Recommendations for implementing rheumatic heart disease echocardiographic detection in remote Australia: A narrative review and lesson-drawing from diabetic retinopathy screening

Benjamin Jones, Angus W Turner, James Marangou, Jennifer Yan, Paul Burgess, Alex Kaethner, Natasha Howard, Mike English, Shobhana Nagraj, Joshua R Francis

Background and objective
Australia has some communities with the highest rates of rheumatic heart disease (RHD) in the world. Echocardiographic detection of RHD through active case finding has been proposed for early detection. Lessons can be learnt from the implementation of a similar program – diabetic retinopathy screening. The aim of this paper is to identify transferable lessons from the implementation of diabetic retinopathy screening that could be applied to RHD echocardiographic detection.

Methods
This paper presents a narrative review and expert recommendations.

Results
Transferable lessons from the implementation of diabetic retinopathy screening include training local staff regularly with formal certification; supplementary health promotion; program champions; general practitioner involvement; informing all staff at clinics; creating separate Medicare Benefits Schedule items for acquisition and interpretation; using echocardiography for detection and monitoring of RHD; establishing referral pathways and communication channels; local community involvement in implementation planning; and developing an adaptable program.

Discussion
Implementing programs successfully and sustainably in remote communities is known to be challenging. These transferable lessons from the implementation of diabetic retinopathy screening might assist in the planning of an RHD detection program.

RHEUMATIC HEART DISEASE (RHD) is a potentially fatal but entirely preventable disease developed during childhood. It is caused by repeated, untreated group A streptococcal infections, typically in the form of pharyngitis and impetigo.[1] An autoimmune process is triggered, causing acute rheumatic fever, which might progress to RHD.[1] RHD is clinically silent in 90% of cases[2] and only symptomatic in late-stage disease once complications such as heart failure or arrythmias develop.

Some remote Aboriginal and Torres Strait Islander communities in Australia have the highest known rates of RHD in the world.[3] Delayed or missed detection of RHD increases mortality and morbidity,[3] whereas early detection and management has been proven to reduce the risk of RHD progression.[4]

The recently published 2023 World Heart Federation guidelines for the echocardiographic diagnosis of RHD state that active case finding using the newly established screening criteria should be considered in high-risk communities.[5] Active case finding with echocardiography encompasses both organised screening events and the opportunistic detection of cases during clinical care. It can incorporate technological advancements in the form of cheaper, more portable, handheld echocardiographic devices and human workforce solutions such as task sharing with local health workers.[5] These innovations have the potential to make early detection of RHD more accessible and have been positioned within a community–driven population health approach in Australia by the National Aboriginal Community Controlled Health Organisation (NACCHO).[6,7]

There is a need to understand optimal implementation strategies for active case finding for RHD in Australia, which are clinically effective, cost efficient and sustainable. There might be useful lessons that could be drawn from the recent implementation of diabetic retinopathy screening in remote communities, and applied to efforts to establish handheld echocardiographic detection for RHD. The national diabetic retinopathy screening program launched in 2018, following the announcement of federal funding,[8] involved providing retinal cameras to 162 primary healthcare facilities, training staff to use them and incorporating telehealth support options.[9] This program has parallels to RHD active case finding, including being used for similar high-risk populations, the introduction of a new technology into primary healthcare clinics along with associated training, the task-sharing component with the

inclusion of local staff image acquisition and off-site image interpretation, and the need to integrate both programs within the chronic care model (Table 1).

The chronic care model[10] is an important lens through which to view the implementation and sustainability of these two programs. The model highlights the need for health system strengthening via clinical information systems, delivery system design, decision support, resources and policies, and self-management support rather than introducing siloed, targeted, case management activities known as 'carve-ins' or 'carve-outs'. Identifying the ways in which the diabetic retinopathy program was successful and unsuccessful in its alignment with the chronic care model can guide us as to how RHD echocardiographic detection can, as a set of activities within the provision of chronic disease care, establish sustainable systems that bridge the gap between diagnosis and chronic conditions management.

The aim of this narrative review was to explore the practical learnings from the implementation of diabetic retinopathy screening for the implementation of echocardiographic detection of RHD.

Methods

We conducted a literature search using the PubMed electronic databases on 1 November 2023. The search was performed using a combination of the keywords 'diabetic retinopathy screening', 'Australia' and 'implementation'. The following search strategy was used ([diabetic retinopathy screening OR diabetic eye test OR diabetic retinopathy OR retinal monitoring OR retinal photography OR retinal checks OR diabetic maculopathy] AND [Australia*]) AND (implementation OR barrier* OR facilitator* OR process OR strategies OR challenges). The inclusion criteria were any article that described, analysed or discussed the implementation of diabetic retinopathy screening in Australia. Articles published at any point-in-time were considered. Only articles published in English were considered. Articles were not excluded on study design. Relevant documents from organisations involved in the Australian diabetic retinopathy screening program were also reviewed. Included papers were analysed using the public policy framework lesson-drawing proposed by Rose,[11] as it is a widely cited and established approach to analysing and applying insights from one context to another. Findings were summarised in a narrative synthesis. Recommendations for RHD active case finding were then developed with consideration of the chronic care model by the relevant expert authors.

Findings

From 549 research results, eight studies met the inclusion criteria (Table 2). These studies were published between 2015 and 2023. From these studies, seven broad areas of implementation were identified to organise the findings. These implementation areas included: (1) training; (2) health promotion; (3) staffing; (4) Medicare Benefit Scheme (MBS) item numbers; (5) coordination; (6) the flexibility of the program; and (7) Aboriginal and Torres Strait Islander healthcare implementation.

Training

There were several lessons regarding training from the diabetic retinopathy screening program literature. First, the importance of prioritising training of *local* health workers (including Aboriginal and Torres Strait Islander health workers or practitioners[12,13]) was noted to establish a more sustainable model of care.[14,15] Second, one study found that over one-third of trained staff members (37%) expressed a lack of confidence in their ability to perform the skill and felt the need for supplementary and ongoing training.[15] Finally, the implementation of a robust accreditation process was suggested to serve as a quality assurance measure, demonstrating the proficiency of the trained local health worker.[16]

Health promotion

Health promotion was regarded as an important aspect of the implementation. For example, offering patients the opportunity to view their images in real-time was found to facilitate engagement in prevention and management counselling.[16] Additionally, community awareness campaigns were suggested within the diabetic retinopathy context to enhance program participation.[17] In one study, patients suggested phone calls, increased public notices, information via mail and text message reminders as strategies of health promotion.[14] However, health professionals mentioned barriers to these strategies because of poor mobile phone reception and mailing services, and suggested newspaper advertisements and local radio announcements as alternatives.[14]

Table 1. Summary of the rheumatic heart disease screening and diabetic retinopathy screening recommendations

	Rheumatic heart disease screening recommendations[5]	Diabetic retinopathy screening recommendations[26]
Mode of acquisition	• Echocardiography using handheld echocardiographic devices	• Digital fundus photography
Screening population	Consider for: • Children and young adults aged 5–20 years living in endemic regions • First-degree relatives of index cases • Pregnant women and young adults (aged 21–39 years) living in endemic regions[A]	• All patients with diabetes mellitus at the time of diagnosis or patients with diabetes who present 'opportunistically' for optometric review • Children with type 1 diabetes when they reach puberty • Pregnant women with a history of diabetes in the first trimester of pregnancy

[A]Confirmatory criteria should be applied for active case finding in individuals aged>20 years given that there is limited evidence to support the use of the screening criteria in this population.

Staffing

Some lessons related to the staff involved in the implementation efforts. The importance of identifying and supporting a champion within each practice who can assume responsibility and drive its implementation was noted in multiple studies.[18–20] The role of general practitioners (GPs) in sharing learnings from the implementation with their colleagues was also emphasised.[14] Furthermore, a study identified the significance of adopting a 'whole-of-practice' approach to ensure successful program implementation with all team members, including those involved with administration and nursing, being aware of the importance of the screening program for a shared purpose.[20] For staff support more broadly, regional coordination roles were demonstrated to have a positive effect on diabetic retinopathy screening.[20]

MBS item number

Many lessons spoke to the introduction of an MBS item number. One study found that the MBS item number billing for both acquisition and interpretation of retinal images was perceived as a significant barrier by GPs. Interview participants expressed a lack of confidence in diagnosing diabetic retinopathy from the retinal images, and suggested a better approach might be to separate MBS billing for: (1) local acquisition of retinal images; and (2) subsequent offsite interpretation of images.[18]

Although the existence of an MBS item has been crucial for integration of diabetic retinopathy screening into routine practice, there remains opportunities for expanding access. Campaigns aimed at increasing awareness among both practitioners and patients of the program and the MBS item number is important,[18] and the federally funded KeepSight campaign, supported by partner organisations (eg Diabetes Australia and Bayer), has responded to this need.[21] Currently, the MBS item cannot be applied when obtaining retinal images for individuals who already have a diagnosis of diabetic retinopathy, thus limiting its potential role in follow-up of known patients.[15]

Coordination

Implementation lessons also related to coordination of patient flow safely through the clinical cascade of care. One study found that there was a perceived lack of available onward referral pathways for management following diagnosis.[15] Another study emphasised the importance of formal communication channels, such as letters, group emails and regular videoconferencing among those involved in patient care.[14] Supporting electronic databases, communication software systems, comprehensive screening forms and clear ongoing treatment guidelines were also encouraged.[14,22] Furthermore, it was highlighted that the results of screening tests should be sent to the coordinating GP, regardless of the outcome.[14] Significant involvement of medical colleges and non-governmental philanthropic organisations in diabetic retinopathy screening was notable,[9,21] and also required coordination.

Flexibility of the program

The flexibility of the program model was recognised as an important implementation lesson. In one study, it was highlighted that service delivery should align with local requirements. It was mentioned that rigid rules imposed by federally delivered services can hinder effectiveness and counteract the intended outcomes at the local level.[14] Local adjustments in consultation with the local community are often necessary for optimal implementation.[14]

Aboriginal and Torres Strait Islander healthcare implementation

There were several elements in the literature relating to implementation of programs for Aboriginal and Torres Strait Islander communities. In one study that interviewed diabetic retinopathy screening program participants, 71% of which were Aboriginal and Torres Strait Islander people, reported high levels of acceptability due to the improved access, reduction of travel time for eye care and simplicity of the procedure.[14] In another study, ophthalmologists with experience in providing healthcare to Aboriginal and Torres Strait Islander communities highlighted the importance of creating an environment that is culturally safe for the provision of diabetic retinopathy screening.[22] This study also noted the benefits of having staff that were willing to provide flexible service models of care to meet community needs.[22]

Diabetic retinopathy screening and the chronic care model

Reflecting on the chronic care model, we noted that although the diabetic retinopathy screening program was successful in the system design and decision support aspects of chronic disease management, gaps remain in terms of workflow inclusion for patients with diabetes within the primary healthcare

Table 2. Diabetic retinopathy screening implementation studies

Authors (year)	Implementation areas[A]
Glasson et al (2017)[14]	Training, health promotion, staffing, coordination, flexibility, Aboriginal and Torres Strait Islander healthcare implementation
Khou et al (2021)[15]	Training, MBS item number, coordination
Atkinson-Briggs et al (2019)[16]	Training, health promotion
Tapp et al (2015)[17]	Health promotion
Watson et al (2021)[18]	Staffing, MBS item number
Crossland and Jackson (2017)[19]	Staffing
Moynihan and Turner (2017)[20]	Staffing
Gilden et al (2023)[22]	Staffing, Aboriginal and Torres Strait Islander healthcare implementation

[A]The implementation areas emerged from the review.

MBS, Medicare Benefits Schedule.

electronic health record, self-management support and access to equipment for opportunistic assessment during other health presentations. These challenges are reflected in the limited penetration and sustainability of retinopathy screening within primary healthcare services in the Northern Territory where the rate of diabetic retinopathy screening is 20% of eligible Aboriginal patients (P. Burgess, pers. comm, 2023).

Recommendations

Seven recommendations for the implementation of RHD echocardiographic detection emerged from the review of diabetic retinopathy screening implementation. They are as follows:

1. Train local staff, regularly, and provide formal certification. Add scanning into job descriptions of trained staff.
2. Supplement the screening with health promotion for the community and promote the introduction of echocardiographic detection of RHD among clinicians and the community.
3. Introduce program champions, involve GPs and inform all staff.
4. Support MBS billing that uncouples image acquisition and interpretation. Consider funding for regular echocardiographic screening, both for detection and monitoring.
5. Establish clear referral pathways and formal communication channels, and plan for increased downstream service requirements including confirmatory diagnostic echocardiograms and provision of secondary prophylaxis to confirmed cases.
6. Develop a case-finding model that can be adapted at each site for local context and encourage multilateral partnerships.
7. Engage the local community in implementation planning, provide services within a culturally safe environment and involve medical practitioners that are committed to improving RHD outcomes in Aboriginal and Torres Strait Islander communities.

Clear implementation lessons are available from diabetic retinopathy screening regarding delivery system design and decision supports. However, the low penetrance of retinopathy screening also offers cautionary learnings and highlights the importance of considering and addressing potential barriers to success, which might be applicable across both programs. Integration into existing models of care delivery is a particular challenge. Although the idea of incorporating echocardiographic scanning into a routine health check holds some promise, lessons from this review suggest that active case-finding activities for RHD might not be fully absorbed into existing workload and systems, and will require additional planning and investment in service delivery. Particularly during the transition phase, these activities will most likely require additional support to coordinate, supervise and monitor quality during implementation.

Regarding funding, these two programs of work for locally focused, community-led care delivery, present an opportunity to consider how the role of Aboriginal and Torres Strait Islander health workers/practitioners and task-sharing models of care might be funded in the Australian context. Further work is needed to consider how MBS items can best support these forms of care or, alternatively, which fit-for-purpose funding models might be better suited than specific MBS item numbers.

Aboriginal and Torres Strait Islander leadership is a central feature in the development and implementation of the echocardiographic detection for RHD work. The idea of training local healthcare workers including Aboriginal health workers and practitioners in handheld echocardiography was conceived organically with clinic staff and clinician–researchers responding to community leaders in affected communities. The overarching community sentiment was that there was clearly a desire for local community members to be able to detect RHD on Country so that the necessary RHD care could be provided. NACCHO has shown leadership in this field and has situated RHD echocardiographic screening within a community-driven population health approach.[7]

Further investigation into the health service integration of RHD active case finding in remote communities is currently being conducted with consideration of the context of limited access to training/pathways for frontline staff, workforce issues, time constraints and shortfalls in funding to implement new programs.[23] However, early feedback highlights that the involvement of GPs is critical in several ways. First, GPs can act as program champions, advocating for the integration of echocardiographic screening within routine clinical practice. The endorsement of GPs, who often have a leadership role (either formally or informally), can enhance the uptake of the program. Additionally, GPs are pivotal in the training and support of local health workers, including Aboriginal health workers and practitioners. By providing ongoing supervision, mentoring and validation of skills, GPs help build a confident and competent local workforce capable of conducting echocardiographic screenings. Moreover, GPs are essential in establishing and maintaining referral pathways, ensuring that patients who screen positive for RHD receive timely and appropriate follow-up care. This includes coordinating with specialists for confirmatory echocardiograms and managing long-term treatment plans. The inclusion of GPs in the program also facilitates a holistic approach to patient care, integrating RHD screening with the management of other chronic conditions, thereby aligning with the chronic care model.

The authors also highlight that going forward, it will be important to consider the implementation of artificial intelligence diagnostic support, which is being currently considered for both diabetic retinopathy screening[24] and RHD detection.[25] This technology might allow for ‘on-the-spot’ support following diagnosis, which might improve the continuity of patient care and immediate care linkage for anyone who screens positive, or provide reassurance for anyone who has a normal result and needs repeat screening at a later date.

Although diabetic retinopathy screening and echocardiographic detection of RHD have several similarities, they also have some key differences. For example, the diabetic retinopathy screening program is the current standard of care in Australia and is thus more established than a proposed RHD active case-finding program, which is still being piloted and investigated. In addition, there is perhaps more variability in the acquisition of handheld echocardiographic images than in digital fundus photography, which is an important consideration in the context of a briefly trained workforce.

Finally, the distribution of the diseases across Australia means that RHD active case finding is likely to occur only in remote clinics as opposed to diabetic retinopathy screening, which is being conducted Australia-wide.

Authors

Benjamin Jones MD, MHLM, Health Systems Collaborative, University of Oxford, Oxford, UK; Honorary Research Fellow, Menzies School of Health Research, Darwin, NT

Angus W Turner MBBS (Hons), MSc (Oxon), FRANZCO, Associate Professor, Centre for Ophthalmology & Visual Sciences (incorporating the Lions Eye Institute), University of Western Australia, Perth, WA

James Marangou MBBS, FRACP, Honorary Research Fellow, Menzies School of Health Research, Darwin, NT

Jennifer Yan MBBS, FRACP, Senior Research Fellow, Menzies School of Health Research, Darwin, NT; Paediatrician and Paediatric Infectious Diseases Physician, Department of Paediatrics, Royal Darwin Hospital, Darwin, NT

Paul Burgess MBBS, BMedSci, MPH, GradDipRuralGP, FRACGP-RG, FARGP, PhD, FAFPHM, GAICD, Director of Health Statistics and Informatics, Northern Territory Health, Darwin, NT

Alex Kaethner BHlthSc, Cardiac Sonographer, Menzies School of Health Research, Darwin, NT

Natasha Howard BHlthSc (Hons), PhD, Associate Professor, South Australian Health and Medical Research Institute, Adelaide, SA

Mike English MBBChir, MRCP, MD, FMedSci, Professor, Health Systems Collaborative, University of Oxford, Oxford, UK

Shobhana Nagraj BSc (Hons), MBBS, MRCS, MRCGP, MPhil, DPhil, SFHEA, Associate Professor, Department of Public Health & Primary Care, University of Cambridge, Cambridge, UK; Honorary Visiting Clinical Researcher, Health Systems Collaborative, University of Oxford, Oxford, UK

Joshua R Francis MBBS, FRACP, Associate Professor, Menzies School of Health Research, Darwin, NT; Paediatrician and Paediatric Infectious Diseases Physician, Department of Paediatrics, Royal Darwin Hospital, Darwin, NT

Competing interests: None.

Funding: None.

Provenance and peer review: Not commissioned, externally peer reviewed.

Correspondence to:
Benjamin.jones@ndm.ox.ac.uk

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correspondence **ajgp@racgp.org.au**