Best for the Bush

RURAL AND REMOTE HEALTH BASE LINE 2022

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Royal Flying Doctor Service

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About the Royal Flying Doctor Service (RFDS)

The RFDS is a national, charitable, health organisation delivering primary healthcare and 24-hour emergency services for those that live in rural and remote Australia. Long known as one of the largest aeromedical organisations in the world, the RFDS delivers health care where mainstream health services are not available, using the latest in aviation, medical and communications technology and a broad-reaching ground-service fleet.

Our Commitment to Reconciliation

The RFDS respects and acknowledges Aboriginal and Torres Strait Islander peoples as the First Australians, recognising the significant and ongoing impacts of colonisation and dispossession.

Our vision for reconciliation is a culture that strives for unity, equity and respect between Aboriginal and Torres Strait Islander peoples and other Australians. The RFDS is committed to improved health outcomes and access to health services for all Aboriginal and Torres Strait Islander peoples. Our Reconciliation Action Plan outlines our intentions to use research and policy to drive improvement: https://www.flyingdoctor.org.au/download-document/RAP22-24/

RFDS research and policy reports include Aboriginal and Torres Strait Islander peoples' data as part of a broader effort to improve health outcomes and access to health services and as a contribution to the 'Close the Gap' campaign. This report contributes to the aims of our Reconciliation Action Plan and the RFDS will continue to work with and be guided by Aboriginal and Torres Strait Islander peoples in determining how best to address their needs and priorities. Through our strong and committed partnerships with Aboriginal and Torres Strait Islander peoples and communities, we will focus on building local, community-led solutions, recognising that that self-determination for Aboriginal and Torres Strait Islander peoples is fundamental to improving health outcomes.

Use of the term 'Indigenous'

The term 'Aboriginal and Torres Strait Islander peoples' is preferred in RFDS publications when referring to the separate Indigenous peoples of Australia. However, the term 'Indigenous peoples' is used interchangeably with 'Aboriginal and Torres Strait Islander peoples' in order to assist readability.

Throughout this publication, the term 'Indigenous peoples' refers to all persons who identify as being Aboriginal, Torres Strait Islander, or both Aboriginal and Torres Strait Islander.

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Foreword

Ruth Stewart

Australia is fortunate to have a world-class health system, the capability of which was both tested and proven during the COVID-19 pandemic. It is only reasonable that all Australians can expect sufficient access to our health system, no matter where they live. However, this report by the Royal Flying Doctor Service (RFDS) provides further evidence that this is not the case.

The result of this inequity sees rural and remote Australians in our hospitals more often and more frequently requiring emergency aeromedical retrievals by the RFDS for preventable conditions such as cardiovascular disease. Those in the most remote parts of our country are dying up to 19 years younger than those in our cities.

While most in our cities can access health services within minutes, mapping in this report demonstrated that over 44,000 people in remote and very remote Australia do not have any access to a primary healthcare service within a 60-minute drive time. This is just one measure that the Australian Institute of Health and Welfare proposes as an indicator of reasonable access to care and is used as a proxy in this report. We know there are many significant barriers to accessing adequate healthcare services throughout rural and remote Australia.

The challenge of ensuring that Australians in the bush can access the health services they need, when they need them, is not new. This report demonstrates how these challenges can be addressed by systematic service planning. We know where people live throughout our country, we are gaining increasing knowledge about the health services that are needed there. The RFDS is well placed to be part of the solution, delivering services in some of the hardest to reach places.

Through evidence, such as that presented in this report, identifying where there are inadequate services, where health and wellbeing of communities is most lacking, and the service models that are most effective, we can take informed steps to respond, working together to overcome these challenges once and for all.

Ruth Stewart
Adjunct Professor
National Rural Health Commissioner

Executive summary

Despite some of the challenges of life on the land, those in rural and remote parts of our country report higher rates of life satisfaction than in our cities. And it is critical, for our society, our identity and our economy that we have populations in these areas farming our fibre, mining our minerals and tending our traditional lands.

However, it is also well-established that rural and remote Australians consistently experience poorer health, with those living in the most remote areas demonstrating the worst health outcomes.[1,2] People in these communities have poorer access to health care services, including hospital services and comprehensive primary healthcare services, travel greater distances to receive such services, experience higher rates of ill health and potentially preventable hospitalisations, and demonstrate higher levels of mortality, morbidity and health and disease risk factors.[1-3]

Having provided essential health services, including emergency aeromedical retrievals and primary healthcare services, to rural and remote communities since 1928, the Royal Flying Doctor Service (RFDS) is acutely aware of the health challenges impacting these communities and is committed to being part of the solution to overcome them. Almost 30 years ago, the RFDS produced a Best for the Bush strategy document, focused on improving health service delivery to rural and remote Australians. The RFDS continues to pursue this and the objective of improved health outcomes in rural areas, embarking on an annual report series. The latest data on the health of rural and remote Australians is presented alongside RFDS aeromedical retrieval data and evidence on service gaps, to identify the issues that most urgently need attention from service providers, funders and policy makers.

Disparities in health outcomes and service access for those living in rural and remote areas, compared to those in our major cities, have existed for many years. We seek to ensure only the best for the bush, achieved through adequate, appropriate, timely and comprehensive care that ensures the highest standards of health and wellbeing, no matter where in Australia you live.

Moving the conversation to pursue solutions and action requires a sound understanding of the health issues impacting rural and remote Australia and the specific gaps in service provision that need to be addressed as the highest priority.

And there is no time to waste. The most recent Australian Census data shows that almost 30% of Australia's population live outside our major cities, and that those living in rural and remote areas are more likely to die at a younger age.[4,5] As recently as 2020, females in very remote areas were likely to die 19 years earlier than their counterparts in major cities, 13.9 years for males. Mortality rates were 1.5 times as high for women living in rural and remote Australia as those living in major cities, and 1.3 times as high for men.[4,5]

The health of Indigenous peoples in rural and remote areas is even poorer. While 3.5% of Australia's total population identify as Indigenous, around 32% of the total population in remote and very remote areas (combined) is Indigenous.[6] A comparison of the health of Indigenous peoples and non-Indigenous Australians in rural and remote Australia demonstrated:

- A gap in life expectancy between Indigenous peoples and non-Indigenous Australians, both male and female, which increased **with increasing remoteness**;
- Life expectancy between Indigenous and non-Indigenous people in remote and very remote Australia was around **14 years less** (14 years for women and 13.8 for men);[7] and
- Life expectancy between Indigenous peoples in remote and very remote areas as compared to Indigenous peoples in major cities was over **6 years less** (6.9 years less for women and 6.2 years less for men).[7,8]

The most recent data confirms that higher prevalence of modifiable risk factors, coupled with increased burden of disease in rural and remote areas, is directly contributing to more avoidable deaths and a lower life expectancy in rural and remote communities.[4,9] In remote and very remote parts of Australia as compared to major cities, total burden of disease rates of:

- Kidney and urinary diseases were **2.7 times as high**;
- Injury was **2.4 times as high**;
- Infectious diseases were **2.3 times as high**;
- Coronary heart disease was **2.2 times as high**; and
- Suicide/self-inflicted injuries were **2.0 times as high**.[9]

Additionally, age-standardised death rates for people in remote and very remote Australia were considerably higher than for people in major cities. Death rates for:

- Diabetes were **3.8 times as high** in very remote areas and the second leading cause of death, while only the seventh in major cities; [10]
- Suicide was **2.3 times as high** in very remote areas;[10] and
- Coronary heart disease was **1.7 times as high** in very remote areas.[10]

In addition, compared to people in major cities:

- People from very remote areas were **2.8 times more likely** to be hospitalised.[11] It was further shown that these hospitalisations were **2.5 time more likely** to be for reasons that are potentially preventable;[12]
- People in remote and very remote areas were **2.0 times as likely** to smoke daily;[13]
- Consumption of sugar sweetened drinks on a daily basis by people in remote and very remote areas was **1.9 times as high**;[14]
- Those in remote and very remote areas were **1.6 times more likely** to consume alcohol at levels that exceed both single occasion and lifetime risk guidelines;[13] and
- Those in rural and remote areas were **1.3 times more likely** to have consumed more than 10 alcoholic drinks in the last week.[14]

To supplement these data sets and shine further light on the key issues impacting the communities we serve in rural and remote Australia, this report also provides an analysis of RFDS service data.

In the last financial year, the RFDS had 387,042 patient contacts nationally, across all services including primary healthcare clinics (i.e. general practitioner, nursing, dental and mental health clinics), aeromedical retrievals, telehealth consultations and non-emergency patient transport. This is equivalent to over 1,000 patient contacts per day. It is the data from RFDS aeromedical retrievals, not otherwise comprehensively captured in national statistics, which is the focus of analysis in this report as a demonstration of where and for whom the most urgent need for care arises.

In 2021–22, the RFDS conducted 34,082 aeromedical retrievals, equivalent to **93 aeromedical retrievals per day, or four per hour**. Analysis of our national aeromedical data shows that:

- Over 30% of patients were Indigenous, reflecting the high proportion living in rural and remote areas;
- Over 55% of patients were male;
- The top three reasons for an aeromedical retrieval were:
  - Diseases of the circulatory system, which includes angina, heart attack and stroke (21.0%);
  - Injury, poisoning and certain other consequences of external causes, which includes as a result of falls, motor vehicle accidents, assaults, suicide attempts or exposure to chemicals (19.1%); and
  - Diseases of the digestive system, which includes gastro-oesophageal reflux, ulcers, appendicitis, bowel issues or diseases of the liver, gallbladder and pancreas (10.0%).

Diseases of the circulatory system are a significant issue for those in rural and remote Australia. And while for Indigenous patients overall, the most common reason for an aeromedical retrieval was injury and poisoning, diseases of the circulatory system was one of the leading reasons for an aeromedical retrieval for both non-Indigenous and Indigenous patients aged 45 years or older. Males comprised almost twice as many aeromedical retrievals for diseases of the circulatory system, suggesting that males in rural and remote Australia are likely to have increased numbers of risk factors for cardiovascular disease.

In many cases, cardiovascular disease can be prevented or carefully managed in the primary healthcare setting to avoid the need for urgent intervention, such as an aeromedical retrieval or hospitalisation. However, access to adequate or comprehensive primary healthcare is significantly lacking in many parts of rural and particularly remote Australia.

There are many factors that contribute to those in rural and remote Australia being able to access appropriate and effective services, and the very first is ensuring that they are available. As one measure to inform improved planning, the Australian Institute of Health and Welfare proposed that to ensure **reasonable access to primary healthcare people should have access to, at a minimum, general practitioner, nursing, oral health, mental health and Indigenous health services within a 60-minute drive time**.[3,15] This could include through permanent services, visiting or 'fly-in fly-out' services, and having timely access to telehealth services as part of an integrated suite of services.[3] In this report, this measure has been used as a simple proxy measure for reasonable access.

Through the RFDS Strategic Planning and Operational Tool, SPOT, which maps service data and overlays this with population data, the RFDS has been able to identify where this is not the case. We found that:

- **44,930** people in remote and very remote Australia had no access to any type of primary healthcare service within a 60-minute drive time of their place of residence;
- **57,899** people did not have access to general practitioner services, with the highest numbers of people without access in the regions of Daly-Tiwi-West Arnhem, the Kimberly and Far North Queensland;
- **208,247** people did not have access to nurse-led services, with the highest numbers of people without access in the regions of East Pilbara, Katherine and Esperance;
- **118,943** people did not have access to general dental services, with the highest numbers of people without access in the regions of West Pilbara, Alice Springs, and Daly-Tiwi-West Arnhem; and
- **134,851** people did not have access to general mental health services, with the highest numbers of people without access in the regions of West Pilbara, Alice Springs, and Daly-Tiwi-West Arnhem.

It is also noted that apart from the simple measure of a 60-minute drive time, there are many other barriers to access that must be addressed in work to develop a more comprehensive definition of reasonable access that is agreed by the rural health sector, funders and policy makers alike. This needs to take into account affordability, cultural appropriateness, availability, and frequency or mode of delivery. Further, the analysis in this report does not account for a patient's ability to access transport, for example a private motor vehicle or public transport, or the costs of doing so. It is also the case that even a 60-minute drive time is a significant undertaking in many places throughout rural and remote areas owing to factors such as difficult terrain, weather conditions or the poor condition of roads.

Providing comprehensive primary healthcare services to small populations across potentially vast geographic distances, as is the case in rural and remote Australia, is challenging, but can be overcome through non-traditional and innovative service models that are adequately and sustainably resourced. However, service delivery challenges are compounded by the well-documented maldistribution of the health workforce in these areas along with broader workforce challenges, including maldistribution of general practitioners and the impact of the ongoing COVID-19 pandemic including service interruption and workforce fatigue.

Previous RFDS research has forecast that in the next decade there will be significant shortages of essential health services in rural and remote Australia.[16] For example, in 2028 there is projected to be:

- Less than a fifth the number of general practitioners in remote Australia as compared to major cities;
- A twelfth of the number of physiotherapists;
- Half the number of pharmacists; and,
- Only a third the number of psychologists.[16]

These challenges exist in the face of seeking to recover from the COVID-19 pandemic and the significant interruptions to services that have further impacted the availability of care in rural and remote Australia. The World Health Organization (WHO) recently identified the backlogs and delays in non-emergency health care, including primary healthcare, caused by the COVID-19 pandemic that has led to late diagnosis of chronic diseases, as well as inadequate follow-up and control of patients.[17] WHO found that each delay in diagnosis and treatment may worsen health problems, prolong recovery and decrease chances of survival for patients.[17]

Further reflecting these issues, an additional review of RFDS aeromedical retrieval data was conducted, which compared the acuity of aeromedical retrievals pre-COVID-19 (1 July 2018 to 31 December 2019) and post COVID-19 (1 July 2020 to 31 December 2021) with initial results suggesting a 25% increase in priority one retrievals post-COVID-19. This suggests that the RFDS retrieved patients who were sicker after lockdowns and is likely to be a result of reduced access to primary healthcare during the pandemic.

This report concludes that returning to 'business as usual' primary healthcare, that was already inadequate, will only see even poorer health outcomes in the bush. Based on the findings of this report, the RFDS makes the following recommendations:

1. Ensure equal access to primary care through local planning

In order to address poorer health outcomes in rural and remote Australia, there must be more equitable access to services, equal utilisation of services and equal health outcomes for those in rural and remote areas as compared to other parts of Australia. Additional funding commitments from Governments to resource primary healthcare services for rural and remote Australians will be required, which should fund models of care that are flexible, client-centred and genuinely responsive to demonstrated need at a local level.

2. Primary care plans for certain populations, locations, and at risk populations

Focused effort should be made to establish and deliver comprehensive primary healthcare plans for high risk individuals, based on evidence of the most effective health preventions to ensure optimum health and wellbeing that is tracked through comprehensive monitoring and tracking.

3. Establish an agreed definition of 'reasonable access'

Equity of access is a major objective of the Medicare system–that being Australia's publicly-funded universal health care insurance scheme.[18] Consequently, all Australians should expect reasonable access to primary healthcare, no matter where they live.

In order to ensure this, an agreed and comprehensive definition of what constitutes 'reasonable' access is required. This definition must consider proximity, as well as affordability, cultural appropriateness, availability, frequency and mode of delivery.

4. Better data collection and integration

To achieve improved local service planning and the monitoring of better health outcomes, work must be undertaken to better collect and coordinate data related to the health and needs of those who reside in rural, and particularly remote, Australia.

5. A National Compact on Rural and Remote Health

To ensure results are achieved, it is critical that efforts across different elements of the health system are carefully coordinated and duplication and inefficiencies are avoided. The Australian Government should lead a National Compact on Rural and Remote Health, to serve as an inter-governmental agreement between the Commonwealth, States and Territories committing to tangibly improving the health outcomes of those living in rural and remote Australia.

Tables

Figures

Chapter 1: Health check on rural and remote Australians

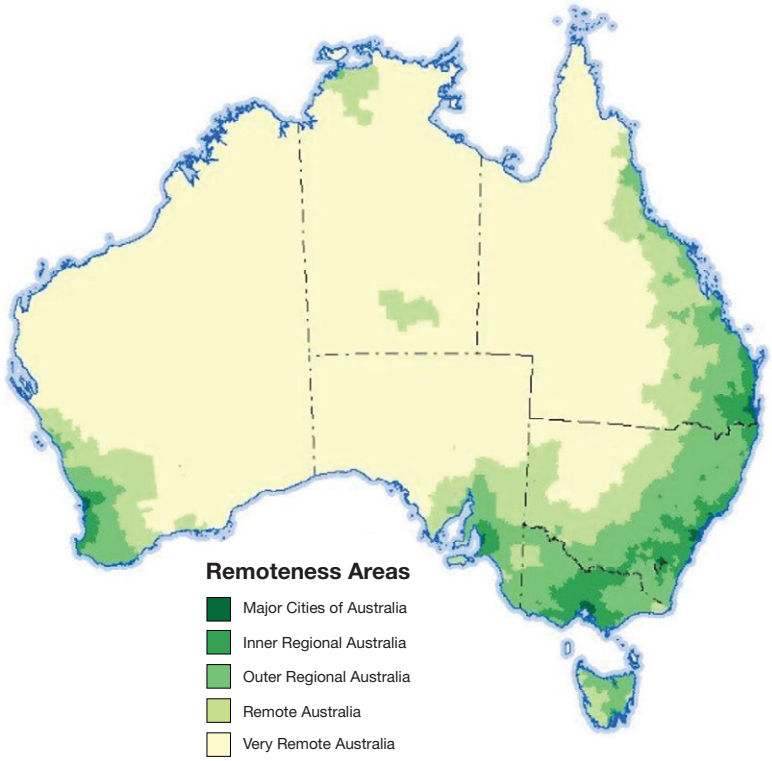
1.1 Defining rural and remote Australia

Australia is a vast continent, spanning 7.69 million square kilometres and is the world's sixth largest country by total area.[19]

The Australian Statistical Geography Standard Remoteness Structure defines remoteness areas in five classes of relative remoteness: major cities; inner regional; outer regional; remote; and very remote (Figure 1.1). These remoteness areas are centred on the Accessibility Remoteness Index of Australia, which is based on the road distances people have to travel for services.[20]

This report uses the term 'rural and remote' to cover any area outside of Australia's major cities.[4]

Figure 1.1. Remoteness areas of Australia



Source: Australian Bureau of Statistics (2021).[20]

1.2 Australian population by remoteness

Major cities comprise only 0.3% of Australia's land mass,[21] yet the majority of Australians live in these areas. Of Australia's estimated resident population of 25,688,079 in June 2021, just over seven million people lived in rural and remote Australia with around half a million living in remote or very remote Australia (Table 1.1).[22] The remaining population is not evenly distributed throughout the country—18.2% live in inner regional areas, 8.2% in outer regional areas, 1.1% in remote areas, and 0.8% in very remote areas.[22]

Table 1.1. Australia's population by remoteness areas, 2021

Remoteness area	Number (N)	Per cent (%)
Major cities	18,414,552	71.7%
Inner regional	4,683,923	18.2%
Outer regional	2,096,218	8.2%
Remote	297,990	1.1%
Very remote	195,396	0.8%
Total population	**25,688,079**	**100%**

Source: Australian Bureau of Statistics (2021).[22]

1.2.1 Aboriginal and Torres Strait Islander peoples

As at 30 June 2021, 896,265 people identified as Indigenous, representing 3.5% of the total Australian population.6 The proportion of the total population who are Indigenous increased with remoteness.[6]

Among Australia's Indigenous peoples, 38.5% live in major cities, 44.2% live in inner and outer regional areas and 17.3% live in remote and very remote areas combined (Table 1.2).[6] 31.5% of the total population in remote and very remote areas (combined) is Indigenous.[6] It is estimated that by the year 2031, there will be around 1.1 million Indigenous peoples.[6,23]

Table 1.2. Australia's Indigenous population by remoteness areas, 2021

Remoteness area	N	%	Proportion of total population that is Indigenous (%)
Major cities	344,765	38.5%	1.9%
Inner and outer regional	395,946	44.2%	5.8%
Remote and very remote	155,554	17.3%	31.5%
Total	**896,265**	**100%**	**3.5%**

Source: Australian Institute of Health and Welfare (2021).[6]

The age structure of Indigenous peoples is relatively young when compared with non-Indigenous Australians.[6] Data from the 2021 Census demonstrated:

- One-third (33.1%) of Indigenous peoples were aged under 15 years compared with 17.9% of non-Indigenous people in the same age group; [24] and
- People aged 65 years and over comprised 5.4% of the Indigenous population compared with 17.2% of the non-Indigenous population.[24]

1.2.2 Life expectancy[a]

In Australia in 2019–21, overall life expectancy at birth was 81.3 years for males and 86.3 years for females[25], however this differed by population group and place of residence.[26]

Table 1.3 demonstrates the life expectancy at birth in 2015–17, by remoteness areas, gender and Indigenous status. In 2015–17:

- The life expectancy of Australians living in remote and very remote parts of Australia was at least 2 years younger than their major city counterparts;[7]
- Both male and female Indigenous peoples had a lower life expectancy than their non-Indigenous counterparts across all remoteness categories;[7]
- The gap in life expectancy between Indigenous peoples and non-Indigenous Australians (both male and female) increased by increasing remoteness;
  - life expectancy of Indigenous males in remote and very remote Australia (65.9 years) was 13.8 years lower than non-Indigenous males in remote and very remote Australia (79.7 years);[7]
  - life expectancy of Indigenous females in remote and very remote Australia (69.6 years) was 14.0 years lower than non-Indigenous females in remote and very remote Australia (83.6 years);[7]
- Life expectancy of women was greater than for men across all remoteness areas, regardless of Indigenous status;[7] and
- Life expectancy for Indigenous males living in remote and very remote areas was 6.2 years lower than that of Indigenous males living in major cities (65.9 years compared with 72.1 years). The equivalent comparison for Indigenous females was 6.9 years lower (69.6 years compared with 76.5 years).[7,8]

a Life expectancy at birth estimates represent the average number of years that a newborn baby could expect to live, assuming current age-specific death rates are experienced through his/her lifetime.[23]

Table 1.3. Life expectancy at birth (years), by remoteness areas, gender and Indigenous status, 2015–17*

	Non-Indigenous	Indigenous	Difference between non-Indigenous and Indigenous life expectancy at birth**
Males			
Major cities	80.7	72.1	8.6 years
Inner and outer regional	79.1	70.0	9.1 years
Remote and very remote	79.7	65.9	13.8 years
Females			
Major cities	83.7	76.5	7.2 years
Inner and outer regional	82.8	74.8	8.0 years
Remote and very remote	83.6	69.6	14.0 years

*Based on the average number of Aboriginal and Torres Strait Islander deaths registered in 2015–17 adjusted for under/over identification of Indigenous status in registrations, and final Aboriginal and Torres Strait Islander population estimates for 30 June 2016 based on the 2016 Census.
**Differences are based on unrounded estimates.
Source: Australian Bureau of Statistics (2018).[7]

1.2.3 Death rates

Rural and remote Australians are more likely to die at a younger age from diseases than people living elsewhere in Australia.[4] Higher prevalence of modifiable risk factors, coupled with poorer access to services and increased burden of disease in rural and remote areas, is directly contributing to more avoidable deaths and a lower life expectancy in rural and remote communities.[4,9]

In 2020:

- Age-standardised death (mortality) rates increased as remoteness increased for males and females (Table 1.4);[4,5]
- Males had higher mortality rates than females across all remoteness categories;[4,5]
- Males living in very remote areas had a mortality rate 1.3 times as high as those living in major cities;[4,5]
- Females living in very remote areas had a mortality rate 1.5 times as high as those living in major cities;[4,5] and
- Males had a higher mortality rate than females in all remoteness areas, with the highest difference in remote areas—at 1.5 times higher.[4,5]

Table 1.4. Age standardised death rates, per 100,000 population, by remoteness areas, 2020

Gender	Major cities	Inner regional	Outer regional	Remote	Very remote	Very remote versus major city	Australia
Males	545.9	630.7	668.1	703.3	712.7	1.3	579.4
Females	388.6	435.9	461.0	468.7	569.5	1.5	406.6
Male v. female	1.4	1.4	1.4	1.5	1.3	-	1.4
Australia	461.3	528.8	563.0	587.6	648.4	1.4	487.7

Source: Data extrapolated from Australian Institute of Health and Welfare MORT Books (2022).[5]

The age-standardised death rate among Indigenous peoples was 1.7 times the rate among non-Indigenous Australians (935 deaths per 100,000 population, compared to 541 per 100,000 respectively)—this includes all remoteness categories combined.[10]

1.2.4 Age at death

As shown in Table 1.5, people living in rural and remote areas are more likely to die at a younger age than people living in major cities[4,5]—as recently as 2020, males in very remote areas were likely to die 13.9 years earlier than their counterparts in major cities[4,5] while females in very remote areas (median age at death 66.2 years) were likely to die 19 years earlier than their counterparts in major cities (median age at death 85.2 years).[4,5]

Table 1.5. Median age at death (years), by remoteness areas, 2020

Gender	Major cities	Inner regional	Outer regional	Remote	Very remote	Difference between remote and major city age at death	Australia
Males	79.6	78.7	76.8	73.1	65.7	13.9 years	78.9
Females	85.2	84.3	82.7	78.3	66.2	19.0 years	84.6
Total Population	82.4	81.3	79.4	74.9	66.0	16.4 years	81.7

Source: Data extrapolated from Australian Institute of Health and Welfare MORT Books (2022).[5]

1.3 Health of rural and remote Australians

Despite higher levels of life satisfaction,[27] rural and remote Australians have poorer access to health care, travel greater distances to receive medical services, experience higher rates of ill health and potentially preventable hospitalisations, and demonstrate higher levels of mortality, morbidity and health and disease risk factors.[1,2]

1.3.1 Social determinants of health

The health outcomes of rural and remote Australians are impacted by the social determinants of health, which include social, economic, environmental, political, behavioural, and biological factors, and cultural perceptions.[28]

In general, people in rural and remote areas experience: lower levels of education; lower levels of employment and lower household incomes; higher occupational risks and hazards, including physical risks and workplace pressures and stressors associated with farming and mining; the need for more long-distance travel; poorer access to fresh foods; and poorer access to health services.[21] Rural and remote Australians are also more likely to be of lower socio-economic status, to experience greater health risk factors,[21] to experience greater social isolation, and have poorer health literacy than people living in major cities.[29]

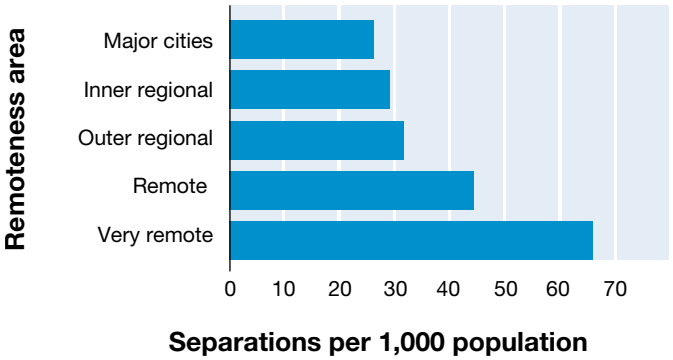
Indigenous peoples, who comprise a large proportion of rural and remote Australians, are further disadvantaged compared to their non-Indigenous counterparts, experiencing higher rates of illnesses, injuries, deaths and hospitalisations than non-Indigenous Australians, and these increase with increasing remoteness.[30] The RFDS is acutely aware that the disparity in health outcomes for Indigenous peoples, who are also impacted by social determinants of Indigenous health, including the significant, long-lasting and ongoing impacts of: dispossession; colonisation; loss of language and connection to the land; environmental deprivation; spiritual; emotional and mental disconnectedness; a lack of cultural respect; lack of opportunities for self-determination; poor educational attainment; reduced opportunities for employment; poor housing; negative interactions with government systems; and systemic discrimination and intergenerational trauma, including through the Stolen Generations.[31,32]

1.3.2 Potentially preventable hospitalisations

A potentially preventable hospitalisation describes a hospitalisation that could have been avoided by the provision of timely and adequate preventive health interventions and early disease management in primary healthcare or community-based healthcare settings by general practitioners, medical specialists, dentists, nurses and allied health professionals.[33] There are 22 conditions across three broad categories (vaccine-preventable conditions, acute conditions and chronic conditions) for which hospitalisation is considered potentially preventable.[33]

In 2017–18, 6.6% of all hospital admissions were potentially preventable.[12] Rural and remote Australians were overrepresented among potentially preventable hospitalisations (Figure 1.2). Potentially preventable hospitalisations were 2.5 times as high for people in very remote areas (66.1 per 1,000 population), 1.5 times as high for people in remote areas (44.5 per 1,000 population), 1.2 times as high for people in outer regional areas (31.8 per 1,000 population), and 1.1 times as high for people in inner regional areas (29.2 per 1,000 population) compared to people in major cities (26.2 per 1,000 population).[12] Indigenous peoples (79.9 per 1,000 population) were 3.0 times as likely as non-Indigenous Australians (26.7 per 1,000 population) to undergo a potentially preventable hospitalisation.[12]

Figure 1.2. Separations per 1,000 population for potentially preventable hospitalisations, by remoteness area, all hospitals, 2017–18



Source: Extrapolated from Australian Institute of Health and Welfare (2019).[12]

1.3.3 Burden of disease

Burden of disease, the measure of years of healthy life lost because of injury, illness or premature deaths in the population, is worse in remote and very remote areas, with total burden of disease being 1.4 times higher in these areas than in major cities in 2018.[9]

The disparity in total burden of disease rates between remote and very remote and major city Australians can also be seen across many specific diseases, including:

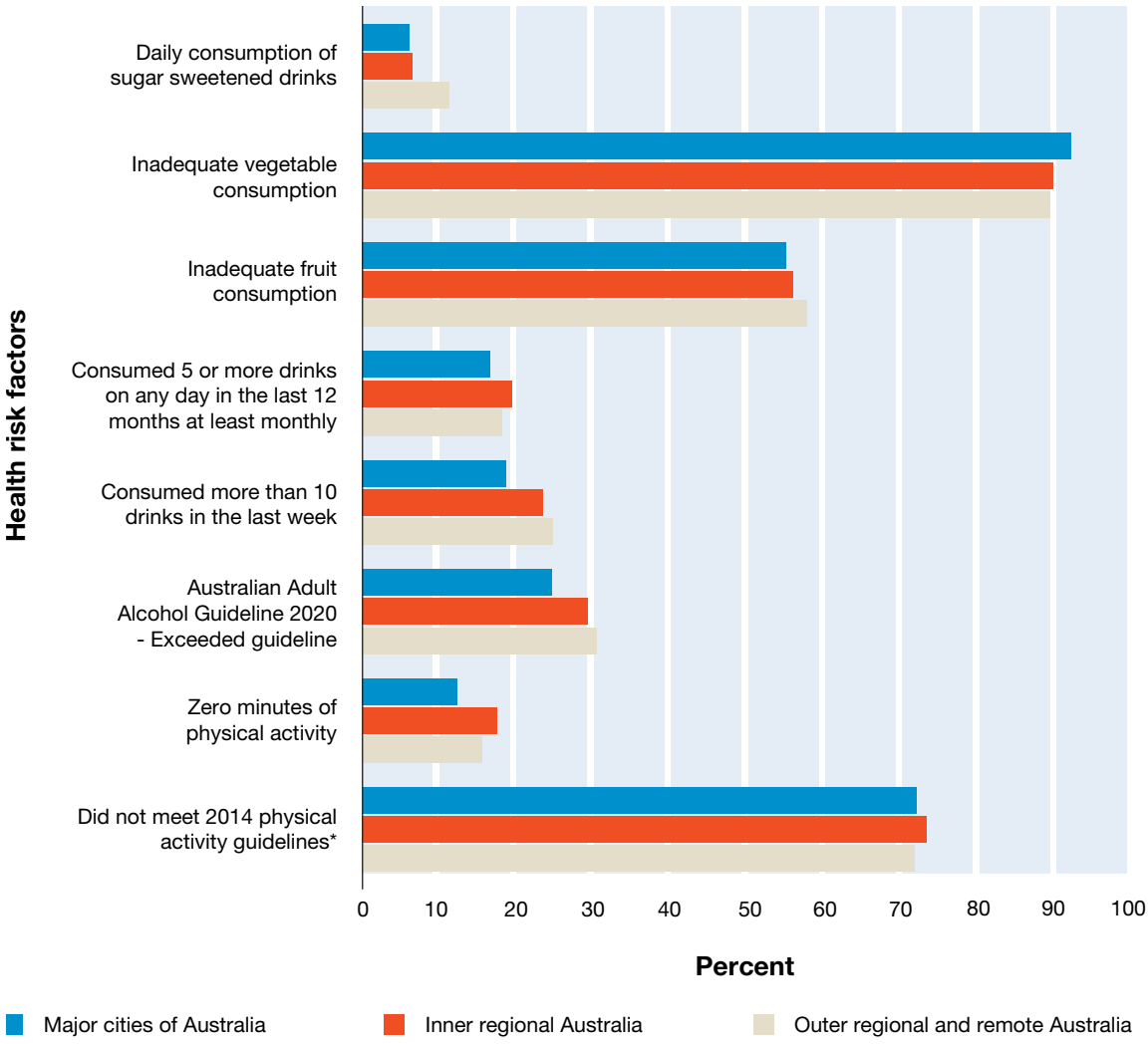
- Kidney and urinary diseases (remote and very remote areas rate was 2.7 times as high as for major cities);
- Injuries (2.4 times as high);
- Infectious diseases (2.3 times as high);
- Coronary heart disease (2.2 times as high); and
- Suicide/self-inflicted injuries (2.0 times as high).[9]

1.3.4 Heath risk factors

Health risk factors are attributes, characteristics or exposures that increase the likelihood of a person developing a disease or health disorder.[2] Many health problems can be prevented by reducing exposure to modifiable risk factors.[2]

The most common modifiable risk factors impacting rural and remote Australians include smoking, overweight and obesity, poor diet, alcohol and drug misuse, insufficient physical activity and high blood pressure (Figure 1.3).[2]

Figure 1.3. Proportion of adults that self-reported selected health risk factors, by remoteness of residence, 2020–21



Note: *Includes exercise and workplace activity.
Source: Data extrapolated from Australian Bureau of Statistics (2022).[14]

Sugar sweetened beverages

Frequent consumption of sugar sweetened beverages is associated with weight gain, obesity, type 2 diabetes, cardiovascular disease, kidney diseases, non-alcoholic liver disease, tooth decay and cavities, gout, and some cancers.[34-37]

In 2020–21, consumption of sugar sweetened drinks on a daily basis (11.2%) in outer regional and remote areas was 1.9 times as high as consumption in major cities (6.0%).[14]

Diet

Only around 10.0% of Australians, across all remoteness categories, ate the recommended serves of vegetables, with the majority reporting inadequate vegetable consumption.[14] Similarly, more than half of respondents across all remoteness areas—54.9% in major cities, 55.7% in inner regional areas and 57.6% in outer regional and remote areas—reported inadequate fruit consumption.[14]

Poor diet, comprising low amounts of fruits, vegetables and whole grains coupled with high intakes of sodium and saturated fat, is a primary contributor to the development of chronic disease, especially cardiovascular disease, type 2 diabetes, high blood pressure, and chronic kidney disease.[2]

Alcohol consumption

The 2020–21 National Health Survey reported that people in outer regional and remote areas were:

- 1.1 times as likely (18.1%) as people in major cities (16.5%) to have consumed five or more drinks on any day on the last 12 months at least monthly;
- 1.3 times as likely (24.6%) as people in major cities (18.6%) to have consumed more than 10 drinks in the last week; and
- 1.2 times as likely (30.3%) as people in major cities (24.5%) to have exceeded the 2020 Adult Alcohol Guideline.[14]

Similarly, increased alcohol consumption correlates with increasing remoteness.[13] In 2019, people in remote and very remote areas were:

- 1.6 times as likely as those in major cities to consume alcohol at levels that exceeded the lifetime risk guideline (25.0% compared with 15.5%);[13] and
- 1.6 times as likely as those in major cities to consume alcohol at levels that exceeded the single occasion risk guideline (38.0% compared with 24.0%).[13]

Alcohol, tobacco and other drugs can directly and indirectly impact Australians and are associated with disease and injury, road trauma, mental health conditions, family and domestic violence, crime, and marginalisation.[38]

To reduce the risk of alcohol related harm over a lifetime, it is recommended that people should not exceed two standard drinks per day (lifetime risk guidelines)[39] or have more than four standard drinks on one occasion at least once a month (single occasion risky drinkers (monthly).[39]

People who exceed the recommended guidelines for alcohol consumption may experience long-term effects.[40] These include, for example:

- Mental health issues such as increased risk of suicide;
- Substance abuse;
- Increased risk of diabetes and weight gain;
- Cancers such as stomach cancer, bowel cancer, breast cancer, mouth cancer, throat cancer, oesophageal cancer and liver cancer;
- Brain damage and brain-related conditions such as stroke and dementia;
- Heart issues such as high blood pressure, heart damage and heart attacks; and
- Cirrhosis of the liver and liver failure.[40]

Smoking

In 2019 people in remote and very remote areas were 2.0 times as likely as those in major cities to smoke daily (19.2% compared with 9.8%).[13]

Smoking increases the risk of lung cancer, heart disease, stroke, and oral cancer.[41] Smoking is also strongly linked to chronic obstructive pulmonary disease, including chronic bronchitis and emphysema.[41] Smokers are also more likely to develop severe influenza, pneumonia, and respiratory infections (and COVID-19), compared to non-smokers.[42,43]

Overweight and obesity

In 2018, more people in inner regional (71.0%) and outer regional and remote (70.3%) areas were overweight or obese, compared with major cities (65.1%).[2]

High Body Mass Index or obesity is directly associated with risk of cancer, including colon, breast, endometrium, oesophagus, and kidney[44] as well as being linked to the development of many chronic conditions such as diabetes and cardiovascular disease.[45]

Physical activity

The 2020–21 National Health Survey demonstrated that 15.5% of respondents in outer regional and remote areas did not engage in any physical activity on a regular basis (zero minutes) and 71.5% did not meet current Australian activity guidelines (noting that while many jobs in rural and remote areas entail physical labour, the survey reported both exercise and workplace activity combined).[14]

Low levels of physical activity are a major risk factor for several chronic conditions.[46] Without sufficient physical activity, people are at increased risk of cardiovascular disease, type 2 diabetes, osteoporosis, overweight and obesity, high blood pressure and high blood cholesterol.[46]

High blood pressure

The 2017–18 National Health Survey found that rates of high blood pressure were similar across all remoteness areas and ranged from 21.5% in major cities to 23.5% in outer regional and remote areas.[2]

High blood pressure is associated with increased risk of heart attack, stroke, heart failure and kidney disease.[47]

1.3.5 Causes of death

The leading causes of death in Australia between 2016 and 2020 have been identified (see Figure 1.4). Between 2016 and 2020:

- Coronary heart disease, which can lead to heart attack, was the leading cause of death across all remoteness areas;[10]
- The age-standardised death rate from coronary heart disease in very remote Australia (90 deaths per 100,000) was 1.7 times the rate in major cities (53 deaths per 100,000);[10]
- Diabetes was the second leading cause of death in very remote areas and seventh in major cities—the age-standardised death rates were 3.8 times as high in very remote areas as in major cities (53 and 14 deaths per 100,000 respectively);[10]
- Dementia including Alzheimer's disease had a lower ranking in remote and very remote areas (ranked fourth and eighth respectively) compared with major cities and regional areas (ranked second);[10]
- In very remote areas, the age-standardised death rates for suicide were 2.3 times as high as in major cities (25 and 11 deaths per 100,000 respectively);[10] and
- The top five causes of death for Indigenous peoples in 2016—20 were coronary heart disease, diabetes, chronic obstructive pulmonary disease, lung cancer and suicide.[10]

Figure 1.4. Leading underlying causes of death by remoteness area, 2016–20

	Remoteness area				
Rank	Major cities	Inner regional	Outer regional	Remote	Very remote
1st	Coronary heart disease	Coronary heart disease	Coronary heart disease	Coronary heart disease	Coronary heart disease
2nd	Dementia incl. Alzheimer's disease	Dementia incl. Alzheimer's disease	Dementia incl. Alzheimer's disease	Lung cancer	Diabetes
3rd	Cerebrovascular disease	Cerebrovascular disease	Lung cancer	Chronic obstructive pulmonary disease	Chronic obstructive pulmonary disease
4th	Lung cancer	Lung cancer	Cerebrovascular disease	Dementia incl. Alzheimer's disease	Lung cancer
5th	Chronic obstructive pulmonary disease	Chronic obstructive pulmonary disease	Chronic obstructive pulmonary disease	Cerebrovascular disease	Suicide

Source: Australian Institute of Health and Welfare (2022).[10]

1.3.6 Other health issues

There are many other health issues that disproportionately impact rural and remote Australians. Some of the longer term issues include, for example, mental health, poor oral health[48,49] and family, domestic and sexual violence.[4] In recent years, bushfires, floods, and drought have significantly impacted the health and mental health of rural and remote Australians while the COVID-19 pandemic, particularly the disruption to regular primary healthcare services, has also been detrimental for rural and remote communities.

Mental health

The prevalence of mental disorders in rural and remote Australia is similar to that of major cities, however age-standardised suicide and self-harm rates are higher.[50] In 2021 the age-standardised rates of suicide for residents of very remote areas (23.9 deaths per 100,000 population) and remote areas (21.2 deaths per 100,000 population) were 2.3 and 2.1 times (respectively) the rate for residents of major cities (10.0 deaths per 100,000 population).[51]

Previous RFDS research demonstrated that farmers, young men, older people, and Indigenous peoples in remote areas were at greatest risk of completing suicide.[50]

Oral health

People in rural and remote Australia have poorer oral health than people living in major cities, and oral health status declines with increasing remoteness.[49] Previous research has demonstrated that compared to people in major cities, rural and remote Australians have poorer access to dental services, experience longer travel times and have limited transport options to services.[49]

Poor oral health is associated with increased risk of several chronic diseases, including heart disease, oral cancers, type 2 diabetes, stroke, lung disease,[52] and poor pregnancy outcomes.[53]

Family, domestic and sexual violence

The Australian Bureau of Statistics 2016 Personal Safety Survey identified that 2.2 million adults had experienced physical and/or sexual violence from a partner since the age of 15.[54]

Previous research demonstrated that people living in rural and remote Australia were 1.4 times as likely to have experienced partner violence than those living in major cities.[2,54] Significantly, people living in remote and very remote areas were 24 times as likely to be hospitalised for domestic violence as those in major cities.[2,54]

COVID-19

COVID-19 incidence and mortality rates were higher in major cities than in rural or remote areas.[55] However, a high proportion of people in very remote areas were affected by COVID-19.[55] Further, around 42% of Indigenous peoples who contracted COVID-19 lived in a rural or remote area.[55]

Health impacts from COVID-19 can be more severe for those with underlying chronic conditions or higher prevalence of risky health behaviours.[4] With many of those increasing with remoteness, rural and remote communities are particularly vulnerable to enhanced health inequalities from COVID-19.[4,56]

Additionally, some rural and remote communities faced further challenges with the pandemic without the same resources available in major cities, and longer travel distances required to access testing and vaccination.[4,57]

A review of RFDS pre- and post-COVID-19 aeromedical retrieval data demonstrated a 25% increase in priority one (to be retrieved within one hour) primary evacuations post-COVID-19. This suggests that the RFDS retrieved patients who were sicker after lockdowns. This is potentially associated with reduced access to primary healthcare during the pandemic.

The World Health Organization (WHO) recently identified that backlogs and delays in non-emergency health care caused by the COVID-19 pandemic impacted populations across the world.[17] Primary healthcare has also been affected, leading to late diagnosis of chronic diseases, as well as inadequate follow-up and control of patients.[17] WHO found that each delay in diagnosis and treatment may worsen health problems, prolong recovery and decrease chances of survival for patients.[17] Countries now need to address these backlogs and this requires policy reforms to ensure that the additional workload can be absorbed by providers.[17]

Furthermore, WHO identified that restoring care to previous levels is not enough to overcome the backlogs and that multiple strategies are needed.[17] These include:

- Making up services to address delayed or deferred care;
- Increasing workforce and staffing;
- Improving productivity, management of capacity and demand; and
- Investing in capital, infrastructure and new models of care.[17]

Chapter 2: The RFDS in rural and remote Australia

2.1 About the RFDS

The RFDS is a national, charitable, health organisation delivering primary healthcare and 24-hour emergency services for those that live in rural and remote Australia. Long known as one of the largest aeromedical organisations in the world, the RFDS delivers health care where mainstream health services are not available, using the latest in aviation, medical, and communications technology and a broad-reaching ground-service fleet.

The RFDS delivers services through innovative and flexible service delivery models and via a number of service delivery platforms. For example, the RFDS delivers services through planned, permanent, or mobile, drive-in drive-out and fly-in fly-out services, and via telehealth.

With 79 aircraft at 23 aerobases, along with 183 road vehicles across Australia, the RFDS provides services to around 300,000 patients each year.

2.2 Services provided by the RFDS

The RFDS is perhaps best known for its aeromedical retrieval service, which provides the mantle of safety for those in rural and remote areas. The RFDS is available 24-hours, seven days a week (24/7) and is supported by a 24/7 telehealth system to patients who are beyond normal medical services and experience a medical emergency that requires transportation to hospital care. Aeromedical retrievals are made up of:

- Primary evacuations, that being an emergency medical service and retrieval for those beyond normal medical infrastructure;[b,58]
- Inter-hospital transfers, that being transfer between hospitals;[c,58]; and
- Repatriations, transporting patients back to their communities.[d]

Beyond the aeromedical retrieval service, the RFDS delivers a comprehensive suite of services to areas of rural and remote Australia, including on behalf of the Australian Government, to address lack of access to the Medical Benefits Schedule in these areas (Table 2.1). Services funded my state and territory governments, philanthropy and fundraising are also provided by the RFDS throughout Australia. Services provided by the RFDS include:

- General practitioner and nursing clinics
- COVID-19 immunisations and clinics
- Respiratory clinics
- Dental clinics
- Telehealth services
- Indigenous health services
- Medical chests
- Medical specialist outreach clinics
- Child and family health clinics
- Mental health, social and emotional wellbeing health services
- Allied health services such as physiotherapy and rehabilitation
- Hearing screening
- Physical activity programs
- Home monitoring.

b Primary evacuation: The provision of emergency medical services to victims of illness or accident who are in a serious or potentially life threatening condition who are beyond the normal medical infrastructure and who require transport and/or medical and nursing care during transport to the nearest suitable hospital (including all fixed wing air transport services directly related to these emergency medical services) but excluding transfers from one hospital to another.[58]

c Inter-hospital transfer: Transfer of patients between hospitals designated as normal medical infrastructure to get specialist treatment and life-saving surgery.[58]

d Repatriations: The transportation of patients from tertiary hospitals back to their communities.

Table 2.1. Current RFDS services by state and territory

	RFDS Section and Operation					
Services provided	South Australia and Northern Territory	Queensland	New South Wales	Victoria	Tasmania	Western Australia
Aboriginal health	✓	✓	✓	✓		✓
Alcohol and drug services			✓			
Automated External Defibrillators (AEDs)	✓					
Better Ageing	✓	✓	✓	✓	✓	
Clinic charter services	✓				✓	
Community transport				✓		
Covid-19 transfers (air/road)	✓	✓	✓	✓		✓
COVID-19 respiratory clinics			✓			
COVID-19 vaccination clinics	✓	✓	✓	✓		✓
Dental/oral health	✓	✓	✓	✓		✓
Eye care				✓		
GP clinics (primary healthcare)	✓	✓	✓	✓		✓
Nurse clinics (primary healthcare)	✓	✓	✓			✓
Health education and/or training and/or health promotion	✓	✓	✓	✓	✓	✓
Primary evacuations (aeromedical retrievals)	✓	✓	✓			✓
Inter-hospital transfers (aeromedical retrievals)	✓	✓	✓			✓
Flying Doctor Telehealth (Mantle)	✓			✓		✓
Medical chests	✓	✓				✓
Mental health and/or wellbeing services	✓	✓	✓			✓
Mobile event care	✓	✓	✓	✓		
Primary care outreach	✓		✓	✓	✓	✓
Road transfers	✓		✓	✓	✓	✓
Speech therapy				✓		
Telehealth (video—appointment based)	✓	✓	✓	✓	✓	✓
Telehealth (phone—unscheduled remote consultations)	✓	✓	✓	✓	✓	✓
Visitor centre	✓	✓	✓	✓	✓	✓

The RFDS prioritises a place-based approach to service planning, to target the specific circumstances of the individual communities we serve. In many communities, despite operating as an outreach service, the RFDS is the 'local doctor' providing high-quality, continuity of care—and in some cases, as the only provider for over 90 years. The RFDS endeavours to tailor services to the communities in which they are delivered, and is committed to both supporting the growth of local capacity and partnering with local service providers. Services are co-designed with the local community, consumers and carers, as well as partner organisations, such as Primary Health Networks and the Aboriginal and Torres Strait Islander health sector, including Aboriginal Community Controlled Health Organisations, and we continue to work with Indigenous communities and stakeholders to ensure services are culturally appropriate.

RFDS Services delivered in 2021–22

387,042 patient contacts

through RFDS clinics (GP, nursing, mental health, dental health), aeromedical retrievals and telehealth consultations, equivalent to more than 1,000 patient contacts per day.

GP CLINICS

32,157

patient contacts (88 per day); 3,087 clinics conducted

NURSING CLINICS

24,779

patient contacts (68 per day); 4,009 clinics conducted

MENTAL HEALTH CLINICS

16,974

patient contacts (46.5 per day); 7,222 clinics conducted

DENTAL CLINICS

16,873

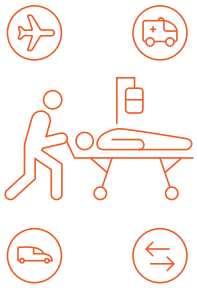
patient contacts (46 per day); 1,994 clinics conducted

TELEHEALTH

63,481

consultations, equivalent to 174 per day or 7.3 per hour (one every eight minutes)

>100,000 patient transports



45,374

AEROMEDICAL RETRIEVALS

124 per day or five per hour

4,674

PRIMARY EVACUATIONS

28,709

INTER-HOSPITAL TRANSFERS

699

REPATRIATIONS

65,800

ROAD TRANSPORTS

1,421

EARLY EVACUATIONS

Due to COVID-19

2.3 RFDS COVID-19 services

The RFDS has also been a critical part of Australia's ongoing response to the COVID-19 pandemic through the provision of aeromedical retrievals, respiratory clinics and vaccinations.

In addition to conducting over 7,500 retrievals for COVID-19 during the pandemic, the RFDS has supported local communities by providing a surge healthcare workforce, vaccination services, pandemic education and the transport and supply of essential items such as personal protective equipment, pathology and rapid antigen testing, in addition to flying food and water and menstrual products into isolated communities.

Between February 2020 and July 2022, the RFDS administered 92,522 vaccinations, across 460 separate locations and completed 2,845 clinic days. This is in addition to providing over 110,000 doses to external vaccination services. These services were provided in partnership with the Commonwealth Department of Health.

Chapter 3: RFDS aeromedical retrievals—A national perspective

The RFDS provides aeromedical retrievals for those from rural and remote areas who require urgent care in a tertiary hospital. Not all components of care provided to people who are transported via an aeromedical retrieval by the RFDS are reported in national statistics, and so an analysis of those conducted between July 2021 and June 2022 is provided to highlight some of the key health issues impacting communities in these areas. The methodology for this analysis is included at Appendix 1.

3.1 Summary data

In 2021–22, the RFDS conducted 34,082 aeromedical retrievals, equivalent to 93 aeromedical retrievals per day, or four per hour. Repatriations comprised 699 of the overall aeromedical retrievals and are excluded from the remaining analyses.

The remainder of this report presents outcome data for 33,383 aeromedical retrievals. The majority, (N=28,709, 86.0%) were inter-hospital transfers and the remaining 4,674 (14.0%) were primary evacuations.

More than one in ten (N=3,869, 11.6%) RFDS aeromedical retrievals were priority one retrievals, 16,372 (49.1%) were priority two retrievals; and the remaining 13,137 (39.4%) were priority three retrievals.

3.2 Patient characteristics

Figures 3.1 and 3.2 demonstrate the number of patients that underwent an aeromedical retrieval by 5-year age group and Indigenous status, and the number of patients that underwent an aeromedical retrieval by gender and Indigenous status, respectively. The following was observed for RFDS aeromedical retrievals in 2021–22:

- People of all age groups underwent aeromedical retrievals, that is the age range of patients was newborn to 85 years of age or older;
- 20,622 (69.2%) patients were non-Indigenous and 9,185 (30.8%) were Indigenous which broadly reflects the demographics of remote and very remote Australia;
  - 25 Indigenous patients and 56 non-Indigenous patients underwent an aeromedical retrieval each day;
- The median age of all patients was 50–54 years;
  - The median age of non-Indigenous patients was 60–64 years;
  - The median age of Indigenous patients was 35–39 years;
- 18,791 (56.3%) patients were male and 14,575 (43.7%) were female;
  - 12,395 (60.1%) non-Indigenous patients were male and 8,220 (39.9%) were females
  - 4,224 (46.0%) Indigenous patients were male and 4,961 (54.0%) were female;
- Non-Indigenous males were 1.5 times as likely as non-Indigenous females to undergo an aeromedical retrieval;
- Indigenous females were 1.2 times as likely Indigenous males to undergo an aeromedical retrieval;
- The highest number of retrievals for all patients were for people aged 65–69 years (N=2,787, 8.4%) and 70–74 years (N=2,727, 8.2%);
  - For non-Indigenous patients, the highest number of retrievals were for people aged 70–74 years (N=2,078, 10.1%) and 65–69 years (N=1,987, 9.6%);
  - For Indigenous patients, the highest number of retrievals were for people aged 0–4 years (N=917, 10.0% and 45–50 years (N=803, 8.7%);
- Reflecting the lower life expectancy, the proportion of Indigenous patients retrieved declined steeply for people aged 60 years and older; and
- 2,749 (29.9%) of retrievals of Indigenous patients were primary evacuations compared to 1,725 (8.4%) of retrievals for non-Indigenous retrievals.

Figure 3.1. Number of patients that underwent an RFDS aeromedical retrieval, by 5-year age group and Indigenous status, 2021–22

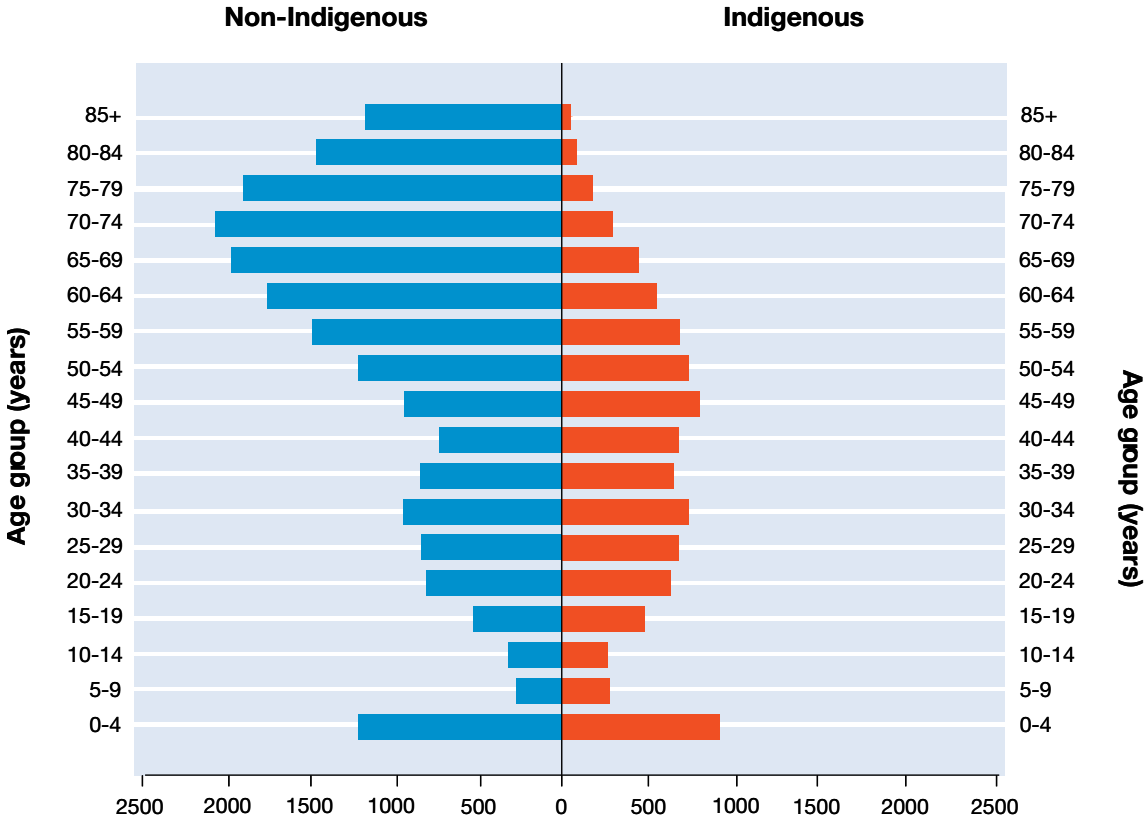
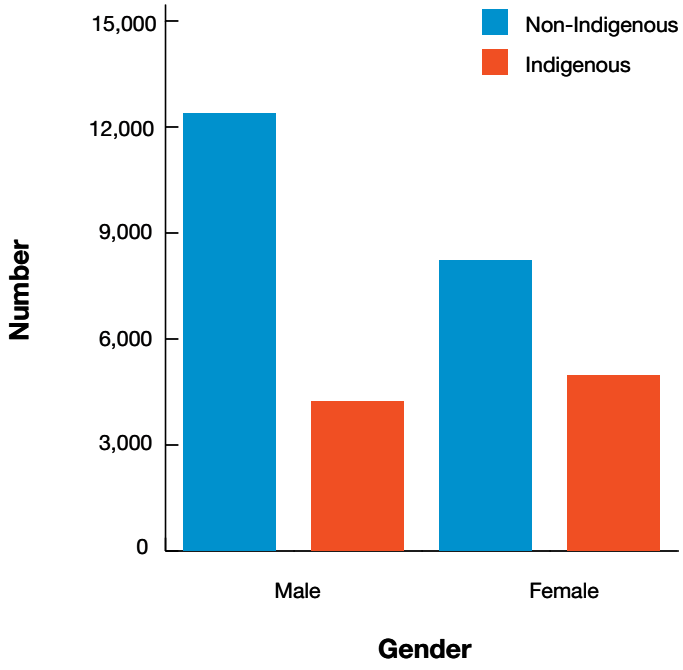


Figure 3.2. Number of patients that underwent an RFDS aeromedical retrieval, by gender and Indigenous status, 2021–22



3.3 Reasons for retrieval

Figure 3.3 demonstrates the number of people that underwent an aeromedical retrieval (as coded by RFDS clinicians under the ICD-10-AM) by Indigenous status. Figure 3.4 presents the top five reasons for an aeromedical retrieval by gender and Indigenous status. The data demonstrated that in 2021–22:

- The top five reasons for an aeromedical retrieval were for:
  - Diseases of the circulatory system (N=6,411, 21.0%);
  - Injury, poisoning and certain other consequences of external causes (N=5,829, 19.1%);
  - Diseases of the digestive system (N=3,044, 10.0%);
  - Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified (N=3,023, 9.9%); and
  - Diseases of the respiratory system (N=1,924, 6.3%).
- For Indigenous patients the top two reasons for an aeromedical retrieval were reversed — Indigenous patients were most likely to be retrieved for injury, poisoning and certain other consequences of external causes, followed by diseases of the circulatory system; and
- Aeromedical retrieval for pregnancy, childbirth and the puerperium (N=1,207, 4.0%) was the fifth most common reason for a retrieval of a female.

Figure 3.3. RFDS Aeromedical retrievals by ICD-10-AM chapter and Indigenous status, 2021–22

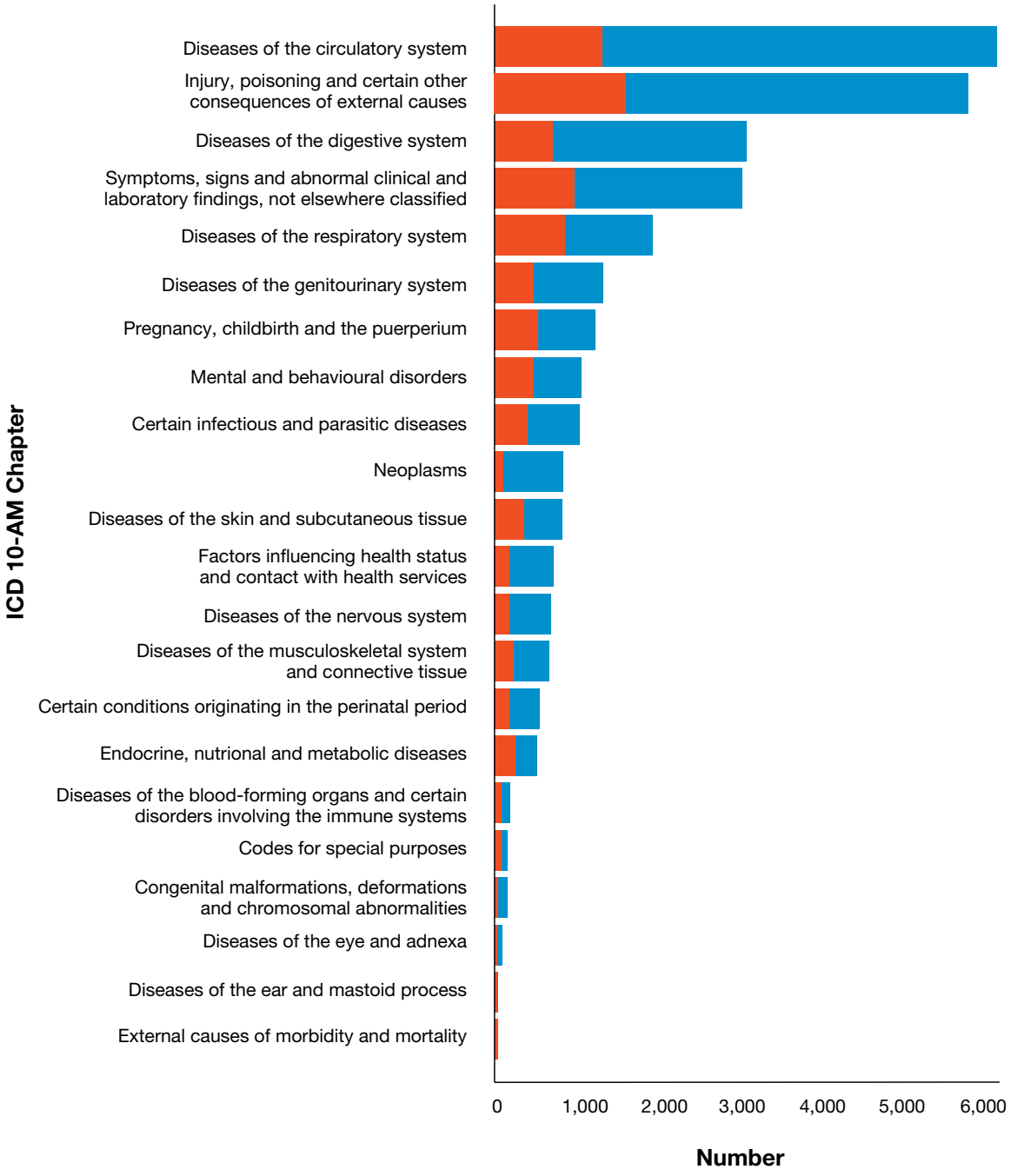


Figure 3.4. Leading reasons for RFDS aeromedical retrievals (number and proportion of total), by gender and Indigenous status, 2021–22

	Demographic characteristics				
Rank	All persons	Male	Female	Non-Indigenous	Indigenous
1st	Diseases of the circulatory system N=6,411 (21.0%)	Diseases of the circulatory system N=4,106 (13.4%)	Diseases of the circulatory system N=2,304 (7.6%)	Diseases of the circulatory system N=4,349 (16.0%)	Injury, poisoning and certain other consequences of external causes N=1,557 (5.7%)
2nd	Injury, poisoning and certain other consequences of external causes N=5,829 (19.1%)	Injury, poisoning and certain other consequences of external causes N=3,546 (11.6%)	Injury, poisoning and certain other consequences of external causes N=2,281 (7.5%)	Injury, poisoning and certain other consequences of external causes N=3,665 (13.4%)	Diseases of the circulatory system N=1,197 (4.4%)
3rd	Diseases of the digestive system N=3,044 (10.0%)	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified N=1,667 (5.5%)	Diseases of the digestive system N=1,395 (4.6%)	Diseases of the digestive system N=2,125 (7.8%)	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified N=879 (3.2%)
4th	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified N=3,023 (9.9%)	Diseases of the digestive system N=1,648 (5.4%)	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified N=1,356 (4.5%)	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified N=1,859 (6.8%)	Diseases of the respiratory system N=772 (2.8%)
5th	Diseases of the respiratory system N=1,924 (6.3%)	Diseases of the respiratory system N=1,117 (3.7%)	Pregnancy, childbirth and the puerperium N=1,207 (4.0%)	Diseases of the respiratory system N=972 (3.6%)	Diseases of the digestive system N=659 (2.4%)

The leading three reasons patients required an aeromedical retrieval, by Indigenous status and 5-year age group are demonstrated in Figure 3.5, which shows that:

- For children 0-4 years:
  - The top reasons for retrieval of non-Indigenous children were for:
    i. Certain conditions originating in the perinatal period (30.2%); and
    ii. Injury, poisoning and certain other consequences of external causes (13.6%);
  - The top reasons for retrieval of Indigenous children were for:
    i. Diseases of the respiratory system (23.9%); and
    ii. Certain conditions originating in the perinatal period (17.2%).
- For 5-44 year olds:
  - Injury, poisoning and certain other consequences of external causes was the leading reason for an aeromedical retrieval for both non-Indigenous and Indigenous patients.
- For those over 45 years old:
  - Diseases of the circulatory system, which includes cardiovascular disease, heart attack and stroke, was the leading reason for an aeromedical retrieval for both non-Indigenous and Indigenous patients aged 45 years or older.

Looking at particular diagnosis categories:

- Pregnancy, childbirth and the puerperium was the second most common reason for an aeromedical retrieval for non-Indigenous and Indigenous patients aged 20–34 years. More than one in ten (12.3%) retrievals of Indigenous patients aged 15–19 years were for pregnancy, childbirth and the puerperium;
- Diseases of the respiratory system was the second most common reason for an aeromedical retrieval for Indigenous patients aged 55–59 years and 65 years of age and older and accounted between 11.6% and 18.6% of retrievals in these age groups;
- Aeromedical retrievals for diseases of the digestive system were common across multiple age groups; and
- Mental and behavioural disorders resulted in one in ten aeromedical retrievals of Indigenous patients aged 25–34 years and 17.4% of retrievals for Indigenous patients aged 15–19 years.

Figure 3.5. Leading three reasons patients required an RFDS aeromedical retrieval, by Indigenous status and 5-year age group, 2021–22*

Age group (years)	Top three reasons for aeromedical retrieval					
	1st		2nd		3rd	
	Non-Indigenous	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	Indigenous
0–4	Certain conditions originating in the perinatal period N=336 (30.2%)	Diseases of the respiratory system N=195 (23.9%)	Injury, poisoning and certain other consequences of external causes N=151 (13.6%)	Certain conditions originating in the perinatal period N=140 (17.2%)	Diseases of the respiratory system N=143 (12.9%)	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified N=105 (12.9%)
5–9	Injury, poisoning and certain other consequences of external causes N=109 (42.6%)	Injury, poisoning and certain other consequences of external causes N=80 (32.4%)	Diseases of the digestive system N=27 (10.6%)^	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified N=38 (15.4%)	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified N=27 (10.6%)^	Diseases of the skin and subcutaneous tissue N=26 (10.5%)
10–14	Injury, poisoning and certain other consequences of external causes N=129 (43.0%)	Injury, poisoning and certain other consequences of external causes N=71 (29.1%)	Diseases of the digestive system N=34 (11.3%)	Diseases of the digestive system N=30 (12.3%)	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified N=27 (9.0%)	Diseases of the circulatory system N=25 (10.3%)
15–19	Injury, poisoning and certain other consequences of external causes N=215 (43.9%)	Injury, poisoning and certain other consequences of external causes N=147 (32.4%)	Diseases of the digestive system N=50 (10.2%)	Mental and behavioural disorders N=79 (17.4%)	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified N=49 (10.0%)	Pregnancy, childbirth and the puerperium N=56 (12.3%)
20–24	Injury, poisoning and certain other consequences of external causes N=265 (34.8%)	Injury, poisoning and certain other consequences of external causes N=157 (26.3%)	Pregnancy, childbirth and the puerperium N=102 (13.4%)	Pregnancy, childbirth and the puerperium N=131 (21.9%)	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified N=96 (12.6%)	Diseases of the digestive system N=56 (9.4%)
25–29	Injury, poisoning and certain other consequences of external causes N=201 (25.9%)	Injury, poisoning and certain other consequences of external causes N=155 (24.6%)	Pregnancy, childbirth and the puerperium N=157 (20.2%)	Pregnancy, childbirth and the puerperium N=122 (19.3%)	Diseases of the digestive system N=97 (12.5%)	Mental and behavioural disorders N=67 (10.6%)
30–34	Injury, poisoning and certain other consequences of external causes N=227 (25.6%)	Injury, poisoning and certain other consequences of external causes N=171 (25.0%)	Pregnancy, childbirth and the puerperium N=191 (21.5%)	Pregnancy, childbirth and the puerperium N=82 (12.0%)	Diseases of the digestive system N=110 (12.4%)	Mental and behavioural disorders N=76 (11.1%)
35–39	Injury, poisoning and certain other consequences of external causes N=183 (23.7%)	Injury, poisoning and certain other consequences of external causes N=132 (22.5%)	Pregnancy, childbirth and the puerperium N=123 (15.8%)	Diseases of the circulatory system N=75 (12.8%)	Diseases of the digestive system N=101 (13.1%)	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified N=59 (10.1%)

40–44	Injury, poisoning and certain other consequences of external causes N=173 (25.5%)	Injury, poisoning and certain other consequences of external causes N=120 (19.3%)	Diseases of the circulatory system N=106 (15.6%)	Diseases of the circulatory system N=112 (18.0%)	Diseases of the digestive system N=95 (14.0%)	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified N=74 (11.9%)
45–49	Diseases of the circulatory system N=220 (25.1%)	Diseases of the circulatory system N=174 (23.7%)	Injury, poisoning and certain other consequences of external causes N=174 (19.8%)	Injury, poisoning and certain other consequences of external causes N=117 (15.9%)	Diseases of the digestive system N=115 (13.1%)	Diseases of the digestive system N=75 (10.2%)
50–54	Diseases of the circulatory system N=307 (27.4%)	Diseases of the circulatory system N=154 (23.0%)	njury, poisoning and certain other consequences of external causes N=202 (18.0%)	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified N=85 (12.7%)	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified N=148 (13.3%)	Injury, poisoning and certain other consequences of external causes N=79 (11.8%)
55–59	Diseases of the circulatory system N=429 (31.5%)	Diseases of the circulatory system N=169 (26.8%)	Injury, poisoning and certain other consequences of external causes N=209 (15.3%)	Diseases of the respiratory system N=76 (12.1%)	Diseases of the digestive system N=151 (11.1%)	Injury, poisoning and certain other consequences of external causes N=60 (9.5%)
60–64	Diseases of the circulatory system N=554 (34.4%)	Diseases of the circulatory system N=125 (24.9%)	Injury, poisoning and certain other consequences of external causes N=225 (14.0%)	Injury, poisoning and certain other consequences of external causes N=59 (11.8%)	Diseases of the digestive system N=190 (11.8%)	Diseases of the respiratory system N=55 (11.0%)
65–69	Diseases of the circulatory system N=620 (34.1%)	Diseases of the circulatory system N=101 (24.6%)	Injury, poisoning and certain other consequences of external causes N=256 (14.1%)	Diseases of the respiratory system N=53 (12.9%)	Diseases of the digestive system N=202 (11.1%)	Injury, poisoning and certain other consequences of external causes N=47 (11.4%)
70–74	Diseases of the circulatory system N=599 (31.6%)	Diseases of the circulatory system N=61 (22.3%)	Injury, poisoning and certain other consequences of external causes N=245 (12.9%)	Diseases of the respiratory system N=35 (12.8%)	Diseases of the digestive system N=230 (12.1%)	**
75–79	Diseases of the circulatory system N=560 (32.7%)	Diseases of the circulatory system N=40 (23.1%)	Injury, poisoning and certain other consequences of external causes N=236 (13.8%)	Diseases of the respiratory system N=20 (11.6%)	Diseases of the digestive system N=184 (10.8%)	Injury, poisoning and certain other consequences of external causes N=19 (11.0%)
80–84	Diseases of the circulatory system N=414 (31.2%)	Diseases of the circulatory system N=16 (19.8%)	Injury, poisoning and certain other consequences of external causes N=219 (16.5%)	Diseases of the respiratory system N=15 (18.6%)	Diseases of the digestive system N=132 (10.0%)	Injury, poisoning and certain other consequences of external causes N=14 (17.3%)
85+	Diseases of the circulatory system N=265 (25.8%)	Injury, poisoning and certain other consequences of external causes N=13 (26.0%)	Injury, poisoning and certain other consequences of external causes N=232 (22.6%)	n.p.	Diseases of the digestive system N=123 (12.0%)	n.p.

Notes: * Proportions represent within age group analysis for non-Indigenous and Indigenous patients.
^ Same number of retrievals for each ICD-10-AM Chapter heading.
** Multiple ICD-10-AM chapter headings with the same proportion of patients, data not published.
n.p. Not published due to small numbers (<10).

3.4 Retrieval pick-up and drop-off locations

Data regarding the airstrip from which a patient was retrieved (pick-up location) and transported to (drop-off location) was collected and is reported.

The top 10 RFDS aeromedical retrieval pick-up locations (Figure 3.6) were:

1. Adelaide, South Australia;
2. Rockhampton, Queensland;
3. Brisbane, Queensland;
4. Geraldton, Western Australia;
5. Hervey Bay, Queensland;
6. Bundaberg, Queensland;
7. Mt Gambier, South Australia;
8. Albany, Western Australia;
9. Broome, Western Australia; and
10. Port Pirie, South Australia.

Figure 3.6. Top 10 RFDS aeromedical retrieval pick-up locations, 2021–22

Data on primary evacuations, whereby a patient is retrieved from a rural or remote location rather than a health facility, was collected. The top 10 RFDS aeromedical retrieval pick-up locations for primary evacuations (Figure 3.7) were:

1. Yuendumu, Northern Territory;
2. Aurukun, Queensland;
3. Ayres Rock (Connellan), Northern Territory;
4. Warburton Ranges, Western Australia;
5. Pormpuraaw, Queensland;
6. Kowanyama, Queensland;
7. Shark Bay, Western Australia;
8. Leinster, Western Australia;
9. Utopia, Northern Territory; and
10. Ti Tree, Northern Territory.

Figure 3.7. Top 10 RFDS aeromedical retrieval pick-up locations for primary evacuations, 2021–22

The top 10 RFDS aeromedical drop-off locations, where the patient received definitive care (Figure 3.8), were:

1. Jandakot, Western Australia;
2. Adelaide, South Australia;
3. Brisbane, Queensland;
4. Alice Springs, Northern Territory;
5. Townsville, Queensland;
6. Broome, Western Australia;
7. Cairns, Queensland;
8. Rockhampton, Queensland;
9. Mt Isa, Queensland; and
10. Toowoomba, Queensland.

Figure 3.8. Top 10 RFDS aeromedical retrieval drop-off locations, 2021–22

3.5 Discussion—aeromedical retrieval data

RFDS aeromedical retrieval data demonstrated that between July 2021 and June 2022, the RFDS conducted 33,383 aeromedical retrievals (excluding repatriations). This equated to 91.4 retrievals per day or 3.8 per hour. Previous analysis of RFDS aeromedical data, collected between July 2013 and December 2015, demonstrated that the RFDS conducted 72,446 aeromedical retrievals (excluding repatriations), equivalent to 79.4 aeromedical retrievals per day or 3.3 per hour.[30] The number of retrievals conducted by the RFDS during the current reporting period were considerably higher than previous data collected between July 2013 and December 2015 (additional 12 aeromedical retrievals per day in 2021–22).

This discrepancy is, in part likely explained by the COVID-19 pandemic. During some of the period when the current data were collected, Australia was under stay at home orders. Consequently, it is likely that the greater number of daily aeromedical retrievals in 2021–22 reflect the fact that people with acute or chronic conditions, that may normally have been treated through regular RFDS primary healthcare clinics, or other health services, were unable to get timely care. This may have resulted in the need for an emergency aeromedical retrieval to receive definitive care in a tertiary hospital.

Indeed, an additional review of RFDS aeromedical retrievals in pre-COVID-19 (1 July 2018 to 31 December 2019) and post COVID-19 (1 July 2020 to 31 December 2021) periods indicated a 25% increase in priority one retrievals (to be retrieved within one hour) post-COVID-19. This trend is likely to continue until primary healthcare services are fully operational and health services have had the opportunity to deliver 'catch-up' services for rural and remote Australians.

The World Health Organisation has identified that backlogs and delays in non-emergency health care caused by the COVID-19 pandemic have impacted populations across the world.[17] Primary healthcare has also been affected, leading to late diagnosis of chronic diseases, as well as inadequate follow-up and control of patients.[17] It is likely that the increase in higher acuity primary evacuations have resulted from poor access to healthcare during the pandemic, when access to services was restricted due to lockdowns.

Some retrievals were for potentially preventable hospitalisations, which are known to be as much as 2.5 times as high for people in very remote Australia compared to people in major cities.[12] There is strong evidence that some hospitalisations could potentially be prevented through the provision of appropriate health interventions and early disease management delivered in primary care and community-based care settings.[12] Examples of primary healthcare interventions that may help people avoid hospitalisation include:

- Reducing and managing disease risk factors;
- Vaccinations;
- Diagnosis and prescribing to manage infections;
- Lifestyle interventions to reduce the development of chronic conditions; and
- Management of chronic conditions to slow progression and risk of complications, including support for self-management.[59]

Previous RFDS research predicted that trends of stability in the numbers of emergency aeromedical retrievals were expected to continue through to 2028, with no significant increase.[16] However, the researchers predicted that with the decentralisation of health networks, the closure of regional hospitals and an increasingly ageing population suffering from complex and age-related illness, the demand for RFDS inter-hospital transfers would grow significantly throughout the next ten years.[16]

3.5.1 Patient characteristics

The data demonstrated that people of all ages, from newborn to 85 years of age or older underwent an aeromedical retrieval in 2021–22. A large proportion of patients were non-Indigenous (69.2%) while 30.8% were Indigenous. Since around 32% of the total population in remote and very remote areas (combined) is Indigenous,[6] the RFDS would expect this to be represented in the proportion of Indigenous patients that underwent an RFDS aeromedical retrieval. These findings are similar to previous analyses of RFDS aeromedical retrieval data, suggesting that the age range and proportion of Indigenous patients that underwent an aeromedical retrieval by the RFDS has remained steady over the last decade.[30,60]

Although the median age of all patients that underwent an aeromedical retrieval was 50–54 years, Indigenous patients (median age range 35–39 years) were around 20–25 years younger than non-Indigenous patients (median age range 60–64 years) when they were retrieved. Similarly, the number of Indigenous patients that underwent an aeromedical retrieval over the age of 60 years declined sharply.

This discrepancy can be explained by reviewing life expectancy and population data. Australian data has demonstrated that both male and female Indigenous peoples have a lower life expectancy than their non-Indigenous counterparts across all remoteness categories and that the gap in life expectancy between Indigenous peoples and non-Indigenous Australians (both male and female) increases by increasing remoteness.[7] In addition, the age structure of Indigenous peoples is relatively young when compared with non-Indigenous peoples[6]—33.1% of Indigenous peoples were aged under 15 years compared with 17.9% of non-Indigenous people in the 2021 census.[24] Similarly, people aged 65 years and over comprised only 5.4% of the Indigenous population compared with 17.2% of the non-Indigenous population. [24]

The data also demonstrated that more than half of all patients (56.3%) patients were male. This mirrors previous RFDS research, which demonstrated male overrepresentation in aeromedical retrievals for accidents and injuries[60] and stroke.[61] Indigenous females were 1.2 times as likely Indigenous males to undergo an aeromedical retrieval. This is likely due to retrievals for pregnancy, childbirth and the puerperium.

3.5.2 Diagnoses

Diseases of the circulatory system

The results demonstrated that diseases of the circulatory system were the main reason for an aeromedical retrieval in 2021–22 accounting for 21.0% of retrievals. Diseases of the circulatory system are often referred to as cardiovascular diseases or heart, stroke and vascular disease and encompass a range of conditions, including angina, heart attack and stroke.[62] Cardiovascular disease is a leading cause of mortality and morbidity worldwide—in 2019 it accounted for 32% of global deaths, with 85% due to heart attack and stroke[63], and was the underlying cause of 25% of all deaths in Australia in the same year.[62]

The 2017–18 National Health Survey showed that 1.2 million Australians (6.2% of the adult population) had one or more conditions related to heart, stroke and vascular disease.[62] The prevalence of heart, stroke and vascular disease was higher in men in 2019.[62] In 2020–21, Indigenous peoples (32.3 per 1,000 population) were more likely to be admitted to hospital than non-Indigenous Australians (19.0 per 1,000 population) for diseases of the circulatory system.[64]

When RFDS data was interrogated, it was clear that diseases of the circulatory system were significant issues for both males and females. However, males comprised almost twice as many aeromedical retrievals for diseases of the circulatory system, suggesting that males in rural and remote Australia are likely to have increased numbers of risk factors for cardiovascular disease.

In terms of male help-seeking, previous research has demonstrated that men are more likely to self-monitor their health status for longer, have shorter consultations when they visit a general practitioner, see general practitioners later in their illness and leave significant health issues unattended.[65-67]

A review of RFDS aeromedical data collected between 1 July 2019 and 30 October 2020 identified that Indigenous peoples that underwent an emergency aeromedical retrieval for heart, stroke and vascular disease had higher prevalence rates, were younger, and had higher rates of hospitalisation than non-Indigenous Australians.[68]

The RFDS recognises that heart, stroke and vascular disease is a significant issue for rural and remote Australians that use RFDS services and is developing a report that presents an in-depth analysis of our heart, stroke and vascular disease service data in this year's Best for the Bush, In Focus report.

Injury, poisoning and certain other consequences of external causes

Injury, poisoning and certain other consequences of external causes was the second most common reason for an RFDS aeromedical retrieval overall (N=5,829, 19.1%) in 2021–22 and the leading reason for an aeromedical retrieval of Indigenous peoples and people aged 5–44 years. Males were overrepresented in aeromedical retrievals for injury, poisoning and certain other consequences of external causes.

In 2021, 4.4 million people died from injuries, comprising almost 8% of deaths worldwide.[69] It is estimated that worldwide, around one in three injury deaths result from traffic accidents, one in six from suicide, one in 10 from homicide and one in 61 from war and conflict.[69] Twice as many males as females are killed each year as a result of injuries.[69]

Injury is a major cause of death and hospitalisation in Australia.[70] In 2019–20, 527,000 people were hospitalised for injury in Australia and 13,400 people died.[70] Injury was the leading cause of death for people aged 1–44 years in 2019–20.[70] Males accounted for 55% of hospitalisations, and 62% of deaths for injury in Australia in 2019–20.[70] In 2020–21, Indigenous peoples (57.0 per 1,000 population) were 1.9 times as likely to be admitted to hospital than non-Indigenous Australians (29.7 per 1,000 population) for injury.[64]

In 2019–20, age-standardised data demonstrated that Indigenous peoples were 2.1 times as likely as non-Indigenous Australians to be hospitalised due to an injury and 1.9 times as likely to die from an injury. [70]

The current findings regarding RFDS aeromedical retrievals for injuries accord with previous RFDS research that considered aeromedical injury retrieval data from 2014–15, and with national data that demonstrates a disproportionate impact of injuries among males, Indigenous peoples, and people aged under 45 years.[60]

Risks contributing to injuries in remote and very remote Australia include environmental factors, injury health literacy, lifestyle factors, age, socio-economic status, supervision of children, individual behaviours, historical factors, and community cohesion.[60] Each of these risks can be ameliorated through preventative actions, provided they are evidence-based and well designed.[60] Doing so will save lives, prevent morbidity and disability, and ultimately save governments and taxpayers money, while improving the lives of remote and rural Australians. [60]

Diseases of the digestive system

Diseases of the digestive system accounted for 3,044 (10.0%) RFDS aeromedical retrievals in 2021–22. Diseases of the digestive system include, for example, embedded or impacted teeth, gastro-oesophageal reflux disease, gastric or duodenal ulcer, appendicitis, hernia, Crohn's disease, irritable bowel syndrome, peritonitis and diseases of the liver, gallbladder and pancreas.[30]

Aeromedical retrievals for diseases of the digestive system were a common reason for aeromedical retrieval across multiple age groups. In 2020–21, rates of hospital admission for Indigenous peoples (49.1 per 1,000 population) were similar to those of non-Indigenous Australians (49.2 per 1,000 population) for diseases of the digestive system.[64]

Previous RFDS research proposed that specialist assistance is required for diagnosis and management of gastrointestinal disorders and that long term specialist follow-up and management, via dedicated clinical support mechanisms, is needed to reduce acute care needs.[71] However, the rates of specialist doctor provision (gastroenterologists) in rural and remote Australia (27 per 100,000 population) are well below suggested benchmarks of 100 per 100,000 population.[16,71]

Improved access to preventive primary healthcare services, such as general practitioner and nurse-led services, as well as specialist care is required. Provision of information to patients, as well as education about their condition is also required in order to facilitate self-management and patient empowerment.[71]

3.5.3 Retrieval pick-up and drop-off locations

The range of aeromedical retrieval and drop off locations shows that aeromedical retrievals occur throughout a variety of locations within rural and remote Australia.

The majority of RFDS aeromedical retrievals are inter-hospital transfers. Where primary evacuations can indicate rurality, inter-hospital transfers can only indicate which locations people have received treatment from. For example, Adelaide and Brisbane are two of the top locations for aeromedical retrieval pick-ups. These sites are not rural and remote locations, but represent inter-hospital transfers for people who may have received acute care in a specialist unit (e.g. a stroke unit) and are being transported to a hospital closer to their home in a rural and remote location but still require ongoing care for their condition.

This data provides information on which locations patients are being taken to in each state/territory which we hope can be used for service planning by the RFDS, Primary Health Networks, Local Health Districts and Aboriginal Community Controlled Health Organisations.

3.6 Conclusion

The data presented in the current report demonstrate that the RFDS pays an important role in the provision of comprehensive health services to rural and remote Australians. Over the next 10 years, it is predicated that the health service needs of rural and remote Australian will increase, and that the RFDS will be instrumental in providing ongoing health care to rural and remote communities, including as a collaborative partner with governments and other service providers.[16]

In 2018, the RFDS sought to forecast the health service needs of Australians living in rural and remote regions in 2028, based on projected population, health status, demand and provision of healthcare services.[16] The research demonstrated that on a population basis, there will continue to be significantly fewer services in country areas as compared to major cities.[16] Specifically, the research indicated that he Australian population is projected to grow steadily at around 1.6% per year over the next decade, reaching approximately 29.4 million in 2028 and that the population in remote and very remote Australia and is predicted to increase to 504,724 by 2028.[16]

It is anticipated that as people live longer, they will also develop a greater prevalence of chronic disease, which will be even more apparent in an increasingly ageing population.[16] Cancer, disorders of mental health and cardiovascular disease are predicted to be the most prevalent chronic diseases, with those in rural and remote areas expected to be impacted most by these growing rates, consistent with current trends.[16]

Culturally appropriate services, delivered by multidisciplinary primary healthcare teams, as well as outreach programs involving specialists, allied health, mental health, dental and telehealth services will be integral to improving health outcomes for rural and remote Australians.[16]

Additional health prevention and early intervention activities will be required to minimise and respond to growth in cancer, mental disorders and cardiovascular disease.[16] Despite the challenges in providing services to smaller populations spread across large distances, it is crucial that rural and remote Australians have the guarantee of reasonable access to comprehensive and enhanced primary healthcare services to respond to these trends, and particularly, increases in chronic disease.[16]

RFDS aeromedical retrieval services will continue to be in high demand throughout the next ten years, particularly given the impacts of service disruption during the pandemic period. It is anticipated that the RFDS aeromedical retrieval service, along with the suite of primary healthcare services, supported by digital innovations, will continue to provide the mantle of safety that rural and remote Australians have come to expect.

Chapter 4: Access to health services in rural and remote Australia: RFDS Service Planning and Operational Tool (SPOT)

4.1 Reasonable access to primary healthcare

Not all people who need primary healthcare services in rural and remote Australia can access them. Instead, many people living in some areas of rural and remote Australia have poor and inequitable access to health services, including preventive and chronic disease management services, compared to people living in major cities.[3]

Australians should expect reasonable access to primary health care. As previously documented by the RFDS, there is currently no agreed definition of reasonable access to health services to guide health planning, despite frequent references to this concept in policy documents and published literature.[3] While urgent work on this is necessary, the Australian Institute of Health and Welfare has proposed one measure of reasonable access is that, at a minimum, all Australians should have access to primary healthcare services, including general practitioner, nursing, oral health, mental health and Indigenous health, within 60 minutes of motor vehicle travel.[15,72] Using this as a simple proxy measure for reasonable access, the RFDS Strategic Planning and Operational Tool, SPOT, is able to identify locations where this is not the case by mapping service data and overlaying it with population data. By understanding this information, service providers such as the RFDS, will be better placed to understand service access gaps, and plan for locations to optimise service provision, relative to need, in rural and remote Australia.

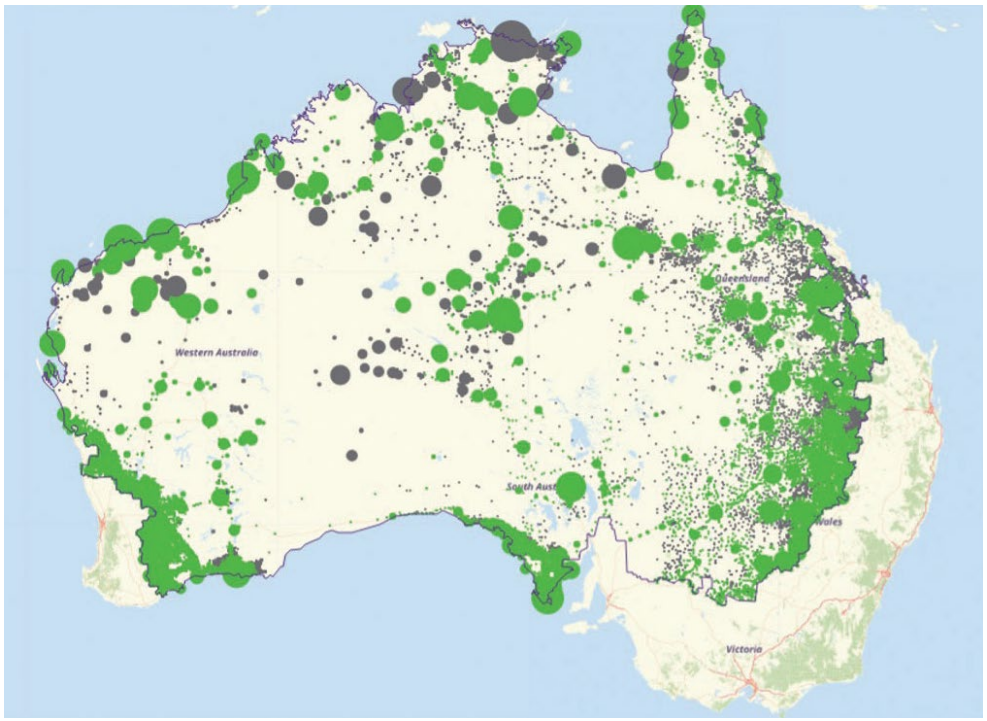
4.2 SPOT findings

SPOT has recently been updated with 2021 Census data from Australian Bureau of Statistics and 2022 Health Direct and RFDS service data for remote and very remote parts of Australia, along with all of Victoria and Tasmania. The location of health services have been mapped to the nearest one square kilometre, to calculate how far people in communities live from their nearest health facilities using road based maps. Working from a geographic distribution of demand (population) and the set of healthcare facilities that provide cover for a range of services (in this case – primary healthcare services), SPOT calculates the proportion of demand covered by those facilities within a user-specified drive time, in this case 60 minutes.[3]

Figure 4.1 provides a graphical representation of the locations of current primary healthcare service providers in remote and very remote Australia (non-RFDS and RFDS), and Australian Bureau of Statistics population concentrations, as derived from SPOT. Grey dots indicate population concentrations who do not have reasonable access to primary healthcare services; (i.e. within a 60-minute drive time of their place of residence) green dots indicate those that do.

It should be noted that most of Victoria and Tasmania are excluded from the current analysis as the majority of their population can access primary healthcare services within a 60-minute drive time of their place of residence. However, it is recognised that a range of other factors impacting access, such as difficult terrain for driving (take for example, the west coast of Tasmania) and challenges accessing transportation, are experienced in these areas and the simple 60-minute drive time proxy does not necessarily reflect reasonable access in these areas.

Figure 4.1. Primary healthcare service providers in rural and remote Australia, by ABS population concentration*



Notes: Grey dots indicate population concentrations who do not have reasonable access to primary healthcare services, with larger dots equalling more people (maximum 3000). Green dots indicate population concentrations who do have reasonable access to primary healthcare services, with larger dots equalling more people (maximum 3000). Most of Victoria and Tasmania are excluded from the current analysis as the majority of their population can access primary healthcare services within a 60-minute drive time of their place of residence.

4.2.1 Access to primary healthcare services

In 2022, SPOT demonstrated that:

- 372,596 people in rural and remote Australia had access to a non-RFDS primary healthcare service (mainly general practitioner and nurse-led clinics) within a 60-minute drive time of their place of residence; and
- 172,068 people in rural and remote Australia had access to an RFDS primary healthcare service (mainly general practitioner and nurse-led clinics) within a 60-minute drive time of their place of residence.

4.2.2 Lack of access to primary healthcare services

In order to identify service gaps, SPOT was used to determine the number of people that had no regular access to any type of primary healthcare service (RFDS or non-RFDS) within a 60-minute drive time of their place of residence. In 2022, SPOT demonstrated that:

- 44,930 people in remote and very remote Australia had no access to any type of primary healthcare service within a 60-minute drive time of their place of residence.

The Northern Territory (N=19,953) had the highest number of people with no access to primary healthcare services within a 60-minute drive time of their place of residence, followed by Western Australia (N=13,491), Queensland (N=8,456), South Australia (N=1,705), and New South Wales (N=856). Specifically, the rural and remote regions of Daly-Tiwi-West Arnhem (8,275 people without access), West Pilbara (3,937 people without access), and Katherine (3,859 people without access), had the highest number of people without primary healthcare access.

When looking at the regular accessibility to specific primary healthcare service types (mainly access to non-RFDS services), the following was observed:

- 57,899 people did not have access to general practitioner services, with the highest numbers of people without access in the regions of Daly-Tiwi-West Arnhem (8,275 people without access), Kimberly (5,672 people without access), and Far North Queensland (4,992 people without access);
- 208,247 people did not have access to nurse-led services, with the highest numbers of people without access in the regions of East Pilbara (24,016 people without access), Katherine (20,322 people without access), and Esperance (15,520 people without access);
- 118,943 people did not have access to general dental services, with the highest numbers of people without access in the regions of West Pilbara (11,463 people without access), Alice Springs (10,327 people without access), and Daly-Tiwi-West Arnhem (9,490 people without access); and
- 134,851 people did not have access to general mental health services, with the highest numbers of people without access in the regions of West Pilbara (11,463 people without access), Alice Springs (10,631 people without access), and Daly-Tiwi-West Arnhem (10,440 people without access).

4.2.3 Service utilisation

Poorer access to primary healthcare services in rural and remote Australia is also demonstrated by reviewing Medicare claims data. Medicare claims data from 2020–21 revealed that the number of non-hospital non-referred attendances per person, such general practitioner visits, were lower in remote (4.7 per person) and very remote areas (3.4 per person), than in major cities (6.8 per person).[4] These data demonstrate that in 2020–21 people in very remote areas saw a general practitioner at half the rate of people in major cities.

The RFDS provides community led healthcare in rural and remote Australia, where traditional Medicare funded service provision is not always available. Based on an analysis of Medicare usage rate by geographical area, the RFDS contributes an estimated additional 130,236 (block-funded, non-Medicare Benefit Schedule claimed equivalent items) services per population in remote and very remote Australia, bringing the average total utilisation rate up from 4.7 and 3.4 (Medicare utilisation only)[4,73] to 5.0 and 4.0 per person in remote and very remote areas, respectively (Medicare and RFDS block funded service provision) (Table 4.1).

Table 4.1. Average Medicare usage and RFDS block funded usage for GP services, by remoteness areas, 2021–22

Australian Statistical Geography Standard Remoteness Areas	Population	Average GP Medicare usage per person*	Additional average RFDS general practitioner episodes of care	Total average occasions of service (Medicare and RFDS)
Major cities	18,414,552	6.8		
Inner regional	4,683,923	6.8		
Outer regional	2,096,218	6.1		
Remote	297,990	4.7	0.3	5.0
Very remote	195,396	3.4	0.6	4.0

Source: Australian Institute of Health and Welfare (2022).[4,73]

4.2.4 Hospital admissions

Some hospitalisations could be prevented through the provision of appropriate preventative health interventions and early disease management in primary healthcare and community-based care settings (including by general practitioners, medical specialists, dentists, nurses and allied health professionals).[33]

Analysis of public hospital admission data demonstrates greater rates of hospitalisations for people in rural and remote areas, compared to people in major cities. In 2020–21, there were 11.8 million hospitalisations (418 per 1,000 population), with public hospitals providing 7.0 million (248 per 1,000 population) hospitalisations.[11] Hospitalisations in public hospitals increased with increasing remoteness of the patient's area of residence.[11] People living in very remote Australia (633.6 per 1,000 hospitalisations) were 2.8 times as likely as people living in major cities (224.8 per 1,000 hospitalisations) to be hospitalised in a public hospital in 2020–21.[11]

4.2.5 Workforce distribution

Table 4.2 shows the clinical fulltime equivalent rate for a range of health professionals, according to remoteness areas, in 2020. Although there are more fulltime equivalent general practitioners per head of population in all remoteness areas, when compared to major cities, this result should be interpreted with caution. Work arrangements in these areas can be more complicated.[74] In the first instance, given the measure is per head of population and populations may be spread across vary vast distances in rural and remote areas, services may therefore not be within a reasonable distance. Additionally, "there may be poor differentiation between general practice for on-call hours, activity for procedures and hospital work for general practitioners working in rural and remote areas, which affects the accuracy of statistics on general practitioner supply and distribution."[4,75] Further, the health workforce is not spread evenly across remote and very remote Australia. Some locations are able to attract health professionals while other areas cannot. Finally, there is a greater need for health professionals in rural and remote areas due to increased complexity and acuity of people living in these areas.

Table 4.2. Employed selected health professionals, clinical fulltime equivalent rate, by remoteness area, 2020

Remoteness areas	Health professionals			
	General practitioners	Nurses and midwives	Dentists	Psychologists
Major cities	103.9	1,053.9	56.7	86.0
Inner regional areas	110.8	1,045.3	41.9	56.5
Outer regional areas	105.5	1,011.9	34.6	39.8
Remote areas	122.4	1,170.0	26.6	31.9
Very remote areas	155.0	1,183.7	18.8	22.4

Source: Australian Institute of Health and Welfare (2022).[4]

The number of nurses and midwives throughout Australia is relatively similar across all remoteness areas but there are significantly fewer dentists and psychologists in remote and very remote areas compared to major cities. Previous RFDS research has predicted that in the next decade there will be significant shortages of essential health services in rural and remote Australia.[16] For example, in 2028 there is projected to be less than a fifth the number of general practitioners in remote as compared to major cities (43 as compared to 255 per 100,000 population respectively); just a twelfth of the number of physiotherapists (276 as compared to 23 per 100,000 population); half the number of pharmacists (113 as compared to 52 per 100,000 population); and only a third the number of psychologists (104 as compared to 34 per 100,000 population).[16]

The current and projected workforce issues need to be addressed, since there is compelling evidence that provision of regular primary healthcare services, and continuity of care within the health system, is key to improving health outcomes for patients.[76] Improving access to primary healthcare for people in rural and remote Australia, and provision of regular prevention and early intervention services, along with early identification and treatment of chronic health conditions, is likely to improve health outcomes for RFDS patients, and reduce the need for avoidable aeromedical retrievals.

4.3 Limitations of SPOT

SPOT used service registration data for non-RFDS primary healthcare services from a single source—Health Direct.[3] Registration with Health Direct is voluntary and is initiated by individual health services.[3] While Health Direct is believed to be the most robust database of healthcare services at the time of publication, some services may not have been registered, and therefore not included in the data provided through Health Direct.[3]

Health Direct data does not include the clinical capacity of the primary healthcare provider to see patients, frequency of service provision, or utilisation (dose) by rural and remote Australians.[3]

Furthermore, SPOT did not differentiate whether an RFDS clinic was permanent, fly-in fly-out or drive-in-drive-out, or the distribution of the workforce within the rural and remote geographic regions studied.[3]

4.4 Conclusion

There are many barriers to accessing primary healthcare for rural and remote Australians, including topography, social isolation, poor or limited access to transport, and perceived relative importance of other events, such as harvest time and cultural barriers. However, the most notable barrier and one that can be overcoming through enhanced planning processes, is the absence of primary healthcare services within a reasonable distance, in this report highlighted as being a 60-minute drive time from a person's place of residence.

SPOT demonstrated that in 2022, **44,930 people, or almost 10% of people in remote and very remote Australia had no access to any primary healthcare services within a 60-minute drive time from their place of residence.** Some specific communities were disproportionately impacted and the lack of services available in these communities needs to be urgently addressed. This finding is consistent with data demonstrating many rural and remote areas have poor provision of general practitioners, nurses, dentists and mental health workers and that the workforce is not evenly spread throughout rural and remote Australia.[3]

Addressing health disparities and inequitable access to primary healthcare is urgently required to improve health outcomes for rural and remote Australians. There is a large body of evidence that demonstrates access to primary healthcare is associated with better health outcomes, lower costs, and greater equity in health, by reducing disparities across population subgroups.[77]

The RFDS is committed to responding to need in the delivery of services, and uses the findings of SPOT in both our service planning as well as engagement with funders and other providers. We continue to work to ensure that we are adequately and sustainably resourced to meet demonstrated need for primary healthcare services, and to develop and promote expanded scopes of practice and innovative service models. To improve access to services, organisations delivering services need to work together, and with the Government, to facilitate the provision of culturally appropriate core primary healthcare services in poorly serviced areas. This includes supporting the retention of the rural and remote workforce and developing appropriate policies and incentives to attract clinicians to rural and remote locations.

It should be noted that while the measure of a 60-minute drive time has been used in this report as a proxy measure for reasonable access, this is an incomplete measure and there are many other barriers to access that must be addressed in developing a more comprehensive definition. For example, SPOT output data does not account for a patient's ability to access transport, such as a private motor vehicle or public transport, nor does it measure the direct and indirect costs of doing so.[3] It is also the case that even a 60-minute drive time is a significant undertaking in many places throughout rural and remote areas owing to factors such as difficult terrain, weather conditions or the poor condition of roads. These factors, along with affordability, cultural appropriateness, availability, frequency or mode of delivery should be addressed in a more comprehensive definition of reasonable access to healthcare that is developed, urgently, and accepted by the rural health sector.

Chapter 5: Recommendations

Based on the findings of this report, the RFDS makes the following recommendations:

1. Ensure equal access to primary care through local planning

Those living in rural and remote parts of our country experience poorer health outcomes and shorter lifespans. In order to address this, there must be equitable access to services, equitable utilisation of services and equitable health outcomes for those in rural and remote areas as compared to other parts of Australia. It is clearly demonstrated that this is not currently the case and inadequate service delivery and planning has been further impacted by the significant disruptions of the COVID-19 pandemic. Returning just to 'business as usual' level services will not be sufficient to address the poorer health outcomes.

Additional funding commitments from Governments to resource primary healthcare services for rural and remote Australians will be required, which should fund models of care that are flexible, client-centred and genuinely responsive to demonstrated need at a local level.

2. Primary care plans for certain populations, locations, and at risk populations

It is well established that many people in rural and remote parts of Australia experience high risk factors for poor health outcomes. With this so well known, focused effort should be made to establish and deliver comprehensive primary healthcare plans for high risk individuals, based on evidence of the most effective health preventions to ensure optimum health and wellbeing that are tracked through comprehensive monitoring and tracking.

For example, given the statistics associated with prevalence and impact of cardiovascular disease in rural and remote Australia, including as the most common reason for an RFDS aeromedical retrieval, it may be appropriate that all people aged over 45 years in rural and remote Australia, and especially males and Indigenous peoples, should receive additional intervention, information and prevention services addressing risk factors for heart disease.

3. Establish a nationally agreed definition of 'reasonable access'

All Australians should expect reasonable access to primary healthcare, no matter where they live. In order to ensure this, an agreed and comprehensive definition of what constitutes 'reasonable' access is required.

In this report, the RFDS has highlighted the Australian Institute of Health and Welfare's measure that reasonable access to primary healthcare includes, at a minimum, access to general practitioner, nursing, oral health and mental health services within a 60-minute drive time. Using just this measure as a simple proxy, the RFDS Strategic Planning and Operational Tool shows that over 44,000 people do not have access to any primary healthcare service within this distance. However, this is an incomplete measure, and there are many other barriers to access that must be recognised in a more comprehensive definition. This includes affordability, cultural appropriateness, availability, frequency or mode of delivery. Establishing such a minimum standard would be of immense value to policy makers, funders and service delivery organisations to provide a common reference point or benchmark for the services Australians should reasonably expect to receive.

4. Better data collection and integration

To further inform a definition of reasonable access, improved local service planning and the monitoring of better health outcomes, work must be undertaken to better collect and coordinate data related to the health and needs of those who reside in rural, and particularly remote Australia. This should seek to recognise the multiple systems, funders and service providers, many of whom operate outside the Medicare Benefits or Pharmaceutical Benefits schemes and similar, and overcome the significantly lower rates of participation in processes such as the National Health Survey.

5. A National Compact on Rural and Remote Health

To ensure results are achieved, it is critical that efforts across different elements of the health system are carefully coordinated and duplication and inefficiencies are avoided. As such, the RFDS is calling on the Australian Government to lead development of a National Compact on Rural and Remote Health, to serve as an inter-governmental agreement between the Commonwealth, States and Territories. This should see all parties committed to tangibly improving the health outcomes of those living in rural and remote Australia, focused particularly on ensuring better access to timely, comprehensive and appropriate primary healthcare, supported by the right technologies, infrastructure and workforce capabilities.

The RFDS is committed to ensuring only the best for the bush, and using the evidence presented in this report, we will continue to work with and advocate to governments, engage in service planning processes and build further partnerships to ensure there is better access to essential healthcare services available to all in rural and remote Australia.

References

1. Australian Institute of Health and Welfare. Australia's health 2014. Australian Institute of Health and Welfare. Australia's health series no. 14. Cat. no. AUS 178 Web site. https://www.aihw.gov.au/reports/australias-health/australias-health-2014/contents/table-of-contents. Published 2014. Accessed 20/5/2019.
2. Australian Institute of Health and Welfare. Rural and remote health. https://www.aihw.gov.au/reports/rural-remote-australians/rural-remote-health/contents/access-to-health-care. Published 2019. Accessed 16/05/2021.
3. Gardiner FW, Bishop L, de Graaf B, Campbell JA, Gale L, Quinlan F. Equitable patient access to primary healthcare in Australia. Canberra: Royal Flying Doctor Service of Australia;2020.
4. Australian Institute of Health and Welfare. Rural and remote health. Australian Institute of Health and Welfare. https://www.aihw.gov.au/reports/rural-remote-australians/rural-and-remote-health. Published 2022. Accessed 15/10/22.
5. Australian Institute of Health and Welfare. Mortality Over Regions and Time (MORT) books. Remoteness areaa 2016–2020. https://www.aihw.gov.au/getmedia/b8ce6ea4-8a7e-4731-84ca-ac1bdb9e2841/MORT_REM_2016_2020.xlsx.aspx. Published 2022. Accessed 15/10/2022.
6. Australian Institute of Health and Welfare. Profile of Indigenous Australians. Australian Institute of Health and Welfare. https://www.aihw.gov.au/reports/australias-health/profile-of-indigenous-australians. Published 2022. Accessed 15/10/2022.
7. Australian Bureau of Statistics. Aboriginal and Torres Strait Islander life expectancy lowest in remote and very remote areas. Australian Bureau of Statistics. https://www.abs.gov.au/articles/aboriginal-and-torres-strait-islander-life-expectancy-lowest-remote-and-very-remote-areas. Published 2018. Accessed 29/10/2022.
8. Commonwealth of Australia Department of the Prime Minister and Cabinet. Closing the Gap report 2020. Commonwealth of Australia. https://ctgreport.niaa.gov.au/sites/default/files/pdf/closing-the-gap-report-2020.pdf. Published 2020. Accessed 24/10/2022.
9. Australian Institute of Health and Welfare. Australian Burden of Disease Study: Impact and causes of illness and death in Australia 2018. Australian Burden of Disease Study series no. 23. Cat. no. BOD 29. Canberra: Australian Institute of Health and Welfare;2021.
10. Australian Institute of Health and Welfare. Deaths in Australia. Australian Institute of Health and Welfare. https://www.aihw.gov.au/reports/life-expectancy-death/deaths-in-australia/contents/variations-between-population-groups. Published 2022. Accessed 17/10/2022.
11. Australian Institute of Health and Welfare. Australia's hospitals at a glance. https://www.aihw.gov.au/reports/hospitals/australias-hospitals-at-a-glance/contents/summary. Published 2022. Accessed 24/10/2022.
12. Australian Institute of Health and Welfare. Admitted patient care 2017–18: Australian hospital statistics. Health services series no. 90. Cat. no. HSE 225. Canberra: Australian Institute of Health and Welfare;2019.
13. Australian Institute of Health and Welfare. National Drug Strategy Household Survey 2019. Drug Statistics series no. 32. PHE 270. Canberra: Australian Institute of Health and Welfare;2020.
14. Australian Bureau of Statistics. Health conditions prevalence. Data download: Table 5 health risk factors by population characteristics. https://www.abs.gov.au/statistics/health/health-conditions-and-risks/health-conditions-prevalence/latest-release#key-statistics. Published 2022. Accessed 27/10/2022.
15. Australian Institute of Health and Welfare. Australia's health 2018. Australia's health series no. 16. AUS 221. Australian Institute of Health and Welfare. https://www.aihw.gov.au/reports/australias-health/australias-health-2018/contents/table-of-contents. Published 2018. Accessed 20/5/2019.

16. Gardiner FW, Gale L, Ransom AL, M. Looking Ahead: Responding to the health needs of country Australians in 2028 - the centenary year of the RFDS. Canberra: Royal Flying Doctor Service of Australia;2018.
17. van Ginneken E, Reed S, Siciliani L, et al. Policy Brief 47: Addressing backlogs and managing waiting lists during and beyond the COVID-19 pandemic. Geneva: World Health Organization;2022.
18. Department of Health and Aged Care. Medicare. https://www1.health.gov.au/internet/main/publishing.nsf/Content/health-medicarebenefits-index.htm. Published 2017. Accessed 15/12/2022.
19. Geoscience Australia. Area of Australia - States and Territories. Australian Government https://www.ga.gov.au/scientific-topics/national-location-information/dimensions/area-of-australia-states-and-territories. Published 2020. Accessed 8 April 2020.
20. Australian Bureau of Statistics. Remoteness Structure. Australian Bureau of Statistics. https://www.abs.gov.au/statistics/statistical-geography/remoteness-structure. Published 2021. Accessed 15/10/2022.
21. Garvan Research Foundation. Medical research and rural health: Garvan report 2015. Darlinghurst: Garvan Research Foundation;2015.
22. Australian Bureau of Statistics. Table 2. Estimated resident population, Remoteness Areas (ASGS2016), Australia. Population estimates by Significant Urban Area and Remoteness Area (ASGS2016), 2001 to 2021. Australian Bureau of Statistics. https://www.abs.gov.au/statistics/people/population/regional-population/2021/32180DS0004_2001-21.xlsx. Published July 2022. Accessed 13/10/2022.
23. Australian Bureau of Statistics. Microdata: National Aboriginal and Torres Strait Islander Health Survey. AIHW analysis of TableBuilder. https://www.abs.gov.au/statistics/microdata-tablebuilder/available-microdata-tablebuilder/national-aboriginal-and-torres-strait-islander-health-australia. Published 2019. Accessed 24/10/2022.
24. Australian Bureau of Statistics. Estimates of Aboriginal and Torres Strait Islander Australians. Australian Bureau of Statistics. https://www.abs.gov.au/statistics/people/aboriginal-and-torres-strait-islander-peoples/estimates-aboriginal-and-torres-strait-islander-australians/latest-release. Published 2022. Accessed 15/10/2022.
25. Australian Bureau of Statistics. Life tables. https://www.abs.gov.au/statistics/people/population/life-tables/2019-2021. Published 2022. Accessed 9/11/2022.
26. Australian Bureau of Statistics. Life tables. https://www.abs.gov.au/statistics/people/population/life-tables/latest-release#key-statistics. Published 2021. Accessed 27/10/2022.
27. Cummins RA, Mead R, the Australian Unity-Deakin University Wellbeing Research Partnership. 20th Anniversary Australian Unity Wellbeing Index: Commemorative Report. Australian Unity and Deakin University. https://www.australianunity.com.au/-/media/rebrandwellbeing/documents/auwi20_interactive_report. Published 2021. Accessed 8/11/2022.
28. Smith JD. Australia's rural, remote and Indigenous health 3e. Chatswood: Elsevier; 2016.
29. Jones D, Lyle D, McAllister L, et al. The case for integrated health and community literacy to achieve transformational community engagement and improved health outcomes: an inclusive approach to addressing rural and remote health inequities and community healthcare expectations. Primary Health Care Research and Development. 2020;21:e57.
30. Bishop L, Laverty M, Gale L. Providing aeromedical care to remote Indigenous communities. In. Canberra: Royal Flying Doctor Service of Australia; 2016.
31. Gracey M, King M. Indigenous health part 1: Determinants and disease patterns. The Lancet. 2009;374(9683):65–75.
32. Department of Health. National Aboriginal and Torres Strait Islander Health Plan 2021–2031. Canberra: Department of Health;2021.

33. Australian institute of Health and Welfare. Potentially preventable hospitalisations in Australia by age groups and small geographic areas, 2017–18. https://www.aihw.gov.au/reports/primary-health-care/potentially-preventable-hospitalisations/contents/overview. Published 2019. Accessed 22/07/2021.
34. Centers for Disease Control and Prevention. Get the Facts: Sugar-Sweetened Beverages and Consumption. https://www.cdc.gov/nutrition/data-statistics/sugar-sweetened-beverages-intake.html#:~:text=Frequently%20drinking%20sugar%2Dsweetened%20beverages,gout%2C%20a%20type%20of%20arthritis. Published 2022. Accessed 31/10/2022.
35. Malik VS, Hu FB. The role of sugar-sweetened beverages in the global epidemics of obesity and chronic diseases. Nature Reviews Endocrinology. 2022;18(4):205-218.
36. Bomback AS, Derebail VK, Shoham DA, et al. Sugar-sweetened soda consumption, hyperuricemia, and kidney disease. Kidney International. 2010;77(7):609-616.
37. Valenzuela MJ, Waterhouse B, Aggarwal VR, Bloor K, Doran T. Effect of sugar-sweetened beverages on oral health: a systematic review and meta-analysis. European Journal of Public Health. 2021;31(1):122-129.
38. Australian Institute of Health and Welfare. National Drug Strategy Household Survey 2019. Australian Institute of Health and Welfare. https://www.aihw.gov.au/reports/illicit-use-of-drugs/national-drug-strategy-household-survey-2019/contents/technical-information. Published 2020. Accessed 31/10/2022.
39. National Health and Medical Research Council. Australian guidelines to reduce the health risks from drinking alcohol. https://www.nhmrc.gov.au/health-advice/alcohol. Published 2009. Accessed 31/10/2022.
40. Deaprtment of Health and Aged Care. What are the effects of alcohol? Published 2022. Accessed 31/10/2022.
41. Centers for Disease Control and Prevention (US), National Center for Chronic Disease Prevention and Health Promotion (US), Office on Smoking and Health (US). How Tobacco Smoke Causes Disease: The Biology and Behavioral Basis for Smoking-Attributable Disease: A Report of the Surgeon General. Chapter 7, Pulmonary Diseases. Centers for Disease Control and Prevention (US). https://www.ncbi.nlm.nih.gov/books/NBK53021/. Published 2010. Accessed 10/07/2021.
42. Cohen S. Psychosocial Vulnerabilities to Upper Respiratory Infectious Illness: Implications for Susceptibility to Coronavirus Disease 2019 (COVID-19). Perspectives on psychological science : a journal of the Association for Psychological Science. 2020:1745691620942516-1745691620942516.
43. Lawrence H, Hunter A, Murray R, Lim WS, McKeever T. Cigarette smoking and the occurrence of influenza – Systematic review. Journal of Infection. 2019;79(5):401-406.
44. Gardiner FW, Nwose EU, Bwititi PT, Crockett J, Wang L. Blood glucose and pressure controls in diabetic kidney disease: Narrative review of adherence, barriers and evidence of achievement. Journal of Diabetes Complications. 2018;32(1):104-112.
45. Ogden CL, Carroll MD, Curtin LR, Lamb MM, Flegal KM. Prevalence of High Body Mass Index in US Children and Adolescents, 2007-2008. Jama. 2010;303(3):242-249.
46. Australian Institute of Health and Welfare. Insufficient physical activity. https://www.aihw.gov.au/reports/risk-factors/insufficient-physical-activity/contents/insufficient-physical-activity. Published 2020. Accessed 26/10/2020.
47. Australian Bureau of Statistics. Hypertension and measured high blood pressure. https://www.abs.gov.au/statistics/health/health-conditions-and-risks/hypertension-and-measured-high-blood-pressure/latest-release. Published 2018. Accessed 9/11/2022.
48. Gardiner FW, Richardson A, Gale L, et al. Rural and remote dental care: Patient characteristics and health care provision. Aust J Rural Health. 2020;28(3):292-300.
49. Bishop L, Laverty M. Filling the gap: Disparities in oral health access and outcomes between major cities and remote and rural Australia. Canberra: Royal Flying Doctor Service;2015.

50. Bishop L, Ransom A, Laverty M, Gale L. Mental health in remote and rural communities. Canberra: Royal Flying Doctor Service of Australia; 2017.
51. Australian Institute of Health and Welfare. Suicide & self-harm monitoring. https://www.aihw.gov.au/suicide-self-harm-monitoring/data/geography/suicide-by-remoteness-areas. Published 2022. Accessed 1/12/2022.
52. Australian Institute of Health and Welfare. Oral health and dental care in Australia. Canberra, Australia: Australian Institute of Health and Welfare,;2018.
53. Dasanayake AP, Gennaro S, Hendricks-Munoz KD, Chhun N. Maternal periodontal disease, pregnancy, and neonatal outcomes. MCN Am J Matern Child Nurs. 2008;33(1):45-49.
54. Australian Institute of Health and Welfare. Family, domestic and sexual violence in Australia: Continuing the national story 2019. Cat. no. FDV 3. Canberra: Australian Institute of Health and Welfare;2019.
55. Australian Institute of Health and Welfare. Australia's health 2022: data insights, catalogue number AUS 240, Australia's health series number 18. Canberra: Australian Instirute of Health and Welfare;2022.
56. Lakhani HV, Pillai SS, Zehra M, Sharma I, Sodhi K. Systematic Review of Clinical Insights into Novel Coronavirus (CoVID-19) Pandemic: Persisting Challenges in U.S. Rural Population. Int J Environ Res Public Health. 2020;17(12):4279.
57. Carter J, Rutherford S, Borkoles E. COVID-19 Vaccine Uptake among Younger Women in Rural Australia. Vaccines (Basel). 2021;10(1).
58. Aspex Consulting. Royal Flying Doctor Service traditional services–systems development: Paper on classification, counting and measurement. East Melbourne: Aspex Consulting;2014.
59. Australian Institute of Health and Welfare. Disparities in potentially preventable hospitalisations across Australia: Exploring the data. https://www.aihw.gov.au/reports/primary-health-care/disparities-in-potentially-preventable-hospitalisations-exploring-the-data/contents/introduction. Published 2020. Accessed 7/12/2022.
60. Bishop L, Gale L, Laverty M. Responding to injuries in remote and rural Australia. Canberra: Royal Flying Doctor Service of Australia;2016.
61. Gardiner FW, Bishop L, Dos Santos A, et al. Aeromedical retrieval for stroke in Australia. Cerebrovascular Diseases. 2020;49(3):334-340.
62. Australian Institute of Health and Welfare. Heart, stroke and vascular disease—Australian facts. https://www.aihw.gov.au/reports/heart-stroke-vascular-diseases/hsvd-facts/contents/about. Published 2021. Accessed 14/11/2022.
63. World Health Organization. Cardiovascular diseases (CVDs). https://www.who.int/en/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds). Published 2021. Accessed 14/11/2022.
64. Australian Institute of Health and Welfare. Admitted patients. https://www.aihw.gov.au/reports-data/myhospitals/sectors/admitted-patients#more-data. Published 2022. Accessed 14/11/2022.
65. Vincent AD, Drioli-Phillips PG, Le J, et al. Health behaviours of Australian men and the likelihood of attending a dedicated men's health service. BMC Public Health. 2018;18(1):1078.
66. Smith JA, Braunack-Mayer A, Wittert G, Warin M. " It's sort of like being a detective": Understanding how Australian men self-monitor their health prior to seeking help. BMC Health Serv Res. 2008;8(1):1-10.
67. Martin S, Haren M, Taylor A, Middleton S, Wittert G. Cohort profile: the Florey Adelaide Male Ageing Study (FAMAS). International Journal of Epidemiology. 2007;36(2):302-306.
68. Gardiner FW, Rallah-Baker K, Dos Santos A, et al. Indigenous Australians have a greater prevalence of heart, stroke, and vascular disease, are younger at death, with higher hospitalisation and more aeromedical retrievals from remote regions. EClinicalMedicine. 2021;42:101181.

69. World Health Organization. Injuries and violence. https://www.who.int/news-room/fact-sheets/detail/injuries-and-violence. Published 2021. Accessed 12/11/2022.

70. Australian Institute of Health and Welfare. Injury in Australia. https://www.aihw.gov.au/reports/injury/injury-in-australia/contents/about. Published 2022. Accessed 14/11/2022.

71. Gardiner FW, Bishop L, McMahon K, et al. Aeromedical retrievals for gastrointestinal disorders in rural and remote Australia: the need for improved access to specialist advice. Intern Med J. 2020;50(5):619-623.

72. 72. Australian Institute of Health and Welfare. Access to primary health care relative to need for Indigenous Australians. Cat. no. IHW 128. Canberra: Australian Institute of Health and Welfare;2014.

73. 73. Department of Health and Aged Care. Medicare annual statistics – Modified Monash Model locations (2009–10 to 2021–22). https://www.health.gov.au/resources/publications/medicare-annual-statistics-modified-monash-model-locations-2009-10-to-2021-22. Published 2022. Accessed 25/11/2022.

74. 74. Alliance NRH. Health Workforce. https://www.ruralhealth.org.au/book/health-workforce-0. Published 2016. Accessed 12/11/2022.

75. 75. Walters LK, McGrail MR, Carson DB, et al. Where to next for rural general practice policy and research in Australia? Medical Journal of Australia. 2017;207(2):56-58.

76. 76. Australian Institute of Health and Welfare. Experiences in health care for people with chronic conditions: how GPs and other specialists communicate with their patients 2017–18. Cat. no. CHC 6. Canberra: Australian Institute of Health and Welfare;2020.

77. 77. Thomas SL, Wakerman J, Humphreys JS. Ensuring equity of access to primary health care in rural and remote Australia—what core services should be locally available? International Journal for Equity in Health. 2015;14:111.

Appendix 1. Methodology for analysis of RFDS aeromedical retrieval data

Classifying diseases and related health problems

The RFDS uses the tenth edition of the International Statistical Classification of Diseases and Related Health Conditions (ICD-10) Australian Modification (AM) (ICD-10-AM) to code and classify health data. In the ICD-10-AM, diseases and injuries are classified under one of 22 chapter headings. Each chapter heading has a range of codes which denote specific illnesses and injuries.

RFDS data collection and coding

The RFDS records data for each aeromedical retrieval it conducts. De-identified data for all aeromedical retrievals conducted between 1 July 2021 and 30 June 2022 (hereafter referred to as 2021–22) were analysed for this section of the report.

De-identified aeromedical retrieval data considered in this report include: retrieval date (day/month year); patient's age (aggregated by 5-year age group); gender (male, female, unknown), Indigenous status (Indigenous, non-Indigenous, unknown); illness or injury associated with the retrieval (ICD-10-AM chapter code and 3-item code (where known)); type of retrieval (primary evacuation, inter-hospital transfer repatriation); priority (priority 1—to be retrieved within one hour, priority 2—to be retrieved within four hours, priority 3—to be retrieved within 12 hours); and pick-up and drop off location (nearest airstrip).

Data analyses

All data were analysed using IBM SPSS Statistics for Windows, Version 26.0 or Microsoft Excel 2016. All analyses used unweighted data. Data are reported as summary statistics, including the number (N) and proportion (per cent (%)) of patients in each category.

The initial analysis on total number of aeromedical retrievals included all retrievals, even if one variable was missing (e.g. age, Indigenous status, gender etc.), in order to provide an overall picture of aeromedical retrievals. All remaining analyses excluded cases where variables were missing and excluded analyses of repatriation flights.

Royal Flying Doctor Service