

An important investment to control Acute Rheumatic Fever needs to run its course

Diana Lennon, Joanna Stewart

New Zealand has been applauded publicly at the World Health Assembly, Geneva for the commitment of the New Zealand Government moving towards control of Acute Rheumatic Fever (ARF).¹ Our primary prevention strategy for control of first episodes of ARF is innovative. Other countries seek guidance from these programmes. This investment is an important step forward for the health of New Zealand children and adults. The life long shadow of the sequela of ARF, Rheumatic Heart Disease (RHD) can reduce longevity by up to 10 years.²

ARF is an important child health indicator in New Zealand with wide socio-economic and ethnic disparities. Poor children residing in decile 10 (using the New Zealand Deprivation Score) have been shown to be nearly 30 times more likely to have ARF compared to those socioeconomically better off.³ A child living in the poorest area, decile 10, has a 1 in 150 cumulative risk of being hospitalised for ARF by his or her 15th birthday.⁴ This disparity is likely due to multiple factors eg: household crowding for a very infectious disease (group A streptococcal (GAS) pharyngitis as the precursor); families unaware ARF is a preventable disease; and poor access to primary healthcare. Most importantly, the strongest published evidence for control comes from improving healthcare access with associated public health messaging.⁵

GAS pharyngitis, the preceding trigger for ARF is a very common childhood illness. Important considerations are the frequency and the associated relatively minor symptoms (with a short natural history of symptoms and signs without treatment of 1-3 days) of a GAS pharyngitis.⁶ Persistence of the GAS has been shown to be an important risk factor for emergence of ARF.⁶

The age group at greatest risk for ARF is primary-school-aged children (range 5–12 years) and is the best group for investment in an effective prevention programme. The government has wisely focused on this age group, investing in an innovative primary health care delivery model through schools. Nurses, under delegated authority for treatments, work in partnership with community health workers, with the potential to prevent the most ARF cases per health dollar invested. School clinics are operating in focused areas of high ARF endemicity throughout the North Island. Many studies have highlighted the poor access for children in low socio-economic groups, particularly Māori and Pasifika children.⁷ Children in families with limited transport and time during surgery hours are less likely to access medical care. This approach to improved access to health care through schools was studied in a cluster randomised Health Research Council/Heart Foundation/Ministry of Health funded controlled trial in New Zealand schools over 4 years (n= ~25 000 subjects) in an area of endemic ARF and provided evidence for the New Zealand scene.⁸ A meta-analysis of community- and school-based studies, including the New Zealand study, suggested ~60% of ARF cases could be prevented by adequate access to primary care and treatment of GAS.⁹

Other investments by the government to widen the approach to control of ARF by sore throat management are laudable, eg, improved free access at GP practices in areas at high risk of ARF. However, this effect is unproven and so far the uptake is difficult to evaluate. The influence of extending free health care to children <13 years of age has yet to be seen. High school clinics with free swabbing and treatment,

recently put in place, are an important extension of the school clinic evidence-supported model.⁸ Acute first episode ARF in adolescents is less common but still occurs.⁸ In the New Zealand school-based study, high schools were part of the design. We found, as many before us have, that influencing adolescent health-seeking behaviour is a different challenge from primary health care delivery in primary schools, with fewer students participating in the sore throat clinic process. Messages to improve knowledge within high school populations were shown to be effective.¹⁰ A further study confirmed this in primary schools.¹¹

The inability of the New Zealand School randomised controlled trial (RCT) to reach statistical significance seems likely to have been influenced by the inability, as a result of the design, to follow up household members of a GAS pharyngitis index case as recommended.¹² The incidence of pharyngeal GAS in the RCT was unchanged over the study period. The infectiousness of pharyngeal GAS in a household where nearly half of siblings will have a culture positive GAS pharyngitis is well described.¹³ This aspect has been corrected in the current school clinic model of GAS pharyngitis management where symptomatic siblings are sought out for throat culture and treatment.¹¹ It seems likely that this measure will have an effect on the household and community burden of pharyngeal GAS.

Measurement of cross sectional prevalence of pharyngeal GAS annually in selected school-aged populations in different DHBs is underway, measuring the necessary precursor of ARF (funded by HRC and partners). Preliminary findings show a reduction in the pharyngeal GAS burden in high-risk communities since the commencement of the school programmes, and an observed low pharyngeal GAS burden in a population at low risk of ARF.¹⁴ An effect on ARF rates will be statistically possible in 2016/2017. An adaption of the school model to a semi-rural environment in a small, predominately Māori community has proved successful in preventing ARF over a >10-year period, and reduced pharyngeal GAS in another area.^{14,15}

However improving access to primary health care through school health services can only function 40 weeks of the year. In the school study we attempted to address this with free 'drop-in' clinics in the school holidays at a centralised school or other venue without success. We came to understand that the limitations (not including cost) of the traditional primary health care model, such as general practice, are factors such as the limitations of transport, hours of opening of the facility, the ongoing need for reinforced 'sore throats matter' messages, and the limited ability of typically large households with many competing and more pressing concerns. Bringing young children to medical attention for a seemingly harmless and self-limited affliction becomes a lower priority. Improving community knowledge will address only some of these concerns. However only recently have the recommendations to ensure improved knowledge of ARF prevention made by the Heart Foundation-sponsored Working Group¹⁶ enlarged to a focus on Pacific RF prevention messages.

To move towards holistic care and to avoid a health care intervention focusing on a sole disease, an intervention was piloted to treat the precursors of the most numerous cause of medical hospitalisations, serious skin infection in the primary school age group. Using the school clinic model developed for ARF prevention, nurse-led diagnosis and treatment of skin infection with standing orders for antimicrobial treatments if required (the minority) was evolved.^{11,17} This is now a part of the health care package through year 1–8 schools in the Auckland region and many other North Island DHBs. As this is a numerically common cause of hospitalisation in the school-age group an effect might be available soon. This approach will consolidate the delivery of primary care services for better access for families. Certain conditions trigger an immediate referral to the family GP or hospital eg, orbital cellulitis.

Ongoing sustainability of school sore throat management programmes in ARF endemic areas seems obvious, at least until the investment has been robustly evaluated. Household conditions (crowding facilitates GAS spread) are unlikely to change fast.

The paradox is that Ministry of Health officials have advised the government to fund this investment only until the end of 2015–16 financial year. After this time the DHBs concerned will make internal decisions on the continuation of the school clinic programmes. Given the current financial constraints faced by DHBs, continued funding of ARF prevention programmes may not be prioritised, as there is no policy in New Zealand for consideration of children first.

Such an important investment to control new cases of ARF requires the support of the best possible data to evaluate its effect.¹⁸ Sufficient power to show a meaningful reduction of ARF as a result of the school programme (as part of the HRC evaluation)

will not be available until 2016/2017. The MOH has indicated that funding for school clinics for ARF prevention will cease at the end of the 2015–16 financial year. The DHBs will be without evidence to guide their decision making for ongoing investment in this project. This is out of keeping with the Finance Minister's public declaration at the Auckland University of Technology in 2013 that health funding decisions should be evidence-based.¹⁹ Continuation of funding (and direction) from the MOH seems indisputable until evidence has accrued for or against the current programme to attempt to prevent this relatively uncommon but devastating disease. It would enable us to hold our heads up the world arena for this highly predictive child health indicator.

Competing interests:

Funding for rheumatic fever research from 1997 has been received from the HRC, Heart Foundation of NZ and the Ministry of Health (and formerly North Health)

Author information:

Diana Lennon, Professor of Population Child & Youth Health, FMHS, Department of Paediatrics, University of Auckland, Auckland; Joanna Stewart, FMHS, Department of Epidemiology & Biostatistics, University of Auckland, Auckland.

Corresponding author:

Professor Diana Lennon, School of Population Health, University of Auckland, Tamaki Campus, 261 Morrin Road, Glen Innes, Private Bag 92019, Auckland
d.lennon@auckland.ac.nz

URL:

<http://www.nzma.org.nz/journal/read-the-journal/all-issues/2010-2019/2015/vol-128-no-1416/6557>

REFERENCES:

1. <http://www.who.int/mediacentre/events/governance/wha/en/>
2. Milne RJ, Lennon D, Stewart JM, Vander Hoorn S, Scuffham PA. Mortality and hospitalisation costs of rheumatic fever and rheumatic heart disease in New Zealand. *Journal of Paediatrics and Child Health*. 2012;48 (8):692-7.
3. Craig E, Jackson C, Han DY, NZCYES Steering Committee. Monitoring the health of New Zealand children and young people: indicator handbook. Auckland: Paediatric Society of New Zealand, New Zealand Child and Youth Epidemiology Service; 2007.
4. Milne RJ, Lennon DR, Stewart JM, Vander Hoorn S, Scuffham PA. Incidence of acute rheumatic fever in New Zealand children and youth. *Journal of Paediatrics and Child Health*. 2012;48 (8):685-91.
5. Gordis L. Effectiveness of comprehensive-care programs in preventing rheumatic fever. *N Engl J Med*. 1973;289(7):331-5.
6. www.heartfoundation.org.nz
7. Kerdelmidis M, Lennon DR, Arroll B, Peat B, Jarman J. The primary prevention of rheumatic fever. *Journal of Paediatrics and Child Health*. 2010;46(9):534-48.
8. Lennon D, Stewart J, Farrell E, Palmer A, Mason H. School-Based Prevention of Acute Rheumatic Fever: A Group Randomized Trial in New Zealand. *Pediatr Infect Dis J*. 2009;28(9):787-94.
9. Lennon D, Kerdelmidis M, Arroll B. Meta-Analysis of Trials of Streptococcal Throat Treatment Programs to Prevent Rheumatic Fever. *Pediatr Infect Dis J*. 2009;28(7):e259-e64.
10. Harre N, Thomas D, Brown K, Raza F, Lennon D. Communicating information about sore throats and rheumatic fever to South Auckland high-

- school students. *N Z Med J.* 2000;113(1111):215-7.
11. Gray S, Lennon D, Anderson P, Stewart J, Farrell E. Nurse-led school-based clinics for skin infections and rheumatic fever prevention : results from a pilot study in South Auckland. *N Z Med J.* 2013;126(1373):211.
 12. American Academy of Pediatrics Red Book. Group A streptococcal infections - Red Book. 28th ed., Red Book: . Pickering LK, Baker CJ, Kimberlin DW, Long SS, editors. Illinois: ELK Grove Village; 2009.
 13. Danchin MH, Rogers S, Kelpie L, Selvaraj G, Curtis N, Carlin JB, et al. Burden of acute sore throat and group A streptococcal pharyngitis in school-aged children and their families in Australia. *Pediatrics.* 2007;120(5):950-7.
 14. Lennon D on behalf of : Ball S MJ, Farrell E, Anderson P3, Percival T5, Crengle S5, Leversha A4, Carter P6, Stewart J5. First Case Acute Rheumatic Fever (Arf) Is Preventable: The Accruing New Zealand Evidence. ASID conference 2015.
 15. Jarman J. Reducing a striking health inequality. *N Z Med J.* 2011;124(1334):18-20.
 16. Lennon D, Convenor. Advice for the Ministry of Health for Best Practice for Rheumatic Fever Control. Summary of International Workshop on Rheumatic Fever/Rheumatic Heart Disease Control in New Zealand. 2010. www.paediatrics.org.nz.
 17. Vogel A, Lennon D, Gray S, Farrell E, Anderson P. Registered nurse assessment and treatment of skin sepsis in New Zealand schools: the development of protocols. *N Z Med J.* 2013;126(1380):27-38.
 18. Moxon T, Lennon DR, Reed P, Jackson C, Anderson P, Leversha A, et al. Is a Rheumatic Fever Register the best way to evaluate the Government programme to control Rheumatic Fever? (Abstract) Annual Scientific Meeting Paediatric Society of New Zealand, Palmerston North.2012.
 19. Integrated Data Road Show at Auckland University of Technology on 2 April, 2014.