Chapter 5
Health of rural populations

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Learning objectives

- Describe how the different determinants of health play out in the rural environment.
- Describe the main differences between the health of people living in rural and remote areas and those living in metropolitan areas.
- Describe contemporary approaches to public and population health.

Introduction

Health and disease do not occur at random. Most of us, no matter where we live, will at some time be confronted by illness, as an individual, a family member, a friend, a carer or a clinician. Mostly, we consider these events in their individual context, but rarely we take the chance to step back and see whether such individual events, as they occur in a community or larger population, might be linked. How frequent are specific outcomes? What is their distribution around the state or the country? Are events more frequent in rural compared with metropolitan areas? What are the factors that determine their occurrence?

These are the questions that someone applying a population perspective to health and disease might ask. Taking this approach can help us identify local factors that may be part of the reason these illnesses arose in the first place. Dealing with these may help prevent the same illness arising in other community members.

In order to draft policies that promote health, legislators and policy makers in local, state and federal governments also need to know about patterns of health or illness, particularly its distribution across geography and groups over time.

Determinants of health

The health of individuals and of populations is influenced by many factors acting in many combinations. Table 5.1 shows the determinants of health from the Australian Institute of Health and Welfare's Rural Health Information Framework.

Table 5.1 Determinants of health

Environmental factors	Socioeconomic factors	Community capacity	Health behaviours	Person-related factors
Physical, chemical and biological factors such as air, water, food and soil quality resulting from chemical pollution and waste disposal.	Socioeconomic factors such as education, employment, per capita expenditure on health, and average weekly earnings.	Characteristics of communities and families such as population density, age distribution, health literacy, housing, community support services and transport.	Attitudes, beliefs, knowledge and behaviours (eg patterns of eating, physical activity, excess alcohol consumption and smoking).	Genetic susceptibility to disease and other factors such as blood pressure, cholesterol levels and bodyweight.
Examples: Water, sewerage, food availability, housing, recreational and cultural facilities, the workplace, environmental hazards.	**Examples**: Education, employment, after-tax income.	**Examples**: Population characteristics, social issues and social capital, services, health literacy, perception of risk, housing, transport, cost of living, regional business health.	**Examples**: Smoking, alcohol consumption, illicit drugs, physical activity, nutrition, sexual practices, driving practices.	**Examples**: Genetically determined diseases, specific birth defects, blood pressure, cholesterol and bodyweight.

Source: The Rural Health Information Framework, AIHW (2005)

Some determinants of health are within our individual control, while others are influenced by where we live, employers and local, state or federal government policy. Factors such as climate and genetics that are not within our control can be managed with appropriate planning and resources. Other factors, for example the quality of air, food, soil and water, or whether we are immunised against common infectious diseases, can be controlled with appropriate public health policy. Many of these factors can also be measured and their association or correlation with certain health outcomes quantified. Individuals, communities and government may then act to change some of these factors, either through changes in behaviour, the built environment or policy. The impact of theses changes can then be monitored over time.

Case study 5.1 Determinants of health: suicide in male farmers

Sville is a small rural town of about 400 people whose economy is based on agricultural production, mainly grain, sheep and beef cattle. The area has experienced lengthy drought periods that have impacted on local businesses and the community. Over the last two months there have been three suicides of male farmers in the local area. Two of the men had been found shot on their properties and the third asphyxiated in his car.

These suicide cases might simply have been managed as unrelated tragedies. However, local health professionals took a population and health determinants perspective, asking a number of different questions to place the suicides in their social context. This approach may also identify strategies for preventing future deaths.

Discussion

Are the farmers in the locality of Sville at high risk of suicide?

Rates of suicide of male farmers and farm managers in Australia were observed to increase significantly over the decade 1988–97. Comparison of age-adjusted rates for this population with reported national Australian male suicide rates showed the risk of a male farmer committing suicide in 1997 was more than double that of other Australians. Suicide rates for male farmers have stayed at similarly high rates from 1998 to 2002 (Judd et al 2006).

What are the common means of suicide of Australian farmers?

The most common methods of male farm suicides were firearms, particularly hunting rifles and shotguns, followed by hanging and motor vehicle exhaust gas (Page and Fragar 2002). These methods accounted for approximately 81% of all suicides in both farm manager and agricultural labourer groups. Farm chemicals were the next most common method of suicide.

What factors may be associated with farmer suicide?

Some known risk factors for Australian farmers are shared with farmers in other countries, for example access to the means of suicide, particularly firearms, hanging implements and chemicals. Most farmers worldwide are closely associated with births and deaths of farm and feral animals, and with methods of destruction. Hence, suicide attempts are more likely to be effective for this occupational group.

Other risk factors may be more specific to Australian farm settings. These include the physical isolation necessary to complete suicide. Although there is significant variability between regions and types of farming activity, Australian farms tend to be larger in area and more remote from other human habitation than in most other countries. Economic conditions for Australian agriculture continue to be associated with ongoing restructuring of the industry, resulting in smaller numbers of farms of larger areas. This has been a

feature of Australian agriculture over the past 40 years, made necessary as prices for products decline and costs of production increase. Additionally, global factors such as agricultural subsidies have an impact on overseas competition for agricultural products.

While rates of clinical depression for Australian farmers are not thought to be higher than the general population, male farmers experiencing depression or anxiety conditions may be less likely to access relevant mental health services that would provide early intervention to prevent suicide. Access to mental health services requires a relevant degree of mental health literacy in farmers or those in contact with farmers. Furthermore, affected farmers need the opportunity to consult either general practitioners or mental health service providers in a timely manner — a growing difficulty in many relatively remote communities.

What preventive action should be considered for the Sville community?

Cumulative models of farm suicide prevention that acknowledge the interaction of a range of related suicide-risk factors relating to the rural economy, family and social issues, alcohol and substance use, and service access may be more effective for the farming population. This approach is being adopted in New South Wales under the leadership of the NSW Farmers Association and supported by Mental Health Services. The NSW Farmers Blueprint for Mental Health (ACAHS 2006) includes a range of activities and programs, some of which include:

- advocacy for farm support
- access to drought support
- change-management skills development
- Farm Pride campaign
- access to crisis lines
- mental health first aid for farm members.

Those health care providers who are consulted by farmers with depressive conditions need to be aware of the special risk of suicide of farmers and ensure that at-risk farmers with depressive illness do not return to an unsupported, isolated farm environment. If necessary, access to firearms by farmers at risk of suicide should be prevented, with the help of local police. Restriction of access to the means of suicide (eg firearms) may reduce suicide rates; however, this approach alone is unlikely to be effective for the farming population because of the accepted use of firearms within agriculture for controlling pests and to put down sick or injured stock.

More general community prevention should include developing professional networks between health and general service providers who are associated with farmers, and ensuring access to crisis support.

Local communities can provide opportunities for improved social contact for isolated farmers, and can also participate in mental health literacy programs, such as mental health

first aid short courses. Improved understanding of the suicide risk problem for farmers by service providers, strengthened service networks and improved opportunities for farmers to stay connected would be immediately useful.

General health status in rural Australia

Australians generally enjoy one of the highest living standards in the developed world and in 2002 had the fourth highest rate of good health for women and for men (AIHW 2002). There are however huge inequalities. For example, the average life expectancy for non-Indigenous Australians is 80 years (females 82.6; males 77.4), but is 20 years lower for Indigenous Australians.

People who live outside large urban centres have higher mortality rates and higher rates of risk factors for ill health (eg smoking, excessive alcohol use, poor diet, and less physical activity) than their urban counterparts (Taylor et al 2003). In addition, studies of socioeconomic risk factors show that rural Australians are less well educated, have lower incomes, have poorer access to health services, are less likely to own their own home, are more likely to be unemployed, work in hazardous industries (eg farming, mining) and engage in risk behaviours (eg driving at speed and over long distances).

These indicators are all associated with poorer health outcomes (Thomson 2003), including higher rates of death from coronary heart disease (ischaemic heart disease), cardiovascular disease, motor vehicle accidents, diabetes, suicide, prostate, colorectal and lung cancers (AIHW 2005a).

The perception of ill health, though, is not necessarily consistent across the country. For example, in a recent population health survey in South Australia, people from country regions were generally less likely to report 'Excellent, Very Good or Good' health than their metropolitan counterparts and were more likely to report poorer health if they were or had been smokers, drank alcohol to excess, were overweight, had low levels of physical activity, or had one or more chronic diseases including diabetes, chronic obstructive pulmonary disease, cardiovascular disease or arthritis (Avery et al 2006).

Paradoxically, data collected across Australia by the AIHW shows that, with the exception of arthritis, the prevalence of self-reported rates of chronic disease (diabetes, cerebrovascular disease, asthma, bronchitis/emphysema and osteoporosis) was lower in non-metropolitan areas than metropolitan areas (AIHW 2005a).

The proximity, number and type of health services, the number of health professionals, and the ease of access to services are also important determinants of health. People in rural and remote zones have less access to health care compared with urban counterparts. This is due to a range of factors, including number of health professionals; distance from health services; and, the inability of small population centres to sustain the full range of medical services. The number of GPs, retail and hospital pharmacists and medical specialists falls sharply with increasing remoteness, reducing availability of medical services and access to medicines in remote areas (Strong 1998).

Morbidity patterns

Strong (1998) reported that rural Australians had poorer health than their metropolitan counterparts and experienced higher hospitalisation rates, higher mortality rates and lower life expectancy. Compared to urban Australians, rural Australians had higher hospitalisation rates for injuries, falls (in the elderly population), burns, strokes and coronary heart disease (Baum 1998, Taylor et al 2003). The situation is worse for Indigenous people, more than two-thirds of whom live in areas classified as 'remote'. Compared with non-Indigenous Australians, Indigenous Australians generally have poorer education levels, more unemployment, and are more likely to be on social support benefits with little material wealth and little disposable income: all factors that limit life choices. Indigenous Australians also more often live in remote areas with poor public health infrastructure and substandard living conditions. As a result, Indigenous Australians suffer higher rates of diabetes, cardiovascular disease, respiratory disease, end-stage renal disease, cancers, sexually transmitted disease and other communicable diseases than non-Indigenous Australians. Hospitalisation rates are also higher and GP consultations are lower, reflecting lower GP density in more remote areas. High rates of suicide, smoking, abuse of alcohol and other substances, together with injury as a result of domestic and other violence contribute further to increased morbidity and mortality in remote communities (Thomson 2003).

Mortality patterns

For non-Indigenous Australians, death rates in regional areas are on average 1.1 times those of major cities. In remote areas, this rate increases to 1.5. The main causes of death include cardiovascular disease, chronic obstructive airways disease, injury related to motor vehicle accidents and suicide (AIHW 2006d). There is a strong pattern of increasing mortality from injury with increasing remoteness, particularly for males.

Death rates for Indigenous people are higher than those of non-Indigenous people, regardless of location, and death rates increase with increasing remoteness. In 2001, the median ages of death were 52 years and 57.6 years for Indigenous men and women respectively, compared with 75.8 years and 81.9 years for non-Indigenous men and women. For Indigenous adults, the leading causes of death include circulatory system disorders, injury, cancer, respiratory disease and diabetes (Thomson 2003).

Infant mortality rates in remote areas are almost double those in urban areas; this figure is skewed by the much higher infant mortality rates among Indigenous people. Among non-Indigenous people, the relative death rates of the elderly (>74 years) in remote and very remote areas are lower than those of their urban counterparts. This is believed to be due to older people in remote areas moving to more populous areas in order to have better access to health services, leaving behind a healthier group of older people (AIHW 2003).

There are some positives in the statistics: cancer death rates for males in remote areas are lower than for males in metropolitan areas; cancer death rates for females and deaths from respiratory disease are similar in metropolitan and rural areas. However, these

findings may also relate to people with these conditions moving closer to health services as described previously.

Public and population health

Public health concerns the health of the public or of certain populations.

Although advances in medical knowledge have identified the aetiology of most communicable diseases, disease vectors, modes of transmission and immune and other responses, the basic principles underpinning public health continue. The availability of basic amenities like clean water, electricity, telephone and suitable housing is still problematic for people living in remote and some rural communities of Australia.

There has been a shift, largely driven by the World Health Organization (WHO), from traditional public health thinking to the interplay of less tangible influences, such as community prosperity, education, social capital, social wellbeing, individual choice and control, community participation, health promotion, the natural and built environment, and the impact of work and play on health. The Ottawa Charter for Health Promotion (WHO 1986) encapsulates the principles of public health approaches and integrates the key prevailing health promotion perspectives. The Charter is based on health prerequisites of peace, shelter, education, food, income, a stable ecosystem, social justice and equity. The Charter outlines five areas for health promotion action (Strong et al 1998, Thomson 2003):

- build healthy public policy
- create supportive environments
- strengthen community action
- develop personal skills
- reorient health services.

Contemporary public health approaches identify the determinants of health and targets inequities and the special needs of disadvantaged populations. It emphasises disease prevention, community development and health promotion programs by mobilisation of individuals, communities, local government, industry and other stakeholders, local access to services, and a more social, culturally sensitive and participatory approach to health.

Contemporary approaches have led to increasingly sophisticated information requirements to describe and evaluate the efficiency and effectiveness of public and population health programs at the local level. At the national level, the Australian Institute of Health and Welfare (AIHW) maintains METeOR, a database of national data standards for the health, community services and housing assistance sectors. METeOR facilitates use of databases by providing metadata so that health variables have the same meaning across different information sources such as national and state agencies.

National information sources include the Health Insurance Commission (HIC) which maintains the Medicare Benefits Schedule, Department of Veteran Affairs database and the Australian Childhood Immunisation Register. Examples of state and jurisdiction datasets include the Victorian Admitted Episodes Dataset and the WA Hospital Morbidity Data System. Many of them are collated and analysed nationally at the AIHW. Western Australia has also linked its hospital morbidity, mortality, cancer, midwives, births and mental health, ambulance and emergency datasets, enabling longitudinal studies at the individual level (Holman et al 1999). All these datasets can be obtained directly from the relevant agencies, which report regularly through their websites or print publications, for example the various Australian Institute of Health and Welfare publications (AIHW 2006d, Population Health Division 2006). Third-party software tools such as HealthWiz (Prometheus Information 2004) have been developed to improve the presentation of and access to these population health data.

Case study 5.2 A population health approach: lead poisoning in children in Broken Hill

Lead poisoning in Broken Hill has been an issue since mining for lead, silver and zinc began in the 1880s. A century later, veterinarians are reporting increasing numbers of cases of lead poisoning in animals. In 1991, comprehensive testing of children under five years revealed that 80% had blood lead levels greater than the recommended maximum level (10 μg/dl).

Further investigation in 1992 found that lead was widely distributed in and around the town and came from multiple sources. The climate of Broken Hill is dry and dusty, partly the result of widespread tree-clearing. Local timber fuelled on-site smelting until 1898. In general, housing is old (50–100 years), often run-down or under renovation. Sealing wood and iron houses so that they are dust-tight is difficult so dust can easily migrate into a home's living space.

To improve the health situation in Broken Hill, a population-based approach was initiated in 1994. One advantage of mounting a public health intervention in a rural area is that the whole population can be targeted and involved. In Broken Hill, a targeted approach combining individual case management, population screening of children aged under five years, public education and health promotion, and zonal remediation of contaminated public land was officially launched in 1994. A doorknock survey in 1994 of all households encouraged parents of preschool children to have their children's blood lead levels tested. In the same year, a survey was conducted on children attending the weekly screening clinic to determine the prevalence of potential risk factors and their association with elevated blood lead levels.

Population surveillance and monitoring underpins the whole program. Free voluntary screening on a yearly basis is available for all children aged under five years, as is antenatal screening of pregnant women and cord blood testing of babies born in Broken Hill Hospital. Children with notifiable lead levels (15 μg/dl) are case-managed. This includes educating parents of lead-affected children about 'lead-safe' practices, such as washing hands and wet wiping of dust. For children with substantial lead levels, homes and surrounds are assessed for possible remediation and removal of sources of lead.

Relevant groups such as councils, nurseries, water authorities, hardware stores and trades are offered accredited training, and education programs have been provided in primary schools.

Soil lead levels and stability were mapped as part of an environmental assessment of public land. High-risk sites adjacent to residential land were prioritised for remediation.

This approach has been successful in reducing the proportion of children with blood levels above the 10 µg/dl guidelines to just over 20%. While differences in children's blood lead levels were initially found between those living close to the mines and those further out, these differences have decreased noticeably since 2002.

Discussion

Intervention success factors

The development and effectiveness of the population-based intervention program at Broken Hill has been strongly influenced by Broken Hill's geographical location and its economic and cultural base. When the lead-management strategy was developed, it became clear that the expertise and skills needed did not exist within Broken Hill's mainstream service providers and that these had to be developed in the first few years.

Informing and engaging the community was vital as many families had lived for generations in the town, worked down the mines and were doubtful of the dangers posed by lead. Lead poisoning was seen as an occupational hazard. The community working group established at the outset that there was no policy to actively move people from high-risk areas (relying on natural attrition of residents from the highest risk areas). To avoid singling out certain areas, the group emphasised that lead levels were a problem throughout the whole town.

The early years of the program coincided with a mining downturn and retrenchment of workers. Like other rural towns that depend on one industry, this was a major economic threat to Broken Hill, and had to be taken into account when the strategies for the lead program were developed and introduced. Broken Hill's isolation forced people to leave town for employment, subsequently decreasing the city council's rate base and limiting public land remediation strategies. The dry, dusty environment and the town's water source, 110 km away, dictated native, low-water-use plants (the unpopular saltbush and bluebush) for regeneration areas. In these circumstances, a public health intervention could only succeed with a strong element of community guidance and control. In a defined rural area like Broken Hill, meaningful community involvement is likely to be easier than in a non-defined metropolitan area.

Lessons learnt from the intervention program

Screening and education were the key features of the lead program. While there was some initial resistance to these approaches, an emphasis on raising awareness among the whole town has gradually shifted community opinion. Broken Hill's underlying dusty environment combined with poorly sealed homes suggested that individual change, such as cleaning homes, requires an ongoing effort to be effective. While home cleaning has reduced lead dust in the immediate environment, it does not appear to have been a major factor in the decrease in children's lead levels. Wider structural change in Broken Hill has been at least as important as individual change, and included capping the mine waste,

covering the railway wagons taking lead concentrate for smelting, and stabilising the soil in the public lands. These efforts have also contributed to minimising recontamination of homes and areas where children live and play. Such environmental interventions would never have been possible if the lead problem had been managed on a purely individual basis.

Long-term evaluation of the program clearly demonstrates its effectiveness. This has only been possible through the involvement of the local community, focusing on building local capacity and a population approach to this important issue.

Key points

- The health status of rural people is generally poorer than their non-rural counterparts and is worst for Indigenous people.
- Morbidity and mortality patterns differ between rural and metropolitan populations.
- Differences in social, economic, cultural and environmental determinants of health in part explain the health differentials that exist between rural and metropolitan populations.
- Whole of community approaches are most effective in achieving sustained changes to public health problems.
- There are a number of state and national databases that provide information about public health and risk factors.

Recommended readings and resources

- Australian Institute of Health and Welfare (2006). *Australia's Health 2006,* AIHW cat. no. AUS 73, AIHW, Canberra. http://www.aihw.gov.au/publications/index.cfm/title/10321

This is the tenth in a series of biennial reports on the health of Australians. It contains information on patterns of health and illness, including rural and Aboriginal and Torres Strait Islander populations, determinants of health, health services utilisation, and health services expenditure.

- Australian Institute of Health and Welfare (2004). *Rural, Regional and Remote Health: A Guide to Remoteness Classifications*, Rural Health Series 4, AIHW, Canberra. http://www.aihw.gov.au/publications/index.cfm/title/9993

This provides a guide to the classification of remoteness and rural and regional health. The AIHW website (http://www.aihw.gov.au/) is a key site to visit for all health and welfare statistics.

- Baum F (1998). *The New Public Health: An Australian Perspective*, Oxford University Press, Melbourne, Australia.

This textbook describes the evolution of public health thinking and provides an overview of public health research methods, including epidemiology, qualitative and quantitative methods and program evaluation.

- Webber KM (2005). *General Practice Hospital Integration Issues in Rural and Remote Australia, Summary of Findings*, Australian Rural Health Education Network, Canberra.

Learning activities

1. What are the main differences between the health of those living in rural and remote areas and those living in metropolitan areas?
2. List some of the determinants of health that may have impacted on your own health.
3. Case study 5.1 outlines some of the factors that may be associated with high rates of suicide of farmers. Can you think of any others?
4. Case study 5.2 describes an environmental health issue in Broken Hill. Find a local environmental health issue in your area and set out a plan of action for population health research and evaluation.
5. Port Pirie in South Australia has a lead problem similar to Broken Hill's. Compare and contrast the approaches taken to address the lead issue.