non-Māori/Non-Pacific. The mean age at RHD death for Pacific and Māori was younger at 50.9/59.8 years and 56.4/58.4 for male/female, respectively. The average annual cost for hospital admissions for ARF and RHD for the period 2000–2009 across all age groups was estimated at \$12 million with heart valve surgery accounting for 28% of admissions and 71% of costs. Two-thirds of the cost occurred after the age of 30 years.

Comment (Dr Teuila Percival): The overall estimated cost associated with ARF and RHD is considerable. Most of this cost is with Māori and Pacific patients in middle-age with valve surgery.

(Dr Toakase Fakakovikaetau): In most Pacific Island countries, valvular heart surgery accounts for 80% of the overseas referral cost. Prior to 2008, Tonga referred 15 to 20 cases of RHD for valvular surgery, costing an average of NZ\$45,000 per case. At least half of this cost was funded by the New Zealand Medical Treatment Scheme.

When considering the cost of treatment, morbidity and mortality, one important point that must be made is that not all cases in the PICs are treated; before 2008, cited reasons for not referring patients included the following:

- Patients presented in the non-operable stage – too late
- NZMST and government budget for overseas referrals all used up.
- Patients refuse treatment (rarely).

From 2008 onwards, cardiac surgical teams have visited Tonga and dealt with at least half of all cases requiring surgery.

Tonga has not yet analysed deaths from RHD/ARF-related causes or their complications. However, in the last 12 years, RHD-related deaths have been recorded in children as young as 5 years. The last death that I know of to occur in a patient aged <15 years was in 2009, at 5 years post-surgery. The mortality rate from RHD/ARF in Tonga is expected to be higher. With the establishment of ECHO screening since 2008, Tonga is already experiencing a significant decrease in mortality in patients aged <20 years and this is expected to influence overall RHD mortality in Tonga for the whole population in the next 5–10 years. ECHO screening results will provide an important short- to medium-term monitoring and evaluation tool for the screening programme.

Reference: *J Paediatr Child Health* 2012;48(8):692-7.
<http://tinyurl.com/aw56vj6>

Rheumatic fever in New Zealand

Authors: Webb R & Wilson N

Summary: This paper discusses the ARF and RHD disease burden in New Zealand and the ethnic disparities. It describes the impact of penicillin dose regimens and research supporting sore throat primary prevention programmes in regions with very high RF rates. The paper highlights out the value of echocardiographic screening for detecting previously undiagnosed RHD in socially disadvantaged children and notes that when combined with secondary prevention, echocardiographic screening has the potential to reduce the prevalence of severe RHD.

Comment (Dr Toakase Fakakovikaetau): ARF & RHD notification has always been under-reported. In Tonga, despite the recorded high rates, non-reporting of RHD persists. The most likely reasons for this include:

- Lack of awareness that pharyngitis can be caused by GAS
- It takes several steps – throat swab, anti-streptolysin O titres (ASOT), ECHO etc. with results not readily available to make the diagnosis
- MOH not making a commitment to find out – maybe due to lack of resources
- Over the years, even fewer cases of ARF have presented and of those who have, most are atypical.

However, the majority of patients are known to the paediatric and adult teams, as the majority of patients present with RHDs. In the last 5 years, fewer and fewer paediatric patients have presented with ARF / heart failure, as the majority are diagnosed by ECHO screening at primary schools. More liberal use of antibiotic treatment for sore throat in the high-risk age group has been called for in Tonga, in particular the use of benzathine penicillin. Tonga has adopted the New Zealand guidelines for the diagnosis of ARF, using the 1992 modification of the Jones criteria. Over the last 5 years, Tonga has experienced the benefits of using ECHO screening and secondary prophylaxis to decrease severity of RHD, with decreasing rate of children and adolescents aged <20 years requiring surgery. Rates of treatment compliance have been greatly improved with delivery of secondary prophylaxis at the main hospital outpatient department in Tonga and with the benzathine pen providing treatment at any time 24/7. An advantage of ECHO screening is that it does not require visible symptoms for testing; a diagnosis can be made at the time of screening.

Reference: *J Paediatr Child Health* 2011 Nov 3. [Epub ahead of print]

<http://onlinelibrary.wiley.com/doi/10.1111/j.1440-1754.2011.02218.x/abstract>



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Do my parents or guardians need to give consent?

- If you are over 16 you are encouraged to discuss the vaccination with your parents or guardians, but you can get vaccinated without their consent if the health professional is sure you fully understand all the risks and benefits.
- If you are under 16 you will need your parents or guardians consent.

Should I be vaccinated if I have already had sexual contact?

- Yes. You may still benefit from the vaccine as there's a chance you won't have been infected with both of the two HPV types that cause seven out of ten cervical cancers.

If vaccinated, will I still need to have cervical smear tests?

Yes. The vaccine doesn't protect against all HPV types that cause cervical cancer, so once sexually active you still need to have a smear test every three years between the ages of 20 and 70.

* The HPV immunisation is free for girls up until the age of 20.



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Cardiac surgery in the Pacific Islands

Authors: Davis PJ et al

Summary: This paper is a review of the cardiac cases that were performed by the New Zealand volunteer cardiac team in Fiji in 2003, 2006, 2007, 2008 and 2009, and also cases performed in Samoa in 2007 and 2008. There were 103 cases over a period of 6 years; more than 90% were RHD valve surgery. The operative mortality was 3.32%, the in-hospital mortality 0.97% and post-discharge mortality was 2.9%, resulting in a 30-day mortality of 3.88%. There were 4 deaths – one occurred in the early postoperative period from biventricular failure post-cardiopulmonary bypass following mitral valve repair; 3 post-discharge deaths from pericardial tamponade occurred within 30 days of surgery. Two of the post-discharge deaths were from late pericardial tamponade presenting after the cardiac team had left. These results are comparable to results in major tertiary cardiosurgical institutions in Australia and New Zealand.

Comment (Dr Satu Viali): The RHD prevalence remains very high in the Pacific Island Countries (PIC). This prevalence imposes a significant burden on the health care systems of the PIC with very limited health care budgets. The PICs could not continue to afford the escalating costs of RHD surgery as the patients are mostly sent for valve surgery in New Zealand and Australia. To reduce the costs of RHD surgery, doing the cardiac surgeries in country is a lot cheaper. The visiting cardiac surgical teams to the PICs play important roles in this cost reduction, so that more patients are done for the same cost that is spent overseas on fewer patients. There is no shortage of severe RHD in the PICs that require valve surgery to prolong life. This study demonstrated that performing cardiac surgery in Fiji and Samoa is a viable practice. With lessons learned with every mission, practices have subsequently changed in several areas in order to deliver optimal cardiac service and reduce postoperative mortality. I was closely involved in 2007 in Samoa with this visiting cardiac surgical team, conducting the preoperative cardiac assessments, and assisting with the perioperative and postoperative assessments. We did not lose any patients. The same team is continuing its cardiosurgical missions in Fiji, while Samoa is waiting for its new hospital to be finished before restarting. A deserved hearty “faafetai” (thank you) to the visiting cardiac team, who continue to volunteer their time, skills, and equipment to assist us in Samoa and Fiji.

Reference: *ANZ J Surg* 2011;81(12):871-5.

<http://onlinelibrary.wiley.com/doi/10.1111/j.1445-2197.2011.05899.x/abstract>

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Environmental factors and rheumatic heart disease in Fiji

Authors: Dobson J et al

Summary: This paper looks at the environmental risk factors involved in the development of RHD in Fiji. It compared 80 RHD cases (picked up from the RHD School Screening) with 80 controls between age 5–15 years, and looked at housing quality, overcrowding in housing and classrooms, and other markers of socioeconomic status. Only one factor, maternal unemployment, was statistically significantly associated with RHD. Measures of crowding at both school and home were similar between cases and controls. Analysis of housing quality showed a trend towards an association of poor housing quality with RHD in all measures, but it did not reach statistical significance. Growth appeared poorer among RHD cases but this was not statistically significant.

Comment (Dr Satu Viali): ARF and RHD are common in the Pacific people in the Pacific Island Countries (PICs), New Zealand, Hawaii, USA, and other countries. ARF occurs as a result of an autoimmune reaction after group A streptococcal throat infection in a susceptible host, whereas RHD represents the chronic valvular pathology that develops from ARF. Susceptibility is thought to be due to genetic factors that are influenced by biological factors such as nutrition, medical factors such as treatment of streptococcal sore throat, and environmental factors such as overcrowding and poverty. Environmental factors are important, because they favour more frequent streptococcal infection. Poverty is an independent risk factor for the development of ARF/RHD. However, the mechanism by which poverty increases the risk of ARF is not clear. In New Zealand, overcrowding increases the risk of developing ARF by 23 times. Despite the large burden of ARF and RHD in the PICs, little is known about the predisposing factors to RHD. This is the first study from the PICs looking at environmental factors involved in susceptibility to RHD. There were several limitations of the study that may have diluted its effect. This included a small study sample size, which limited the statistical power, the RHD cases were of mild severity rather than the severe end of the spectrum, matching cases and controls within the same school, and the usage of a generic rather than Fiji-specific measure of the socioeconomic status. Again, this study highlights what we have all suspected and it also points towards the common understanding of the rheumatic fever world in identifying the universal environmental risk factors. It is also known that improving and eliminating these environmental risk factors eliminate ARF/RHD, as shown in Europe and the USA.

Reference: *Pediatr Cardiol* 2012;33(2):332-6.

<http://link.springer.com/article/10.1007%2Fs00246-011-0139-x>



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Streptococcal skin infection and rheumatic heart disease

Authors: Parks T et al

Summary: This paper discusses the many studies showing the higher prevalence of impetigo (skin infection) in areas where there is a higher prevalence of ARF and RHD. In the same areas, GAS throat infection is lower. GAS is the more common bacteria isolated from impetigo followed by *Staphylococcus aureus*. The previous studies from Samoa, Fiji and Indigenous Australians showed high rates of RHD. These same studies also showed much higher rates of impetigo (33%–69%) than GAS throat infection (2.4%–4.6%). The extensive studies of GAS disease in central and northern Australia provided the most compelling epidemiological evidence that GAS impetigo may be the driving force behind ARF in impetigo endemic regions. The closely linked epidemiology of GAS impetigo would support the hypothesis that impetigo plays a role in the pathogenesis of RHD.

Comment (Dr Satu Viali): ARF is caused by group A streptococcal (GAS or *Streptococcus pyogenes*) infection and not by other bacteria, any virus or parasite or fungus. The association between ARF attack and GAS infection of the throat is “clear cut”. This has been the dogma for many years. The most popular widely read cardiology “bible” or textbook *Braunwald Heart Disease - A Textbook of Cardiovascular Disease*, stated that ARF only occurs after a pharyngeal GAS infection and not following a streptococcal skin infection (impetigo). Following an untreated GAS throat infection, up to 3% develop ARF, which is an autoimmune disease initiated by GAS affecting the heart, joints, subcutaneous tissues, skin, and brain. With subsequent GAS throat infection and previous ARF, the risk of another attack of ARF is very high (25%–70%). RHD is a result of the damage to the valves following ARF. The more attacks of ARF sustained, the higher the occurrence and severity of RHD. There is now increasing evidence implicating GAS isolated from skin infections (impetigo) in the causation of ARF and RHD. Impetigo is the most common skin infection in children throughout the developing world. GAS from the skin infection (impetigo) is known to cause acute post-streptococcal glomerulonephritis (APSGN), which is another autoimmune disease initiated by GAS affecting the kidneys. APSGN is also common in the Pacific people in PICs and New Zealand. The common understanding of the autoimmunity basis of ARF and APSGN is the cross reactivity of the antibodies produced by the host to the GAS, which attacks the base membrane of the human heart and kidney, causing these diseases. Though there is strong indirect evidence linking GAS skin infections with ARF/RHD, there is a need for prospective studies and treatment trials to further investigate this link.

Reference: *Curr Opin Infect Dis* 2012;25(2):145-53.

<http://tinyurl.com/8rrbrer>

Rheumatic heart disease

Authors: Marijon E et al

Summary: This Lancet Seminar article reviews the epidemiology, pathophysiology, clinical presentation and management of ARF and RHD. Primary and secondary prevention literature is summarised along with prevention cost-effectiveness assessments. The article goes into more detail on RHD surveillance of asymptomatic populations with echocardiography-based screening. The World Heart Foundation has recently developed consensus guidelines for the ECHO definition of subclinical RHD. One of the areas of some debate is the management of patients with clinically silent mild valvular abnormalities detected by echocardiography. With no long-term follow-up RCT studies of subclinical, mild valvular RHD, there is currently no evidence to support its systematic treatment.

Comment (Dr Teuila Percival): This is an article worth reading. It provides a comprehensive, up-to-date overview of ARF and RHD including current controversies.

Reference: *Lancet* 2012;379(9819):953-64.

[http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(11\)61171-9/abstract](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(11)61171-9/abstract)

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