

Introduction

In 2003, the Australian Institute of Health and Welfare (AIHW) released *Rural, Regional and Remote Health: Information Framework and Indicators, Version 1* (the Framework) (AIHW 2003b). That report aimed to identify all the important issues affecting rural health, to assess available data sources and to describe methods for analysing and presenting regional comparisons for each issue. The report was referred to as 'Version 1' in recognition of the fact that the methods and data sets were untested, that the availability and quality of data would change over time, and that further issues relating to rural health may be identified and added to the Framework.

This report – *Rural, Regional and Remote Health: Indicators of Health* – uses data from administrative data collections and surveys to describe as many as possible of the indicators listed in the Framework. Indicators are organised according to the three tiers of the Framework (see page 311): health status, determinants of health, and health system performance. Another previous AIHW report, *Rural, Regional and Remote Health: a Study on Mortality* (AIHW 2003a), described mortality patterns in regional and remote areas in depth.

However, this is the first systematic report of a comprehensive range of rural health issues, including descriptions of the social setting in which people live, the prevalence of risk factors such as smoking, aspects of the health of people living in Major Cities and in regional and remote areas, and the health services available to these people. As was done for the first time in the mortality report, analyses of regional and remote data attempt to disentangle the effects of remoteness from the effects of poorer overall Aboriginal and Torres Strait Islander (referred to hereafter for brevity as 'Indigenous') health on the populations in different areas.

Other analyses have attempted to consider the possible effects of the migration of the frail aged towards less remote areas, potentially reducing the apparent size of inter-regional health differentials.

Where the data support it, and where differences have been apparent, details have been reported separately for males and females, and by age group.

Although measures of health status in this report describe average health status for the population living in each area, they do not predict an individual's health status, nor is the health status of an area 'adopted' by an individual after moving there. Similarly, migration of people into and out of areas means that any historical influence of the area's environment on health status statistics will be diluted by the influence of other areas from which people migrated.

This report is based on analyses of national data sets, many of them administrative data sets (for example, Health Insurance Commission and hospital morbidity data). It is not based on interviews with people living or working in regional and remote areas. Summary statistics derived from analyses of the large national data sets are useful because they are objective. However, they are rarely, if ever, capable of describing the subjective experience of living in regional or remote areas. This is both a strength and a weakness.

Readers should be aware that the Framework on which this report is based is not perfect, the available data sources are not complete, and the data are subject to a number of shortcomings. However, on a wide range of issues, the report provides useful detailed statistics with which to inform the development and evaluation of rural health policy.

For example, the report contains much information on health status (such as rates of chronic disease, mental health, birth outcomes, disability and mortality); determinants of health (such as fluoridated water, educational status, income, household crowding, cost of living, smoking, overweight and nutrition); and health system performance (such as immunisation, specialist consultations, bulk-billing rates, general practitioner (GP) consultations, supply of specific health professionals, and student commencements in a range of health courses).

Comparisons between areas can be affected by complex issues. For example, comparisons of numbers of GPs in each area are affected by issues such as the possibly different per-capita need for GP services in regional and remote areas from that in Major Cities.

Some indicators are not yet able to be quantified for a number of reasons:

- the data do not exist
- the data exist, but they are considered to be inaccurate
- the data are available for some states, but not nationally
- the data do not contain a geographic identifier (e.g. postcode) with which to allocate a remoteness category
- the data describe only part of the picture (e.g. Medical Benefits Scheme – Medicare (MBS) and Pharmaceutical Benefits Scheme (PBS) provide a large volume of services but lack data on other services).

A number of specific indicators proposed in the earlier Framework publication (AIHW 2003b) have not been presented; these include:

- aged care and the rate of GP consultation for specific conditions – compiling these indicators was thought to be technically too difficult in the time available
- hospital separations – the usefulness of the inter-regional comparisons was unclear, given the differences in precautionary admission practices, health need, function and capacity of hospitals in each area and other factors
- prescription – the only available data source was PBS data; because prescription drugs are available from other sources (and availability may vary between the remoteness areas), inter-regional comparisons of PBS data, in the absence of a clear understanding of the contribution of the other sources, may be misleading
- surgical and medical misadventure – the findings from this indicator were thought to be ambiguous and the data require further examination and improvement.

The indicators in this publication are a selection of those that could be reported against the Framework. They may in the future be augmented by additional analyses as data become available. In particular, data describing:

- referred specialist out-of-hospital consultation
- bulk billing rates
- primary care medical consultation
- care planning and case conferencing

could be derived from the Medical Benefits Scheme database.

Auxiliary data such as these could be included in future editions of this report or as a supplement to this publication via internet release.

Wherever possible, analysis has attempted to describe changes over time, except where data from different years were not comparable because of differences in the method of collection or in the classifications used or where data were available only for a limited number of years.

An important aim of rural health information is to be able to differentiate between the effects of 'living in a remote area' and the effects of 'being Indigenous'. For many 'rural health' issues, it is becoming increasingly clear that they have more to do with Indigenous status than with rurality or remoteness. For other issues, however, remoteness per se plays a substantial part independent of Indigenous status. For this reason, and where possible, the results of regional analyses have been presented for Indigenous people and non-Indigenous people as well as for the overall population.

Analysis in this report differentiates between Indigenous and regional/ remote effects except where:

- the Indigenous identifier was missing or considered to be inaccurate
- the small number of available records meant that inter-regional estimates would be particularly unreliable.

Regional Indigenous analysis has been conducted using Australian Bureau of Statistics (ABS) census data because:

- the census data were considered to be largely accurate for the variables of intent
- any errors in the numerators and denominators of rates were likely to be compensating (i.e. the inter-regional comparisons were not invalidated by the inconsistent levels of accuracy between the numerator and denominator data sets)
- there were sufficient records in the areas with the smallest populations to support inter-regional comparisons.

Where regional Indigenous analysis has not been possible, results for the national or 'total' Indigenous population have been presented. The aim is, wherever possible, to present the rural health statistics taking into account patterns observable in Indigenous health statistics.

In a number of cases, data were available for regional areas, but not for remote areas. This was particularly the case for surveys, such as the ABS National Health Survey.

Consequently, several indicators lack data for remote areas.

In writing the report, it became obvious that simply reporting some indicators in the Framework might result in readers drawing misleading conclusions about health patterns unless those indicators were accompanied by additional details or analyses. For example:

- Inter-regional comparisons of health patterns for people older than 65 years were at odds with those for younger people, potentially as a result of the migration of older people who required access to services not available in the more remote centres. Consequently, comparisons have also been made for the population younger than 65 years.
- Differentials may have been affected by Indigenous issues rather than issues of remoteness per se, and consequently inter-regional comparisons have also been made, where the data allow, for Indigenous and non-Indigenous populations.
- While one sex might show better health outcomes in a particular area, the other may show worse outcomes. In these cases, inter-regional comparisons have been provided for each sex.
- Although indirect age-standardised rates identified areas with significantly better or worse outcomes than others, they did not indicate the magnitude of the issue. In cases such as these, the magnitude of the issue has been described using counts (for example, number of deaths or number of deaths in excess of what would be expected if Major Cities rates had applied in each area).

This work reports the results of statistical analysis of a range of census data, administrative data sets and surveys. The report does not enter into interpretations or policy conclusions, but it is hoped it will be a useful resource for those who design and evaluate policy, for researchers and for the broader community.

Data sources for this report include:

- ABS Census of Population and Housing conducted each 5 years
- national surveys such as the National Health Survey, the Survey of Mental Health and Wellbeing of Adults, the National Nutrition Survey, Child Dental Health Survey
- administrative data sets such as Medicare, Pharmaceutical Benefits Scheme, Hospital Morbidity and Hospital Establishments data, ABS Mortality data set
- other censuses such as the National Health Labour Force surveys that collect details when health professionals re-register
- some data from the private sector such as that pertaining to petrol prices.

Reporting against these indicators has tested the validity and practicality of the Framework (AIHW 2003b). Experience reporting against the indicators has provided information that will guide future enhancements of the Framework and the indicators suite.

As discussed earlier, there are many gaps in the report resulting from a range of data availability and quality issues. Moreover, it suffers from 'painting the Sydney Harbour Bridge' syndrome. The diversity of data sources consulted, the choice of geographic classification, demanding work priorities of many of the data suppliers and the sheer magnitude of the work means that by the time it is all completed, some parts are 'out of date'. Future reports of this type may include updates of subsets of the data (e.g. reports based on the most recent census or National Health Survey, or the latest mortality or hospital data).

Statistical analysis

The major statistical issues pertinent to this report relate to age standardisation and to statistical significance.

Age standardisation

In several situations, crude rates, simple percentages and means have been used to provide descriptive statistics. However, most comparisons have involved age standardisation.

Each population has its own demographic characteristics. For example, Indigenous populations tend to have proportionally larger numbers of children and smaller numbers of older people than non-Indigenous populations. Similarly, there are differences between the age structure and the proportions of males and females living in metropolitan, rural and remote populations (see page 160). Comparison of crude rates, percentages and means may simply reflect the different age and sex structures of populations rather than any difference in the underlying likelihoods of death, illness or consulting with a GP.

Age standardisation is a technique that can be used to take into account such differences. It is discussed further on page 302.

Statistical significance

Because of the influence of chance and natural variation, calculated rates will vary a little from year to year, regardless of whether the rates are based on census or survey data, although the latter may show greater variability. Where possible, so as to help determine whether calculated rates are meaningfully different from one area to another, confidence intervals have been calculated, and significant differences highlighted.

To simplify the text, two rates, percentages or means that are statistically significantly different at the 95% level of confidence are described simply as 'significantly different'. The words 'significantly' and 'significant' have been used only in this way in this report.

Frequently, differences in the underlying condition of the population are not statistically significant. This can be due to the fact that there is in fact little difference, or because the numbers of cases or observations are so small as to make it difficult to discern any real statistically significant difference.

In tables presented in this report, estimates significantly different from those in Major Cities are in bold print and accompanied by an asterisk. This indicates that the difference is likely to be a real difference that would be reflected in analyses of data from other years unless underlying conditions change over time.

In a number of places, estimates that appear to show a difference, but are *not* significantly different from those in Major Cities have been included (and identified as not significant) in tables. However, all such non-significant differences should be treated cautiously. These estimates have been included for completeness and because, taken together, they may point to a pattern or a trend.

Statistical significance is discussed further on page 302.

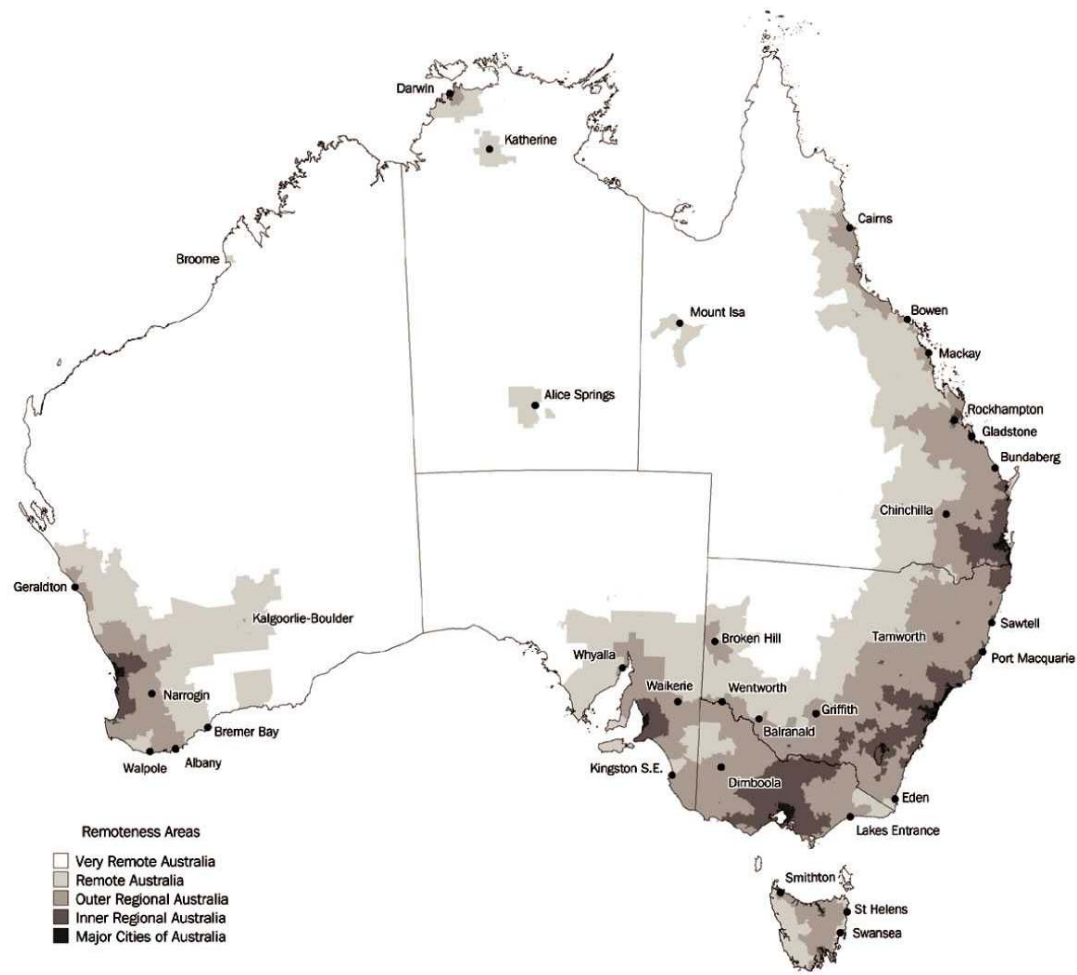
Geographical classification

The ABS Australian Standard Geographical Classification (ASGC) Remoteness Areas classification (see Figure A) was selected in preference to the Accessibility/Remoteness Index of Australia (ARIA) and Rural, Remote and Metropolitan Areas (RRMA) classification as the geographic basis for reporting for a range of reasons outlined in an earlier report in this series, *Rural, Regional and Remote Health: a Guide to Remoteness Classifications* (AIHW 2004a).

The ASGC Remoteness Areas classification was developed by the ABS and was based on ARIA+, which was developed earlier by the National Key Centre for the Social Applications of Geographical Information Systems (GISCA) (ABS 2001).

In figures and tables throughout this report, Major Cities, Inner Regional, Outer Regional, Remote and Very Remote categories have been abbreviated as MC, IR, OR, R and VR.

For more information on the various remoteness classifications please refer to the AIHW publication *Rural, Regional and Remote Health: A Guide to Remoteness Classifications* (AIHW 2004a).



Source: ABS.

Figure A: ASGC Remoteness Areas of Australia

Notes on data presentation

1. Percentages or numbers in tables may not add to 100 or other totals due to rounding.
2. Standardisation has been indirect where possible using Major Cities rates for males and females, typically those in the most recent year for which data is presented – details are provided with each analysis.
3. Where necessary, standardisation has been by the direct method. Where possible, direct age standardisation has used the 2001 Australian population as the standard.
4. Ninety-five percent confidence intervals have been calculated and used to identify statistically significant differences. Sometimes, when data were provided in summary form by another agency, there was insufficient information with which to calculate confidence intervals. Confidence intervals were not calculated for census data.
5. Statistical methods are described from page 302.
6. In this report, names of specific areas defined by the Australian Standard Geographical Classification have been capitalised (e.g. Inner Regional, Remote, Very Remote). Where reference has been made to generic 'regional' or 'remote' areas (respectively, Inner plus Outer Regional areas, Remote plus Very Remote areas), the terms have been left uncapitalised (e.g. regional, remote).
7. 'Excess' deaths are calculated by subtracting the expected number of deaths from the number observed. Expected deaths are the number of deaths expected annually if death rates found in Major Cities are applied to the populations living in each of the other areas. 'Excess' deaths provide an indication of the extra burden of mortality in each area.
8. Where there were fewer deaths than expected, this report states, for example, either 5 fewer deaths than expected annually or -5 'excess' deaths annually; both expressions mean the same thing.
9. All statements about rates in this report are based on the ratio of observed to expected events or observations. If there are twice as many events (e.g. deaths) as expected, then the rate (e.g. of death) can be assumed to be twice that of the comparison population.
10. Where rates are statistically significantly different from one another, they are referred to in the text as 'significantly different'; if rates are not statistically significantly different, they are not said to be significantly different. Statistical significance is at the 95% level.
11. In some situations, differences that just fail to be statistically significant at the 95% level, in contexts that suggest that real differences exist, have been described as 'apparent' rather than 'significant' differences; alternatively, the difference is stated as being statistically significant at 'a lower level of confidence'.
12. Statistically significant figures are indicated in tables in bold and with an asterisk.
13. To improve readability, where reference is made to 'Major Cities, Inner Regional, Outer Regional, Remote and Very Remote areas', the term 'the five areas' has been used. Where there is reference to 'Inner Regional, Outer Regional, Remote and Very Remote areas', the term 'the four areas outside Major Cities' has been used.