

The RHD Endgame Strategy: Evidence Brief #4

Screening for RHD by echocardiography

The diagnosis of asymptomatic RHD may provide an opportunity to begin secondary prophylaxis earlier and prevent the progression of heart valve damage. This raises the possibility of screening programs to detect RHD in the latent phase before symptoms develop. Echocardiography, or the assessment of cardiac structure and function via ultrasound, is the primary method of RHD screening. The suitability of RHD as a medical condition warranting the screening of asymptomatic people using echocardiography can be assessed using agreed public health criteria,¹ summarised below.

Table 1: Suitability of early RHD for screening.

Evidence of a significant burden of disease	The prevalence of RHD among Aboriginal and Torres Strait Islander people in Northern Australia is one of the highest in the world.
Condition must have a latent stage	RHD has an asymptomatic phase when heart valve damage can be detected before symptoms are evident. ²
The latent stage must be detectable by simple, accessible and sensitive tests	Echocardiography, using ultrasound to examine the heart, is more accurate at detecting asymptomatic RHD than auscultation with a stethoscope and is the most suitable model for screening. ²
The early stage of disease must be treatable with adequate therapy	While the role of secondary prophylaxis for borderline RHD is still to be confirmed, it is generally accepted that the risk and rate of disease progression are related to the severity of disease at diagnosis and access to healthcare and cardiac surgery. ³
Early intervention must improve prognosis	The clinical effect of early diagnosis of RHD through echocardiography screening remains unclear as most studies were performed in regions of the world with limited access to secondary prophylaxis, cardiac medications and/or cardiac surgery. Further research is required.

The largest study of echocardiography screening in Australia comes from the gECHO study, conducted from 2008 – 2010 in 32 remote communities with over 4,000 Aboriginal and Torres Strait Islander children (5 – 15 years) who had echocardiography screening.⁴ Overall, 4.6 new cases of RHD were detected on echocardiography screening for every 1,000 children screened, and sixty-two children with ‘borderline’ RHD were detected (15.7/1,000).⁴ Based on this gECHO study, echocardiography screening in high-risk Aboriginal communities in Australia was found to be cost-effective on economic analysis. This was based on the assumptions that RHD could be identified two years earlier than it would otherwise have been, that secondary prophylaxis for definite RHD would be started at diagnosis, and that this would result in reduction in disease severity.⁵

There is emerging potential for the non-expert operators (nurses, community health workers) to undertake echocardiography screening and consider the role of smaller, more portable echocardiography machines. The first Australian study using non-expert operators and handheld machines was conducted in West Arnhem Land in 2018. This study found a very high prevalence of RHD, identifying the disease in 20 children not previously diagnosed with RHD and 3 who required immediate heart surgery.⁶

Screening for RHD by echocardiography; evidence and recommendations

The role of echocardiography screening goes beyond the role of diagnosing RHD. Screening activities generally increase community awareness and engagement in RHD control and hence may be a catalyst for better uptake of other ARF, RHD and Strep A control activities. Echocardiography also has the potential to be equity enhancing if it improves delivery of disease-altering secondary prophylaxis for the inequitable burden of RHD.

The benefits of echocardiography screening for people detected with definite RHD can lead to regression and even resolution of RHD if followed up by high-quality secondary prophylaxis immediately post-diagnosis. There are also benefits for the small proportion of people detected with severe disease by echocardiography screening, who can receive surgery following diagnosis and thereby minimise risk of complications including stroke, heart failure, arrhythmias and death.

The process of echocardiography appears to be acceptable to Aboriginal and Torres Strait Islander communities in most settings, particularly when it is coupled with community-led action to reduce the burden of Strep A, ARF and RHD. Development of echocardiography screening programs should continue to require input from communities and a range of stakeholders to maximise effectiveness and be coupled with support to deliver continued secondary prophylaxis.

Echocardiography screening using expert operators has been conducted in a number of remote Aboriginal and Torres Strait Islander communities. While generally expensive, present evidence indicates this process is cost effective within certain parameters,⁵ however further research is currently underway.

Echocardiography screening may impact quality of life or create health-related anxiety,⁷ but could potentially be mitigated by strategies to improve health literacy, such as peer-support groups.⁸ Furthermore, decisions about whether to give secondary prophylaxis to those with borderline RHD on echocardiography and if so, for how long have profound implications for the individual, with potential harm from adverse effects of BPG. Therefore, it is necessary for diagnosis to be definitive.

Opportunity cost of resources devoted to echocardiography screening may reduce capacity to delivery other strategies to prevent new cases of Strep A infection and ARF, or other cost-effective health interventions. The risks may include needs-based funding for cardiology in Australia. Potentially unnecessary secondary prophylaxis in those with borderline RHD or echocardiography is an added burden on the health system. All factors should be considered prior to the roll-out of any echocardiographic screening program in a population.

Recommendations

- Echocardiography screening for RHD may be considered in communities with high rates of ARF and RHD, or in the context of ARF outbreak investigation or follow-up.
- When echocardiography screening is undertaken, there must be community support and input, and systems and resources available for the provision of education, secondary prophylaxis and follow-up. Ideally, screening would form part of a comprehensive health response to RHD in communities.
- The RHD National Implementation Unit should provide advice to communities, government agencies and service providers around criteria and thresholds for screening, funding mechanisms, and technical guidance on implementation of community echocardiographic screening.
- Further research is required on the role of echocardiography screening in other populations (e.g. pregnant women at high risk of RHD), the use of non-expert operators, and incorporation of screening into routine health checks.
- Mass population-level echocardiography screening for RHD is not recommended at this time.

About the END RHD CRE

In 2014, The End Rheumatic Heart Disease Centre of Research Excellence (END RHD CRE) was established to address the urgent need for a comprehensive, evidence-based plan to eliminate rheumatic heart disease across Australia.

Bringing together leading experts from 16 institutions across Australia and backed by a grant from the National Health and Medical Research Council (NHMRC), the CRE has synthesised the collective experience of communities, clinicians, Aboriginal Community Controlled Health Organisations, and government and non-government organisations – as well as more than 25 years of research – to tackle this need head on.

The result is *The RHD Endgame Strategy: The blueprint to eliminate rheumatic heart disease in Australia by 2031*. Outlining the best existing evidence-based strategies to prevent new cases of RHD in Australia and improve the lives of those already living with the disease, The RHD Endgame Strategy was launched in October 2020 and can be viewed at telethonkids.org.au/rhd-endgame.

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