



Australian Government  
National Health and  
Medical Research Council

# Cardiac Rehabilitation Geographic Information System

Geographic Information System of Cardiac  
Rehabilitation Services for Aboriginal  
and Torres Strait Islander Peoples



WORKING TO BUILD A HEALTHY AUSTRALIA







**Australian Government**

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**National Health and Medical Research Council**

**GEOGRAPHIC INFORMATION SYSTEM OF  
CARDIAC REHABILITATION SERVICES FOR  
ABORIGINAL AND TORRES STRAIT ISLANDER PEOPLES**

Endorsed January 2007

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## LETTER OF INTRODUCTION FROM CEO

Improving the health of all Australians is a primary focus of the NHMRC and with coronary heart disease being identified as the largest single cause of death for Aboriginal and Torres Strait Islander People, a proactive approach to combating this growing health problem was a priority.

As part of its strong commitment to improving Aboriginal and Torres Strait Islander health, the NHMRC has developed this report as part of a set of resources that aim to assist health professionals working with Indigenous Australian patients who have experienced a cardiac event.

The expert Working Committee responsible for developing these materials has made a significant contribution to the future health of Aboriginal and Torres Strait Islander Peoples. It has provided a model of how Indigenous Australians and non-Indigenous Australians can work together to create opportunities for improving health services for Aboriginal and Torres Strait Islander Peoples. It has conducted considerable research into available services and produced clear, practical guidance on how best practice in this area of health service delivery could be achieved.

I commend this report and the whole NHMRC cardiac rehabilitation package to all Australian health professionals, whether they work in urban, regional or remote areas.



**Professor Warwick Anderson**  
Chief Executive Officer  
NHMRC



## WELCOME MESSAGE

### This package can help you to improve outcomes among your Aboriginal and Torres Strait Islander patients

It is well known that Aboriginal and Torres Strait Islander Peoples experience much **higher death rates from coronary heart disease** than other Australians. A recent report from the Australian Institute of Health and Welfare<sup>1</sup> found compelling evidence of disparities that contribute to these higher death rates. Compared with other Australians, Indigenous Australians are considerably **more likely to have a heart attack**, and to die from it whether they are admitted to hospital or not. If in hospital, they are also **less likely to receive common procedures** such as coronary bypass surgery or angioplasty.

Compounding this picture of health inequalities, it is clear that Indigenous people who survive a major coronary event such as a heart attack are also **much less likely to attend a cardiac rehabilitation program** than other Australians. Cardiac rehabilitation is an important part of secondary prevention of coronary heart disease, aiming to give people the confidence, motivation and skills to make a lifelong commitment to a healthy lifestyle and greater well-being.

The materials in this package will assist health professionals and health services to actively contribute to improving cardiovascular outcomes among Aboriginal and Torres Strait Islander patients.

- ❖ **A practical guide** — *Strengthening Cardiac Rehabilitation and Secondary Prevention for Aboriginal and Torres Strait Islander Peoples: A Guide for Health Professionals* — the guide provides **advice and tools** for each stage of cardiac rehabilitation, from diagnosis of heart disease to secondary prevention and self-management.
- ❖ **A Cardiac GIS** — this interactive geographic information system (GIS) is a computer-based visual aid that can **help you to find the best services** for Indigenous patients with heart disease.
- ❖ **A Final Report** — this report details the methods, analyses and **key findings** of the Cardiac GIS project.



<sup>1</sup> AIHW (2006) *Aboriginal and Torres Strait Islander Peoples with Coronary Heart Disease: Further Perspectives on Health Status And Treatment*. Australian Institute of Health and Welfare, Canberra.

#### The Guide in action

“There are many health care providers with good intentions who want to improve the health of Indigenous people through proven methods such as cardiovascular health, rehabilitation and secondary prevention programs. This guide provides the necessary insight into how this is best achieved and is a must have for clinicians, managers and service providers – for without it, they may well miss the mark..”

Kathy Broad  
Cardiac Rehabilitation Coordinator  
Cairns Base Hospital

“The Wuchopperen Health Service Healthy Hearts outpatient cardiac rehabilitation program uses the four Toolkits from the guide as a reference for education materials, for trouble shooting if required and as a source for better understanding the basics of various heart conditions affecting Indigenous peoples. The funding case scenarios are also useful examples.”

Barry Fewquandie  
Cardiac Rehabilitation Coordinator  
Wuchopperen Health Service,  
Cairns

The materials are the result of a program of work by the NHMRC to address the cardiovascular health of Aboriginal and Torres Strait Islander Peoples. Aboriginal and Torres Strait Islander members made up nearly two-thirds of the working committee appointed to carry out the project.

Key organisations were involved from the outset, including the National Aboriginal Community Controlled Health Organisation and the Australian Indigenous Doctors' Association. The committee listened carefully to health professionals and consumers talking about why Aboriginal and Torres Strait Islander Peoples do not attend cardiac rehabilitation programs and how services could be made more accessible.

This process has been valuable in a number of ways. It has:

- ❖ provided a model of how non-Indigenous and Indigenous people can work together to create opportunities for improving health services for Aboriginal and Torres Strait Islander Peoples
- ❖ shown that involving the right organisations and individuals, and including community consultation all the way through the process, makes a big difference to the relevance and usefulness of the final products.

We are proud to recommend this package to health professionals and health services everywhere. We trust it will help to improve the uptake and outcomes of cardiac rehabilitation among Aboriginal and Torres Strait Islander Peoples, and through this, the health of Aboriginal and Torres Strait Islander communities across Australia.

Professor Warwick Anderson  
**Chief Executive Officer of the NHMRC**

Dr Noel Hayman and Dr Mark Wenitong  
**Co-Chairs, NHMRC Cardiac Rehabilitation Working Committee**

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## EXECUTIVE SUMMARY

In 2005 the National Health and Medical Research Council (NHMRC) convened an expert working committee to investigate barriers to effective practice and develop guidance for health professionals working in the area of cardiac rehabilitation among Aboriginal and Torres Strait Islander Peoples. The Committee conducted workshops, which were hosted by Aboriginal Community Controlled Health Services in Darwin, Townsville and Mt Druitt (Sydney). This information contributed to the development of a practical guide for health professionals — *Strengthening Cardiac Rehabilitation and Secondary Prevention for Aboriginal and Torres Strait Islander Peoples: A Guide for Health Professionals*.

To further assist primary care health professionals and cardiac rehabilitation services, the Committee commissioned the Cardiac Geographic Information System (GIS) project. This project aimed to develop an interactive CD-ROM-based GIS report and maps that integrate the location of cardiac rehabilitation services in Australia with eligible Aboriginal and Torres Strait Islander Peoples who have had an adverse cardiac event. The project was undertaken by Healthcare Management Advisors (HMA), Adelaide and resulted in an interactive CD-ROM, a user manual and this final report, which details the methodology used, analyses undertaken and key findings of the Cardiac GIS project.

The CD-ROM has been designed as a resource for primary health care providers and cardiac rehabilitation services, providing a tool to locate services and understand the distribution of cardiac illness in local areas. The information may also be of value to those involved in planning and developing cardiac rehabilitation service systems as it offers a means of considering the spatial distribution of services (cardiac rehabilitation and primary/community health) in the context of population distribution.

Coupled with the Guide, the CD-ROM provides a tool to support ongoing development of cardiac rehabilitation and secondary prevention for Aboriginal and Torres Strait Islander Peoples.

### Development of the Cardiac GIS

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The Cardiac GIS was based on the following research:

- ❖ a survey of cardiac rehabilitation services and Aboriginal Community Controlled Health Services (ACCHS);
- ❖ estimation of the Aboriginal and Torres Strait Islander population and analysis of the distribution of the Aboriginal and Torres Strait Islander population in terms of proximity to a cardiac rehabilitation service;
- ❖ estimation of the number of Aboriginal and Torres Strait Islander Peoples eligible for cardiac rehabilitation, using hospital separation data for the Northern Territory, Queensland, South Australia and Western Australia; and
- ❖ calculation of the distance between each postal area and the nearest postal area in which there is a cardiac rehabilitation service.

As expected, it was found that cardiac rehabilitation services are predominantly located in urban and major regional centres. This highlights the importance of previous findings that:

- ❖ only a small proportion of the Aboriginal and Torres Strait Islander population eligible for cardiac rehabilitation and secondary prevention access these services;

- ❖ the benefits of cardiac rehabilitation accrue where changes in behaviour reduce risk factors such as smoking, lack of activity and hypertension; and
- ❖ interventions that involve not only patients but their families, carers and communities, are more likely to be effective for Aboriginal and Torres Strait Islander Peoples.

It is clear that there is considerable scope for improving access to cardiac rehabilitation for Aboriginal and Torres Strait Islander Peoples and for enhancing the cultural safety of health services. One solution is to involve primary and community health services, the geographic distribution of which is much more closely related to the population than is the distribution of cardiac rehabilitation services.

## Key findings

The accuracy with which Aboriginal and Torres Strait Islander Peoples are identified within hospital separation data limits the capacity to accurately determine the level of ill health within this population. This in turn presents challenges to planning services as they attempt to ensure adequate access to cardiac rehabilitation services. For the current project, data for the Northern Territory, Queensland, South Australia and Western Australia have allowed the following conclusions to be drawn.

### Access to cardiac rehabilitation services

- ❖ Almost 90% of cardiac rehabilitation services are located in either urban centres or major regional centres, and only 12% of services include an outreach program.
- ❖ The more remote the community, the less access there is to cardiac rehabilitation.
- ❖ Twenty-one per cent of the Aboriginal and Torres Strait Islander population (and 18.8% of those with a hospital separation that includes cardiac illness) live in postal areas that are further than 100 kilometres from the nearest cardiac rehabilitation service.
- ❖ A continuing barrier to Aboriginal and Torres Strait Islander Peoples' access to cardiac rehabilitation services is limited implementation of service systems and resources to increase the cultural appropriateness of services.
- ❖ Geographic access to primary and community health services appears to be more closely related to population distribution than is access to cardiac rehabilitation services.

### Relationship between cardiac rehabilitation and primary health care services

- ❖ The development of effective links between specialist cardiac rehabilitation services and primary and community health services presents an opportunity for expanding access to cardiac rehabilitation services.
- ❖ Local primary health care services have a key role in secondary prevention and ongoing support for Aboriginal and Torres Strait Islander Peoples who may benefit from cardiac rehabilitation.
- ❖ Increasing the involvement of Aboriginal Health Workers in cardiac rehabilitation and secondary prevention, particularly through Aboriginal Community Controlled Health Services (ACCHS), provides an opportunity to improve access to cardiac rehabilitation and secondary prevention.

**A range of opportunities exist for development of accessible cardiac rehabilitation services**

- ❖ Chronic disease strategies in most jurisdictions provide a framework within which to enhance access to cardiac rehabilitation and secondary prevention.
- ❖ Streamlining of Enhanced Primary Care arrangements within the Medicare Benefits Schedule represents a potential source of support for greater involvement of ACCHS in the provision of cardiac rehabilitation and secondary prevention.
- ❖ Linking in with national and jurisdictional programs (eg Healthy for Life) represents a potential avenue for developing innovative approaches to improving access to cardiac rehabilitation and secondary prevention services for Aboriginal and Torres Strait Islander Peoples.



## I BACKGROUND

Aboriginal and Torres Strait Islander Peoples experience poorer health than other Australians and have greater difficulty in accessing health services. This is of particular concern in the area of cardiac rehabilitation services, which aim to improve general health and prevent further cardiac events.

Although the benefits of cardiac rehabilitation are clear, only a small proportion of people who have experienced cardiac events attend programs.<sup>1</sup> Aboriginal and Torres Strait Islander Peoples are even less likely to participate in cardiac rehabilitation programs than non-Indigenous Australians,<sup>1-3</sup> despite being twice as likely to die from heart disease.<sup>4-7</sup>

In 2005 the National Health and Medical Research Council (NHMRC) convened a Cardiac Rehabilitation Working Committee (see Appendix 1) to investigate barriers to effective practice and develop guidance for health professionals working in the area of cardiac rehabilitation among Aboriginal and Torres Strait Islander Peoples. The Committee conducted workshops, which were hosted by Aboriginal Community Controlled Health Services in Darwin, Townsville and Mt Druitt (Sydney). This information contributed to the development of a practical guide for health professionals — *Strengthening Cardiac Rehabilitation and Secondary Prevention for Aboriginal and Torres Strait Islander Peoples: A Guide for Health Professionals* (the Guide).<sup>8</sup>

To further assist primary care health professionals and cardiac rehabilitation services, the Committee commissioned the Cardiac GIS project. This project aimed to develop an interactive CD-ROM-based GIS report and maps that integrate the location of cardiac rehabilitation services in Australia with eligible Aboriginal and Torres Strait Islander Peoples who have had an adverse cardiac event. The project was undertaken by Healthcare Management Advisors (HMA), Adelaide and resulted in an interactive CD-ROM, a user manual and this final report. The following barriers to accessing services, identified by the Guide, were central in determining the focus of the Cardiac GIS project:

- ❖ distance from treatment centres, particularly for Aboriginal and Torres Strait Islander Peoples living in rural and remote areas;
- ❖ weak links between mainstream services and the Indigenous health sector and inadequate discharge planning and follow-up;
- ❖ difficulties associated with patients and only one carer travelling from home for treatment;
- ❖ a lack of training and support for Aboriginal Health Workers related to cardiac rehabilitation; and
- ❖ a low rate of referral to cardiac rehabilitation programs.

The Cardiac GIS CD-ROM and user manual aim to allow health professionals to:

- ❖ locate the cardiac rehabilitation services nearest to where a patient lives;
- ❖ print out the details of the cardiac rehabilitation services to provide to patients as they are referred;
- ❖ identify community health services located near a patient's place of residence;

- ❖ view the estimated distribution of cardiac-related morbidity and mortality as maps;
- ❖ access background information such as:
  - geographic distribution of Indigenous language groups across Australia
  - resources developed within the Guide; and
- ❖ download data about services that are used regularly.

## 1.1 Objectives

---

The aim of this project was to produce an interactive CD-ROM-based GIS report and associated maps that identified cardiac rehabilitation services and Aboriginal and Torres Strait Islander Peoples eligible for cardiac rehabilitation. The GIS report and maps were to integrate information on:

- ❖ services that provide cardiac rehabilitation within the health care system, including hospitals and Indigenous-specific health services in Australia as well as their service scope and location;
- ❖ location of allied health services and Aboriginal health programs and areas that they cover;
- ❖ the prevalence of Aboriginal and Torres Strait Islander Peoples who are eligible for cardiac rehabilitation services;
- ❖ distances from home address of eligible cardiac rehabilitation patients to the nearest cardiac rehabilitation service; and
- ❖ population density or distribution of Aboriginal and Torres Strait Islander Peoples.

Analyses were conducted on the basis of groups of postal areas. The use of individual cases would have required street address data, necessitating Ethics Committee approval, which was not feasible within the limited timeframe originally proposed for the project. Further, it was expected that there would be relatively few, if any, cases in individual postal areas, which would limit the capacity to draw conclusions regarding the overall access to services. The location of cases from year to year was also expected to vary considerably.

## 1.2 Overview of methodology

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The original methodology, as agreed with the Cardiac Rehabilitation Working Committee, involved:

- ❖ a survey of cardiac rehabilitation services and Aboriginal Community Controlled Health Services to identify current cardiac rehabilitation services and their characteristics;
- ❖ analysis of hospital separation data where Aboriginal and Torres Strait Islander Peoples were involved and where cardiac illness was a primary or secondary diagnosis;
- ❖ analysis of Aboriginal and Torres Strait Islander mortality data where cardiac illness was present; and
- ❖ analysis of the geographic distribution of the Aboriginal and Torres Strait Islander population.

### 1.3 Purpose and structure of this document

---

This document represents the final report for the project, and accompanies the CD-ROM developed to present the results of the GIS analysis. There are seven chapters, including this introductory chapter:

- Chapter 2** Provides an overview of the survey of cardiac rehabilitation services and Aboriginal Community Controlled Health Services undertaken for the project and the analysis of responses.
- Chapter 3** Describes the range of data used for the current project, the shortcomings of the data and the risks associated with its use.
- Chapter 4** Provides an analysis of data relating to the population of those potentially eligible for cardiac rehabilitation and their relationship to the location of cardiac rehabilitation services and community/allied health services.
- Chapter 5** Provides an analysis of the geographic distribution of services and considers the implications for future planning and development of cardiac rehabilitation services and services models to meet the needs of Aboriginal and Torres Strait Islander Peoples.
- Chapter 6** Draws on the findings and recommendations presented in the Guide to consider current barriers to cardiac rehabilitation and secondary prevention, the factors that contribute to the development of successful programs and current programs that may provide funding to support the development of programs in Aboriginal and Torres Strait Islander communities.
- Chapter 7** Presents conclusions and recommendations designed to facilitate improved access to cardiac rehabilitation and secondary prevention services for Aboriginal and Torres Strait Islander Peoples, particularly those living in rural and remote communities.



## 2 SURVEY OF CARDIAC REHABILITATION PROGRAMS

*This chapter describes the survey of cardiac rehabilitation services and Aboriginal Community Controlled Health Services undertaken to provide base data for the project.*

### 2.1 Overview of survey

---

In order to gain current information regarding cardiac rehabilitation services nationally, a list of cardiac rehabilitation services and Aboriginal Community Controlled Health Services (ACCHS) was compiled. This list, including 457 sites, was based on information gathered from the National Heart Foundation of Australia (NHF), State and Territory Health Departments and the Office of Aboriginal and Torres Strait Islander Health (OATSIH).

A total of 457 surveys was distributed, 98 (21.2%) to ACCHS and 359 (78.5%) to cardiac rehabilitation services. Contact information for ACCHS was provided by OATSIH, while information on cardiac rehabilitation services was collated from data sources held by NHF offices and some State and Territory health authorities. Of the 457 surveys sent, 237 (52.0%) surveys were completed and returned (nine of these failed to indicate whether or not a cardiac rehabilitation service was provided). Follow-up of non-responding sites by telephone confirmed that a total of 372 sites operated a cardiac rehabilitation program.

Surveys were posted to all sites, accompanied by a covering letter from the NHMRC which provided background information about the project. Where surveys were returned marked “Return to Sender”, enquiries were made by telephone to the service or, alternatively, contact was made with either the NHF or OATSIH to obtain an updated address. Survey packages provided details of the due date for completion and return of the survey (about one week following receipt of the survey).

One week after the stated due date, services that had not returned a survey received a follow-up phone call checking that the survey had been received and enquiring whether the survey was in the process of being completed or had already been sent. If the survey had not been received or had been misplaced, another copy was sent with a request for the service to return it as soon as possible. During this phone call, services were also given the option of providing their responses to the survey over the phone (if this was preferred the survey was conducted verbally and responses recorded at that time). An additional three rounds of follow-up calls were made.

Following receipt of completed survey responses, follow-up phone calls were undertaken where necessary to address missing data and clarify any ambiguities. During the process of receiving completed surveys and checking the responses, some respondents provided details of other cardiac rehabilitation services that were not in the original lists provided by the NHF and OATSIH (these services were involved in a specific project in New South Wales). Although surveys were not provided to these services, contact details have been included in the CD-ROM.

A copy of the survey tool is provided at Appendix 4.

## 2.2 Survey response by State and Territory

The majority of surveys received were from NSW (33.3%). Analysis of response rates indicated that there was no significant difference across jurisdictions among designated cardiac rehabilitation services ( $X^2 = 7.96$ ,  $df = 7$ ).

**Table 2.1 Cardiac rehabilitation service response rates**

| Jurisdiction | Sites surveyed (n) | Responses (n) |
|--------------|--------------------|---------------|
| ACT          | 2                  | 2             |
| NSW          | 129                | 70            |
| NT           | 2                  | 2             |
| QLD          | 66                 | 37            |
| SA           | 25                 | 15            |
| TAS          | 5                  | 3             |
| VIC          | 104                | 64            |
| WA           | 26                 | 20            |
| <b>Total</b> | <b>359</b>         | <b>213</b>    |

Similarly, review of responses rates for ACCHS indicated that there was no difference between jurisdictions ( $X^2 = 6.22$ ,  $df = 6$ ) (Tasmania was excluded from the analysis). The relatively low response rate for ACCHS reflected the absence of identified cardiac rehabilitation services in the majority of services. In subsequent analyses, responses from ACCHS that provided cardiac rehabilitation services were included with those for mainstream services.

**Table 2.2 Aboriginal Community Controlled Health Service: response rates**

| Jurisdiction | Sites surveyed (n) | Responses (n) |
|--------------|--------------------|---------------|
| ACT          | 1                  | 0             |
| NSW          | 23                 | 7             |
| NT           | 17                 | 2             |
| QLD          | 20                 | 1             |
| SA           | 8                  | 1             |
| TAS          | 0                  | 0             |
| VIC          | 9                  | 1             |
| WA           | 20                 | 3             |
| <b>Total</b> | <b>98</b>          | <b>15</b>     |

Follow-up discussions with ACCHS indicated the majority of those that did not respond did not consider the survey relevant as they did not provide a cardiac rehabilitation service. The response rate is provided as background for those utilising the CD-ROM tool developed through the current project.

## 2.3 Service setting

Survey respondents were asked to indicate the settings in which their cardiac rehabilitation service operated. Respondents could indicate more than one setting. Table 2.3 presents the range of responses received — 55.3% (131) of respondents indicated they provided services in an acute public hospital and 29.5% (70) indicated that they provided services in a public community health centre or service. Overall, 14 (5.9%) survey respondents either did not provide a response to this question or indicated that their service did not fit any of the categories.

**Table 2.3 Service settings reported (n = 237)**

| Service Setting                                 | n   | % of Total |
|---|-----|------------|
| Within an acute public hospital                 | 131 | 55.3       |
| Within an acute private hospital                | 25  | 10.5       |
| Within an Aboriginal Medical Service            | 14  | 5.9        |
| Within a non-acute/community hospital           | 9   | 3.8        |
| Within a public community health centre/service | 70  | 29.5       |
| Within a private outpatient service             | 16  | 6.8        |
| As part of an outreach service to communities   | 29  | 12.2       |

Note: Individual services reported operating in more than one setting.

## 2.4 Cultural appropriateness

Survey respondents were asked to complete questions concerning the inclusion of activities or approaches identified in the Guide as representing best practice in engaging Aboriginal and Torres Strait Islander Peoples in cardiac rehabilitation.

Table 2.4 provides a summary of the responses to the cultural appropriateness questions in the survey:

- ❖ around a third (37.1%) reported that they had established flexible approaches to gaining consent that involved family members and provision of information in a culturally appropriate manner;
- ❖ a similar proportion (37.6%) used education materials that had been specifically designed for Aboriginal and Torres Strait Islander Peoples;
- ❖ over half those responding (51.1%) indicated that they either employed, or had established access to, Aboriginal Health Workers to support the provision of cardiac rehabilitation services to Aboriginal and Torres Strait Islander patients; and
- ❖ the majority of respondents (79.3%) reported referral networks with the range of health professionals required to support cardiac rehabilitation

However:

- ❖ only 60 services (25.3%) indicated that they used a comprehensive case management approach with Aboriginal and Torres Strait Islander patients;
- ❖ only a quarter of services had established processes to discuss cardiac rehabilitation with Aboriginal and Torres Strait Islander patients before their admission to hospital; and
- ❖ only 51 services (21.5%) reported that they had established a buddy or mentor system for Aboriginal and Torres Strait Islander patients who did not have a family member or carer available to support decision-making.

The launch of the Guide occurred after the survey was completed. Nevertheless, the relatively limited application of strategies to increase the cultural appropriateness of services suggests that there is considerable scope for improvement.

**Table 2.4 Cultural Appropriateness Survey Questions**

| Code  |   | Yes  | No   | No response | Not applicable | Total |
|---|---|------|------|-------------|----------------|-------|
| Use case management for Aboriginal and Torres Strait Islander patients that covers the process of care from tests and/or procedures through to cardiac rehabilitation                   | n | 60   | 146  | 29          | 2              | 237   |
|   | % | 25.3 | 61.6 | 12.2        | 0.8            | 100.0 |
| Have flexible approaches to obtain informed consent from Aboriginal and Torres Strait Islander patients that involve family members and culturally appropriate provision of information | n | 88   | 115  | 33          | 1              | 237   |
|   | % | 37.1 | 48.5 | 13.9        | 0.4            | 100.0 |
| Use education materials on common cardiovascular conditions, tests, interventions, medications and cardiac rehabilitation designed for Aboriginal and Torres Strait Islander Peoples    | n | 89   | 119  | 28          | 1              | 237   |
|   | % | 37.6 | 50.2 | 11.8        | 0.4            | 100.0 |
| Discuss the importance of cardiac rehabilitation with Aboriginal and Torres Strait Islander patients before they come into hospital   | n | 61   | 140  | 33          | 3              | 237   |
|   | % | 25.7 | 59.1 | 13.9        | 1.3            | 100.0 |
| Employ or ensure access to an Aboriginal Health Worker to assist Aboriginal and Torres Strait Islander patients   | n | 121  | 87   | 28          | 1              | 237   |
|   | % | 51.1 | 36.7 | 11.8        | 0.4            | 100.0 |
| Operate a buddy and/or mentoring systems for patients whose families or carers are not available to take part in the decision-making process or accompany them to hospital              | n | 51   | 145  | 40          | 1              | 237   |
|   | % | 21.5 | 61.2 | 16.9        | 0.4%           | 100.0 |
| Have referral networks involving allied health professionals such as dietitians, pharmacists, social workers or physiotherapists  | n | 188  | 21   | 27          | 1              | 237   |
|   | % | 79.3 | 8.9  | 11.4        | 0.4            | 100.0 |

## 2.5 Distribution of cardiac rehabilitation services

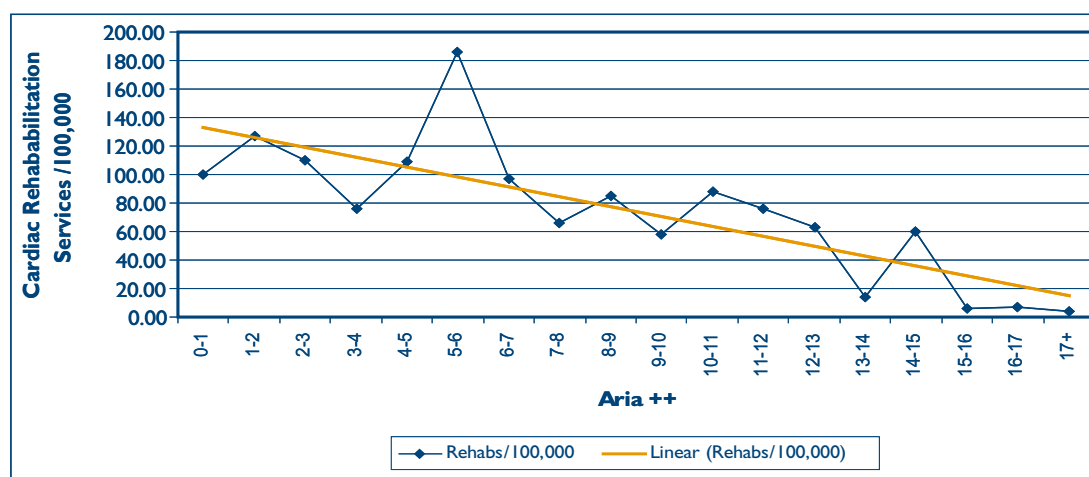
A key stage in the survey was identifying cardiac rehabilitation services. The postal area (an Australian Bureau of Statistics geographic approximation of postcodes) in which each cardiac rehabilitation program was located was used to provide a measure of remoteness using the Accessibility and Remoteness Index of Australia (ARIA++) score (between 0 and 18). Table 2.5 shows the distribution of cardiac rehabilitation programs in terms of remoteness. To give some sense of how ARIA++ describes remoteness:

- ❖ a score of zero reflects a location in the centre of a metropolitan area such as the Sydney central business district;
- ❖ a regional centre such as Wagga Wagga receives a score of approximately 2.5;
- ❖ small communities near regional centres (eg Barmera in South Australia or Stanthorpe in Queensland) receive a score of approximately 5;
- ❖ a remote centre (eg Broken Hill or Tennant Creek) is given a score of approximately 12; and
- ❖ small, very remote communities (eg Cundeelee [WA] or Adavale [Qld]) receive scores over 15.

**Table 2.5 Cardiac rehabilitation services (frequency) by ARIA ++**

| ARIA++          | No. of cardiac rehabilitation Programs | Estimated Indigenous population July 2004 | Cardiac rehabilitation programs per 100,000 Indigenous population |
|-----------------|--|---|---|
| 0.00–0.99       | 155                                    | 155,572                                   | 99.8  |
| 1.00–1.99       | 33                                     | 26,037                                    | 126.7   |
| 2.00–2.99       | 31                                     | 28,141                                    | 110.2   |
| 3.00–3.99       | 42                                     | 55,057                                    | 76.3  |
| 4.00–4.99       | 27                                     | 24,662                                    | 109.5   |
| 5.00–5.99       | 37                                     | 19,923                                    | 185.7   |
| 6.00–6.99       | 11                                     | 11,379                                    | 96.7  |
| 7.00–7.99       | 4                                      | 6,106                                     | 65.5  |
| 8.00–8.99       | 4                                      | 4,720                                     | 84.7  |
| 9.00–9.99       | 4                                      | 6,865                                     | 58.3  |
| 10.00–10.99     | 7                                      | 7,929                                     | 88.3  |
| 11.00–11.99     | 2                                      | 2,638                                     | 75.8  |
| 12.00–12.99     | 3                                      | 4,775                                     | 62.8  |
| 13.00–13.99     | 3                                      | 21,816                                    | 13.8  |
| 14.00–14.99     | 5                                      | 8,386                                     | 59.6  |
| 15.00–15.99     | 1                                      | 17,568                                    | 5.7   |
| 16.00–16.99     | 2                                      | 27,725                                    | 7.2   |
| 17.00 or higher | 1                                      | 22,724                                    | 4.4   |
| <b>Total</b>    | <b>372</b>                             | <b>452,023</b>                            | <b>82.1</b>   |

The number of cardiac rehabilitation programs declines as areas become more remote. Further, the number of services per 100,000 Aboriginal and Torres Strait Islander population declines quite rapidly outside major regional centres (see Figure 2.1).

**Figure 2.1 Cardiac rehabilitation services per 100,000 Indigenous people by ARIA++**



### 3 ESTIMATING POPULATION DATA

*A key consideration in any assessment of illness in a community is establishing the base population against which hospital separation and mortality rates can be generated. This chapter considers the current quality of population data regarding Aboriginal and Torres Strait Islander Peoples and also describes the methods applied to develop population estimates for the current project.*

#### 3.1 Census data

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Over the past 15 years, the Australian Bureau of Statistics (ABS) has identified shortcomings in Census data on Aboriginal and Torres Strait Islander Peoples and has sought to improve both the extent to which Aboriginal and Torres Strait Islander Peoples are enumerated within the Census every five years, and the quality of estimates developed in the periods between Census collections and for longer term projects.

The ABS advises that, while identification and enumeration of Aboriginal and Torres Strait Islander Peoples in the Census continues to improve, it is estimated that in more remote communities as many as 10 percent of the population is not identified.

For the Cardiac GIS project, the 2001 Census was used as the starting point for estimating the Aboriginal and Torres Strait Islander population. Data provided by the ABS included the Census population of Indigenous people by ten-year age group and postal area (see Section 4.2 for a discussion on postal areas). The relatively small Aboriginal and Torres Strait Islander population results in individual data cells (ie age groups for a specific postal area) falling below three cases, so the ABS provides a randomised number between 0 and 3 for these cells.

The initial request for data from the ABS included a breakdown of the 2001 Census data by postal area, gender and five-year age group. Following an initial test and taking account of the advice from the ABS, the data provided did not include gender and utilised ten-year age groups, significantly reducing the number of randomised cells. An issue was the number of cases within the 2001 Census for which no response was provided regarding Indigenous status. It was assumed that failure to complete this item was randomly distributed and cases were therefore allocated proportionately (ie if 10 percent of the population in a cell was Indigenous, 10 percent of non respondents were allocated to the Indigenous population).

Use of the 2001 Census data was considered less than ideal:

- ❖ it is believed that this Census underestimated the Indigenous population by approximately 6.1%;<sup>9</sup> and
- ❖ changes in the population between August 2001 and June 2004 would have been ignored.

Using the 2001 Census data as a denominator for subsequent analyses would have been relatively straight forward, but would have provided an underestimate of the underlying population and therefore inflated the hospital separation and mortality rates developed. As a result, estimates of the 2004 Indigenous population were sought.

Establishment of the denominator population for subsequent calculations is discussed in Section 3.3.

### 3.2 Mortality data

Review of available literature regarding Indigenous mortality data suggests that, in the past, the quality of data has been relatively poor. For instance, Shahidulla and Dunstan<sup>10</sup> found that, nationally, only two of every five Indigenous deaths were recorded as such. There was also considerable variation between jurisdictions, with estimates for the ACT, Queensland, Tasmania and Victoria unable to be calculated due to the small number of deaths recorded, New South Wales estimated at 27.4% of cases and the Northern Territory, South Australia and Western Australia combined providing an estimate of 84.8% of cases.

More recently, the ABS has employed an alternative analysis (see Section 3.3) to develop an estimate of the Indigenous population and calculation of life expectancy tables.<sup>9</sup> This analysis found that between 1991 to 1996, and 1996 to 2001, there appeared to have been an improvement in the quality of Indigenous mortality data in NSW, Queensland and Tasmania, while the Northern Territory, Western Australia and South Australia remained relatively strong (see Table 3.1).

**Table 3.1: Implied coverage of Indigenous mortality data by jurisdiction 2000–2004**

| State/Territory              | Registered deaths (Number) | Expected deaths (Number) | Implied coverage % |
|------------------------------|----------------------------|--------------------------|--------------------|
| New South Wales              | 2,445                      | 5,371                    | 46                 |
| Victoria                     | 401                        | 1,144                    | 35                 |
| Queensland                   | 2,838                      | 5,312                    | 53                 |
| South Australia              | 644                        | 982                      | 66                 |
| Western Australia            | 1,861                      | 2,584                    | 72                 |
| Tasmania                     | 103                        | (a)                      | (a)                |
| Northern Territory           | 2,225                      | 2,365                    | 94                 |
| Australian Capital Territory | 27                         | (a)                      | (a)                |
| Australia(b)                 | 10,550                     | 18,495                   | 57                 |

Notes: (a) Not calculated due to small numbers;  
(b) includes other territories.

Source 11, p.62

Discussions with the ABS indicated that there has been considerable effort in all jurisdictions to improve the accuracy of mortality data related to Aboriginal and Torres Strait Islander Peoples, and that the data requested for 2003–04 should be a better (though still imperfect) reflection of mortality among Aboriginal and Torres Strait Islander Peoples. Analysis of mortality data for 2003–04 was undertaken as part of the current project, but the quality of the data and the relatively small number of cases limited the value of the results and it has been excluded from this report.

### 3.3 Estimation of the Aboriginal and Torres Strait Islander population

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Initial experimental estimates of the Indigenous population developed by the ABS<sup>10</sup> used a methodology that assumed that there was no migration into or out of the population. This methodology involved the calculation of fertility (assuming that where an Indigenous father and a non-Indigenous mother gave birth the child would be identified as Indigenous) and life expectancy tables using birth and mortality data for the period 1991–2001, and application of a methodology developed by Preston Hill.<sup>12</sup>

However, it has been noted<sup>9</sup> that Indigenous people are increasingly identifying as such, possibly representing migration, and highlighting a potential flaw in the Preston Hill method. As a result, the Bhat<sup>13</sup> method was applied and experimental estimates and projections of the Indigenous population were developed for the period 2001–2010. These estimates and projections were developed for the 36 ATSI regions, and presented high and low estimates, with the low estimate used for the current project.

The estimates developed were then used to calculate a population growth coefficient for each ATSI region. Appendix 5 presents the coefficient for each region used to adjust Census data to reflect the projected 2004 population. In order to allocate growth coefficients, postal areas were mapped against ATSI regions. The relevant growth coefficients were then applied to the 2001 Indigenous population by age group to provide an adjusted 2004 population.

### 3.4 Risks and caveats associated with population estimates

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The development of experimental estimates and projections of the Indigenous population rests on a series of assumptions and underlying estimates of the base population in the Census year. These assumptions contribute to adjustment of birth and mortality data, and estimates of behaviour related to propensity to identify as Indigenous. The ABS experimental projections of the Indigenous population were developed at the level of ATSI regions using data of differing quality across jurisdictions and sources. It is emphasised that the estimates become increasingly unstable as the base population diminishes.

While acknowledging this issue, an approach was required for the current analysis that allowed an estimate of the population in individual postal areas to allow subsequent regrouping of data, around either ARIA++ or proximity to cardiac rehabilitation service measures. It was evident from the experimental estimates<sup>9</sup> that population growth was not consistent across ATSI regions, precluding the application of a single coefficient nationally. As a result, postal areas were allocated to an ATSI region and the coefficient for the relevant region was applied. Where postal areas did not map exactly to ATSI boundaries, the postal area was allocated to the ATSI region into which its centroid fell. Care was taken to ensure that no group crossed jurisdictional boundaries and that subsequent groupings resulted in total populations at least equivalent to those within ATSI regions for which the population estimates were developed.

The results presented in the remainder of this report should be viewed with some caution as they are based on data of variable quality. Furthermore, no attempt should be made to draw comparison between jurisdictions as this involves use of data of differing quality and, accordingly estimates of differing quality.



## 4 ESTIMATING ELIGIBILITY FOR CARDIAC REHABILITATION

*This chapter describes the process of assessing the relative density of the Aboriginal and Torres Strait Islander population eligible for cardiac rehabilitation. Two options were available, namely:*

- ❖ *identifying the number of Aboriginal and Torres Strait Islander Peoples admitted to hospital in whom a cardiac illness related to either rheumatic or ischaemic heart disease was identified; and*
- ❖ *assuming that the prevalence of cardiac illness is relatively constant across the Indigenous population, and using the total Indigenous population as a proxy for the relative number of Aboriginal and Torres Strait Islander Peoples who may require cardiac rehabilitation.*

*The initial approach taken sought to utilise hospital separation data as a proxy for identifying those eligible for cardiac rehabilitation programs.*

### 4.1 Data sought from States and Territories

A list of International Classification of Diseases – Australian Modification (ICD-AM) codes associated with cardiac illness (both rheumatic and ischaemic) was developed (see Appendix 3). A request was forwarded to all jurisdictions seeking access to data relating to all hospital separations for 2003–04 where the patient was identified as Indigenous and where any of the diagnosis fields relating to the patient included at least one of the identified ICD10-AM codes. Cases where a patient was admitted for a non-cardiac-related condition (eg an orthopaedic procedure) but was known to also have a cardiac-related illness were included in the data.

The request also sought:

- ❖ patient postcode;
- ❖ gender;
- ❖ date of birth or age;
- ❖ hospital of admission; and
- ❖ a unique patient identifier.

It was noted that the capacity of different jurisdictions to effectively identify duplicate cases (ie where an individual had been admitted on more than one occasion in the period under study) varied. For instance, Western Australia had the capacity to match records across facilities. This allowed provision of data in the form of a table of postcodes by age groups, with cells representing the number of cases where patients were Indigenous and diagnosed with a cardiac condition.

Other jurisdictions, as far as possible sought to exclude duplicate cases. Where data were provided at the individual record level (eg in South Australia), further screening was undertaken to identify cases where the date of birth, gender and postcode were the same. These cases were assumed to be the same patient or duplicate records, and only the first record was retained for the analysis. Where data from one jurisdiction included cases for a postcode in another jurisdiction, these cases were added to the data for the relevant State/Territory. Table 4.1 provides a summary of the data received from each of the jurisdictions considered in the report.

**Table 4.1 Separations and age-adjusted separations reported by jurisdiction**

| Jurisdiction       | Estimated Indigenous population | Cases reported | Crude cases/1,000 | Age-adjusted cases/1,000 |
|--------------------|---------------------------------|----------------|-------------------|--------------------------|
| Northern Territory | 57,396                          | 486            | 8.5               | 17.54                    |
| Queensland         | 125,375                         | 2,962          | 23.7              | 57.66                    |
| South Australia    | 23,643                          | 783            | 33.1              | 77.81                    |
| Western Australia  | 65,535                          | 938            | 14.3              | 37.53                    |
| Total              | 271,949                         | 5,169          | 19.0              | 45.63                    |

When the separations data were reviewed in the context of previous work relating to cardiac illness among Aboriginal and Torres Strait Islander Peoples, the face validity of the data was questioned. This related to the pattern of results for the Northern Territory, South Australia and Western Australia, which suggested that there was comparatively lower cardiac-related hospital activity in the Northern Territory. This did not accord with mortality data published by the ABS and AIHW<sup>14</sup> (see Table 4.2) which suggested that there were higher death rates for circulatory diseases in the Northern Territory than South Australia and Western Australia.

**Table 4.2 Indigenous Crude Death Rates/100,000 – Circulatory Diseases, 1997–2002**

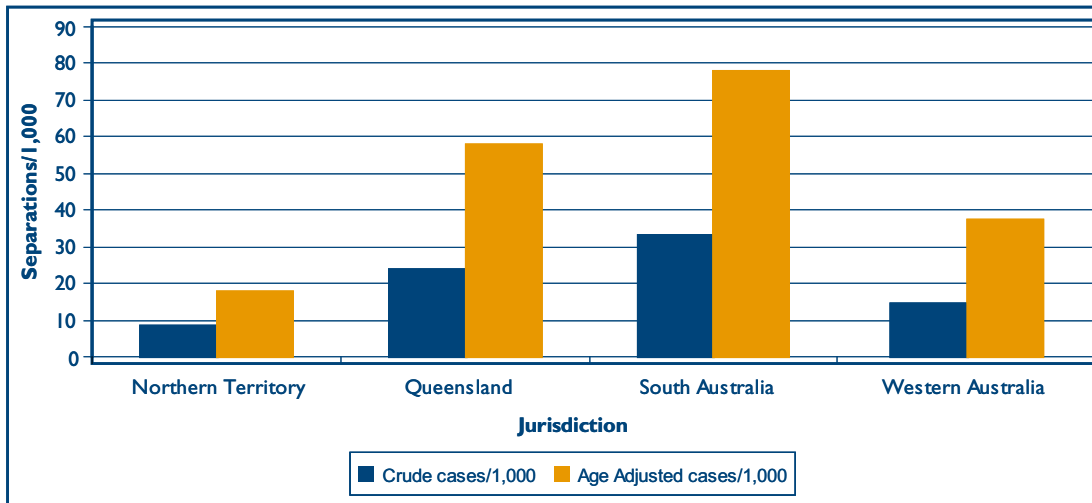
|                           | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---------------------------|------|------|------|------|------|------|
| <b>Western Australia</b>  |      |      |      |      |      |      |
| Males                     | 220  | 209  | 170  | 142  | 182  | 155  |
| Persons                   | 173  | 172  | 150  | 150  | 133  | 130  |
| <b>South Australia</b>    |      |      |      |      |      |      |
| Males                     | 195  | 184  | 164  | 145  | 111  | 86   |
| Persons                   | 152  | 153  | 146  | 131  | 121  | 115  |
| <b>Northern Territory</b> |      |      |      |      |      |      |
| Males                     | 274  | 274  | 237  | 247  | 228  | 228  |
| Persons                   | 249  | 229  | 199  | 208  | 181  | 206  |

Source: 14, Table 9.35

A range of factors may have contributed to the difference between the raw number of cases per 1,000 for each jurisdiction, including:

- ❖ different levels of accuracy in identifying Aboriginal and Torres Strait Islander patients;
- ❖ different criteria for the admission of individuals into hospitals;
- ❖ different levels of accuracy in identifying co-morbidities; and
- ❖ different levels of cardiac illness within populations in each jurisdiction.

As can be seen from Figure 4.1, the variation between jurisdictions is considerable. Adjusting for differences in the age distribution of the population within each jurisdiction further increased the apparent disparity between jurisdictions. This will not be discussed further as the project was not designed to test or explain the reasons for differences in the apparent level of cardiac-related illness between jurisdictions.



**Figure 4.1 Crude separation rate and age-adjusted separation rates (per 1,000 population) by jurisdiction (2003–04)**

The initial approach to analysis of data for the project included all States and Territories. However, concerns regarding the data resulted in analyses with a reduced data set. The Australian Institute of Health and Welfare (AIHW) was commissioned by the Australian Health Ministers' Conference to undertake a review and assessment of the quality of Indigenous identification in hospital separations data. As a result of the review, guidelines for the use of hospital separations data were established and included:<sup>15</sup>

- “5. When using Indigenous status information for analytical purposes, the data for only Queensland, Western Australia, South Australia and the Northern Territory should be used, individually or in aggregate.
6. Analyses based on data for Queensland, Western Australia, South Australia and the Northern Territory in aggregate should be accompanied by caveats about limitations imposed by jurisdictional differences in data quality and about the data not necessarily being representative of the jurisdictions excluded.
17. When deriving age-standardised Indigenous separation rates, age groups should be amalgamated where greater than an age determined by analysis of the data in question, as necessary, to ensure that all age groups have sufficient numbers for reliable results.”

Accordingly, the analysis (see below) of hospital separations was restricted to the Northern Territory, Queensland, South Australia and Western Australia, however the data for all jurisdictions was analysed and mapped to provide the spatial backgrounds for the accompanying CD-ROM.

## 4.2 Quality issues associated with data

The relatively poor quality of health data related to Indigenous people has been a key concern within the Australian health system over the past decade. In 2001, agreement was reached regarding amendment of the Indigenous data item within the National Health Data Dictionary. Further, establishment of the National Advisory Group on Aboriginal and Torres Strait Islander Health Information and Data (NAGATSIHID) provided a mechanism to support improved collection of data related to Indigenous people through the Australian health system.

Nevertheless, review of the data received, and discussions with key stakeholders suggested that there continues to be shortcomings in the recording of Indigenous status. A study by Jackson-Pulver<sup>16</sup> reported that only 34.5% of women attending an obstetric event in hospital (in NSW), who readily identified as Aboriginal or Torres Strait Islander, were identified as such in hospital records. Discussions with the author of that analysis suggested that similar results had been obtained in Victoria, but that data in the Northern Territory and Western Australia were considered to be more accurate. This provided further justification for excluding data from NSW, Victoria and Tasmania in the current analysis.

### Allocation of postcodes

No formal study of the extent to which the postcode of Indigenous patients is recorded accurately in hospital admission records was identified, except for patients with end stage renal disease. The location attributed to patients is crucial to the current project, as the patient postcode was the only practical means of distributing cases geographically. South Australian data suggested that approximately one quarter of all separations were drawn from the postcode related to one rural centre, and subsequent inquiries provided no clear explanation for this concentration of patients. However, it was suspected that patients may have provided the name of the regional centre rather than their place of residence either because they did not expect health professionals to be aware of the more remote communities, or because they were staying nearby at the time of their admission.

### Case identification

If it is assumed that the incidence of cardiac disease is relatively uniform within the Indigenous population across jurisdictions, it would be expected that the crude separation rate would be relatively similar. However, as can be seen from Table 4.1 (above) crude separation rates range between 10.6 cases per 1,000 and 33.1 cases per 1,000. This suggests a potentially significant variation between jurisdictions in relation to:

- ❖ the likelihood that Indigenous patients are recorded as such;
- ❖ practices related to the admission of cases for inpatient care; and
- ❖ capacity to identify cases where more than one admission occurred in the 2003–2004 period.

Where unit record data was provided, every effort was made to screen for duplicate cases (ie the same patient with more than one admission). However, where data were provided as a frequency table (Queensland and Western Australia) (ie postcode, by age group, by number of separations) it was not possible to check data.

### Use of ABS postal areas

ABS postal areas were used to align population data with hospital separation data, and provide a basis for incorporating data into a geographic analysis. These boundaries are a proxy for postcode, though the boundaries do not align perfectly with those of postcode areas and in some cases traverse State and Territory boundaries. However, an advantage of using postal areas is that they readily align with other ABS boundaries, which allows analysis against population data.

### Grouping separation data

Three approaches were taken to grouping separation data. The first relied on the average ARIA++ score for each postal area. Postal areas were ranked on the basis of their ARIA++ score and then grouped to provide an equal distribution of separations.

For example, if there were 600 cases in a jurisdiction, and five groupings were sought, once data were sorted by ARIA++, the number of separations was summed for each postal area, until the cumulative sum reached 120 cases. This defined the partition between the first and second group, with the procedure repeated until the required number of groups were achieved.

The decision regarding the number of groups was moderated by:

- ❖ the total population of the jurisdiction;
- ❖ the estimated Indigenous population of each grouping; and
- ❖ capacity for data to be effectively represented geographically.

Once data were grouped, an age-adjusted separation rate was calculated for each group, and it is this rate which is represented in maps related to morbidity by ARIA++.

The second basis for grouping was the proximity score for each postal area. The distance between the centroid<sup>1</sup> of each postal area and the nearest cardiac rehabilitation service was calculated and used as a proximity score. Although there was a significant correlation between ARIA++ score and proximity to a cardiac rehabilitation service (Pearson's  $r = 0.6$ ,  $df=2428$ ), there was some movement of postal areas between groups, particularly where a cardiac rehabilitation service was identified in a relatively remote location.

### Adjusting separation rates for the age distribution of the Indigenous population

Review of population estimates showed that the age distribution of the Indigenous population varied between regions and that the Indigenous population had a different age distribution to the Australian population as a whole. In order to ensure that the results of analysis provide some basis for comparison to the Australian population as a whole, it was necessary to adjust separation rates to take account of the age distribution of the Indigenous population in each group analysed.

Direct age adjustment of the data was identified as the most valid means of allowing comparison of results (at least within jurisdictions). This was achieved by:

- ❖ constructing a standard 1,000,000 population for Australia by taking the 2004 Australian population estimate, dividing 1,000,000 by the total population and then multiplying the population in each 10-year age group by the result (see Table 4.3);
- ❖ calculating the total population for each 10-year age group, in each of the groupings (ie ARIA++ or proximity to Cardiac Rehabilitation Services);
- ❖ calculating the total number of separations for each age group in each grouping;
- ❖ dividing the separations for each age group by the population for that age group to give a raw separation rate;
- ❖ multiplying the raw separation rate for each age group and group by the relevant standard Australian population for that age group, giving an expected number of separations;

- ❖ adding the expected separations for each age group within each grouping, to provide a total number of expected separations; and
- ❖ dividing the total expected separations for each grouping by 1,000 to provide an age-adjusted separation rate per 1,000 population.

**Table 4.3: Standard Australian per million population, 2004**

| Age group  | 0–9     | 10–19   | 20–29   | 30–39   | 40–49   | 50–59   | 60–69  | 70+    | Total     |
|------------|---------|---------|---------|---------|---------|---------|--------|--------|-----------|
| Population | 129,247 | 135,856 | 141,991 | 149,630 | 146,317 | 124,515 | 81,928 | 90,516 | 1,000,000 |

### 4.3 Distribution of hospital separations

Analysis showed variation in hospital separation data between jurisdictions. However, it was unclear to what extent this was a reflection of differences in the accuracy of Aboriginal and/or Torres Strait Islander identification in hospitals rather than differences in the incidence of cardiac-related illness. Accordingly, the results below are given by jurisdiction, and no attempt has been made to draw comparisons between States or Territories.

#### The Northern Territory

Three cardiac rehabilitation programs were identified in the Northern Territory. Table 4.4 provides a summary of hospital separation data for the Northern Territory, in terms of age-adjusted separation rates, raw cases and the total estimated Indigenous population for each ARIA++ grouping.

Population density in more remote areas is lower, and the data for the Northern Territory suggested that the age-adjusted rate of cardiac-related hospital separations for 2003–04 declined with remoteness. However, when the total number of reported cases is considered it became apparent that two-thirds of those who would have been eligible for cardiac rehabilitation in 2003–04 would have had to travel over 100 kilometres to access a specialist cardiac rehabilitation program. The remaining cases were within 10 kilometres of a cardiac rehabilitation service.

When only population is considered, it is evident from Table 4.4 that over 70% of the Indigenous population in the Northern Territory reside within the two ARIA++ groups where the average distance to a specialist cardiac rehabilitation service is over 145 kilometres.

**Table 4.4: Age-adjusted separation rates, raw cases, average kilometres to cardiac rehabilitation and Indigenous population for the Northern Territory by ARIA++ grouping**

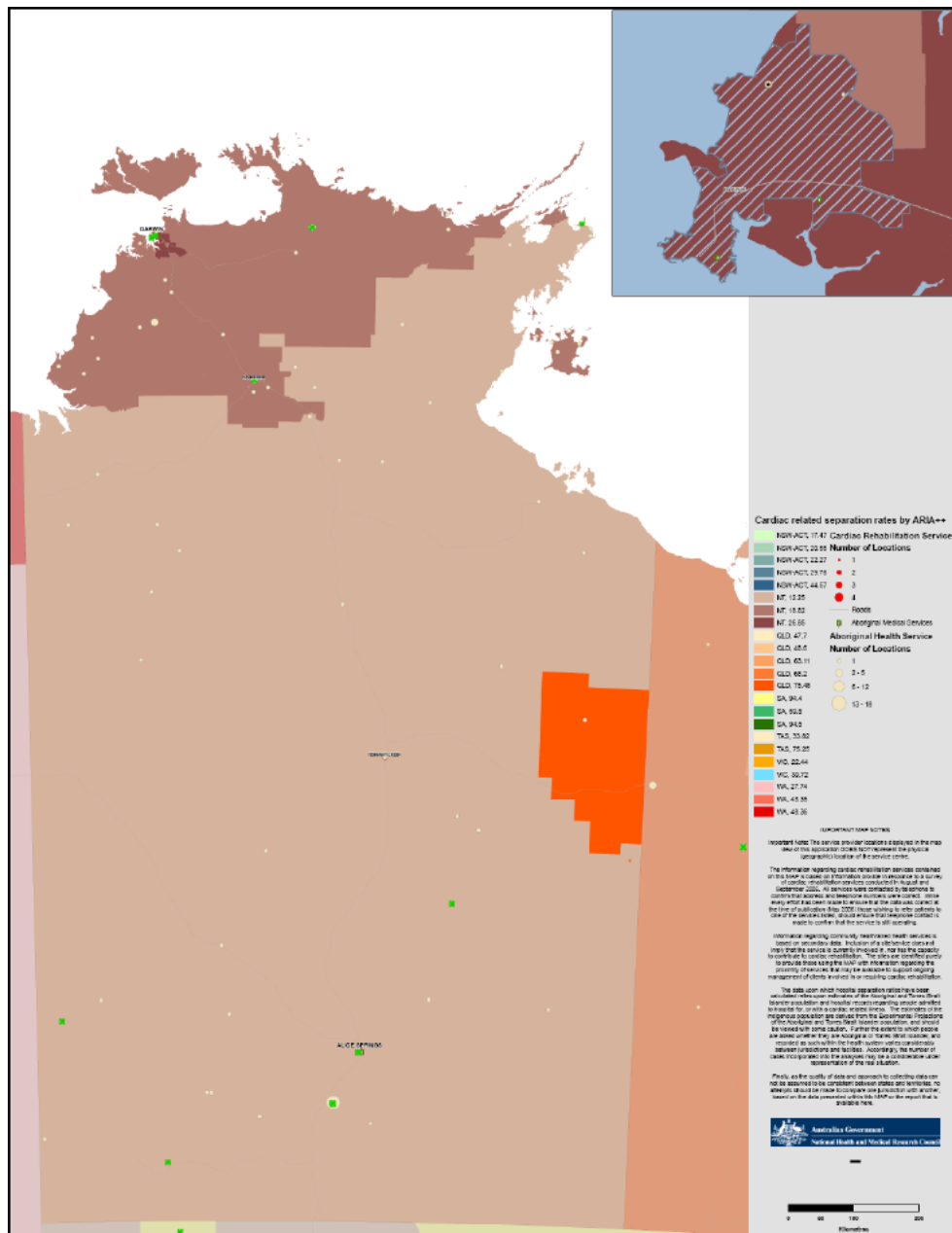
| Group | ARIA++ Range      | Age-adjusted separation rate/1000 by ARIA++ | Cases | Average km to cardiac rehabilitation | Total population |
|-------|-------------------|---|-------|--------------------------------------|------------------|
| 1     | 3.0 to 6.0169     | 26.9  | 167   | 4.9                                  | 14,888           |
| 2     | 6.4905 to 13.4421 | 18.8  | 163   | 145.4                                | 18,953           |
| 3     | 15.0 to 17.3403   | 12.3  | 156   | 183.3                                | 23,555           |

Table 4.5 highlights the relatively limited access to cardiac rehabilitation services for more remote populations. However, the distribution of community or primary health care services suggests that there is potential for building support systems for cardiac rehabilitation in more remote communities. This issue is discussed in more detail in Chapter 5.

**Table 4.5: Relative access to cardiac rehabilitation services and other health services by ARIA++ grouping for the Northern Territory**

| Group | ARIA++ Range      | Cases | Community/primary health care services | Cardiac rehabilitation services | Total population |
|-------|-------------------|-------|--|---------------------------------|------------------|
| 1     | 3.0 to 6.0169     | 167   | 9                                      | 1                               | 14,888           |
| 2     | 6.4905 to 13.4421 | 163   | 29                                     | 1                               | 18,953           |
| 3     | 15.0 to 17.3403   | 156   | 56                                     | 1                               | 23,555           |

Map 1 presents the distribution of cardiac-related separation rates by ARIA++ groupings, cardiac rehabilitation services and primary and community health services for the Northern Territory.



For detailed viewing of this map, please see the CD-ROM.

**Map 1: Separation rate (per 1,000) by postal areas grouped by ARIA++ for the Northern Territory**

## Queensland

Data for postal areas in Queensland were grouped by ARIA++ score so that groups contained approximately equal numbers of hospital separations.

As can be seen from Table 4.6, on average over 75% of the Aboriginal and Torres Strait Islander population in Queensland live within 60 kilometres of a cardiac rehabilitation service while the remaining two ARIA++ groups have an average journey of over 150 kilometres to the nearest cardiac rehabilitation service. Although the data suggest that the separation rates in this latter group are higher, it is unclear if this was related to better identification of Aboriginal and Torres Strait Islander patients in more remote areas or an increased likelihood of cardiac illness in those admitted to hospital.

**Table 4.6: Age-adjusted separation rates, raw cases, average kilometres to cardiac rehabilitation and Indigenous population for Queensland by ARIA++ grouping**

| Group | ARIA++ Range       | Age-adjusted separation rate/1000 grouped by ARIA++ | Cases | Average km to cardiac rehabilitation | Total Indigenous population |
|-------|--------------------|---|-------|--------------------------------------|-----------------------------|
| 1     | 0 to 0.5378        | 47.7  | 594   | 11.7                                 | 37,310                      |
| 2     | 0.5425 to 3.3134   | 48.6  | 604   | 25.1                                 | 32,176                      |
| 3     | 3.3146 to 10.0755  | 63.1  | 595   | 58.4                                 | 23,238                      |
| 4     | 10.1765 to 15.6259 | 68.2  | 623   | 154.5                                | 17,733                      |
| 5     | 15.9062 to 17.8768 | 75.5  | 546   | 373.9                                | 14,917                      |

As in the Northern Territory, cardiac rehabilitation services are concentrated in urban and regional settings, with a rapid decline in availability of these services in more remote communities. The distribution of primary or community health services in more remote communities highlights the opportunities for cardiac rehabilitation services to work closely with local health services to ensure continuing support for those who have experienced a cardiac illness.

**Table 4.7: Relative access to cardiac rehabilitation services and other health services by ARIA++ grouping for Queensland**

| Group | ARIA++ Range       | Cases | Community/primary health care Services | Cardiac rehabilitation services | Total Indigenous population |
|-------|--------------------|-------|--|---------------------------------|-----------------------------|
| 1     | 0 to 0.5378        | 594   | 40                                     | 22                              | 37,310                      |
| 2     | 0.5425 to 3.3134   | 604   | 46                                     | 15                              | 32,176                      |
| 3     | 3.3146 to 10.0755  | 595   | 110                                    | 21                              | 22,870                      |
| 4     | 10.1765 to 15.6259 | 623   | 70                                     | 8                               | 17,733                      |
| 5     | 15.9062 to 17.8768 | 546   | 46                                     | 1                               | 14,917                      |

The distribution of separations by ARIA++ groupings, cardiac rehabilitation services and primary and community health services for Queensland is presented in Map 2.



Australian Health Department failed to provide an explanation for the apparent over representation of these two postcodes. It was noted that South Australia had included a weighting for Aboriginal and Torres Strait Islander Peoples in casemix funding systems and that this may explain the higher than expected reporting of Indigenous separations, and the apparent concentration of cases in a limited number of postal areas.

In South Australia, over 50% of the Indigenous population live in postal areas with an average distance to the nearest cardiac rehabilitation service of 6.9 kilometres. Nevertheless, approximately one third of hospital separations in 2003–04 for Indigenous people, where cardiac illness was identified, related to the group of postal areas that had an average distance to the nearest cardiac rehabilitation service of over 100 kilometres. The distribution of these postal areas (see Map 3) shows that many of these postal areas are considerably further than 100 kilometres from the nearest cardiac rehabilitation service.

**Table 4.8: Age-adjusted separation rates, raw cases, average kilometres to cardiac rehabilitation and Indigenous population for South Australia by ARIA++ grouping**

| Group | ARIA++ Range      | Age-adjusted separation rate/1000 by ARIA++ | Cases | Average km to cardiac rehabilitation | Total Indigenous population |
|-------|-------------------|---|-------|--------------------------------------|-----------------------------|
| 1     | 0.0 to 0.4505     | 59.5  | 263   | 6.9                                  | 12,171                      |
| 2     | 0.4829 to 4.7803  | 94.5  | 266   | 33.1                                 | 6,201                       |
| 3     | 4.9174 to 17.3400 | 94.4  | 254   | 119.4                                | 5,271                       |

The distribution of cardiac rehabilitation services in South Australia includes four sites in areas where the ARIA++ score was greater than 15, which are in locations assessed as remote or very remote. Primary or community health services are more accessible in remote areas in South Australia providing a potential resource for cardiac rehabilitation and secondary prevention.

**Table 4.9 Relative access to cardiac rehabilitation services and other health services by ARIA++ grouping for South Australia**

| Group | ARIA++ Range      | Cases | Community/primary Health care Services | Cardiac rehabilitation services | Total population |
|-------|-------------------|-------|--|---------------------------------|------------------|
| 1     | 0.0 to 0.4505     | 263   | 14                                     | 13                              | 12,171           |
| 2     | 0.4829 to 4.7803  | 266   | 18                                     | 9                               | 6,201            |
| 3     | 4.9174 to 17.3400 | 254   | 39                                     | 4                               | 5,271            |



Secondly, Western Australia has some of the most remote communities in Australia. Initial analysis suggested that more than three groups resulted in a large proportion of more remote communities being included in individual groups and what appeared to be a decline in morbidity as groups became more remote. As a result, the data were divided into three groups (consistent with the basis for developing population estimates), with the number of identified cases evenly distributed between the three groups.

Approximately one-third of Aboriginal and Torres Strait Islander Peoples in Western Australia live in urban settings and over 40% live in postal areas with an ARIA++ score of 12 or higher (ie remote). It appears from the data that age-adjusted separation rates decline in more remote communities, though explaining this was beyond the scope of the project.

Cardiac rehabilitation services appeared more evenly distributed across the three ARIA++ groupings than in other States, with six sites identified within postal areas with an ARIA++ score above 14. Again, as can be seen from Table 4.11, the distribution of primary and community health services in more remote areas (shown as pale dots in Map 4) highlights the potential for cardiac rehabilitation services to expand their reach by supporting primary health care services.

**Table 4.10: Age-adjusted separation rates, raw cases, average kilometres to cardiac rehabilitation and Indigenous population for Western Australia by ARIA++ grouping**

| Group | ARIA++ Range     | Age-adjusted separation rate/1000 grouped by ARIA++ | Cases | Average km to cardiac rehabilitation | Total Indigenous population |
|-------|------------------|---|-------|--------------------------------------|-----------------------------|
| 1     | 0.0 to 1.754     | 43.4  | 316   | 33.5                                 | 24,939                      |
| 2     | 1.773 to 14.094  | 48.4  | 325   | 93.9                                 | 18,524                      |
| 3     | 14.181 to 18.000 | 27.7  | 297   | 322.7                                | 22,072                      |

**Table 4.11: Relative access to cardiac rehabilitation services and other health services by ARIA++ grouping for South Australia**

| Group | ARIA++ Range     | Cases | Community/ Primary Health care Services | Cardiac Rehabilitation Services | Total population |
|-------|------------------|-------|---|---------------------------------|------------------|
| 1     | 0.0 to 1.754     | 316   | 21                                      | 12                              | 24,939           |
| 2     | 1.773 to 14.094  | 325   | 92                                      | 9                               | 18,524           |
| 3     | 14.181 to 18.000 | 297   | 36                                      | 6                               | 22,072           |



## 4.4 Key findings

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### Data quality

The extent to which hospital separation data accurately identifies Aboriginal and Torres Strait Islander Peoples appears to vary considerably between jurisdictions. Further, when compared with mortality data published by the AIHW,<sup>14</sup> the apparent distribution of illness reflected in mortality data between key jurisdictions (ie the Northern Territory, South Australia and Western Australia) differs from hospital separation data. Determining the reasons for the apparent differences was beyond the scope of the project, though a number of potential explanations were identified, including:

- ❖ differences in the accuracy of recording patients who identify as Aboriginal and/or Torres Strait Islander;
- ❖ varied incentives associated with hospital funding systems; and
- ❖ differences in accepted clinical practice and thresholds for admission.

Despite the perceived poor quality of the data, patterns of hospital separations provide important insight into the distribution of illness geographically that can be compared to the current location and distribution of services.

### Access to cardiac rehabilitation services

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Cardiac rehabilitation services (see maps 1 to 4, and Figure 2.1) are concentrated in urban and major regional centres. However, 18.8% of the Aboriginal and Torres Strait Islander population potentially eligible for cardiac rehabilitation (ie those with hospital separations from cardiac illness) live in postal areas on average further than 100 kilometres from the nearest cardiac rehabilitation service.

### Cultural appropriateness

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In addition to geographic barriers to accessing cardiac rehabilitation services experienced by Aboriginal and Torres Strait Islander Peoples, the extent to which services provide a culturally appropriate service represents another barrier. Although the Guide was launched after the survey undertaken for the current project, the results of the survey suggested that there is limited development of specific resources and approaches to better meet the needs of Aboriginal and Torres Strait Islander Peoples.

## 5 DISTRIBUTION OF COMMUNITY AND PRIMARY HEALTH CARE SERVICES

*This chapter provides an analysis of the geographic distribution of services and considers the implications for future planning and development of cardiac rehabilitation services and services models to meet the needs of Aboriginal and Torres Strait Islander Peoples.*

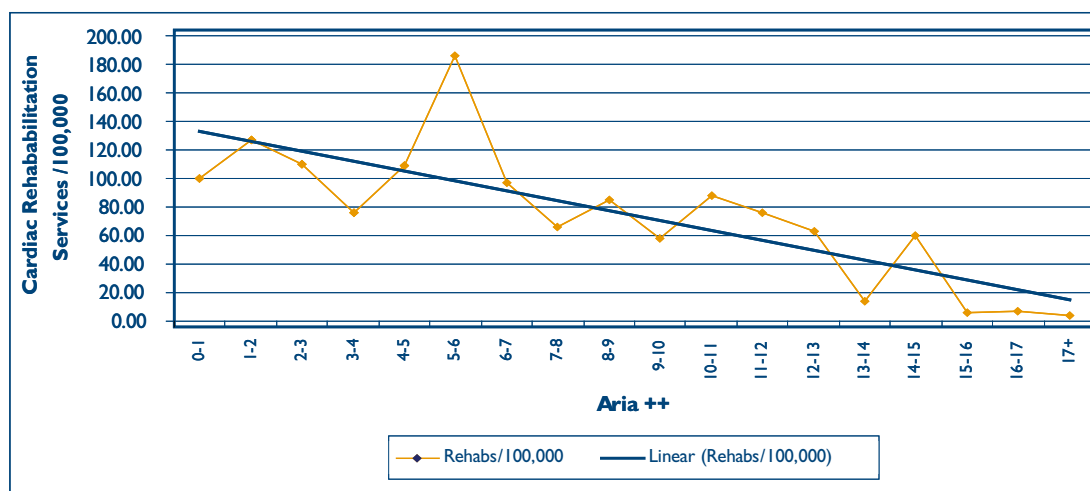
### 5.1 Identification of services

Community and primary health care services were identified using the Hospital and Health Service Buyers Guide published annually by APN Business Information Group and the website for each State and Territory health department. Sites in metropolitan areas were only selected if they were designated as community health services, while in rural and remote areas all sites were selected, as community and allied health services are likely to be provided through the local hospital or primary health clinic. As a result, 1,101 sites were included in the dataset.

### 5.2 Distribution of services

#### Distribution of cardiac rehabilitation services

The survey of cardiac rehabilitation services (see Chapter 2) indicated that over 65% of cardiac rehabilitation services were located within an acute hospital. Further, the relatively specialised role of these services requires access to a consistent flow of patients requiring the service. As a result, access to cardiac rehabilitation services declines as the location in which prospective patients live becomes more remote (see Figure 5.1). Further, 21% of the Aboriginal and Torres Strait Islander population live in postal areas that are more than 100 kilometres from the nearest cardiac rehabilitation service.



**Figure 5.1 Rehabilitation Services per 100,000 Indigenous people by ARIA++**

The National Heart Foundation's Recommended Framework for Cardiac Rehabilitation<sup>17</sup> emphasises that the long-term benefits from cardiac rehabilitation come from continuing behavioural change beyond the period of inpatient and outpatient treatment, and that establishing ongoing community-based approaches is essential. The Framework concludes that, despite the evidence to support cardiac rehabilitation, existing services remain underutilised.

Consultations undertaken in the development of the Guide noted that, among other issues, distance from treatment centres and relatively poor coordination between different phases in cardiac rehabilitation represented barriers to Aboriginal and Torres Strait Islander Peoples' access to, and utilisation of, cardiac rehabilitation and secondary prevention services.

### Distribution of primary and community health services

The address of community and primary health care services was used to allocate each to a postal area, and the corresponding ARIA++ value was then allocated to the service. The number of services for each ARIA++ score (i.e. 0 – >1, 1 – <2 etc) was established and is presented in Figure 5.2.

When this is compared to Figure 5.1, it can be seen that access to primary and community health care services in rural and remote communities is considerably greater than for cardiac rehabilitation services.

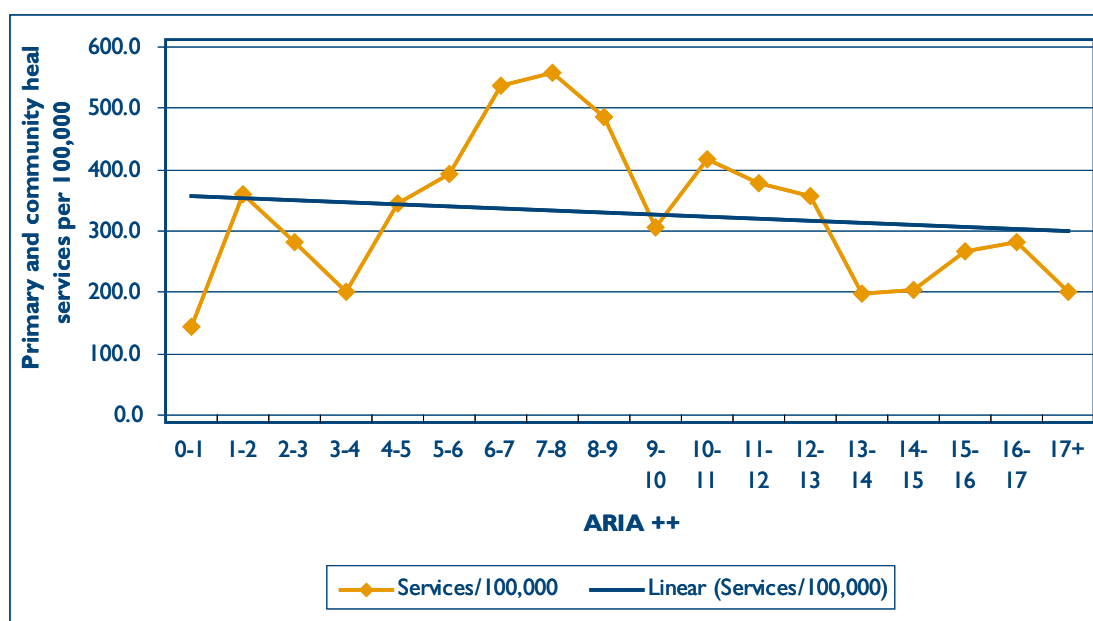


Figure 5.2 Distribution of primary and community health care services by ARIA ++

### Implications for access to cardiac rehabilitation and secondary prevention

For those experiencing an acute cardiac event, admission to an acute hospital presents the opportunity to access specialist cardiac rehabilitation programs. However, the distribution of these services, primarily in urban centres or larger regional centres, limits access to ongoing support and follow-up for those from rural and remote communities.

A national workshop was convened in Townsville in 1999 to consider the recommendations of the National Health Priority Areas report *Cardiovascular Health 1998*.<sup>18</sup> One of the key priorities for action identified through the workshop was the need for programs for culturally appropriate and adequately resourced secondary prevention and rehabilitation of ischaemic heart disease for Aboriginal and Torres Strait Islander Peoples in rural and remote areas.

Accordingly, the greater access to primary and community health care services in rural and remote communities, and the role of ACCHS, highlights the need for these services to be key players in providing ongoing rehabilitation and for specialist cardiac rehabilitation services to support these services. However, consultation undertaken in

the development of the Guide emphasised that even where physical access to outpatient cardiac rehabilitation services is available, the structure and approach to providing services often presents a barrier to Aboriginal and Torres Strait Islander Peoples.

### 5.3 Potential role of primary health and community health service providers

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A significant body of work has already been undertaken, and continues to progress, to identify more accessible, appropriate and effective ways to respond to the burden of cardiac-related illness in the Aboriginal and Torres Strait Islander population, and in rural and remote communities. The Guide is a concise summary of current knowledge about approaches to improve access to, and utilisation of, cardiac rehabilitation and secondary prevention services by Aboriginal and Torres Strait Islander Peoples.

The presence of trained Aboriginal Health Workers in many communities and their capacity (with appropriate training) to more effectively provide information to Aboriginal and Torres Strait Islander Peoples represents one avenue for improving utilisation of cardiac rehabilitation and uptake of secondary prevention strategies. However, it should be emphasised that in order for strategies to be effective there needs to be:

- ❖ a range of allied health professionals, with the capacity to support improved cardiac rehabilitation and secondary prevention, actively involved in developing programs with communities;
- ❖ the establishment and maintenance of links between primary health care services, health professionals working in cardiac care in hospitals and people who have experienced a cardiac event or procedure;
- ❖ community support; and
- ❖ access to outreach specialists.

In August 2003 a workshop convened by Services for Australian Rural and Remote Allied Health (SARRAH) and the Centre of National Research on Disability and Rehabilitation Medicine (CONROD) sought to develop agreed principles and guidelines for the implementation of community-based rehabilitation in rural, remote and Indigenous communities in Australia.<sup>19</sup> Central to the principles resulting from this workshop was the engagement with and the transfer of knowledge and skills to communities and consumers. Primary and community health care services are in an ideal position to support this expanded approach to rehabilitation, particularly cardiac rehabilitation.

### 5.4 Role of cardiac rehabilitation services as a support to primary and community health care

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In order to support ongoing recovery and rehabilitation, the range of local primary and community health care providers, carers and family members need to work with individual patients to ensure that the responses that are developed:

- ❖ are realistic and take account of the environment in which the patient lives;
- ❖ involve family and other community members consistent with individual patient wishes;
- ❖ relate to goals set by the client with celebration of small steps toward these goals; and
- ❖ encourage patients to talk and health professionals to listen.

Most cardiac rehabilitation services are not located to allow provision of this level of care when patients return to their communities. As a result, the role of specialist cardiac rehabilitation services becomes:

- ❖ a source of evidence-based advice to primary and community health service providers;
- ❖ the focal point for arranging appropriate discharge planning to ensure that the range of local health professionals required to support ongoing rehabilitation and recovery are engaged prior to discharge;
- ❖ a location for providing advice and assistance to primary health care providers to integrate cardiac rehabilitation and secondary recovery into patient's continuing management and prevention program; and
- ❖ a source of motivation and practical skills to patients to become experts in their own health.

## 6 STRENGTHENING CARDIAC REHABILITATION AND SECONDARY PREVENTION FOR ABORIGINAL AND TORRES STRAIT ISLANDER PEOPLES

*The current project was designed to complement the work undertaken in development of the Guide. This chapter considers the findings from the current analysis in the context of the directions proposed in the Guide.*

### 6.1 Key points for success

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“The projected reductions in coronary events achievable through secondary prevention and by focusing on risk factors of elevated cholesterol, physical inactivity, cigarette smoking and hypertension ranges from 31% to 47% depending on the degree of disease or risk factors.”<sup>20</sup> However, participation by Aboriginal and Torres Strait Islander Peoples in cardiac rehabilitation and secondary prevention is relatively low. The Guide identifies a range of barriers to Aboriginal and Torres Strait Islander Peoples accessing cardiac rehabilitation and secondary prevention services and identifies a series of factors that will contribute to more effective engagement with Indigenous patients and progression towards self-management and rehabilitation. As the current project was designed to support the work undertaken in developing the Guide, the key findings within the Guide are considered below.

#### Barriers to access

Barriers to accessing cardiac rehabilitation services are not just related to physical distance, and the availability of reliable transport. A range of factors was also identified as limiting Aboriginal and Torres Strait Islander Peoples’ capacity and willingness to engage with services. These factors included:

- ❖ **“Not enough black faces”** — key barriers to involvement of Aboriginal and Torres Strait Islander Peoples in the planning, delivery and evaluation of health care include a lack of training related to heart health for Aboriginal Health Workers, lack of Aboriginal and Torres Strait Islander Peoples employed within the health system, lack of support and professional recognition in communities and from other health professionals for Aboriginal Health Workers, and insufficient culturally appropriate resources;
- ❖ **Communication and understanding** — cultural factors often not understood and therefore not taken into account in mainstream services include the diversity of Aboriginal and Torres Strait Islander Peoples and culture, the complexity of Aboriginal Lore and the importance of family and community involvement, and a holistic view of health that includes the body, the spiritual, the land and dreaming;
- ❖ **Continuity of care** — there is a need for better coordination between mainstream services and Aboriginal and Torres Strait Islander services, particularly between specialist cardiac rehabilitation services and those services providing ongoing primary health care in the community;
- ❖ **Taking the message home** — strategies for secondary prevention need to be manageable in the social context within which patients reside and considered in terms of other basic priorities such as access to food, housing and responding to social pressure; and
- ❖ **Self determination and control** — programs are unlikely to succeed if there is limited involvement of communities and community leaders in the development of programs.

As noted previously (see sections 2.4 and 4.4.3), there appears to be limited attention within existing cardiac rehabilitation services to meeting the needs of Indigenous people. As the survey reflects the environment before the launch of the Guide, broad uptake of the suggested strategies contained within the document may increase Aboriginal and Torres Strait Islander patients' willingness to access cardiac rehabilitation services.

### **Factors contributing to successful cardiac rehabilitation and secondary prevention**

The Guide identified the following key components of cardiac rehabilitation and secondary prevention services that are likely to enjoy success among Aboriginal and Torres Strait Islander communities.

- ❖ Wherever possible, an Aboriginal Health Worker should be a key member of the cardiac rehabilitation team and be supported to deliver cardiac rehabilitation in a range of settings.<sup>17</sup>
- ❖ Patients should be seen in culturally safe environments.
- ❖ Health professionals should seek to learn from patients, their families and communities about what works, the needs and stresses of patients.
- ❖ Partnership across organisations providing health services provides consumers with access to a wider range of services.
- ❖ Wherever possible, non-Indigenous health professionals should work with an Aboriginal Health Worker or an Aboriginal and Torres Strait Islander cultural mentor to raise their awareness of cultural matters.
- ❖ Broader approaches that acknowledge the shared risk factors for a range of chronic diseases (eg diabetes and kidney disease) should be developed.

It is acknowledged that the Guide was launched after the survey of cardiac rehabilitation services undertaken for the current project. However, it is also evident from responses to the section of the survey that considered the key requirements for a culturally safe cardiac rehabilitation service that considerable opportunity exists to improve the accessibility of cardiac rehabilitation and secondary prevention services for Aboriginal and Torres Strait Islander Peoples (see Table 2.4).

## **6.2 Implications of the findings for rural and remote communities**

As outlined in Chapters 2, 4 and 5, the distribution of existing cardiac rehabilitation services is concentrated in urban and regional centres with a limited number of sites in rural and more remote communities. There is little information available to assess whether the number of cardiac rehabilitation services is adequate even in urban areas. The current distribution sees approximately 21% of the Aboriginal and Torres Strait Islander Peoples (and 18.8% of those with a hospital separation that includes cardiac illness) living in postal areas on average further than 100 kilometres from the nearest cardiac rehabilitation service.

In terms of the quality and appropriateness of current cardiac rehabilitation services, the Guide recommends that links be developed between primary health care providers (including Aboriginal Health Workers), allied health professionals, patients, their families and communities, and that these would provide an avenue for:

- ❖ extending the reach of specialist cardiac rehabilitation services;
- ❖ increasing the capacity of local primary and community health services to support cardiac rehabilitation and secondary prevention;
- ❖ engaging communities and gaining support for ongoing changes to reduce the risk factors which contribute to cardiac illness; and
- ❖ increasing the involvement and capacity of ACCHS in cardiac rehabilitation and secondary prevention.

### **6.3 Enhancing the role of Aboriginal Health Workers**

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As noted previously (see sections 6.2 and 6.3), Aboriginal Health Workers are ideally key members of the cardiac rehabilitation team. However, in order to take on this role it is crucial that Aboriginal Health Workers receive the training and professional support necessary to allow them to effectively participate in cardiac rehabilitation, and that the organisations they work within allocate the time and resources necessary for this role to develop.

The development of the Aboriginal Vascular Health Program (AVHP) in New South Wales provides one example of a comprehensive approach to enhancing the role of Aboriginal Health Workers and ACCHS. The program commenced in 2000 in 12 locations and has since expanded to include 31 projects. The program involves:

- ❖ development of local infrastructure (ie procedures, processes and planning);
- ❖ flexible development of local approaches;
- ❖ state-wide infrastructure (eg the Aboriginal Vascular Health Network and Bulletin);
- ❖ training and support for Aboriginal Health Workers;
- ❖ education and training resources specifically developed for Aboriginal people; and
- ❖ support for evaluation.

The evaluation of the AVHP<sup>21</sup> noted that, while partnerships and networks had begun to develop, this was a longer term process and that ongoing support would be required. Development of curricula and support for the training of Aboriginal Health Workers to participate in cardiac rehabilitation should be viewed as only one component of a strategy to enhance the role of Aboriginal Health Workers in cardiac rehabilitation, with engagement at the organisational and community levels essential, and State and Territory health departments fulfilling a central role in providing support and incentives to improve linkages at the health system level.

The NHF has actively sought to promote the provision of high quality training to Aboriginal Health Workers to support a more active role in the provision of cardiac rehabilitation and secondary prevention. One component of this work has been the development of a curriculum for Aboriginal Health Workers that involves 60 hours of training along with a framework for ongoing support of the Aboriginal Health Worker role that includes:

- ❖ relationship building;
- ❖ two week (60 hour) training program;
- ❖ mentoring and continuing education over the following 12 months; and
- ❖ assistance to Aboriginal Health Workers and the organisations in which they work to access funding and implement a heart health program.

#### 6.4 Programs that may support increased role of primary healthcare sector

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The national workshop convened in Townsville in 1999 established a series of proposals for action which addressed areas including:

- ❖ development of flexible service delivery models;
- ❖ supporting infrastructure to facilitate linkages between health service organisations and professional groups;
- ❖ expansion, training and support for the Aboriginal and Torres Strait Islander health workforce;
- ❖ development of alternative funding models; and
- ❖ evaluation and feedback from the community level upwards.

In addition to the Aboriginal Vascular Health Program operating in New South Wales, a range of national programs as well as those operating in individual States and Territories provide potential avenues through which support may be accessed to enhance cardiac rehabilitation and secondary prevention. Relevant national projects include:

- ❖ The National Primary Care Collaborative (NPCC), which was established in 2003–04 and has engaged 22 Divisions of General Practice in ongoing improvement of the management of chronic disease, reducing risk factors and improving health. A number of ACCHS participate in the program which provides access to resources to support the ongoing development of responses to diabetes, cardiovascular disease and service access, annual meetings to support shared learning and a broader network of participating services with whom to learn and develop solutions.
- ❖ The Healthy for Life Program announced in the 2005–06 Federal Budget provided \$102.4 million over four years to improve child and maternal health and chronic disease prevention and management for Aboriginal and Torres Strait Islander Peoples. The Program is being implemented in four rounds, with approximately 20 additional sites to be funded in each round. Current directions for Healthy for Life have seen the initial focus for chronic disease management and prevention focussed on diabetes and cardiovascular illness.
- ❖ The Enhanced Primary Care Medicare items introduced from 1 July 2005 support multidisciplinary care planning and case management and provide rebates to allied health professionals (including Aboriginal Health Workers). The items present a potential avenue to support the costs of maintaining secondary prevention and cardiac rehabilitation programs that involve: comprehensive health assessment through GP Management Plans (GPMP); development of multidisciplinary care plans (Team Care Arrangements); and six monthly review of GPMPs. Effective utilisation of this funding source, particularly by ACCHS, provides the potential for organisational support for a greater role by Aboriginal Health Workers in secondary prevention and supporting the maintenance phase of cardiac

rehabilitation.

Each State and Territory has also committed to the development of a variety of approaches to improving chronic disease management and prevention for Aboriginal and Torres Strait Islander Peoples. Although the potential access to additional funding through these programs varies considerably, the opportunity is there to access support for the development of collaborative partnerships and improve coordination between mainstream and Indigenous services.

## **6.5 Potential application of the CD-ROM to support improved practice**

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The CD-ROM developed as a component of the current project includes:

- ❖ a searchable database of cardiac rehabilitation services;
- ❖ the capacity to search for cardiac rehabilitation services through text and using a geographic interface;
- ❖ an excel spreadsheet containing a list of primary and community health services identified for the current project;
- ❖ maps showing Aboriginal and Torres Strait Islander language group distribution, distribution of the estimated Indigenous population, hospital separation rates and mortality rates; and
- ❖ the Guide.

The CD-ROM has been designed to provide a resource to primary health care providers and cardiac rehabilitation services. The information contained may also be of value to those involved in the planning and development of cardiac rehabilitation service systems as it provides a means of considering the spatial distribution of services (cardiac rehabilitation and primary/community health) in the context of population distribution.

Coupled with the Guide, the CD-ROM provides a tool to support ongoing development of cardiac rehabilitation and secondary prevention systems for Aboriginal and Torres Strait Islander Peoples.



## 7 CONCLUSIONS

*This chapter provides a brief summary of the conclusions drawn through the project.*

### 7.1 Data quality

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The quality of data related to Aboriginal and Torres Strait Islander Peoples continues to present a barrier to comprehensive analysis of the health of the population. This project has been restricted to findings relating to the Northern Territory, Queensland, South Australia and Western Australia, with the validity still the subject of some question.

### 7.2 Application of geographic information systems

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The use of a GIS to support the analyses undertaken for the current project highlights the potential value of using this technology to support a better understanding of the relationship between services, populations and health.

Although the information presented in the GIS application has inherent shortcomings in terms of data currency (data were accurate as at September 2005), it has provided a means of demonstrating the capacity of this technology and testing the extent to which information presented in this form is useful and relevant to the work of primary care clinicians, cardiac rehabilitation services and those involved in the planning and development of health services, and the potential for similar, Internet-based tools to be developed.

### 7.3 Distribution of cardiac rehabilitation services

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Cardiac rehabilitation services are relatively specialised, so they tend to be located within larger population centres. As a result, approximately 21% of the Aboriginal and Torres Strait Islander Peoples live in postal areas that are on average further than 100 kilometres from the nearest cardiac rehabilitation service. This project did not assess whether cardiac rehabilitation services, even in urban areas, are suitable for Aboriginal and Torres Strait Islander Peoples.

As can be seen from the maps presented in Chapter 4 and the analysis provided in Chapter 5, primary and community health services are more broadly distributed, with considerably less distance to travel from remote communities to a primary care service than to a cardiac rehabilitation service. Accordingly, development of close links and partnerships between specialist cardiac rehabilitation services and primary and community health services presents a sustainable direction for expanding access to effective rehabilitation. One such option is represented by community-based rehabilitation.<sup>19</sup> However, efforts by specialist cardiac rehabilitation services to establish effective links with primary care providers and local communities for their Aboriginal and Torres Strait Islander patients should not be restricted to a specific model.

The introduction of EPC items within the MBS provides an opportunity for ACCHS and some primary health care providers to supplement funding that supports a broader approach to secondary prevention and cardiac rehabilitation. The implementation of the Healthy for Life Program offers further opportunities for primary health services with a focus on meeting the needs of Aboriginal and Torres Strait Islander Peoples to support development of systematic secondary prevention programs linked to formal cardiac rehabilitation services.

The quality and appropriateness of existing cardiac rehabilitation services for Aboriginal and Torres Strait Islander Peoples was not assessed in the project, but the Guide, launched after the survey component of this project, provides directions for the future.

#### **7.4 Future development of services**

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The current project has provided data that supports the information gained during consultations for the Guide. Further, information on the distribution of services emphasises the role of primary and community health services in expanding access to cardiac rehabilitation and supporting patients in their communities.

Programs nationally and at the State and Territory level that seek to enhance the prevention and management of chronic diseases, including cardiovascular disease, present an opportunity and resources to implement the directions proposed within the Guide. Responses at the community level, while involving Aboriginal Health Workers, must also be supported by partnerships at organisational and regional levels as well as appropriate educational resources, and include engagement with communities. Programs such as Healthy for Life potentially represent a pool of resources to support ACCHS and other organisations to enhance cardiac rehabilitation and secondary prevention services.

Further, the development of a comprehensive heart health curriculum for Aboriginal Health Workers by the NHF presents a framework within which to develop the skills base within the Aboriginal Health Worker workforce to effectively support a community-based rehabilitation approach.

## ACRONYMS AND ABBREVIATIONS

|            |   |
|------------|---|
| ABS        | Australian Bureau of Statistics   |
| ACCHS      | Aboriginal Community Controlled Health Services   |
| AIHW       | Australian Institute of Health and Welfare  |
| AHW        | Aboriginal Health Worker  |
| ARIA       | Accessibility and Remoteness Index of Australia   |
| AVHP       | Aboriginal Vascular Health Program  |
| CONROD     | Centre of National Research on Disability and Rehabilitation Medicine                         |
| DoHA       | Department of Health and Ageing (Australian Government)                                       |
| EPC        | Enhanced Primary Care   |
| GIS        | Geographic Information System   |
| GPMP       | General Practitioner Management Plan  |
| HMA        | Healthcare Management Advisors  |
| ICD10-AM   | International Classification of Diseases Australian Modification                              |
| NAGATSIHID | National Advisory Group on Aboriginal and Torres Strait Islander Health Information and Data  |
| NHMRC      | National Health and Medical Research Council  |
| NHF        | National Heart Foundation of Australia  |
| NPCC       | National Primary Care Collaborative   |
| MBS        | Medicare Benefits Schedule  |
| OATSIH     | Office of Aboriginal and Torres Strait Islander Health of the Department of Health and Ageing |
| SARRAH     | Services for Australian Rural and Remote Allied Health  |



## REFERENCES

- 1 Scott IA et al (2003) Utilisation of outpatient cardiac rehabilitation in Queensland. *MJA* 179: 341–45.
- 2 Cunningham J (2002) Diagnostic and therapeutic procedures among Australian hospital patients identified as indigenous. *MJA* 176: 58–62.
- 3 Shepherd F et al (2003) Improving access to cardiac rehabilitation for remote Indigenous clients. *Aust NZ J Public Health* 27:632–36.
- 4 ABS (2003) *Causes of Death 2002*. ABS Cat No 3303.0. Australian Bureau of Statistics, Canberra.
- 5 AIHW (2004) *Heart, Stroke and Vascular Diseases: Australian Facts 2004*. AIHW Cat No CVD 27. Australian Institute of Health and Welfare, Canberra.
- 6 ABS (2001) *National Health Survey: Aboriginal and Torres Strait Islander Results, Australia 2001*. ABS Cat No 4715.0. Australian Bureau of Statistics, Canberra.
- 7 ABS & AIHW (2003) *The Health and Welfare of Australia's Aboriginal and Torres Strait Islander Peoples*. ABS Cat No 4704.0; AIHW Cat No IHW11. Commonwealth of Australia.
- 8 NHMRC (2005) *Strengthening Cardiac Rehabilitation and Secondary Prevention for Aboriginal and Torres Strait Islander Peoples: A Guide for Health Professionals*. National Health and Medical Research Council, Canberra.
- 9 ABS (2004) *Experimental Estimates and Projections, Aboriginal and Torres Strait Islander Australians*. ABS Cat. No. 3238.0. Australian Bureau of Statistics, Canberra.
- 10 Shahidullah M & Dunstan K (2003) *Demography Working Paper 2000/2 Draft Experimental Aboriginal and Torres Strait Islander Abridged Life Tables, Australia and States/Territories, 1995–97*. Australian Bureau of Statistics, Canberra
- 11 ABS (2005) *Deaths*. ABS Cat. No. 3302.0. Australian Bureau of Statistics, Canberra.
- 12 Preston S & Hill K (1980) Estimating the completeness of death registration. *Population Studies* 34: 349–66.
- 13 Bhat PNM (2002) General growth balance method: a reformulation for populations open to migration. *Population Studies* 56: 23–34.
- 14 Trewin D & Madden R (2005) *The Health and Welfare of Australia's Aboriginal and Torres Strait Islander Peoples 2005*. AIHW Cat No IHW14. Australian Institute of Health and Welfare, Canberra.
- 15 AIHW (2005). *Improving the Quality of Indigenous identification in Hospital Separations Data*. AIHW Cat No HSE 101. Health Services Series No 25. Australian Institute of Health and Welfare, Canberra.
- 16 Jackson Pulver L et al (2003) Identification of Aboriginal and Torres Strait Islander women using an urban obstetric hospital. *Australian Health Review* 26(2): 19–25.
- 17 National Heart Foundation of Australia and Australian Cardiac Rehabilitation Association (2004) *Recommended Framework for Cardiac Rehabilitation*, National Heart Foundation of Australia.

- 18    Commonwealth Department of Health and Aged Care & AIHW (1999) *National Health Priority Areas Report: Cardiovascular Health 1998*. AIHW Cat No PHE 9. Australian Institute of Health and Welfare, Canberra.
- 19    Kuipers P (2003) *Principles and Guidelines for the Implementation of Community Based Rehabilitation (CBR) in Rural, Remote and Indigenous Communities in Australia*. Unpublished manuscript provided by the National Heart Foundation of Australia.
- 20    Field P & Ring I (2001) *Issues and Options Paper for Alternate Models of Second Prevention of Chronic Disease in Aboriginal Peoples and Torres Strait Islanders*. Unpublished manuscript provided through the National Heart Foundation of Australia.
- 21    Hackett J & Cotton R (2004) *Evaluation of the NSW Aboriginal Vascular Health Program: Building Blocks for Sustainable Change*. NSW Health, Sydney.

## APPENDICES

### APPENDIX I

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#### MEMBERSHIP AND TERMS OF REFERENCE

##### Membership, Cardiac Rehabilitation Working Committee

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**Dr Mark Wenitong** — Co-Chair (Kabi Kabi; Senior Medical Officer, WuChopperen Health Service; Vice-President Australian Indigenous Doctors' Association; Senior Lecturer James Cook University, Faculty of Medicine, Health and Molecular Sciences; member of HAC)

**Mr Mick Adams** (Yadhiagana with association with Wardaman and Torres Straits, as well as extensions with Warlpiri (Yuendumu), Gurrumaru (East Arnhem Land); National Aboriginal Community Controlled Health Organisation)

**Dr Rosemary Aldrich** (Public Health Physician and member of HAC)

**Mr Gary Christian** (Erub, Darnley Island and associations with Mowgoo Village; Consumer representative)

**Dr Peter Joseph** (Royal Australian College of General Practitioners (RACGP); Provost of the Rural Faculty of the RACGP; member of HAC)

**Mr Traven Lea** (National Program Manager, Aboriginal & Torres Strait Islander Program, National Heart Foundation of Australia – Brisbane)

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**Dr Warren Walsh** (Cardiac Society of Australia and New Zealand (CSANZ); Chair Indigenous Health Working Group of CSANZ)

**Professor Elizabeth Waters** (Chair in Public Health, Deakin University, and member of HAC)

##### Observers

**Associate Professor Peter Sainsbury** (Sydney South West Area Health Service; member of NHMRC)

**Ms Shona McQueen** (Office for Aboriginal and Torres Strait Islander Health, Australian Government Department of Health and Ageing)

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Expert advice was also provided to the working committee by Dr Sophie Couzos (CEO, NACCHO) and Professor Kerin O'Dea (Director, Menzies School of Health Research).

### NHMRC Secretariat

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Ms Elizabeth Hall      Ampersand Editorial & Design

Ms Jenny Zangger      Ampersand Editorial & Design

### Terms of reference

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1. Develop information that provides health services including hospitals, primary health care workers and Indigenous Health Workers with strategies to improve uptake and access to cardiac rehabilitation services, and the prevention of further cardiac events for Aboriginal and Torres Strait Islander Peoples, by:
  - ❖ Undertaking a systematic review of available literature concerning the structure, delivery, and barriers to uptake of cardiac rehabilitation services to Aboriginal and Torres Strait Islander Peoples in Australia, and Indigenous populations internationally.
  - ❖ Mapping cardiac rehabilitation programs, including Aboriginal and Torres Strait Islander Peoples' specific services, with service utilisation by Aboriginal and Torres Strait Islander Peoples and population demographics. This will include conducting an audit of cardiac rehabilitation health service delivery and access, looking at epidemiological data, and the modelling of service utilisation.
  - ❖ Consulting widely with community groups and other stakeholders about the barriers to access and uptake of cardiac rehabilitation services by Aboriginal and Torres Strait Islander Peoples.
2. Develop a comprehensive consultation strategy.
3. Develop an implementation and dissemination strategy.
4. Present the document to HAC and Council for issuing.

## APPENDIX 2

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### PROCESS REPORT

In 2005 the National Health and Medical Research Council (NHMRC) convened an expert working committee to investigate barriers to effective practice and develop guidance for health professionals working in the area of cardiac rehabilitation among Aboriginal and Torres Strait Islander Peoples. The Committee conducted three workshops, which were hosted by Aboriginal Community Controlled Health Services in Darwin, Townsville and Mt Druitt (Sydney). This information contributed to the development of a practical guide for health professionals — *Strengthening Cardiac Rehabilitation and Secondary Prevention for Aboriginal and Torres Strait Islander Peoples: A Guide for Health Professionals*.

To further assist primary care health professionals and cardiac rehabilitation services, the Committee commissioned the Cardiac Geographic Information System (GIS) project. This project aimed to develop an interactive CD-ROM-based GIS report and maps that integrate the location of cardiac rehabilitation services in Australia with eligible Aboriginal and Torres Strait Islander Peoples who have had an adverse cardiac event.

The project was overseen by a sub-committee of the Cardiac Rehabilitation Working Committee, comprising Dr Noel Hayman, Dr Mark Wenitong, Professor Elizabeth Waters, Dr Peter Joseph and Mr Traven Lea.

The project was undertaken by Healthcare Management Advisors (HMA), Adelaide.

The project resulted in an interactive CD-ROM, a user manual and this final report.

### Methodology

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#### Survey of cardiac rehabilitation services

In order to determine the location of cardiac rehabilitation services and their characteristics, a survey was undertaken of all identified cardiac rehabilitation services and Aboriginal Community Controlled Health Services (ACCHS). The survey was sent to each of the 359 potential cardiac rehabilitation services identified and also to 98 ACCHS. A total of 237 surveys was returned, of which 228 provided sufficient data for incorporation into the analysis. Follow-up indicated that, overall, cardiac rehabilitation is available from 372 sites, with each site included in the database within the CD-ROM.

Almost 90% of identified cardiac rehabilitation services (325) are located in either urban centres or major regional centres. Only 12% of services that submitted a completed survey response included an outreach program.

The survey also sought information on the extent to which the range of strategies developed to date were likely to increase utilisation of cardiac rehabilitation services by Aboriginal and Torres Strait Islander Peoples.

#### Estimating the Aboriginal and Torres Strait Islander population

Estimating the Aboriginal and Torres Strait Islander population presented significant challenges. For the current project, adjusted population data from the 2001 Census, and a series of coefficients developed using the Australian Bureau of Statistics (ABS) experimental population projections for the Aboriginal and Torres Strait Islander population (and applied to postal area populations) were used to produce an estimate of the Indigenous population as at 30 June 2004.

### **Estimating eligibility for cardiac rehabilitation**

In order to develop an estimate of Aboriginal and Torres Strait Islander Peoples who were eligible for cardiac rehabilitation, hospital separation data for 2003–04 was sought from all States and Territories to develop age-adjusted separation rates for each postal area. However, in line with recommendations from the Australian Institute of Health and Welfare, only data for the Northern Territory, Queensland, South Australia and Western Australia are presented within this report.

### **Analyses undertaken**

The Accessibility and Remoteness Index of Australia (ARIA ++)<sup>1</sup> was used as a means of ranking postal areas in terms of remoteness, and the distance between the geographic centre of each postal area and that of the nearest postal area in which there was a cardiac rehabilitation service was calculated.

### **Consultation**

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A stakeholder workshop was held on 17 February 2006 in Adelaide, to focus test the useability of the GIS. Participants included seven health professionals working in Indigenous health.

As the GIS is an interactive CD-ROM, it was considered that the workshop with health professionals was the most appropriate forum to focus test the GIS, and for seeking feedback on its usefulness.

Feedback from the workshop from a Clinical Nurse Cardiac Rehabilitation Coordinator, at a major Adelaide hospital, was that not only would the GIS be extremely useful for her Aboriginal and Torres Strait Islander cardiac patients, but would also be useful for referring all of her cardiac patients.

### **Dissemination**

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The CD-ROM, the final report and the Guide are being distributed as a package to assist health services and cardiac rehabilitation services all over Australia. It is being sent to a wide range of interested and relevant individuals and organisations, including Aboriginal Community Controlled Health Services.

## APPENDIX 3

### ICD 10-AM CODES INCLUDED IN SEPARATION DATA

#### ICD 10-AM Codes Included in Separation Data

| Level | Code ID | Code ID altered | Long Description  | Short Description                            |
|-------|---------|-----------------|---|--|
| 3     | I00     | I00             | Rheumatic fever without mention of heart involvement      | Rheumatic fever wo mention heart inv         |
| 3     | I01     | I01             | Rheumatic fever with heart involvement                    | Rheumatic fever with heart involvement       |
| 4     | I01.1   | I01.1           | Acute rheumatic endocarditis                              | Acute rheumatic endocarditis                 |
| 4     | I01.2   | I01.2           | Acute rheumatic myocarditis                               | Acute rheumatic myocarditis                  |
| 4     | I01.8   | I01.8           | Other acute rheumatic heart disease                       | Other acute rheumatic heart disease          |
| 4     | I01.9   | I01.9           | Acute rheumatic heart disease, unspecified                | Acute rheumatic heart disease NOS            |
| 3     | I05     | I05             | Rheumatic mitral valve diseases                           | Rheumatic mitral valve diseases              |
| 4     | I05.0   | I05.0           | Mitral stenosis   | Mitral stenosis                              |
| 4     | I05.1   | I05.1           | Rheumatic mitral insufficiency                            | Rheumatic mitral insufficiency               |
| 4     | I05.2   | I05.2           | Mitral stenosis with insufficiency                        | Mitral stenosis with insufficiency           |
| 4     | I05.8   | I05.8           | Other mitral valve diseases                               | Other mitral valve diseases                  |
| 4     | I05.9   | I05.9           | Mitral valve disease, unspecified                         | Mitral valve disease unspecified             |
| 3     | I06     | I06             | Rheumatic aortic valve diseases                           | Rheumatic aortic valve diseases              |
| 4     | I06.0   | I06.0           | Rheumatic aortic stenosis                                 | Rheumatic aortic stenosis                    |
| 4     | I06.1   | I06.1           | Rheumatic aortic insufficiency                            | Rheumatic aortic insufficiency               |
| 4     | I06.2   | I06.2           | Rheumatic aortic stenosis with insufficiency              | Rheumatic aortic stenosis with insufficiency |
| 4     | I06.8   | I06.8           | Other rheumatic aortic valve diseases                     | Other rheumatic aortic valve diseases        |
| 4     | I06.9   | I06.9           | Rheumatic aortic valve disease, unspecified               | Rheumatic aortic valve disease NOS           |
| 3     | I07     | I07             | Rheumatic tricuspid valve diseases                        | Rheumatic tricuspid valve diseases           |
| 4     | I07.0   | I07.0           | Tricuspid stenosis  | Tricuspid stenosis                           |
| 4     | I07.1   | I07.1           | Tricuspid insufficiency                                   | Tricuspid insufficiency                      |
| 4     | I07.2   | I07.2           | Tricuspid stenosis with insufficiency                     | Tricuspid stenosis with insufficiency        |
| 4     | I07.8   | I07.8           | Other tricuspid valve diseases                            | Other tricuspid valve diseases               |
| 4     | I07.9   | I07.9           | Tricuspid valve disease, unspecified                      | Tricuspid valve disease unspecified          |
| 3     | I08     | I08             | Multiple valve diseases                                   | Multiple valve diseases                      |
| 4     | I08.0   | I08.0           | Disorders of both mitral and aortic valves                | Disorders both mitral & aortic valves        |
| 4     | I08.1   | I08.1           | Disorders of both mitral and tricuspid valves             | Disorders both mitral & tricuspid valves     |
| 4     | I08.2   | I08.2           | Disorders of both aortic and tricuspid valves             | Disorders both aortic & tricuspid valves     |
| 4     | I08.3   | I08.3           | Combined disorders of mitral, aortic and tricuspid valves | Cmb disrd mitral, aortic tricuspid valve     |
| 4     | I08.8   | I08.8           | Other multiple valve diseases                             | Other multiple valve diseases                |
| 4     | I08.9   | I08.9           | Multiple valve disease, unspecified                       | Multiple valve disease unspecified           |

| Level | Code ID | Code ID altered | Long Description  | Short Description                        |
|-------|---------|-----------------|---|--|
| 3     | I09     | I09             | Other rheumatic heart diseases  | Other rheumatic heart diseases           |
| 4     | I09.0   | I090            | Rheumatic myocarditis   | Rheumatic myocarditis                    |
| 4     | I09.1   | I091            | Rheumatic diseases of endocardium, valve unspecified  | Rheumatic dis endocardium unspec valve   |
| 4     | I09.8   | I098            | Other specified rheumatic heart diseases  | Other specified rheumatic heart diseases |
| 4     | I09.9   | I099            | Rheumatic heart disease, unspecified  | Rheumatic heart disease unspecified      |
| 3     | I10     | I10             | Essential (primary) hypertension  | Essential (primary) hypertension         |
| 3     | I11     | I11             | Hypertensive heart disease  | Hypertensive heart disease               |
| 4     | I11.0   | I110            | Hypertensive heart disease with (congestive) heart failure                                  | Hypertensive heart dis w heart failure   |
| 4     | I11.9   | I119            | Hypertensive heart disease w/o (congestive) heart failure                                   | Hypertensive heart dis wo heart failure  |
| 3     | I12     | I12             | Hypertensive renal disease  | Hypertensive renal disease               |
| 4     | I12.0   | I120            | Hypertensive renal disease with renal failure   | Hypertensive renal dis w renal failure   |
| 4     | I12.9   | I129            | Hypertensive renal disease without renal failure  | Hypertensive renal dis wo renal failure  |
| 3     | I13     | I13             | Hypertensive heart and renal disease  | Hypertensive heart and renal disease     |
| 4     | I13.0   | I130            | Hypertensive heart and renal disease with (congestive) heart failure                        | H/T heart & renal dis w heart failure    |
| 4     | I13.1   | I131            | Hypertensive heart and renal disease with renal failure                                     | H/T heart & renal dis w renal failure    |
| 4     | I13.2   | I132            | Hypertensive heart and renal disease with both (congestive) heart failure and renal failure | H/T heart & renal dis w heart renal fail |
| 4     | I13.9   | I139            | Hypertensive heart and renal disease, unspecified   | Hypertensive heart and renal disease NOS |
| 3     | I15     | I15             | Secondary hypertension  | Secondary hypertension                   |
| 4     | I15.0   | I150            | Renovascular hypertension   | Renovascular hypertension                |
| 4     | I15.1   | I151            | Hypertension secondary to other renal disorders   | Hypertension sec to other renal disorder |
| 4     | I15.2   | I152            | Hypertension secondary to endocrine disorders   | Hypertension sec to endocrine disorders  |
| 4     | I15.8   | I158            | Other secondary hypertension  | Other secondary hypertension             |
| 4     | I15.9   | I159            | Secondary hypertension, unspecified   | Secondary hypertension unspecified       |
| 3     | I20     | I20             | Angina pectoris   | Angina pectoris                          |
| 4     | I20.0   | I200            | Unstable angina   | Unstable angina                          |
| 4     | I20.1   | I201            | Angina pectoris with documented spasm   | Angina pectoris with documented spasm    |
| 4     | I20.8   | I208            | Other forms of angina pectoris  | Other forms of angina pectoris           |
| 4     | I20.9   | I209            | Angina pectoris, unspecified  | Angina pectoris unspecified              |
| 3     | I21     | I21             | Acute myocardial infarction   | Acute myocardial infarction              |
| 4     | I21.0   | I210            | Acute transmural myocardial infarction of anterior wall                                     | Acute transmural MI of anterior wall     |
| 4     | I21.1   | I211            | Acute transmural myocardial infarction of inferior wall                                     | Acute transmural MI of inferior wall     |

| Level | Code ID | Code ID altered | Long Description  | Short Description                        |
|-------|---------|-----------------|---|--|
| 4     | I21.2   | I212            | Acute transmural myocardial infarction of other sites   | Acute transmural MI of other sites       |
| 4     | I21.3   | I213            | Acute transmural myocardial infarction of unspecified site  | Acute transmural MI of unspecified site  |
| 4     | I21.4   | I214            | Acute subendocardial myocardial infarction  | Acute subendocardial MI                  |
| 4     | I21.9   | I219            | Acute myocardial infarction, unspecified  | Acute myocardial infarction unspecified  |
| 3     | I22     | I22             | Subsequent myocardial infarction  | Subsequent myocardial infarction         |
| 4     | I22.0   | I220            | Subsequent myocardial infarction of anterior wall   | Subsequent MI of anterior wall           |
| 4     | I22.1   | I221            | Subsequent myocardial infarction of inferior wall   | Subsequent MI of inferior wall           |
| 4     | I22.8   | I228            | Subsequent myocardial infarction of other sites   | Subsequent MI of other sites             |
| 4     | I22.9   | I229            | Subsequent myocardial infarction of unspecified site  | Subsequent MI of unspecified site        |
| 3     | I23     | I23             | Certain current complications following acute myocardial infarction   | Certain current comp following acute MI  |
| 4     | I23.0   | I230            | Haemopericardium as current complication following acute myocardial infarction  | Haemopericardium current comp foll ac MI |
| 4     | I23.1   | I231            | Atrial septal defect as current complication following acute myocardial infarction                                      | ASD as current comp following acute MI   |
| 4     | I23.2   | I232            | Ventricular septal defect as current complication following acute myocardial infarction                                 | VSD as current comp following acute MI   |
| 4     | I23.3   | I233            | Rupture of cardiac wall without haemopericardium as current complication following acute myocardial infarction          | Rupt card wall wo hemopericrd foll ac MI |
| 4     | I23.4   | I234            | Rupture of chordae tendineae as current complication following acute myocardial infarction                              | Rupt chordae tendineae comp foll ac MI   |
| 4     | I23.5   | I235            | Rupture of papillary muscle as current complication following acute myocardial infarction                               | Rupt papillary muscle comp foll ac MI    |
| 4     | I23.6   | I236            | Thrombosis of atrium, auricular appendage, and ventricle as current complications following acute myocardial infarction | Atrl thromb auric append ventric w ac MI |
| 4     | I23.8   | I238            | Other current complications following acute myocardial infarction   | Other current complication foll acute MI |
| 3     | I24     | I24             | Other acute ischaemic heart diseases  | Other acute ischaemic heart diseases     |
| 4     | I24.0   | I240            | Coronary thrombosis not resulting in myocardial infarction  | Coronary thrombosis not resulting in MI  |
| 4     | I24.1   | I241            | Dressler's syndrome   | Dressler's syndrome                      |
| 4     | I24.8   | I248            | Other forms of acute ischaemic heart disease  | Other forms of acute IHD                 |
| 4     | I24.9   | I249            | Acute ischaemic heart disease, unspecified  | Acute ischaemic heart disease NOS        |

| Level | Code ID | Code ID altered | Long Description  | Short Description                        |
|-------|---------|-----------------|---|--|
| 3     | I25     | I25             | Chronic ischaemic heart disease                           | Chronic ischaemic heart disease          |
| 4     | I25.0   | I250            | Atherosclerotic cardiovascular disease, so described      | Atherosclerotic C-V disease so described |
| 4     | I25.1   | I251            | Atherosclerotic heart disease                             | Atherosclerotic heart disease            |
| 5     | I25.10  | I2510           | Atherosclerotic heart disease, of unspecified vessel      | Atherosclerotic heart dis unspec vessel  |
| 5     | I25.11  | I2511           | Atherosclerotic heart disease, of native coronary artery  | Atheroscl heart dis native coron artery  |
| 5     | I25.12  | I2512           | Atherosclerotic heart disease, of autologous bypass graft | Atheroscl heart dis autolgs byps graft   |
| 5     | I25.13  | I2513           | Atherosclerotic heart disease, nonautologous bypass graft | Atheroscl heart dis nonautolgs byps gft  |
| 4     | I25.2   | I252            | Old myocardial infarction                                 | Old myocardial infarction                |
| 4     | I25.3   | I253            | Aneurysm of heart   | Aneurysm of heart                        |
| 4     | I25.4   | I254            | Coronary artery aneurysm                                  | Coronary artery aneurysm                 |
| 4     | I25.5   | I255            | Ischaemic cardiomyopathy                                  | Ischaemic cardiomyopathy                 |
| 4     | I25.6   | I256            | Silent myocardial ischaemia                               | Silent myocardial ischaemia              |
| 4     | I25.8   | I258            | Other forms of chronic ischaemic heart disease            | Other forms of chronic IHD               |
| 4     | I25.9   | I259            | Chronic ischaemic heart disease, unspecified              | Chronic IHD unspecified                  |
| 3     | I26     | I26             | Pulmonary embolism  | Pulmonary embolism                       |
| 4     | I26.0   | I260            | Pulmonary embolism with mention of acute cor pulmonale    | Pulm embolism w acute cor pulmonale      |
| 4     | I26.9   | I269            | Pulmonary embolism w/o mention of acute cor pulmonale     | Pulm embolism wo acute cor pulmonale     |
| 3     | I27     | I27             | Other pulmonary heart diseases                            | Other pulmonary heart diseases           |
| 4     | I27.0   | I270            | Primary pulmonary hypertension                            | Primary pulmonary hypertension           |
| 4     | I27.1   | I271            | Kyphoscoliotic heart disease                              | Kyphoscoliotic heart disease             |
| 4     | I27.2   | I272            | Other secondary pulmonary hypertension                    | Other secondary pulmonary hypertension   |
| 4     | I27.8   | I278            | Other specified pulmonary heart diseases                  | Other specified pulmonary heart diseases |
| 4     | I27.9   | I279            | Pulmonary heart disease, unspecified                      | Pulmonary heart disease unspecified      |
| 3     | I28     | I28             | Other diseases of pulmonary vessels                       | Other diseases of pulmonary vessels      |
| 4     | I28.0   | I280            | Arteriovenous fistula of pulmonary vessels                | Arteriovenous fistula pulmonary vessels  |
| 4     | I28.1   | I281            | Aneurysm of pulmonary artery                              | Aneurysm of pulmonary artery             |
| 4     | I28.8   | I288            | Other specified diseases of pulmonary vessels             | Other spec diseases pulmonary vessels    |
| 4     | I28.9   | I289            | Disease of pulmonary vessels, unspecified                 | Disease pulmonary vessels unspecified    |
| 4     | I30.1   | I301            | Infective pericarditis                                    | Infective pericarditis                   |
| 3     | I31     | I31             | Other diseases of pericardium                             | Other diseases of pericardium            |
| 4     | I31.2   | I312            | Haemopericardium, not elsewhere classified                | Haemopericardium NEC                     |
| 4     | I31.3   | I313            | Pericardial effusion (noninflammatory)                    | Pericardial effusion (noninflammatory)   |

| Level | Code ID | Code ID altered | Long Description   | Short Description                        |
|-------|---------|-----------------|--|--|
| 4     | I31.8   | I318            | Other specified diseases of pericardium                                      | Other specified diseases of pericardium  |
| 4     | I31.9   | I319            | Disease of pericardium, unspecified  | Disease of pericardium unspecified       |
| 3     | I32     | I32             | Pericarditis in diseases classified elsewhere                                | Pericarditis in dis classified elsewhere |
| 4     | I32.0   | I320            | Pericarditis in bacterial diseases classified elsewhere                      | Pericarditis in bact dis class elsewhere |
| 4     | I32.1   | I321            | Pericarditis in other infectious and parasitic diseases classified elsewhere | Pericarditis oth infect parasit dis cl/e |
| 4     | I32.8   | I328            | Pericarditis in other diseases classified elsewhere                          | Pericarditis in other diseases cl/e      |
| 3     | I33     | I33             | Acute and subacute endocarditis  | Acute and subacute endocarditis          |
| 4     | I33.0   | I330            | Acute and subacute infective endocarditis                                    | Acute & subacute infective endocarditis  |
| 4     | I33.9   | I339            | Acute endocarditis, unspecified  | Acute endocarditis unspecified           |
| 3     | I34     | I34             | Nonrheumatic mitral valve disorders  | Nonrheumatic mitral valve disorders      |
| 4     | I34.0   | I340            | Mitral (valve) insufficiency   | Mitral (valve) insufficiency             |
| 4     | I34.1   | I341            | Mitral (valve) prolapse  | Mitral (valve) prolapse                  |
| 4     | I34.2   | I342            | Nonrheumatic mitral (valve) stenosis   | Nonrheumatic mitral (valve) stenosis     |
| 4     | I34.8   | I348            | Other nonrheumatic mitral valve disorders                                    | Oth nonrheumatic mitral valve disorders  |
| 4     | I34.9   | I349            | Nonrheumatic mitral valve disorder, unspecified                              | Nonrheumatic mitral valve disorder NOS   |
| 3     | I35     | I35             | Nonrheumatic aortic valve disorders  | Nonrheumatic aortic valve disorders      |
| 4     | I35.0   | I350            | Aortic (valve) stenosis  | Aortic (valve) stenosis                  |
| 4     | I35.1   | I351            | Aortic (valve) insufficiency   | Aortic (valve) insufficiency             |
| 4     | I35.2   | I352            | Aortic (valve) stenosis with insufficiency                                   | Aortic (valve) stenosis w insufficiency  |
| 4     | I35.8   | I358            | Other aortic valve disorders   | Other aortic valve disorders             |
| 4     | I35.9   | I359            | Aortic valve disorder, unspecified   | Aortic valve disorder unspecified        |
| 3     | I36     | I36             | Nonrheumatic tricuspid valve disorders                                       | Nonrheumatic tricuspid valve disorders   |
| 4     | I36.0   | I360            | Nonrheumatic tricuspid (valve) stenosis                                      | Nonrheumatic tricuspid (valve) stenosis  |
| 4     | I36.1   | I361            | Nonrheumatic tricuspid (valve) insufficiency                                 | Nonrheumatic tricuspid insufficiency     |
| 4     | I36.2   | I362            | Nonrheumatic tricuspid (valve) stenosis with insufficiency                   | Nonrheum tricuspid stenosis w insuff     |
| 4     | I36.8   | I368            | Other nonrheumatic tricuspid valve disorders                                 | Oth nonrheumatic tricuspid valve disrd   |
| 4     | I36.9   | I369            | Nonrheumatic tricuspid valve disorder, unspecified                           | Nonrheumatic tricuspid valve disrd NOS   |
| 3     | I37     | I37             | Pulmonary valve disorders  | Pulmonary valve disorders                |
| 4     | I37.0   | I370            | Pulmonary valve stenosis   | Pulmonary valve stenosis                 |
| 4     | I37.1   | I371            | Pulmonary valve insufficiency  | Pulmonary valve insufficiency            |
| 4     | I37.2   | I372            | Pulmonary valve stenosis with insufficiency                                  | Pulmonary valve stenosis w insufficiency |

| Level | Code ID | Code ID altered | Long Description  | Short Description                        |
|-------|---------|-----------------|---|--|
| 4     | I37.8   | I378            | Other pulmonary valve disorders   | Other pulmonary valve disorders          |
| 4     | I37.9   | I379            | Pulmonary valve disorder, unspecified                                       | Pulmonary valve disorder unspecified     |
| 3     | I38     | I38             | Endocarditis, valve unspecified   | Endocarditis valve unspecified           |
| 3     | I39     | I39             | Endocarditis and heart valve disorders in diseases classified elsewhere     | Endocarditis heart valve disrd dis cl/e  |
| 4     | I39.0   | I390            | Mitral valve disorders in diseases classified elsewhere                     | Mitral valve disorders in diseases cl/e  |
| 4     | I39.1   | I391            | Aortic valve disorders in diseases classified elsewhere                     | Aortic valve disorders in diseases cl/e  |
| 4     | I39.2   | I392            | Tricuspid valve disorders in diseases classified elsewhere                  | Tricuspid valve disorders in dis cl/e    |
| 4     | I39.3   | I393            | Pulmonary valve disorders in diseases classified elsewhere                  | Pulmonary valve disorders in dis cl/e    |
| 4     | I39.4   | I394            | Multiple valve disorders in diseases classified elsewhere                   | Multiple valve disorders in disease cl/e |
| 4     | I39.8   | I398            | Endocarditis, valve unspecified, in diseases classified elsewhere           | Endocarditis unspec valve in dis cl/e    |
| 3     | I40     | I40             | Acute myocarditis   | Acute myocarditis                        |
| 4     | I40.0   | I400            | Infective myocarditis   | Infective myocarditis                    |
| 4     | I40.1   | I401            | Isolated myocarditis  | Isolated myocarditis                     |
| 4     | I40.8   | I408            | Other acute myocarditis   | Other acute myocarditis                  |
| 4     | I40.9   | I409            | Acute myocarditis, unspecified  | Acute myocarditis unspecified            |
| 3     | I41     | I41             | Myocarditis in diseases classified elsewhere                                | Myocarditis in diseases class elsewhere  |
| 4     | I41.0   | I410            | Myocarditis in bacterial diseases classified elsewhere                      | Myocarditis in bacterial diseases cl/e   |
| 4     | I41.1   | I411            | Myocarditis in viral diseases classified elsewhere                          | Myocarditis in viral diseases cl/e       |
| 4     | I41.2   | I412            | Myocarditis in other infectious and parasitic diseases classified elsewhere | Myocarditis in infect & parasit dis cl/e |
| 4     | I41.8   | I418            | Myocarditis in other diseases classified elsewhere                          | Myocarditis in other dis class elsewhere |
| 3     | I42     | I42             | Cardiomyopathy  | Cardiomyopathy                           |
| 4     | I42.0   | I420            | Dilated cardiomyopathy  | Dilated cardiomyopathy                   |
| 4     | I42.1   | I421            | Obstructive hypertrophic cardiomyopathy                                     | Obstructive hypertrophic cardiomyopathy  |
| 4     | I42.2   | I422            | Other hypertrophic cardiomyopathy   | Other hypertrophic cardiomyopathy        |
| 4     | I42.3   | I423            | Endomyocardial (eosinophilic) disease                                       | Endomyocardial (eosinophilic) disease    |
| 4     | I42.4   | I424            | Endocardial fibroelastosis  | Endocardial fibroelastosis               |
| 4     | I42.5   | I425            | Other restrictive cardiomyopathy  | Other restrictive cardiomyopathy         |
| 4     | I42.6   | I426            | Alcoholic cardiomyopathy  | Alcoholic cardiomyopathy                 |
| 4     | I42.7   | I427            | Cardiomyopathy due to drugs and other external agents                       | Cardiomyopathy dt drugs & oth ext agents |
| 4     | I42.8   | I428            | Other cardiomyopathies  | Other cardiomyopathies                   |
| 4     | I42.9   | I429            | Cardiomyopathy, unspecified   | Cardiomyopathy unspecified               |
| 3     | I43     | I43             | Cardiomyopathy in diseases classified elsewhere                             | Cardiomyopathy in diseases cl/e          |

| Level | Code ID | Code ID altered | Long Description   | Short Description                        |
|-------|---------|-----------------|--|--|
| 4     | I43.0   | I430            | Cardiomyopathy in infectious and parasitic diseases classified elsewhere | Cardiomyopathy infect parasit dis cl/e   |
| 4     | I43.1   | I431            | Cardiomyopathy in metabolic diseases                                     | Cardiomyopathy in metabolic diseases     |
| 4     | I43.2   | I432            | Cardiomyopathy in nutritional diseases                                   | Cardiomyopathy in nutritional diseases   |
| 4     | I43.8   | I438            | Cardiomyopathy in other diseases classified elsewhere                    | Cardiomyopathy in other diseases cl/e    |
| 3     | I44     | I44             | Atrioventricular and left bundle-branch block                            | Atrioventricular & L bundle branch block |
| 4     | I44.0   | I440            | Atrioventricular block, first degree                                     | Atrioventricular block first degree      |
| 4     | I44.1   | I441            | Atrioventricular block, second degree                                    | Atrioventricular block second degree     |
| 4     | I44.2   | I442            | Atrioventricular block, complete   | Atrioventricular block complete          |
| 4     | I44.3   | I443            | Other and unspecified atrioventricular block                             | Other & unspec atrioventricular block    |
| 4     | I44.4   | I444            | Left anterior fascicular block   | Left anterior fascicular block           |
| 4     | I44.5   | I445            | Left posterior fascicular block  | Left posterior fascicular block          |
| 4     | I44.6   | I446            | Other and unspecified fascicular block                                   | Other and unspecified fascicular block   |
| 4     | I44.7   | I447            | Left bundle-branch block, unspecified                                    | Left bundle-branch block unspecified     |
| 3     | I45     | I45             | Other conduction disorders   | Other conduction disorders               |
| 4     | I45.0   | I450            | Right fascicular block   | Right fascicular block                   |
| 4     | I45.1   | I451            | Other and unspecified right bundle-branch block                          | Other & unspec R bundle branch block     |
| 4     | I45.2   | I452            | Bifascicular block   | Bifascicular block                       |
| 4     | I45.3   | I453            | Trifascicular block  | Trifascicular block                      |
| 4     | I45.4   | I454            | Nonspecific intraventricular block                                       | Nonspecific intraventricular block       |
| 4     | I45.5   | I455            | Other specified heart block  | Other specified heart block              |
| 4     | I45.6   | I456            | Pre-excitation syndrome  | Pre-excitation syndrome                  |
| 4     | I45.8   | I458            | Other specified conduction disorders                                     | Other specified conduction disorders     |
| 4     | I45.9   | I459            | Conduction disorder, unspecified   | Conduction disorder unspecified          |
| 3     | I46     | I46             | Cardiac arrest   | Cardiac arrest                           |
| 4     | I46.0   | I460            | Cardiac arrest with successful resuscitation                             | Cardiac arrest w success resuscitation   |
| 4     | I46.1   | I461            | Sudden cardiac death, so described                                       | Sudden cardiac death so described        |
| 4     | I46.9   | I469            | Cardiac arrest, unspecified  | Cardiac arrest unspecified               |
| 3     | I47     | I47             | Paroxysmal tachycardia   | Paroxysmal tachycardia                   |
| 4     | I47.1   | I471            | Supraventricular tachycardia   | Supraventricular tachycardia             |
| 4     | I47.2   | I472            | Ventricular tachycardia  | Ventricular tachycardia                  |
| 4     | I47.9   | I479            | Paroxysmal tachycardia, unspecified                                      | Paroxysmal tachycardia unspecified       |
| 3     | I48     | I48             | Atrial fibrillation and flutter  | Atrial fibrillation and flutter          |
| 4     | I49.0   | I490            | Ventricular fibrillation and flutter                                     | Ventricular fibrillation and flutter     |
| 4     | I49.1   | I491            | Atrial premature depolarisation  | Atrial premature depolarisation          |
| 4     | I49.2   | I492            | Junctional premature depolarisation                                      | Junctional premature depolarisation      |
| 4     | I49.3   | I493            | Ventricular premature depolarisation                                     | Ventricular premature depolarisation     |

| Level | Code ID | Code ID altered | Long Description  | Short Description                        |
|-------|---------|-----------------|---|--|
| 4     | I49.4   | I494            | Other and unspecified premature depolarisation  | Other & unspec premature depolarisation  |
| 4     | I49.5   | I495            | Sick sinus syndrome   | Sick sinus syndrome                      |
| 3     | I50     | I50             | Heart failure   | Heart failure                            |
| 4     | I50.0   | I500            | Congestive heart failure  | Congestive heart failure                 |
| 4     | I50.1   | I501            | Left ventricular failure  | Left ventricular failure                 |
| 4     | I50.9   | I509            | Heart failure, unspecified  | Heart failure unspecified                |
| 3     | I51     | I51             | Complications and ill-defined descriptions of heart disease                           | Comp & ill-def description heart disease |
| 4     | I51.0   | I510            | Cardiac septal defect, acquired   | Cardiac septal defect acquired           |
| 4     | I51.1   | I511            | Rupture of chordae tendineae, not elsewhere classified                                | Rupture of chordae tendineae NEC         |
| 4     | I51.2   | I512            | Rupture of papillary muscle, not elsewhere classified                                 | Rupture papillary muscle NEC             |
| 4     | I51.3   | I513            | Intracardiac thrombosis, not elsewhere classified                                     | Intracardiac thrombosis NEC              |
| 4     | I51.4   | I514            | Myocarditis, unspecified  | Myocarditis unspecified                  |
| 4     | I51.5   | I515            | Myocardial degeneration   | Myocardial degeneration                  |
| 4     | I51.6   | I516            | Cardiovascular disease, unspecified   | Cardiovascular disease unspecified       |
| 4     | I51.7   | I517            | Cardiomegaly  | Cardiomegaly                             |
| 4     | I51.8   | I518            | Other ill-defined heart diseases  | Other ill-defined heart diseases         |
| 4     | I51.9   | I519            | Heart disease, unspecified  | Heart disease unspecified                |
| 3     | I52     | I52             | Other heart disorders in diseases classified elsewhere                                | Other heart disrd in dis class elsewhere |
| 4     | I52.0   | I520            | Other heart disorders in bacterial diseases classified elsewhere                      | Other heart disrd in bacterial dis cl/e  |
| 4     | I52.1   | I521            | Other heart disorders in other infectious and parasitic diseases classified elsewhere | Oth heart disrd infect parasit dis cl/e  |
| 4     | I52.8   | I528            | Other heart disorders in other diseases classified elsewhere                          | Oth heart disrd in other diseases cl/e   |
| 4     | Q24.8   | Q248            | Other specified congenital malformations of heart                                     | Oth spec congenital malformations heart  |
| 4     | Q22.3   | Q223            | Other congenital malformations of pulmonary valve                                     | Oth cong malformations pulmonary valve   |

## APPENDIX 4

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### SURVEY OF CARDIAC REHABILITATION SERVICES

#### Geographic Information System (GIS) of Cardiac Rehabilitation Services (CRS) for Aboriginal and Torres Strait Islander Peoples

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##### Questionnaire for Cardiac Rehabilitation Services

The questionnaire seeks critical information from your service for the National Health and Medical Research Council (NHMRC) through the Department of Health and Ageing to develop a CD-ROM that will facilitate clinicians referring Aboriginal and Torres Strait Islander patients to the nearest and most appropriate cardiac rehabilitation service to where they live. Accordingly, the more complete the information available for development of the CD-ROM, the more useful it will be to individual clinicians and cardiac rehabilitation services.

Most questions are multi-choice with scope for entering any other comments as appropriate. The questionnaire should be completed **once** only to reflect the Service as a whole. The questionnaire has been approved by the Australian Government Statistical Clearing House and has Approval Number 01691-01. We thank you for completing this questionnaire on behalf of your Service.

Completed questionnaires may be returned by 23rd September 2005 using the reply paid envelope or mailed to:

Healthcare Management Advisors  
Reply Paid 10086  
ADELAIDE BC SA 5000

Questionnaire responses may also be faxed on (08) 8150 5599 or if you wish to provide verbal responses to the questionnaire, please contact HMA on (08) 8150 5555.

##### Part I Service Profile - Characteristics

This first part records details about your Service that will provide information to map the location of your Service and provide information to other service providers regarding your service (including contact details).

##### Q1 Contact for survey:

Name: \_\_\_\_\_

Phone: \_\_\_\_\_

##### Q2 Service location:

Service name: \_\_\_\_\_

Street Address: \_\_\_\_\_

Suburb: \_\_\_\_\_

Town/City: \_\_\_\_\_

Postcode: \_\_\_\_\_

Telephone: \_\_\_\_\_

Facsimile: \_\_\_\_\_

E-mail: \_\_\_\_\_

**Q3 What type of Cardiac Rehabilitation Service does your organisation provide:**

a) Inpatient Cardiac Rehabilitation

Yes

No

b) Outpatient Cardiac Rehabilitation

Yes

No

**Q4 What type of facility/setting do you use to provide your Service:  
(tick all that apply)**

Within an acute public hospital

Within an acute private hospital

Within an Aboriginal Medical Service

Within a non-acute/community hospital

Within a public community health centre/service

Within a private outpatient service

As part of an outreach service to communities

**Q5 Does your Service accept the following?**

Yes No

DVA

Medicare

Centrelink

Healthcard

Other concessions (Please specify) \_\_\_\_\_

**Part 2 Service Profile — Staff**

This part of the questionnaire provides information on the services and staff including the number of hours per week which are available to patients.

**Q6** Does your Service employ/contract the following types of personnel?  
(please indicate hours/ week - note that if health professionals are NOT contracted or employed please report in Q7 below)

Hours/week

|                              |  |  |   |  |
|------------------------------|--|--|---|--|
| Aboriginal Health Worker     |  |  | . |  |
| Dietitian                    |  |  | . |  |
| Cardiologist                 |  |  | . |  |
| Exercise physiologist        |  |  | . |  |
| GP                           |  |  | . |  |
| Interpreters                 |  |  | . |  |
| Occupational therapist       |  |  | . |  |
| Palliative care team         |  |  | . |  |
| Pharmacist                   |  |  | . |  |
| Physician                    |  |  | . |  |
| Physiotherapist              |  |  | . |  |
| Psychologist                 |  |  | . |  |
| Registered Nurse             |  |  | . |  |
| Cardiac rehabilitation Nurse |  |  | . |  |
| Social worker                |  |  | . |  |
| Other                        |  |  | . |  |

Other description (Please specify) \_\_\_\_\_

**Q7** Does your Service have regular access to?

- Aboriginal Health Worker
- Dietitian
- Cardiologist
- Exercise physiologist
- GP
- Interpreters
- Occupational therapist
- Palliative care team
- Pharmacist
- Physician
- Physiotherapist
- Psychologist

Registered Nurse Social worker An Aboriginal Medical Service Other 

Other description (Please specify eg Paediatrician, endocrinologist, dentist) \_\_\_\_\_

Q8 What is the Full Time Equivalent (FTE) for your Service including administrative and support staff:

Q9 What hours does your service operate: (indicate operating hours)

| Days             | Open from | Closes at | Not open |
|------------------|-----------|-----------|----------|
| Monday to Friday |           |           |          |
| Saturday         |           |           |          |
| Sunday           |           |           |          |
| Public Holidays  |           |           |          |

### Part 3 Service Profile – Volume, Demographic and Geographic

This part records details about your Service that will provide information on the geographic area serviced by your Cardiac Rehabilitation Service (CRS), the demographics of your patient population and geographic served.

Q10 What is the maximum number of patients your CRS can service in a month:

Q11 How many patients did your Service treat in the last financial year (2004/2005)?

Q12 What was the proportion (%) of Aboriginal and Torres Strait Islander patients treated in the last financial year (2004/2005)?

Q13 Does your Cardiac Rehabilitation Service accept patients from: (tick all that apply)

The local area (radius of 10 Km) The region (radius of 100 Km) The State/Territory Nationally 

Q14 Does your Cardiac Rehabilitation Service provide outreach to rural and remote communities?

Yes No

## Part 4 Cultural Appropriateness

This part seeks to determine whether your Service is likely to be culturally relevant for Aboriginal and/or Torres Strait Islander Peoples, should they require a CRS program.

**Q15 Does your Service:**

|   |   | Yes                      | No                       |
|---|---|--------------------------|--------------------------|
| A | Use case management for Aboriginal and Torres Strait Islander patients that cover the process of care from tests and/or procedures through to cardiac rehabilitation                  | <input type="checkbox"/> | <input type="checkbox"/> |
| B | Have flexible approaches to obtain informed consent from Aboriginal and Torres Strait Islander patients that involve family members and culturally appropriate provision of?          | <input type="checkbox"/> | <input type="checkbox"/> |
| C | Use education materials on common cardiovascular conditions, tests, interventions, medications and cardiac rehabilitation designed for Aboriginal and Torres Strait Islander Peoples? | <input type="checkbox"/> | <input type="checkbox"/> |
| D | Talk with Aboriginal and Torres Strait Islander patients about the importance of cardiac rehabilitation before they come into hospital?   | <input type="checkbox"/> | <input type="checkbox"/> |
| E | Employ or ensure access to an Aboriginal Health Worker to assist you and your Aboriginal and Torres Strait Islander patients?   | <input type="checkbox"/> | <input type="checkbox"/> |
| F | Operate a buddy and/or mentoring systems for patients whose family or carer is not available to take part in the decision-making process or accompany them to hospital?               | <input type="checkbox"/> | <input type="checkbox"/> |
| G | Have referral networks involving allied health professionals such as dieticians, pharmacists, social workers, physiotherapists?   | <input type="checkbox"/> | <input type="checkbox"/> |

**Q16 Indicate/estimate the number of hospitals providing cardiac surgery in your area:**

|  |  |
|--|--|
|  |  |
|--|--|

**Q17 Indicate/estimate the proportion of hospitals where your Service has established a system with the hospital(s) providing cardiac surgery in your area, so that pre-admission checks on Aboriginal and Torres Strait Islander patients may be carried out with the health service:**

|  |  |
|--|--|
|  |  |
|--|--|

**Q18 Do the staff in your Service undertake/provide cultural safety training:**

Yes

No

**Q19 Please provide an estimate of the time taken to complete this questionnaire**

|  |  |
|--|--|
|  |  |
|--|--|

hrs

|  |  |
|--|--|
|  |  |
|--|--|

min

## APPENDIX 5

### COEFFICIENTS USED TO ADJUST 2001 CENSUS POPULATIONS

Coefficients used to adjust 2001 Census populations

| ATSI REGION      | Age Group |        |        |        |        |        |        |        |
|------------------|-----------|--------|--------|--------|--------|--------|--------|--------|
|                  | 0-9       | 10-19  | 20-29  | 30-39  | 40-49  | 50-59  | 60-69  | 70+    |
| Adelaide         | 0.9920    | 1.1333 | 1.0741 | 1.0635 | 1.1098 | 1.1248 | 1.1732 | 1.1074 |
| Alice Springs    | 1.0044    | 1.1643 | 0.9477 | 1.0438 | 1.1213 | 0.9546 | 1.1200 | 0.9120 |
| Apatala          | 0.9585    | 1.0132 | 1.0561 | 1.1244 | 1.1169 | 1.0678 | 1.0225 | 0.9698 |
| Ballarat         | 0.9252    | 1.1413 | 1.1148 | 1.1112 | 1.1255 | 1.2013 | 1.0512 | 0.9962 |
| Bourke           | 0.9632    | 0.9886 | 0.9487 | 0.9884 | 1.0697 | 1.2238 | 1.0116 | 1.0076 |
| Brisbane         | 1.0160    | 1.1706 | 1.0896 | 1.0942 | 1.1290 | 1.1752 | 1.0948 | 0.9986 |
| Broome           | 1.0051    | 0.9693 | 1.0663 | 0.9968 | 1.1260 | 1.3211 | 1.0833 | 0.8727 |
| Cairns           | 0.9748    | 1.1312 | 1.0319 | 1.0756 | 1.1509 | 1.2326 | 1.1010 | 0.9631 |
| Ceduna           | 0.9689    | 1.0494 | 1.0596 | 0.9103 | 1.1678 | 1.0364 | 0.9935 | 1.1527 |
| Coffs Harbour    | 1.0217    | 1.1338 | 1.0717 | 1.0395 | 1.0955 | 1.1808 | 1.0964 | 1.0879 |
| Cooktown         | 1.0110    | 0.9858 | 0.9519 | 1.1085 | 1.0839 | 1.1120 | 0.9607 | 1.0443 |
| Darwin           | 1.0431    | 1.1758 | 0.9845 | 1.1170 | 1.0317 | 1.2227 | 1.1224 | 0.9384 |
| Derby            | 1.0579    | 0.9672 | 1.0692 | 1.0262 | 1.1932 | 1.0607 | 1.0989 | 0.8613 |
| Geraldton        | 0.9724    | 1.1098 | 0.9938 | 1.0562 | 1.1173 | 1.2148 | 1.0111 | 1.0017 |
| Hobart           | 0.9890    | 1.0584 | 1.0975 | 0.9688 | 1.0726 | 1.1378 | 1.1258 | 0.9610 |
| Jabiru           | 0.9816    | 1.0109 | 1.0526 | 1.0667 | 1.1308 | 1.1951 | 1.0971 | 1.2277 |
| Kalgoorlie       | 0.9791    | 1.1469 | 1.0236 | 1.0265 | 1.0629 | 1.2322 | 1.2176 | 0.8938 |
| Katherine        | 0.9665    | 1.0229 | 1.0385 | 1.0687 | 1.1469 | 1.0644 | 1.0357 | 0.9865 |
| Kununurra        | 1.0053    | 0.9760 | 1.1005 | 1.0861 | 1.1171 | 1.0978 | 0.9428 | 1.1368 |
| Mount Isa        | 1.0173    | 1.0345 | 1.0073 | 1.0454 | 1.0383 | 1.0723 | 0.9742 | 0.9955 |
| Narrogin         | 0.9767    | 1.1554 | 0.9960 | 1.0675 | 1.1204 | 1.0979 | 1.0707 | 1.1489 |
| Nhulunbuy        | 1.0404    | 0.9880 | 1.0151 | 1.0772 | 1.0590 | 1.1919 | 1.1128 | 1.4050 |
| Perth            | 0.9985    | 1.1482 | 1.1008 | 1.0404 | 1.1037 | 1.2647 | 1.1389 | 1.1896 |
| Port Augusta     | 0.9595    | 1.0588 | 1.0395 | 1.0709 | 1.0958 | 1.2713 | 1.0513 | 0.9499 |
| Queanbeyan       | 1.0223    | 1.1266 | 1.0698 | 1.0485 | 1.1057 | 1.1356 | 1.1535 | 0.8987 |
| Rockhampton      | 0.9729    | 1.1039 | 1.0025 | 1.0316 | 1.1113 | 1.1369 | 1.1735 | 1.0281 |
| Roma             | 0.9985    | 1.1412 | 1.0536 | 1.0178 | 1.1568 | 1.1754 | 1.1389 | 1.0747 |
| South Hedland    | 0.9857    | 1.0876 | 0.9598 | 1.0444 | 1.0781 | 1.1150 | 1.0791 | 1.0425 |
| Sydney           | 0.9540    | 1.1010 | 1.0263 | 1.0418 | 1.0566 | 1.0909 | 0.9659 | 1.0062 |
| Tamworth         | 0.9787    | 1.0585 | 1.0083 | 1.0408 | 1.1849 | 1.1394 | 1.1297 | 1.0637 |
| Tennant Creek    | 0.9572    | 1.0492 | 0.9157 | 1.0591 | 1.0901 | 1.2631 | 1.0406 | 0.8226 |
| Torres Strait RA | 0.9922    | 1.0160 | 1.0407 | 1.0841 | 0.9856 | 1.2388 | 0.8117 | 0.9608 |
| Townsville       | 1.0130    | 1.1392 | 0.9772 | 1.0465 | 1.1120 | 1.1531 | 1.0319 | 1.0192 |
| Wagga Wagga      | 0.9915    | 1.1103 | 1.0090 | 1.0706 | 1.1478 | 1.1464 | 1.1634 | 0.9689 |
| Wangaratta       | 1.0124    | 1.1164 | 1.0204 | 1.0787 | 1.0892 | 1.1386 | 1.0828 | 0.9670 |
| Warburton        | 1.0978    | 0.9567 | 0.9967 | 1.1327 | 1.0444 | 1.1056 | 0.8145 | 1.0835 |



## The National Health and Medical Research Council

The National Health and Medical Research Council (NHMRC) was established in 1936 and is now a statutory body within the portfolio of the Australian Government Minister for Health and Ageing, operating under the *National Health and Medical Research Council Act 1992* (NHMRC Act).

The NHMRC advises the Australian community and the Australian Government, and State and Territory governments on standards of individual and public health, and supports research to improve those standards.

The NHMRC Act provides four statutory obligations:

- to raise the standard of individual and public health throughout Australia;
- to foster development of consistent health standards between the states and territories;
- to foster medical research and training and public health research and training throughout Australia; and
- to foster consideration of ethical issues relating to health.

The NHMRC also has statutory obligations under the *Prohibition of Human Cloning Act 2002* (PHC Act) and the *Research Involving Human Embryos Act 2002* (RIHE Act).

The activities of the NHMRC translate into four major outputs: health and medical research; health policy and advice; health ethics; and the regulation of research involving donated IVF embryos, including monitoring compliance with the ban on human cloning and certain other activities.

A regular publishing program ensures that Council's recommendations are widely available to governments, the community, scientific, industrial and education groups. The Council publishes in the following areas:

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- Environmental Health
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