

# Mind The Gap, Aboriginal and Torres Strait Islander Cardiovascular Health: A Narrative Review



Michael McGee, MBBS, MClinMed(L&Mgt), FRACP<sup>a,b</sup>,  
Lauren Shephard, BMed, BMedRadSci<sup>a,b</sup>, Stuart Sugito, BMed, FRACP<sup>a,b,c</sup>,  
David Baker, MBBS, FRACP<sup>a,c</sup>, Stephen Brienesse, BMed, FRACP<sup>a,b,c</sup>,  
Mohammed Al-Omary, MBBS, FRACP<sup>a,b,c</sup>,  
Rhian Nathan-Marsh, BN, MN (Ed)<sup>b</sup>, Doan T.M. Ngo, BPharm, PhD<sup>a,c</sup>,  
Patrick Oakley, BMed, FRACP<sup>a,c,d,e</sup>, Andrew J. Boyle, MBBS, PhD, FRACP<sup>a,b,c</sup>,  
Gail Garvey, MEd, PhD<sup>f</sup>, Aaron L. Sverdlov, MBBS, PhD, FRACP<sup>a,b,c,\*</sup>

<sup>a</sup>College of Health, Medicine and Wellbeing, The University of Newcastle, Newcastle, NSW, Australia

<sup>b</sup>Cardiovascular Department, John Hunter Hospital, Newcastle, NSW, Australia

<sup>c</sup>Hunter Medical Research Institute, Newcastle, NSW, Australia

<sup>d</sup>Aboriginal Health Unit, Hunter New England Health, Wallsend Health Campus, Newcastle, NSW, Australia

<sup>e</sup>General Medicine Department, John Hunter Hospital, Newcastle, NSW, Australia

<sup>f</sup>School of Public Health, Faculty of Medicine, University of Queensland, Brisbane, Qld, Australia

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Australia's First Nations Peoples, Aboriginal and Torres Strait Islanders, have reduced life expectancy compared to the wider community. Cardiovascular diseases, mainly driven by ischaemic heart disease, are the leading contributors to this disparity. Despite over a third of First Nations Peoples living in New South Wales, the bulk of the peer-reviewed literature is from Central Australia and Far North Queensland. Regardless of the site of publication, First Nations Peoples are significantly younger at disease onset and have higher rates of comorbidities, in turn driving adverse health events. On top of this, very few First Nations Peoples specific cardiovascular interventions or programs have been shown to improve outcomes. The traditional biomedical model of care is less efficacious and non-traditional models of communication such as clinical yarning may benefit both clinicians and patients. The key purpose of this review is to highlight the deficiencies of our knowledge of cardiovascular burden of disease for First Nations Peoples; and to serve as a catalyst for more dedicated research. We need to have relationships with communities and concentrate on community improvement and partnerships. By involving First Nations Peoples researchers in collaboration with local communities in all levels of health care design and intervention will improve outcomes.

## Keywords

Aboriginal and Torres Strait Islander • Ischaemic heart disease • Heart failure • Cardiovascular health interventions and outcomes

## Introduction

Aboriginal and Torres Strait Islanders, Australia's First Nations Peoples, represent one of the oldest continuing cultures

in the world. Collectively, Aboriginal and Torres Strait Islander people account for 3.3% (estimated 798,400 people) of the total Australian population [1]. Over recent decades, there have been steady increases in life expectancy of

\*Corresponding author at: A/Prof Aaron L. Sverdlov, Hunter Medical Research Institute, Lot 1 Kookaburra Circuit, New Lambton Heights, NSW, 2305, Australia; Email: [aaron.sverdlov@newcastle.edu.au](mailto:aaron.sverdlov@newcastle.edu.au); Twitter: @SverdlovAaron

Aboriginal and Torres Strait Islander people. Despite this, a 10-year gap in life expectancy remains compared to the wider community, with cardiovascular disease being the leading cause of this gap [2]. Whilst there is no official consensus in Australia, First Nations Peoples is now emerging as the chosen term by Aboriginal and Torres Strait Islander people as it acknowledges the diversity of cultures and identities [3] and is a term we hereafter use to refer to Aboriginal and Torres Strait Islander people.

The largest proportion of First Nations Peoples reside in New South Wales (NSW) (33% of the national total), followed by Queensland (29%), Western Australia (WA) (12%), and the Northern Territory (NT) (9%) [4]. Despite this population distribution, clinical cardiovascular research has largely focussed on First Nations Peoples residing in remote and very remote areas of Australia, which may not fully represent the issues of First Nations Peoples living in more urbanised areas.

Data regarding cardiovascular outcomes has largely been driven by peak government body publications and administrative reports, predominantly through the Australian Institute of Health and Welfare (AIHW). “*Closing The Gap*” has included a focus on life expectancy and rate of over-representation of First Nations Peoples, however our knowledge of specific culturally appropriate interventions in primary health care remains poor.

The purpose of this review is to summarise the major cardiovascular health issues facing First Nations Peoples, including risk factors and prevention strategies, with the aim to illuminate gaps in clinical knowledge and understanding. By doing this, we can begin to have collaboration with local communities to facilitate working groups and cardiology clinics with tailored approaches to patients and their families in the primary health care setting.

## Methods

A scoping review was conducted to identify and describe the current knowledge on major cardiovascular health issues facing First Nations Peoples in a primary care setting in Australia. We conducted a keyword search-based literature review using Medline and PubMed for studies between January 2009 to January 2021. The following search terms were used ‘First Nations’, ‘Aboriginal and Torres Strait Islander’, ‘ischaemic heart disease’, ‘coronary artery disease’, ‘heart failure’, ‘stroke’, ‘atrial fibrillation’, ‘rheumatic heart disease’, ‘cardiothoracic surgery’, ‘life expectancy’, ‘primary health’, ‘morbidity’, ‘mortality’, and ‘interventions’. We limited this review to peer-reviewed articles (e.g., primary research, reviews and commentaries) and online Australian government reports. Publications were also eligible for inclusion if a description of a cardiovascular care pathway (a set of protocols, algorithms, guidelines) was used to guide clinical practice, or a descriptive study examining patient experiences and/or practitioner perceptions was conducted.

Our focus of discussion in this narrative review will include ischaemic heart disease, heart failure, atrial fibrillation and stroke as the major burdens of disease in First Nations Peoples, along with current surgical and cardiovascular interventions used to improve outcomes.

## Results

Our search resulted in identifying 48 publications for inclusion. Seven (7) of these publications looked at reports with statistics regarding mortality and life expectancy in all states and territories of Australia. Forty (40) national and international peer reviewed journals were also included, on topics of burden of heart disease, disparities in management, and the influence of geographic remoteness in Aboriginal and Torres Strait Islander peoples. Of note, very few First Nations’ specific cardiovascular interventions or programs have been shown to improve outcomes. Twelve (12) journal papers address this, including three papers using *clinical yarning* as an emerging culturally responsive communication tool in the clinical setting (see section Aboriginal and Torres Strait Islander Cardiovascular Health Screening, Interventions and Outcomes following).

### Ischaemic Heart Disease

Ischaemic heart disease (IHD, otherwise known as coronary heart disease) remains the leading individual disease contributing to burden in First Nations Peoples with the most recent data presented in the Australian Institute of Health and Welfare’s Heart, stroke and vascular disease—Australian facts [5] alongside the Australian Burden of Disease Study: Impact and Causes of Illness and Death in Aboriginal and Torres Strait Islander people 2018, published in 2022 [6].

Ischaemic heart disease contributes 5.8% of the total burden, before anxiety disorders (5.3%), self-inflicted injuries and suicide (4.6%), and alcohol use disorders (4.4%). After adjusting for age structure, the rates of IHD for First Nations Peoples are more than twice that of other Australians (7.2% and 2.7%) [5].

Between 2015–2019, IHD was also the largest contributor to the gap in circulatory deaths between First Nations Peoples and other Australians (68% of the gap). Measuring this ‘gap’ in disease burden between First Nations and other Australians has become a key interest for policy makers.

Data from WA demonstrated First Nations Peoples presenting with an acute myocardial infarction (AMI) were younger at the time of presentation. They were also over-represented, contributing 7.4% of incident AMIs, whilst only representing 2.4% of the state’s population [7,8]. First Nations Peoples generally experienced worse adjusted outcomes following AMI events, including a case fatality ratio at 28 days of 1.6 and 1.4 for males and females respectively aged 55–74 [7,8].

Curiously, an observed trend in several studies has been that First Nations cohorts comprise a higher percentage of

females compared to the wider community [7,9,10]. Considering IHD and systolic heart failure (HF) predominantly affect men at a younger age than women, it is possible this reflects that men may fail to present to medical services, representing an unknown and unmeasured gap.

Several studies have now demonstrated poorer health outcomes in First Nations Peoples, driven by the higher prevalence of comorbidities [11,12]. A review of the topic in 2018 noted that First Nations Peoples face disadvantage at almost every stage of the atherosclerotic disease process [13]. This disadvantage seems rooted in socioeconomic factors. Thus far, we lack the evidence-based practices to reduce this disparity and address this area of clinical need.

Currently, First Nations Peoples experience a much higher burden and incidence of IHD, occurring at younger ages, and leading to worse outcomes.

## Heart Failure

The prevalence of HF in First Nations Peoples is higher than in other Australians [14]. McGrady *et al.* [15] screened 436 First Nations Peoples participants and found HF prevalence was 5.3% and 13% of patients had asymptomatic left ventricular dysfunction. The prevalence of cardiovascular risk factors was higher, providing suitable targets for intervention [15]. The age-adjusted rate of First Nations Peoples HF hospitalisation in 2011–2012 was about three times more than other Australians [16].

Regarding HF mortality and re-admissions, there is a sparsity of data in the Aboriginal and Torres Strait Islander population [17,18]. One study suggested HF mortality after HF admission had declined in other Australian patients over a 6-year period, whereas in First Nations Peoples it had remained stable or potentially increased [19].

In 2012 Woods *et al.* [20] published a systematic review of HF among First Nations Peoples. Only 11 peer-reviewed articles were identified. Of these, three focussed on prevalence or incidence, three concerned aetiology and clinical presentation, one examined co-morbidities, three examined mortality, and four examined health service delivery and utilisation. The largest study included 558 First Nations Peoples and almost all were in central Australia, Far North Queensland or WA. Their major finding was that a significant lack of data was available, alongside an excess burden of HF relative to the wider community.

Teng *et al.* [21] reported characteristics and outcomes of 1,013 First Nations HF patients in WA. Heart failure patients were 15 years younger, lived in more rural areas, had higher Charlson Comorbidity Index, higher incident HF hospitalisation and more prevalent history of IHD and rheumatic heart disease. Finally, guideline-directed medical management of HF may indeed be underutilised [22]. Therefore, optimisation of medical management targeting the risk factors and co-morbidities in First Nations Peoples, with culturally informed and appropriate strategies, might be the key to reduce this evident health care gap.

## Atrial Fibrillation and Stroke

There are significant disparities reported between First Nations Peoples and other Australians with atrial fibrillation (AF) and stroke incidence in the clinical setting. A systematic review on AF in First Nations Peoples of Australia, New Zealand, Canada and the United States [23] found that First Nations Peoples had a higher incidence of AF when adjusted for age, and had worse 30-day mortality, which appeared to be driven by a higher prevalence of co-morbidities [24].

In a large retrospective cross-sectional study [25] of 204,668 patients, there were 5,892 patients who identified as First Nations Peoples, of which 221 had AF. When compared to 14,152 other Australian patients with AF, the major findings were that First Nations Peoples were 20 years younger (55.4 years vs 74.5 yrs), and those under 60 years of age had worse left ventricular function and a higher AF prevalence.

No studies have focussed on the incidence of cardiac surgery-related AF in First Nations Peoples, but one retrospective study by Russell *et al.*, found that patients undergoing valve surgery with AF were more likely to be older, female, Aboriginal and/or Torres Strait Islander, have rheumatic heart disease and had a greater burden of comorbidities [26].

First Nations Peoples are more likely to suffer from cerebrovascular disease [27,28], and there is limited but suggestive data indicating worse outcomes [27]. Retrospective data from WA using data linkage found an increased rate ratio in age-standardised stroke incidence of 2.6 for males and 3.0 for females compared to other Australians [27]. Retrospective data from the NT over a 12-year period also showed similar increases in age-adjusted stroke risk with 2.8 for First Nations men and 2.7 for women [28].

Further work has been suggested to develop programs to reduce risk factors, increase access to culturally appropriate stroke services [27], and to understand the disparities given the significant differential between First Nations Peoples and other Australians for age-stratified stroke incidence [29]. Given the common aetiology of all cardiovascular risk factors, any programs would also likely benefit IHD and HF outcomes.

## Rheumatic Heart Disease

Rheumatic heart disease (RHD) is 26 times more common in First Nations Peoples compared to other Australians, with acute rheumatic fever (ARF) and RHD accounting for an eight-fold higher rate of hospitalisation [30].

The true incidence of ARF and prevalence of RHD is unknown due to a lack of consistent registry data and control programs. Data from the NT showed ARF was almost exclusively a disease of First Nations Peoples accounting for 98% of all cases between 2005 and 2010. New cases of RHD in First Nations Peoples were reported at a rate of 61 per 100,000 population compared to 0.2 per 100,000 population in the wider community [31]. In other literature, a cross-sectional survey compared regional differences in RHD prevalence, demonstrating the prevalence of RHD was as

high as 15 per 1,000 in children from the Top End of the NT [32], a rate that is two to three times higher than other regions. These findings further highlighted the significant proportion of previously undetected disease in high-risk populations.

Group A streptococcal (GAS) infection, and its complications, including ARF and RHD, is generally associated with poverty. Low socioeconomic status, poorly designed housing, poor sanitation and limited access to health care are major risk factors for exposure to GAS, recurrent ARF and progression to RHD. First Nations communities, particularly the more remote communities, are at higher risk [33,34].

Acute rheumatic fever and RHD incidence and mortality rates remain high for First Nations people with substantial amounts of undetected disease present [35] and significant long-term implications due to disease progression and its treatment. There is a need for long term antibiotic treatment with current guidelines recommending secondary prevention of RHD with injections of benzathine benzylpenicillin every 28 days, or every 21 days for high-risk groups or recurrence. Treatment duration is for 10 years or until 21 years of age (whichever is longer) placing significant burdens on patients and their families [33,34]. Data from the NT suggests adequate treatment rates are low with only 28% achieving more than 80% of the required dose in 2010 [30]. Compliance with antibiotic regimens for secondary prophylaxis has been identified as a barrier to treatment in children with recommendations for increased use of pain reduction techniques during the administration of the painful deep intramuscular injections [36]. Ultimately, progressive disease will require cardiothoracic surgery, which as discussed below, has poorer outcomes in First Nations Peoples.

## Cardiothoracic Surgery

First Nations Peoples undergoing cardiac surgery are significantly younger [37,38], more likely to be female and from a remote area, and have a higher burden of comorbidities; particularly smoking, hypertension, previous coronary artery bypass grafting [12], diabetes and renal dysfunction [37].

Perioperative surgical risk is higher in the First Nations population, driven by increased rates of HF and left ventricular dysfunction diagnosed preoperatively, with First Nations Peoples being more likely to undergo concomitant valvular surgery compared to other Australians [38]. This leads to higher perioperative morbidity, cardiac mortality and all-cause mortality regardless of remoteness [39].

A recent publication by Wiemers et al. demonstrated worse outcomes in First Nations Peoples undergoing coronary revascularisation. At 3 years of follow-up, major adverse cardiovascular outcomes (MACE) were worse in First Nations Peoples, compared to the wider community, driven by increased rates of stroke and myocardial infarction. Following adjustment, renal impairment and left ventricular dysfunction predicted worse outcomes, however First Nations status on its own did not [11].

## Aboriginal and Torres Strait Islander Cardiovascular Health Screening, Interventions and Outcomes

Whilst there has been a significant body of work over the last decade in raising cultural respect in the Australian health system, there are very few First Nations specific cardiovascular screening, risk stratification tools, interventions and programs [40]. Compounding this is the geographical barriers to accessing health care.

Regarding screening and risk stratification, there is evidence that screening should be commenced at younger ages [41,42]. Currently risk escalation for IHD commences at 35 years of age for First Nations Peoples compared to 45 years of age for other Australians. Due to the difference in age at presentation, traditional risk stratification tools, such as the GRACE score, are not valid in the First Nations population as they underestimate risk.

Similarly, there is a paucity of data for culturally specific programs and successful interventions for First Nations Peoples with cardiovascular disease. When interventions have been implemented, the results have been promising. Cultural safety and awareness programs for staff in the hospital setting have been associated with higher levels of referral and subsequent participation in cardiac rehabilitation [43]. By implementation of a working together model of care by an Aboriginal and Torres Strait Islander Hospital Liaison Officer and a specialist cardiac nurse early in a patient's hospital admission it has demonstrated improved referral to and attendance at cardiac rehabilitation services, with potential to prevent complications and mortality [43,44].

Another landmark program, called The Lighthouse Hospital Project, has aimed to improve care and outcomes for First Nations Peoples who experience acute coronary syndrome (ACS) by improving the quality and cultural competence of the health workforce. The project is run by the Heart Foundation and aims to drive systemic changes in the acute care sector. Initial results of the program have been promising, and in 2017 the project was expanded to 18 hospitals across Australia [45].

Other interventions such as efforts to support smoking cessation have seen mixed results. Components of success include availability of social support [46] and enabling local development, along with ownership and participation of a program within a culturally safe framework [47]. Advice from health professionals to quit is associated with making a quit attempt [48].

Disparities in access to health care also continue to be reported. One significant factor is large travel times, especially longer than 60 minutes, to access culturally safe clinical services [40]. One such example is Aboriginal and Islander Community Controlled Health Services in Queensland (AICCHSs) [49]. Whilst large travel times can be a hurdle to accessing health care, the data suggests that First Nations Peoples indeed value these community-controlled primary care services and their use is higher than the Australian

Bureau of Statistics census data would suggest. First Nations Peoples are prepared to travel longer periods to engage with specialised Aboriginal and Torres Strait Islander health services [49].

Improving communication techniques in the clinical setting has also been recognised as important. Rather than focus on individual's health literacy, culturally responsive research addresses how the biomedical model can be a barrier to communication and how we can 'talk with' First Nations Peoples about matters, including non-verbal communication [50,51]. Clinical Yarning is a technique that is emerging as a culturally responsive communication tool [52]. The patient-centred approach of clinical yarning merges Aboriginal and Torres Strait Islander cultural communication preferences with biomedical understandings of health and disease. It consists of social yarn, diagnostic yarn and the management yarn, which aim to facilitate improved outcomes for patients and practitioners [52].

## Discussion

There has been a deficit discourse regarding First Nations Peoples' health. As clinicians, we must be mindful that any gap in health care provision and outcomes between First Nations Peoples and other Australians is unacceptable and needs to be addressed as a matter of national priority. We need to have sustained partnerships with our local First Nations communities, employing improved systems-based approaches.

It's likely the widespread health inequality and socio-economic disadvantage described by the Australian Institute of Health and Welfare adversely impacts the cardiovascular disease burden in First Nations Peoples [53]. Indeed, the social determinants of health explain 34% of the total health gap between First Nations Peoples and other Australians, namely household income, employment and hours worked [54]. Whilst currently available interventions are unlikely to address this core issue of socio-economic disadvantage, we can aim to improve our management of the disease process and its sequelae. More broadly, the design of health care, behaviour, and attitude of health staff, including respectfully including First Nations Peoples in discussions and decisions about the design of services and programs have evidence for improving health care participation.

Successful interventions in the Aboriginal and Torres Strait Islander cardiovascular space have all required local community support and participation in their design and implementation. First Nations Peoples are more likely to live in urban locations but represent a greater population proportion in regional and remote areas. Although this doesn't seem to be a significant factor in program participation or medication adherence, improving accessibility must be a key design feature. When distance is combined with other disincentives, such as financial strain, or cultural insensitivity, it becomes a significant factor.

The paucity of data available in successful interventions represents a major failing of research in Australia. Before we

can successfully close the gap, we must first understand the nature and driver of the disadvantage. Future research directions should focus on investigating Aboriginal and Torres Strait Islander cardiovascular outcomes in metropolitan and regional centres, in addition to remote Australia. Once we improve partnerships with First Nations communities, we can tailor specific culturally appropriate interventions with the aim of improving outcomes. What these interventions might look like is not yet clear, but it will need to be deliverable across a wide geographical area and be informed and supported by local First Nations Peoples.

## Conclusions

Cardiovascular disease remains a major cause for morbidity and mortality in First Nations Peoples and a major contributor to the health outcomes gap compared to other Australians. We must continue to analyse and describe the characteristics, management and outcomes of First Nations Peoples with cardiovascular disease before we can truly 'close the gap' in cardiovascular mortality and morbidity.

Stronger engagement between Federal and State Government, Local Health Districts, research institutions and Aboriginal and Torres Strait Islander communities will enable us to develop strategies to tackle the demographic, societal and health service cultural challenges. By having consistent and thoughtful partnerships with key players, including the creation of First Nation working groups and other models of care, we can start closing the inequalities in the social determinants of health for First Nations Peoples.

The key purpose of this review is to highlight the deficiencies of our knowledge of cardiovascular (CV) outcomes as they apply to First Nations Peoples; and to serve as a catalyst for more dedicated research involving Aboriginal and Torres Strait Islander researchers in collaboration with First Nation communities, focussing on the areas of need identified as culturally important and supported by said communities.

## Ethics Approval

No ethics approval was required for this narrative review.

## Conflicts of Interest

The authors declare no conflicts of interest.

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