The second half of the last century has seen unprecedented growth in the world’s population, massive migration from rural to urban centres and a greater than 50% increase in life expectancy. In 2009, for the first time, more than half of the world’s population lived in cities and there are now more than 20 ‘mega-cities’ with populations of more than 20 million people, mostly in developing countries. The pace continues, with the two biggest countries, China and India, experiencing increased urban drift from rural areas as millions of people search for a better quality of life, access to jobs and services and better prospects for their children. In the same 50 years Australia has gone from a rural agricultural economy to one dominated by service industries and where more than two-thirds of us now live in a handful of coastal cities.

In Australia and other OECD countries, our improved life expectancy over the last half century has been mainly due to a steep decline in cardiovascular mortality in adults, whereas the health transition in most developing countries has been dominated by improved child survival. Yet, as we open the 21st century, we all share a set of stark common problems that have their genesis in the very success of these past 50 years. Globalisation of fast foods, urbanisation, sedentariness, obesity, diabetes and attendant complications are all linked, and will likely limit further increase in longevity, increase our years spent with disability and contribute to escalating healthcare costs.

At the same time we document growing disparities in health outcomes between the rich and poor, Indigenous and others, and urban and rural people. The contributions from health behaviours (food choices, smoking, physical activity), structural inequities (very low incomes combined with high cost of food in remote areas, poor quality of the food supply, food insecurity, low educational attainment, poverty and poor housing, low economic participation etc.) and access to services (jobs, housing, health care, education) explain many of these differences.
The challenges faced by rural Australian communities are multidimensional and must go hand in hand with policies to improve the basis for the structural and service inequalities they face. For service providers, epidemiologists, health service providers and social researchers, rural communities offer opportunities for real community engagement that are not feasible in cities. In rural communities the population is known and it is possible to make a big difference in health and other outcomes with relatively simple measures, in health and other social outcomes. The essays and research reports that are collected in this Rural Health edition of the South Australian Public Health Bulletin, testify to the research and policy initiatives that seek to address disparities between rural and urban populations and in doing so they draw upon the many positive aspects of rural health and community life.

Contributors to this edition highlight that while there is an imperative to research the needs of rural populations and regions, such research can be challenged by definitions of key terminology and by community attitudes. Clark et al. discuss the importance of clearly delineated definitions of access and remoteness in the context of the Cardiac ARIA project, arguing that definitions can impact understandings of the ways that distance mediates and limits access to goods and services. From their work on the Whyalla Intergenerational Study of Health (WISH), Haren et al. acknowledge that rural community uptake and involvement in research activities could be bolstered by actively seeking and integrating community knowledge about public health matters, building trust with communities and empowering communities in the governance of their futures.

The rural population is a diverse group with varying needs and opportunities for improved health outcomes and quality of life. Hence, authors in this edition of the Public Health Bulletin draw the reader's attention to specific policy and research activities linked to subgroups of the rural population—such as Aboriginal pregnant women, workers in farm industries, rural men and migrants to rural localities. Specifically, Caponi et al. discuss the positive impacts of the Aboriginal Family Birthing Program for rural Aboriginal women and their children. Lower outlines the evidence-based, well-known and practical solutions that can be used to reduce injuries and fatalities in the high-risk farming industry. Misan et al. comment on the key determinants of men’s health and existing policy initiatives, and the authors recommend priorities and additional initiatives to address disparities in men's health.

Finally, Sawford et al. describe the Regional Migrant Settlement health lens project which has explored migrants’ experiences of settlement in rural South Australia and the relationship between migrant settlement and health and wellbeing. The work of Martini et al. analyses data from the National Bowel Cancer Screening Program data, and illustrating that subgroups of the rural population are vulnerable to disease occurrence due to their particularly poor uptake of disease screening which is a cornerstone of modern public health. In particular cancer screening rates were poor for older rural and remote residents but also for men, Indigenous people, lower socioeconomic groups and those living in Far North South Australia.

The resilience, adaptation and innovation that have historically been part of the rural Australian ethos are also reflected through articles included in this edition of the Public Health Bulletin. King et al. explore the contextual, social and personal factors that influence how rural families maintain their health and wellbeing in the face of adverse climatic conditions such as drought. In summary, the authors advocate for a systemic across-government approach to building community and individual resilience through health maintenance. The role of technology such as the internet in the experiences of rural Australians is considered by Feist et al., who highlight its impact in fostering and facilitating the relationships between people and places and in increasing the wellbeing of older generations. On the same topic, Bell et al. view a high-speed and ubiquitous national internet network as infrastructure that will enrich all Australians’ lives and allow rural Australians to more readily access health care. The coverage and activities of the Royal Flying Doctor Service are described by Setchell as an innovative service that has responded to the needs of rural communities since its establishment in 1928, evolving with these remote populations over 83 years of service.

This edition of the Public Health Bulletin does not provide a comprehensive review of the rural health challenges to be faced in the 21st century. Rather this edition provides a snapshot of issues, challenges and responses faced in the rural health setting. In doing so the Public Health Bulletin seeks to contribute to our joint understandings of the unique challenges of distance and accessibility and to aid in our joint search for solutions.

Note: Due to the large size of Volume 7, Number 3 of the Public Health Bulletin this edition includes a paper by Magarey et al (pg 58), which responds to the theme Childen and Public Health.
Why measuring accessibility is important for public health: a review from the Cardiac ARIA project

Robyn A Clark
Associate Professor
NHMRC Post Doctoral Fellow, School of Nursing and Midwifery
Queensland University of Technology
Adjunct, Sansom Institute, University of South Australia

Neil Coffee
Senior Research Fellow
Social Epidemiology and Evaluation Research, Sansom Institute, University of South Australia
On behalf of the Cardiac ARIA project

Introduction
Measuring accessibility has become more common in the literature in recent years—indeed, accessibility is often a ‘variable’ within regression analyses seeking to determine associations between health and outcomes. The purpose of this paper is to report on the importance of having a clear definition of access in public health research, and to demonstrate how a geographic definition was applied in the Cardiac ARIA project.

Accessibility can be defined as ‘the ease of approach from one location to another measured in terms of distance travelled, the cost of travel, or the time taken’. Remoteness can be defined as ‘distant or far away geographically’. These concepts are at the heart of geographic models of access and remoteness, the underlying principle of which is the impact that distance plays in assisting or hampering access to goods and services—in this case, access to healthcare services.

We acknowledge that these definitions refer to physical rather than social accessibility, which could include class structure, income, age, education, gender or ethnicity, and the impact these factors can have in accessing services. While ‘access’ is a major concern in healthcare policy, it is also one of the most frequently used words in discussions of the healthcare system. Access is an important concept in health policy and health services research, yet it is often not defined or employed precisely. To some, access refers to entry into or use of the healthcare system, while to others it characterises factors influencing entry or use. In the pinnacle paper by Penchansky and Thomas, access is defined as a general concept that summarises a set of more specific dimensions describing the fit between the patient and the healthcare system. The specific dimensions are availability, accessibility, accommodation, affordability and acceptability. The Penchansky taxonomy is defined in more detail in Table 1.2

### Table 1: Penchansky definition of access in the context of healthcare services

<table>
<thead>
<tr>
<th>Concept</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability</td>
<td>The relationship of the volume and type of existing services (and resources) to the clients’ volume and types of needs. It refers to the adequacy of the supply of physicians, dentists and other providers; of facilities such as clinics and hospitals; and of specialised programs and services such as mental health and emergency care.</td>
</tr>
<tr>
<td>Accessibility</td>
<td>The relationship between the location of supply and the location of clients, taking account of client transportation resources and travel time, distance and cost.</td>
</tr>
<tr>
<td>Accommodation</td>
<td>The relationship between the manner in which the supply resources are organised to accept clients (including appointment systems, hours of operation, walk-in facilities, telephone services) and the clients’ ability to accommodate to these factors and their perception of their appropriateness.</td>
</tr>
<tr>
<td>Affordability</td>
<td>The relationship of prices of services and providers’ insurance or deposit requirements to the clients’ income, ability to pay and existing health insurance. The clients’ perception of worth relative to total cost is a concern here, as is their knowledge of prices, total cost and possible credit arrangements.</td>
</tr>
<tr>
<td>Acceptability</td>
<td>The relationship of clients’ attitudes about personal and practice characteristics of providers to the actual characteristics of existing providers, as well as to provider attitudes about acceptable personal characteristics of clients. In the literature the term appears to be used most often to refer to specific consumer reaction to such provider attributes as age, sex, ethnicity, type of facility, neighbourhood of facility, or religious affiliation of facility or provider. In turn, providers have attitudes about the preferred attributes of clients or their financing mechanisms. Providers either may be unwilling to serve certain types of clients (e.g. welfare patients) or, through accommodation, may make themselves more or less available.</td>
</tr>
</tbody>
</table>

Measuring accessibility in Australia

One of the earlier Australian remoteness classifications was the Rural, Remote and Metropolitan Areas (RRMA) classification. It was developed in 1994 by the then Departments of Primary Industry and Energy and Human Services and Health in response to concerns in the Commonwealth Department of Health about the level of health service provided to rural and remote areas. In essence, RRMA defined remoteness in terms of ‘distance’ based on a straight line (Euclidean or ‘as the crow flies’) between the centroid (or centre-most point) of a statistical local area (SLA) and the centroid of the nearest service centre, coupled with a ‘personal distance’ factor based on population density. Although the publication of RRMA was significant, a number of limitations in its application became apparent over time, for example its use of Euclidean distances rather than established road or air networks, its reliance on SLAs, the use of the word ‘rural’, and inclusion of a personal distance factor. These issues and others, more notably RRMA’s increasing incompatibility with recent policy and analysis (particularly at the town level), provided the impetus for the development in 1997 of a new geographic remoteness index—the Accessibility/Remoteness Index Australia (ARIA). ARIA replaced RRMA and has been modified to measure all essential community services (Figure 1).

In order to systematically tailor services to meet the needs of Australians living in regional locations, a workable definition of ‘remoteness’ (identified as a lack of accessibility to services regarded as normal in metropolitan areas) was required. In 1996–97 the National Key Centre for Social Applications of Geographical Information Systems (GISCA) at The University of Adelaide was commissioned to assist the Australian Bureau of Statistics (ABS) in its review of the Australian Standard Geographical Classification (ASGC). This review included quantifying the measurement of remoteness in a more-or-less objective way. GISCA recommended applying geographic information system (GIS) techniques to construct a remoteness measure. The resulting ARIA was designed to be comprehensive, sufficiently detailed, as simple as possible, transparent, defensible and stable over time—and to make sense

**Figure 1: Accessibility and Remoteness Index of Australia (ARIA)**
ARIA was also designed to be an unambiguously geographical approach to defining remoteness—that is, socioeconomic, urban/rural and population size factors were not incorporated into the measure. The 2007 version of ARIA (ARIA++) calculated remoteness as accessibility to service centres based on road distances. Remoteness values for 20,387 populated localities were derived from the road distance to service centres in four categories (a weighting factor is applied for islands). Remoteness values for each populated locality are then interpolated to a 1 km grid that covers the whole of Australia and averages are calculated for larger areas. To create an associated classification, ARIA values are grouped into the following five categories using a 0–18 continuous variable:

1. Highly Accessible (ARIA score 0 to <0.20)—relatively unrestricted accessibility to a wide range of goods and services and opportunities for social interaction.
2. Accessible (ARIA score 0.20 to <2.40)—some restrictions to accessibility of some goods, services and opportunities for social interaction.
3. Moderately Accessible (ARIA score 2.40 to <5.95)—significantly restricted accessibility of goods, services and opportunities for social interaction.
4. Remote (ARIA score 5.95 to <10.5)—very restricted accessibility of goods, services and opportunities for social interaction.
5. Very Remote (ARIA score 10.5 to <15)—very little accessibility of goods, services and opportunities for social interaction.

The ARIA classification has been widely accepted by a variety of users since its release in 1999. As a result, the ABS included ARIA scores as part of the 2001–2006 Census data releases. The ARIA framework has also been used as the basis of the development of derivative indexes. Within the Department of Health and Aged Care, a GPARIA using a different ‘basket’ of services was developed for all localities to assist in determining retention payments for general practitioners (GPs) living in non-metropolitan areas and to define categories of service centres. Similarly, a PhARIA was developed for retention payments for pharmacies in rural and regional areas. There have also been many epidemiological publications demonstrating the relationship between access to services and disease and risk of disease using the ARIA.

The Cardiac ARIA project
Physical or geographic accessibility was the underlying basis of the methodology developed for the Cardiac ARIA project, which was based on the ARIA conceptual framework. Timely access to appropriate cardiac care is critical for optimising outcomes after a cardiac event. The aim of this project was to derive an objective, comparable, geographic measure that reflects access to cardiac services along the road network for Australia’s 20,387 population localities.

Methods
An expert panel defined a single patient care pathway for cardiac events and the services and facilities required to manage defined cardiac events. The events included cardiac arrest, acute coronary syndrome, acute decompensating heart failure and life-threatening arrhythmias. Nine datasets were included for the GIS modelling phase of the project, including the Australian road network, population localities, ambulance stations, hospitals and clinics, general practices, pharmacies, cardiac rehabilitation services and pathology laboratories.

GIS methodology was used to build a numeric/alpha index to measure acute and after-care cardiac accessibility. The acute index (numeric) ranged (Figure 2) from 1 (access to tertiary centre with Percutaneous Coronary Interventions (PCI) ≤ 1 hour) to 8 (no ambulance service, > 3 hours to medical facility, air transport required). The after-care index was modelled into five alphabetic categories: A (access to GP, pharmacy, cardiac rehabilitation, pathology ≤ 1 hour) to E (no services available within 1 hour).

Similar to the ARIA, the Cardiac ARIA can be aggregated to other areal units such as a local government area, statistical local area, postcode, suburb, census collection district or any other user-defined catchment. This enables the incorporation of population data for these units to be associated with a Cardiac ARIA score so that estimates of population numbers at risk can be calculated.

Results
The results of analysis of the key population characteristics for each Cardiac ARIA category are presented in Table 2. In 2006, 70.6% or 13.9 million Australians (68% of older persons) resided within a Cardiac ARIA category 1A location (access to tertiary centre with PCI ≤ 1 hour and access to GP, pharmacy, pathology laboratories).
Figure 2: Accessibility to category 1 public hospitals in Australia

cardiac rehabilitation, pathology ≤ 1 hour). For Indigenous people, only 40% had access to a category 1 hospital and services to support cardiac rehabilitation, and 12% (56000) resided 3 hours or more from a hospital and only had access to service to support one rehabilitation (Table 2). Disparity in access to category 1A cardiac services was demonstrated for 5.8 million (30%) of all Australians, 60% of Indigenous people and 32% of people over 65 years of age (Table 2).

Implications for practice
Our study has provided a geographic measure of access to cardiac services but does not measure health system performance. Therefore, it reflects ‘what should happen…not what does happen’. The Cardiac ARIA focuses on community access/support as opposed to medically centred responses. This could allow communities to be proactive by taking the lead to improve access to cardiac services based on the Cardiac ARIA for their population locality. The Cardiac ARIA will be iterative as data access improves, and the results can then be used to identify geographic hotspots where there is a mismatch between demand and provision of cardiac services. Inequities in access in rural areas will continue without system changes. Public health researchers can use the Cardiac ARIA to determine cardiovascular health service delivery against service requirements in an objective way.

For population localities with limited access to cardiac services (i.e. high Cardiac ARIA scores), a case could be made for innovative practice such as virtual or electronically supported cardiac care.
Table 2: ABS Census data 2006 key characteristics of Cardiac ARIA categories

<table>
<thead>
<tr>
<th>Cardiac ARIA category</th>
<th>Persons n (%)</th>
<th>Indigenous persons n (%)</th>
<th>Persons aged ≥ 45 years n (%)</th>
<th>Persons aged ≥ 55 years n (%)</th>
<th>Persons aged ≥ 65 years n (%)</th>
<th>Persons aged ≥ 75 years n (%)</th>
<th>Persons aged ≥ 85 years n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A</td>
<td>13 983 696 (70.58%)</td>
<td>180 210 (39.74%)</td>
<td>5 171 675 (68.19%)</td>
<td>3 257 449 (67.48%)</td>
<td>1 784 081 (67.56%)</td>
<td>882 236 (69.47%)</td>
<td>229 650 (71.19%)</td>
</tr>
<tr>
<td>2A</td>
<td>1 645 086 (8.30%)</td>
<td>47 821 (10.55%)</td>
<td>646 419 (8.52%)</td>
<td>415 277 (8.60%)</td>
<td>230 228 (8.72%)</td>
<td>108 312 (8.53%)</td>
<td>26 429 (8.19%)</td>
</tr>
<tr>
<td>3A</td>
<td>1 100 338 (5.55%)</td>
<td>32 252 (7.11%)</td>
<td>457 016 (6.03%)</td>
<td>303 527 (6.29%)</td>
<td>172 781 (6.54%)</td>
<td>80 687 (6.35%)</td>
<td>19 495 (6.04%)</td>
</tr>
<tr>
<td>4A</td>
<td>7 183 (0.04%)</td>
<td>78 (0.02%)</td>
<td>2 848 (0.04%)</td>
<td>1 787 (0.04%)</td>
<td>1 058 (0.04%)</td>
<td>519 (0.04%)</td>
<td>132 (0.04%)</td>
</tr>
<tr>
<td>5A</td>
<td>89 497 (0.45%)</td>
<td>2 718 (0.60%)</td>
<td>37 732 (0.50%)</td>
<td>24 873 (0.52%)</td>
<td>14 068 (0.53%)</td>
<td>6 774 (0.53%)</td>
<td>1 693 (0.52%)</td>
</tr>
<tr>
<td>5B</td>
<td>669 981 (3.38%)</td>
<td>27 182 (5.99%)</td>
<td>295 491 (3.90%)</td>
<td>196 465 (4.07%)</td>
<td>107 617 (4.08%)</td>
<td>48 198 (3.80%)</td>
<td>11 871 (3.68%)</td>
</tr>
<tr>
<td>5C</td>
<td>101 629 (0.51%)</td>
<td>8 358 (1.84%)</td>
<td>44 621 (0.59%)</td>
<td>30 469 (0.63%)</td>
<td>17 680 (0.67%)</td>
<td>8 250 (0.65%)</td>
<td>2 115 (0.66%)</td>
</tr>
<tr>
<td>5D</td>
<td>223 851 (1.13%)</td>
<td>23 463 (5.17%)</td>
<td>88 823 (1.17%)</td>
<td>56 556 (1.17%)</td>
<td>29 924 (1.1%)</td>
<td>13 442 (1.06%)</td>
<td>3 463 (1.07%)</td>
</tr>
<tr>
<td>6A</td>
<td>102 898 (0.52%)</td>
<td>17 191 (3.79%)</td>
<td>31 759 (0.42%)</td>
<td>17 391 (0.36%)</td>
<td>7 827 (0.30%)</td>
<td>3 206 (0.25%)</td>
<td>739 (0.23%)</td>
</tr>
<tr>
<td>6B</td>
<td>486 069 (2.45%)</td>
<td>12 485 (2.75%)</td>
<td>219 102 (2.89%)</td>
<td>139 819 (2.90%)</td>
<td>67 266 (2.55%)</td>
<td>25 223 (1.99%)</td>
<td>5 074 (1.57%)</td>
</tr>
<tr>
<td>6C</td>
<td>44 293 (0.22%)</td>
<td>2 044 (0.45%)</td>
<td>19 229 (0.25%)</td>
<td>11 939 (0.25%)</td>
<td>5 445 (0.21%)</td>
<td>1 901 (0.15%)</td>
<td>316 (0.10%)</td>
</tr>
<tr>
<td>6D</td>
<td>232 851 (1.13%)</td>
<td>3 103 (0.68%)</td>
<td>34 157 (0.45%)</td>
<td>20 800 (0.43%)</td>
<td>9 294 (0.35%)</td>
<td>3 091 (0.24%)</td>
<td>543 (0.17%)</td>
</tr>
<tr>
<td>6E</td>
<td>10 777 (0.20%)</td>
<td>3 103 (0.68%)</td>
<td>34 157 (0.45%)</td>
<td>20 800 (0.43%)</td>
<td>9 294 (0.35%)</td>
<td>3 091 (0.24%)</td>
<td>543 (0.17%)</td>
</tr>
<tr>
<td>7D</td>
<td>40 809 (0.19%)</td>
<td>3 421 (0.75%)</td>
<td>3 103 (0.68%)</td>
<td>3 103 (0.68%)</td>
<td>3 103 (0.68%)</td>
<td>3 103 (0.68%)</td>
<td>3 103 (0.68%)</td>
</tr>
<tr>
<td>8C</td>
<td>2 332 (0.01%)</td>
<td>62 (0.01%)</td>
<td>1 406 (0.02%)</td>
<td>1 056 (0.02%)</td>
<td>486 (0.02%)</td>
<td>141 (0.01%)</td>
<td>16 (0.00%)</td>
</tr>
<tr>
<td>8D</td>
<td>3 757 (0.02%)</td>
<td>1 987 (0.04%)</td>
<td>977 (0.01%)</td>
<td>509 (0.01%)</td>
<td>218 (0.01%)</td>
<td>69 (0.01%)</td>
<td>19 (0.01%)</td>
</tr>
<tr>
<td>8E</td>
<td>29 764 (0.15%)</td>
<td>8 225 (1.81%)</td>
<td>9 733 (0.13%)</td>
<td>5 379 (0.11%)</td>
<td>2 101 (0.08%)</td>
<td>661 (0.05%)</td>
<td>132 (0.04%)</td>
</tr>
<tr>
<td>NA</td>
<td>18 666 (0.09%)</td>
<td>296 (0.07%)</td>
<td>7 760 (0.10%)</td>
<td>5 175 (0.11%)</td>
<td>2 678 (0.10%)</td>
<td>1 137 (0.09%)</td>
<td>243 (0.08%)</td>
</tr>
<tr>
<td>Total</td>
<td>19 813 080</td>
<td>453 429</td>
<td>7 583 701</td>
<td>4 827 009</td>
<td>2 640 667</td>
<td>1 270 011</td>
<td>322 607</td>
</tr>
</tbody>
</table>
Recommendations for further Research
Outcomes from the Cardiac ARIA project will provide extensive opportunities for further research. We are currently awaiting a national mortality dataset from the Australian Bureau of Statistics to complete further modeling to determine if there is a correlation between Cardiac ARIA categories and health outcomes. Other sources of data for this project include risk factor data and outcomes from the North West Adelaide Health Survey and the Greater Green Triangle risk Factor Study.

Limitations
The Cardiac ARIA is dependent on the quality of data that is acquired, and will be iterative as data is updated and access to key national datasets improves. The index demonstrates geographic access to cardiac services rather than the performance of the healthcare system.

Conclusion
Our study has shown that in 2006 the majority of Australians were geographically located in communities that have timely access for survival of a cardiac event. The time it takes for systems to mobilise, rather than the distance to services, may be more important when determining the outcomes for a cardiac event for this proportion of the population. The Cardiac ARIA project was to make a contribution to improve heart health for all Australian communities. The Cardiac ARIA is a potentially powerful tool for policy makers and researchers to both highlight and combat the burden of cardiovascular disease in urban, rural and remote Australia by classifying access to cardiac services in an objective geographic way that establishes a benchmark for practice.

References
Introduction

The purpose of this paper is to outline a model of ante- and postnatal care that meets the holistic needs of Aboriginal women in rural and remote South Australia (SA). It seeks to highlight the importance of building relationships between health services, the community they serve and the health professionals involved in birthing services.

Although relationships are a key success factor in providing a comprehensive birthing service to Aboriginal women, this paper also outlines other elements that support a successful service for Aboriginal women in rural and remote areas.

Program development

The Aboriginal Family Birthing Program (AFBP), originally based in Port Augusta and Whyalla, is a culturally appropriate, holistic early intervention program aimed at working with ante- and postnatal Aboriginal women to improve the health and wellbeing of both mother and baby.

Need for the program

The impetus for the program arose from an analysis of the data presented in the Pregnancy Outcome Unit Report South Australia 2003. This showed that:

- The perinatal mortality rate for Aboriginal women was 16.9 per 1000 compared with 9.7 in non-Aboriginal women.
- 59% of pregnant Aboriginal women were smokers compared with 20% of non-Aboriginal women.
- The infant mortality rate of Aboriginal children was 12.8% per 1000 compared with 3.5% per 1000 for non-Aboriginal children.
- Low birth weight continued to be a significant problem, occurring in 18% in Aboriginal births compared with 6.5% in non-Aboriginal births.

Based on data presented in this report, it was apparent that more needed to be done to improve outcomes for Aboriginal women and their children, and to ensure that Aboriginal mothers accessed professional care through the birthing process.

Birthing is sacred to Aboriginal women and, traditionally, women would have supported each other through this process. Over time, with the pressures of society and poverty, female support mechanisms have broken down and many young Aboriginal women struggle to deal with the immense challenges of pregnancy and childbirth in isolation.

Consultation on the model

The initial consultation process informing the development of the AFBP very quickly identified that a program was needed that would see Aboriginal women looking after Aboriginal women through their birthing process. It was also noted that, in order to achieve continuity of care, each woman needed an individual primary caregiver throughout her pregnancy.

After the initial consultation process, a group of key health service providers met to develop the alternative birthing program. This program was a partnership between Pika Wiya Health Service, the Port Augusta Hospital, Nunyara Health and Wellbeing Service, and the Whyalla Hospital and Health Service.

As part of this process, an Aboriginal women’s advisory group was formed to give guidance and to ensure that the program was run in a culturally appropriate way. It comprised a cross-section of Aboriginal women from the communities involved in the project. In particular, members of the group were insistent that only women could work in the program because in Aboriginal culture birthing is women’s business. Group members also strongly supported Aboriginal women caring for Aboriginal women as the cornerstone of the program. This key recommendation led to the development of the Aboriginal Maternal Infant Care (AMIC) Worker position.

The model

The operational model of the AFBP was based around the role of women’s AMIC workers, who would look after the women in a holistic sense, including providing some elements of clinical care. Specifically, it was envisaged that recruited AMIC workers would already be Aboriginal health workers and that this role would be expanded to provide antenatal care to Aboriginal
clients. They would be the key worker for the women, working alongside midwives (both community and acute) and supporting women to attend appointments with their general practitioner and obstetrician. In addition, women could request that the AMIC worker be present during the birth. The AMIC workers would form part of the clinical care team involving medical and midwifery professionals that would support the women from early in the pregnancy through to 6 weeks post natal.

All Aboriginal women would be targeted for enrolment in the AFBP, with priority given to those who were at risk of poor birth outcomes (young women, women living in poverty and/or first pregnancy). Due to similar poor outcomes being experienced by teenage pregnant non-Aboriginal women in Whyalla, they were also included in the Whyalla-based program’s priority targets.

The model outlined here became the basis for the current AFBP that is successfully run in Port Augusta and Whyalla.

Key success factors
A number of key success factors were identified as underpinning the success of the AFBP. These were the various relationships between AMIC workers and midwives; among health services; and between health services and the community.

In order to ensure the success of the program, the key components of these relationships were considered in the context of mindfulness theory. Snyder and Lopez highlighted that, in order to build positive relationships, it is important to:

- seek to understand the other’s point of view
- give others the ‘benefit of the doubt,’ which could also be interpreted as developing trust
- accept and respect
- actively participate in the maintenance and enhancement of the relationship.

A number of processes were developed to support the program by encompassing the key points of positive relationships outlined by Snyder and Lopez, and these are discussed below.

**Relationship between AMIC workers and midwives**
The program recognised the need to build partnerships between AMIC workers and midwives as this would ensure that Aboriginal clients would be more comfortable in accessing services. As outlined, mutual respect and learning needed to be developed in areas where this did not already exist. This was partly achieved through working closely together and having shared goals for the client, but the main target was the achievement of mutual learning between AMIC workers and midwives. It was recognised that each group was committed to their clients and valued learning, but that each group brought mutually exclusive and important expertise to the care of Aboriginal women—AMIC workers contributed cultural expertise and midwives contributed clinical expertise.

To further enhance the process of shared learning and facilitate delegation of care between the workers, the AFBP project team, in conjunction with the Aboriginal Health Council of South Australia, developed a nationally accredited Certificate IV in Aboriginal Maternal and Infant Care, including three diploma level modules. Two AMIC workers have now completed this training and a number of others are currently in the process of gaining their qualification. Similarly, the development of a cultural learning program targeted at midwives is nearing completion.

**Relationship among health services**
In order to ensure a professional, seamless, quality health service for pregnancy that meets Aboriginal women’s clinical, social and cultural needs, it was recognised that a strong relationship would be needed among all the service providers, namely AMIC workers, midwives, Aboriginal health organisations and the local hospitals. As noted, mutual respect and shared goals for the client were important to these relationships, but examination and modification of policies and processes was also required to ensure that all staff involved in the project could work across agencies without barriers. The management committee of the AFBP played a key role in identifying and addressing any barriers, and the committee was also a forum for the resolution of any conflicts arising between stakeholders.

**Relationship between health services and the community**
The AMIC workers play a vital role in the relationship between health services and the community because they have both cultural and community knowledge, which are necessary for the success of the program. In addition, community engagement was undertaken during the consultation phase of the program’s
development, and this contributed to community ownership and understanding of the program. The Aboriginal women’s advisory group’s role in the development of the AFBP cannot be underestimated, particularly with regard to the ongoing maintenance of the relationship with the community.

Outcomes of the Aboriginal Family Birthing Program

Over the first 4 years (2004–08) of implementation of the AFBP, 164 women were enrolled. Data collected by the program staff for this period show that, of the enrolled women:

- > 42% attended their first antenatal visit at less than 14 weeks gestation
- > 84% attended seven or more antenatal sessions throughout their pregnancy
- > 14% delivered low-birthweight babies (statewide average is 18%)
- > a reduction (albeit small) in smoking during pregnancy was noted.

Feedback from women enrolled in the AFBP indicated that, following participation, they:

- > were more aware of their health
- > were looking forward to the birth as a positive experience
- > had improved confidence throughout the birthing process
- > felt more confident in accessing the health system throughout their pregnancy.

Based on participant feedback, it was also noted that there was an increase in breastfeeding following enrollment in the AFBP.

One teenage mum stated that:

“This program has really helped me understand what changes were happening to my body while I was pregnant. [The AMIC workers] supported me through my pregnancy and also prepared me for my birth. [AMIC workers] have also supported me after my daughter was born, to help me and the baby in those first few weeks. If it wasn’t for this program I don’t know what I would have done, but I am really enjoying being a mum now.”

This young mum came back to the program with her second pregnancy and was again very happy with the support she received.

Program extension

The success of the AFBP, coupled with the availability of increased funding, has led to the program being extended into other regional areas of SA that have been identified as having a high Aboriginal birth rate and an existing positive relationship between the Aboriginal health service and other local health services. These communities are in Ceduna, Murray Bridge, Leigh Creek, Copley and Coober Pedy.

Future expansions of the AFBP will target other identified suitable areas pending funding availability.

In line with the success factors highlighted in the initial stages of the project, the communities identified for establishment of the program were consulted regarding how it should operate in their area—for example, should staff be employed locally or through an outreach service, and which organisation should employ the staff? Locally based Aboriginal women’s advisory groups have also been established to ensure that local cultural aspects are considered and community awareness of the program is maximised. Local management committees were established to oversee the program and to consider the relationships between agencies, including the examination of policy and processes to enable implementation of the model. Finally, staff were provided with training to equip them with the knowledge and skills to take on the AFBP model.

Although each site is slightly different due to the local environment and community resources, the model of care is ultimately the same across localities, in that Aboriginal women are cared for by Aboriginal women throughout their pregnancy. Care is also provided in a team environment that ensures that the clinical, social and cultural needs of the women are met, which results in a holistic, seamless and safe service.

In addition to expansion in rural and remote areas, the success of the AFBP model of care has also been adapted to metropolitan Adelaide, with the Children’s Youth and Women’s Health Service leading development of the program.

With regard to evaluation of the program, although data collection has been a continual process, planning is underway for full evaluation across SA during 2012 and 2013.
Conclusion
The AFBP has improved the birthing experiences of Aboriginal and teenage women through shifting the paradigm of service delivery in rural and remote SA.

In summary, the success of the program has illustrated that the development of good relationships between key stakeholders can enable the effective implementation of an alternative model of care. Support structures such as local management committees and Aboriginal women’s advisory groups, as well as training for staff involved in the program, were also paramount to its success. A service delivery model delivered by a skilled clinical team with common goals for Aboriginal women needs to underpin a culturally and clinically safe model of care that has Aboriginal women being cared for by Aboriginal women. The end result is a growing group of Aboriginal women who are strong, confident mothers due to the care they have received through the AFBP.

References

Farm injury fatalities: where are we and where to from here?

Tony Lower
Director
Australian Centre for Agricultural Health and Safety
University of Sydney

Background
Farming is internationally regarded as a high-risk industry for injury and fatalities. However, in terms of the rates of occupation-related fatalities in Australia, the agricultural sector (10.4/100000 employees) ranks only third to forestry/logging (61.8/100000 employees) and road freight transport (37.6/100000 employees).

The Australian Centre for Agricultural Health and Safety (ACAHS) houses the National Farm Injury Data Centre, which draws on fatality data from the National Coroners Information System. While the methods used for data extraction and quality control are reported elsewhere, the data indicate that on-farm non-intentional deaths have reduced from 587 during the period 1989–92 (mean 146 per year) to 353 (mean 88 per year) in 2001–04. Furthermore, if assessed on the basis of annual deaths per 100000 employees, the rates dropped from 23.3/100000 in 1989–92 to 14.0/100000 in the second period. A similar reduction is also apparent when assessed by annual deaths per 10000 agricultural enterprises—from 9.1/10000 farms to 7.0/10000 farms.

Despite these significant improvements over the past 15 years, agriculture remains a high-risk industry and lags behind progress in other primary industries such as mining and construction. This disparity is likely a function of the fact that over 90% of farming operations are family owned and operated; hence, institutionalising occupational health and safety practices is more complex and challenging than in large corporate enterprises, where significant investments have been made to improve health and safety over several decades.

Agents of fatal injuries
For the period 2001–04 the four leading causes of on-farm fatalities, making up almost 48% of all deaths, were tractors (n = 76), quad bikes (n = 51), farm utilities (n = 21) and dams (n = 20). In South Australia the leading causes of the 22 fatalities in this same period were tractors (n = 3), farm utilities (n = 3), quad bikes (n = 2), motorbikes (n = 2) and dams (n = 2).
Reducing farm fatalities

For each of the four main agents of death identified nationally, there are existing evidence-based, well-known and practical solutions that can significantly ameliorate the burden of farm deaths. Consequently, the adoption of these solutions will be key to driving further safety improvements in the sector.

Tractors

Approximately 50% of tractor-related fatalities involve rollovers. However, there is strong evidence for the efficacy of rollover protection structures (ROPS) on new tractors in reducing the number of fatalities. Additionally, other international and Australian data support the retro-fitment of ROPS to older tractors. Despite the clear safety advantage of this engineering solution, a considerable number of tractors without ROPS remain in use.

Run-overs are the other principle mechanism of tractor-related deaths. These can be reasonably expected to increase as a proportion of all tractor deaths as more ROPS-fitted tractors are purchased in the sector. To address this issue, another engineering solution is to retrofit tractors with safe access steps that have been developed to reduce the risk of serious injuries and deaths associated with mounting and dismounting. There is some evidence to support the use of this approach in reducing fatalities from tractor run-overs.

Quad bikes

Both the use of quad bikes on Australian farms and the related fatalities have increased rapidly in the past 15 years. Safety agencies and manufacturers recommend that adult-size quad bikes should not be used by children under 16 years of age, no passengers should be carried and helmets should be worn by riders. Deaths due to crush or asphyxiation from quad bike rollovers accounted for 47% of the 119 cases during 2001–09 where adequate information was available to define the nature of the incident. There has been significant long-term debate about the efficacy of systems to protect the rider in the event of a quad bike rollover. Recent reviews of the engineering evidence suggest that fitment of such devices has the potential to be beneficial. Additionally, the use of suitable helmets can potentially reduce deaths from head injuries where riders are thrown from the machine but not crushed.

Farm utilities

Typically, farm utility fatalities result from passengers being unrestrained in the cab or riding in the back tray of a ute. It is now illegal to ride in the trays of utes on public roads in all states of Australia. While farms are not covered under these laws (because they are on private property), this practice is not recommended based on the available data. Globally, the protective advantages of seatbelts for both drivers and passengers are well recognised and supported by strong evidence. Therefore, adoption of this simple behavioural practice will have important preventive outcomes.

Dams

The majority (over 80%) of drowning deaths in farm dams are of children under 5 years of age, with one-third being visitors to the property. A review of the evidence to prevent drowning on farms indicated that the essential approaches are having a safe and secure play area that provides a barrier between the hazard (the dam or water body) and the child and having active supervision. In essence, this works in the same manner as a swimming pool fence does—however, instead of keeping small children out of an area, it keeps them within a safe area and separates them from hazards in the farm environment such as dams, workshops, moving vehicles and stock. This approach has been instigated nationally and has illustrated positive results, and is also supported by the most recent review examining the effectiveness of pool fencing.

Current adoption of solutions in South Australia

A recent study undertaken by ACAHS and the Australian Bureau of Agricultural and Research Economics–Bureau of Rural Science surveyed 683 randomly selected agricultural enterprises across Australia with an estimated value of agricultural output greater than $40000. The study examined a range of factors including controls for hazard management in relation to the four leading agents associated with fatal injuries. The South Australian sample consisted of 81 farms, and the results for adoption of solutions compared with the Australian averages are listed in Table 1.
Table 1: Comparison of hazard controls—South Australian and national data

<table>
<thead>
<tr>
<th>Solutions</th>
<th>South Australia</th>
<th>Australia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% (95% CI)</td>
<td>% (95% CI)</td>
</tr>
<tr>
<td>Tractors with a ROPS</td>
<td>92.8 (89.2–96.3)</td>
<td>90.4 (87.7–93.1)</td>
</tr>
<tr>
<td>Farms with all tractors having a ROPS</td>
<td>79.1 (67.9–90.3)</td>
<td>78.7 (72.7–84.6)</td>
</tr>
<tr>
<td>Use of seatbelts in farm vehicles</td>
<td>13.9 (8.3–19.5)</td>
<td>36.8 (31.7–41.7)**</td>
</tr>
<tr>
<td>Securely fenced &amp; gated house yard or safe play area</td>
<td>69.3 (57.2–81.5)**</td>
<td>48.3 (42.8–53.9)</td>
</tr>
<tr>
<td>Use of helmets on quad bikes</td>
<td>42.0 (23.3–60.7)</td>
<td>45.0 (38.6–51.4)</td>
</tr>
</tbody>
</table>

** Significant variation based on 95% confidence intervals.

Notwithstanding the limits to this assessment, including sample size and representativeness, these data suggest that the rate of adoption of evidence-based solutions for the four leading agents of death are relatively similar in South Australia when compared with the national data. One obvious anomaly appears to be the significantly lower rate of seatbelt use when travelling on-farm in vehicles in South Australia compared with the Australian sample.

Although there is a statistically higher rate of compliance for presence of safe play areas for young children, approximately 30% of farms do not have a secured area. There are 7% of tractors without a ROPS, with over 20% of South Australian enterprises in this sample having at least one tractor without a ROPS. Additionally, fewer than half of all individuals riding a quad bike reported using a helmet.

Where to from here?

There remain significant gaps in the adoption of evidence-based solutions, placing those working and living on farms at increased risk of injury and death. The farm environment is somewhat unique in that the lines between home and work are frequently blurred, exposing not only those working on the farm to hazards but also those that live on and visit the property.

Primary producers are well acquainted with drawing on research and evidence to improve their production systems (e.g. new crops, crop rotations). Continued efforts to work with farmer associations and grower groups are required to ensure that health and safety evidence is supported by them and used in a similar way to improve safety practice. Indeed, this element of industry ownership and leadership has been identified as a key principle to achieve farm safety change. Practical solutions to reduce the risks from the major agents of farm fatalities already exist (Table 2)—the challenge remains to ensure their adoption in collaboration with industry leaders.

Table 2: Evidence-based solutions to common high-risk hazards

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Solution(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tractors — rollover</td>
<td>Tractor rollover protection structures (ROPS)1, 5–7</td>
</tr>
<tr>
<td>Tractors — run-over</td>
<td>Safe access steps 8,9</td>
</tr>
<tr>
<td>Quad bikes</td>
<td>Quad bike rollover protection devices11–13</td>
</tr>
<tr>
<td></td>
<td>Helmets14</td>
</tr>
<tr>
<td>Farm utilities</td>
<td>Seatbelt use16,17</td>
</tr>
<tr>
<td>Farm dams</td>
<td>Safe play areas18–20</td>
</tr>
</tbody>
</table>

References

Resilience in farm families: a constructivist perspective

Debra King
Senior Research Fellow
National Institute of Labour Studies
Flinders University

Anna Lane
Research Assistant
National Institute of Labour Studies
Flinders University

Colin MacDougall
Associate Professor
Public Health
Flinders University

Jennene Greenhill
Director
Rural Clinical School
Flinders University

Introduction

The resilience and mental health and wellbeing of farm families experiencing climate variation in South Australia (SA) during the 2006–09 drought was highlighted in research funded through SA Health’s Strategic Health Research Program. We took a salutogenic approach to resilience, exploring how health is created in a positive way. We therefore sought to understand the contextual, social and personal factors that shaped how participants sustained health and wellbeing even when facing adversity. The research demonstrated that, in achieving the positive outcome of ‘getting by’ in the domains of livelihood and mental health and wellbeing during drought, farm men and women exhibited a stance that informed the way in which they negotiated with their personal, social and environmental contexts to use particular resources and strategies.

Mental health and resilience in farm families

South Australia has the highest rate of suicide (14.8 per 100000 people in 2000–05) among all the mainland states. The rate increases for each category of remoteness, with men having higher rates of suicide than women. In relation to farm families, studies indicate that the rate of farm male suicide is higher than that of the non-farm rural population.
and of the male population more generally. For example, between 1997 and 2001 in SA, farm men were approximately 40% more likely than non-farm rural men to commit suicide. Although these statistics appear alarming, it is important to bear in mind that the ‘vast majority of farmers do not commit, nor consider committing, suicide’. However, once farmers do consider suicide, the pathway seems to be shorter and more intense than for other groups, with more lethal consequences.

These statistics are serious. Being in a drought significantly increases the likelihood of mental health problems for farmers and farm managers. Current research highlights the complexity of assessing the impact of drought on farm families and the relationship between the financial, social and personal impacts. In particular, it demonstrates the importance of understanding the context within which farm families experience drought and that these experiences differ across regions, generations, and farm types and viabilities.

That farm families are deeply affected by drought is not in question; our research sought to understand the resilience of farm families rather than their distress. There are many approaches to resilience. In this research resilience was defined as a process whereby individuals display positive adaptation behaviour despite experiences of significant adversity. We adopted a constructivist model of resilience as process, which contrasts with the more deductive approaches that attempt to demonstrate clear pathways between cause and effect. In defining resilience as a process rather than an outcome or personality trait, we did not view individuals as ‘being resilient.’ Instead, resilience was understood as relating to the processes that farm men and women used to achieve a positive outcome (i.e. getting by) in two life domains—livelihood, and mental health and wellbeing.

The research
The constructivist model of resilience as a process understands resilience as constructed by the interplay of complex and contextually specific processes. These processes may be individual but also social and economic. In operationalising the research, we conducted two waves of interviews, 12 months apart, with farm families in four regions: Central Eyre Peninsula, Lower Lakes and River Murray Corridor, Mid North, and Upper South East. Of the original 80 farm families (148 participants), 75 families (132 participants) participated in the second wave of interviews. Approximately 48% were women; the mean age of the female participants was 47 years and the male participants 50 years; and nearly all participants were born in Australia. Participants completed the General Health Questionnaire–12-item version (GHQ12) and subjective measures of general and physical health in both waves, and a broader demographic questionnaire in wave one. The GHQ12 is a recognised mental health measure. Scores ranging from 0 to 15 reflect normal functioning, from 16 to 20 evidence of distress, and above 20 severe psychological distress. Additional data were collected from rural service providers through holding six focus group consultations in the regions, with policy implications being discussed at a workshop with selected government and non-government agencies in 2009. The interviews and focus groups were conducted in 2008–09. We drew conclusions about social capital by analysing data about individuals and communities and looking for social capital building blocks such as trust and reciprocity.

Resilience as process
Our sample comprised participants who had self-selected on the basis that they were ‘getting by’ during drought. It included people who had a diagnosed mental illness and those who were considering leaving farm life. The resilience of farm families was therefore not about the absence of psychological distress, but about how such distress was managed; nor was it about the capacity to stay on farm, but about the capacity of farm families to maintain a source of livelihood.

Over the 12-month period between the two interviews, an increased number of participants rated themselves as having fair to poor general health, although the proportion was similar to that of the Australian population at that time. However, there were differences between regions and age groups. In contrast, the mental health of participants improved over this time, with the proportion scoring >15 in the GHQ12 decreasing from 20.2% in 2008 to 15.2% in 2009. Older participants (over 60 years of age) had the highest rates of distress and the least recovery from stress over time.

Information was sought as to the participants’ capacity to get by (emotionally and financially) over time—47.2% indicated that their capacity had increased in the 12 months since the first interview, with a further 32.8% staying the same. Two main reasons were given
for this outcome. On a personal level, participants discussed finding useful strategies for dealing with stress and realising that, having been through so much, their threshold was higher than they thought. On a business level, participants discussed the ways in which their drought-related business strategies had worked out, and that they were now more familiar with the situation and had greater confidence in their business decision-making. To understand how farm families managed to not only get by during drought but to improve their capacity to get by, we developed a conceptual framework of resilience as a process in which three elements were critical: stance, context and processes (resources and strategies).

**Stance**

A stance is reflective of a person's identity, social location and social roles, and is the position that is assumed when making decisions, non-decisions and taking action. We identified four aspects of participants' stances that influenced their approach to getting by: a commitment to farming as a business lifestyle, having a positive sense of self, having contingent optimism, and engaging in active decision-making.

The stances of farm men and farm women were different. While that of farm men was strongly related to their primary role in the farm business, the stance of farm women was more diverse. Depending on their level of involvement in the farm business, their family responsibilities and their off-farm roles, it was evident that family relationships strongly influenced women's decisions and actions. Farm women and farm men had different bases of power that influenced how they positioned both themselves and each other within the farm family.

Although a stance is relatively stable, it was apparent from the interviews that participants constructed and reconstructed it as circumstances changed. There were several 'key events' that could alter a stance, including: moving on-farm, taking off-farm work (or moving off-farm), intergenerational transitions, having children and financial pressure. This fluidity in a stance means that it is likely that aspects of it can be learned, and a stance can be shaped to enhance an individual's capacity to successfully negotiate with their environment for resources and strategies that could help them get by during adversity.

**Context**

Context was the second of the three elements of resilience identified in this project. Three spheres of influence directly or indirectly affected the wellbeing of farm families as they dealt with drought. The micro sphere of the farm and family was important on a day-to-day basis as they worked through competing demands on their time and their financial, emotional and relational resources. The meso sphere comprised the geographical region in which the farm family was located. Within the region the environment, community and industry provided opportunities and constraints for engaging in resilience processes. Regional differences were evident among the four areas selected for this research and, in some areas, intra-regional differences were also noted. Differences were especially noticeable in levels of social capital in both communities and agricultural industries. The macro sphere of government, the economy and society were particularly influential on the livelihood of farm families. Service provision and social norms, which cross macro and meso spheres and attitudes, were also important.

The three spheres of influence were embedded in one another and inherently linked. Changes in one sphere could trigger changes in another. For example, changes in the global financial sector influenced the profitability of regional industries and businesses, services and employment. This, in turn, affected the farm family's ability to secure off-farm work or draw on investment income, while also impacting on their profit margin by raising the cost of inputs. However, the changes were not all one way, with changes in the farm family (e.g. decreased involvement in community activities) also influencing levels of social capital and/or service provision, especially in smaller communities where the withdrawal of relatively few volunteers can make a big difference to the sustainability of community services.

While such 'bottom-up' changes would have only a minor impact at an individual level, when undertaken en-masse in response to widespread drought-related financial stress, the impact on elements of the meso and macro spheres would be significant.

**Resources and strategies**

Farm families used a range of resilience resources and strategies to help get by during the drought. In the mental health and wellbeing domain, strategies associated with the development and maintenance of social capital and significant relationships were identified as being important, as was the ability to
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... disengage from the farm business and place their situation in perspective. Most participants had strategies for managing their physical and mental health, with 74% having regular check-ups with a primary healthcare provider. Women identified a lack of recognition of their role in mental health maintenance, with several women suggesting that the focus on men’s health made their own issues invisible and difficult to discuss openly. However, both men and women in the study had good levels of awareness about the resources available for health maintenance. While women often took the primary role in monitoring family health and organising services if required, men were also active participants, using strategies such as checking on friends they thought might be at risk, going along to information sessions, incorporating exercise into their daily program, and eating healthily.

In the livelihood domain, participants used a range of strategies to sustain their income and minimise their expenses. Their preparedness for drought was important, as was their confidence as business managers. The availability of options, particularly in relation to work, also provided farm families with a sense of security and a ‘fallback’ position when they were under financial pressure.

Implications for policy

Resilience, as with health, is affected by social, economic, political, environmental and cultural determinants. In this research we identified determinants that were specifically mentioned by participants as being relevant to the ways in which they engaged in resilience processes during the drought.

In the consultations about policy and service provision it was suggested that enhancing resilience requires a systemic across-government approach that focuses on health maintenance rather than illness prevention or treatment. This requires recognising the social contexts—the family, business (industry) and community—within which people negotiate for the appropriate resources to achieve wellbeing, and presents challenges to the current ways of thinking about mental health, wellbeing and resilience.

It is worth noting some of the main points made by service providers and policy practitioners. Enhancing resilience among farm families would require coordination between four policy areas: health, families and communities, regional development and agriculture, and climate change. Across and within these areas, workshop participants indicated a need for:

> Continuity of services at a base level outside adverse events to reduce the lag and reliance on crisis-driven responses. Service providers and policy practitioners were critical of the ‘crisis’ model of service delivery in which communities were inundated with services during a crisis, only to have them withdrawn when the crisis was perceived to be over. Instead, they argued that a salutogenic approach to community development and rural health required the provision of a better base-level of continuous services in rural communities. This would help to create resilience in community structures, providing a buffer and resource for individuals against adversity.

> Community capacity building, including leadership development in rural communities, which can, in turn, increase social capital. For example, enhancing community resilience through developing social infrastructure and strengthening social capital, including finding mechanisms for generating collective optimism, will, in turn, increase the relevance and effectiveness of services provided to individuals.

> A gendered approach to policy to ensure that services are able to meet both the common and distinctive needs of rural men and women.

> Greater acknowledgment of the contribution of farm families to the community and to agricultural and non-agricultural industries.

> Improving service delivery, shifting it toward a strengths-based, client-centred model with better coordination and integration. It was recognised that service providers would need capacity building to make this transition effectively.

> Creating opportunities for learning and employment for farm families

This project was funded on the basis that resilience research might well hold the keys to better preventive policies and services. The strengths-based, process-focused approach used in our research opened up opportunities for shifting the discussion about mental health and wellbeing to one that acknowledges the personal, social and environmental contexts within which farm families achieve wellbeing, even when facing adversity.
Regional migrant settlement: a health lens project

Amy Sawford
Project Officer, Health in All Policies
SA Health

Deborah Wildgoose
Senior Project Officer, Health in All Policies
SA Health

Tyson Miller
Policy Officer, Population and Migration Policy
Department of Trade and Economic Development

Introduction
Regional South Australia (SA) faces the challenges of low population growth (particularly in comparison to the state average), a rapidly ageing population and young South Australians leaving their local areas to pursue career paths in Adelaide, interstate and overseas. A key role for the SA Government is to promote population growth through overseas migration programs. The Australian Government has supported the state’s desire for population growth through migration by developing policies promoting state-specific and regional migration. As a result, migration to SA, particularly into regional areas, has increased significantly in recent years, with a particular focus on skilled migration to counter persistent skill shortages. Migration provides a significant contribution to the economic growth, prosperity and cultural diversity of SA. However, as both the literature and the findings of this project reflect, many migrants face challenges during settlement. These may include language barriers, cultural differences, unfamiliarity with how to engage with and access the Australian service system, and the loss of familiar support structures. These challenges can be described as ‘settlement needs’. In any given location, the level and type of settlement needs encountered by new arrivals are based on a range of factors, including overall numbers of arrivals; the characteristics, specific needs and pre-arrival experiences of those arrivals; the capacity of local services to respond to those needs; the amount of family or community support available on arrival; and community attitudes.

There are many benefits associated with living in regional and rural areas, including the strong sense of...
community often found, resulting in better community cohesion and personal resilience. In their 2001 study, Onyx and Bullen found that “social capital was generally higher in the rural communities… compared with the urban centres, particularly in relation to community connections, feelings of trust and safety and neighbourhood ties”. However, in some cases, the challenges faced by migrants can often be magnified in regional and rural areas because of language difficulties, cultural or religious differences, limited access to extended family or cultural networks and difficulties in navigating or accessing potential supports and services (i.e. health services, Centrelink, training opportunities). In addition, differing community and migrant expectations of what the settlement experience will be like, verses the reality of settlement.

It is critical that future policies, programs and services are effective in meeting the challenges of migration in order to continue to attract and retain migrants in these areas.

Collaborative health lens project
In order to more fully understand the range of challenges faced by migrants and the potential mechanisms for addressing these challenges, the Department of Trade and Economic Development (DTED), the Department of Health (DH) and Multicultural SA undertook a collaborative Health in All Policies (HiAP) ‘health lens analysis’ project.

The health lens analysis is part of the broader HiAP approach, a primary recommendation of 2007 Adelaide Thinker in Residence Professor Ilona Kickbusch, which was adopted by the South Australian Government in 2008. A health lens is a collaborative process between SA Health and other government agencies that assesses and analyses the links between health and wellbeing and the partner agencies’ policy areas. It aims to identify opportunities to optimise the partner agencies’ (in this case DTED and Multicultural SA) goals in a way that supports improved population health and wellbeing. Both of these outcomes are equally important, and HiAP aims for outcomes that are mutually beneficial.

The aim of the Regional Migrant Settlement Health Lens Project (the project) was to develop a deeper understanding of the relationship between settlement and health and wellbeing for migrants in regional areas of SA. Applying a health lens to settlement services, programs and processes helped identify the complex interplay between the social, economic and health factors impacting on migrant settlement and the associated health outcomes.

The project comprised three stages.

Stage 1—Project Development—explored the general issues of migrant settlement through a literature scan and development of a Migrant Settlement Wellbeing Framework. The findings from this stage suggested that the four key areas for successful settlement are:

> employment
> social support
> access to services
> English language proficiency.

Stage 2—Preliminary Investigation—included baseline data collection (including location data), the development of settlement pathways for both skilled and humanitarian migrants, and the development of detailed profiles of two regional areas of SA—Whyalla and the Limestone Coast.

Developing a clear picture of the current location of recently arrived migrants was challenging. While data is collected by a number of agencies for a variety of administrative purposes, there is no requirement by any agency to provide a picture of either initial settlement location or movement of either skilled or humanitarian migrants to support policy-making and service planning decisions. However, the Department of Education and Children’s Services (DECS) collects country-of-origin data for public school students. A spatial mapping exercise was undertaken by researchers from the University of Adelaide using DECS data, and was supplemented by data from the Australian Bureau of Statistics (ABS) to identify the clustering of migrant populations across SA.

The DECS data provided a picture of the current location of migrants but only captured migrants in family units; however, in the South Australian context this is still a significant proportion of recently arrived migrants. Census data from 2006 supplemented the DECS enrolment data to provide a more comprehensive picture. This information was then used to inform the selection of regions on which to focus the remainder of the project.

Workshops were undertaken with service providers in both of the chosen regions. The outcomes provided
the service providers with an overview of the project and identified what they perceived as the key issues impacting on migrants. Their assistance was then sought in shaping the approach that would be incorporated into stage 3 of the project.

The preliminary investigation stage suggested that in-depth qualitative research needed to be conducted to form a more comprehensive and complete picture of migrant settlement that could inform policy recommendations.

Stage 3—Regional Research—consisted of undertaking qualitative research with community members, employers and recently arrived migrants (primarily in the previous 5 years). A total of 111 migrants, community members and employers from Whyalla and the Limestone Coast each participated in eight focus groups and three interviews. This stage of the project built on earlier findings to explore more-specific interaction between migrant settlement experiences and outcomes and health/wellbeing in regional SA.

Migrant groups represented in the research were:
> skilled migrants—Indian, Fijian-Indian, Fijian, Zimbabwean, South African, Dutch, French, Eritrean, Sudanese and Pakistani
> humanitarian migrants—Burmese.

Key project findings

While settlement experiences varied (Table 1), migrants commonly faced a challenging period in the first 3–6 months following arrival. Many participants reported settling well after overcoming the initial hurdles of finding jobs, adequate housing and social support. Some participants found the settlement process uneasy due to communication and social engagement difficulties, and lack of access to services and to education and training opportunities.

Most participants intended or hoped to stay in SA and indicated strong commitment to their local area. In cases where participants planned to move elsewhere, it was predominantly within Australia, and the primary reasons given were the need to find suitable employment or to access further education and training for themselves or their family. Factors such as lifestyle and cheaper living costs were important in people’s longer term commitment to regional SA.

Overall, migrants, employers and community members presented a largely positive picture of migrants’ integration into regional communities. Nonetheless, participants from all three perspectives agreed that there were ‘pockets’ of negativity and discrimination. Migrants and community members felt that local communities had improved over time in their openness to new migrants, and also acknowledged that it took time for new migrants to settle and integrate.

Both community members and employers noted that migrants contributed positively to local communities. They felt that greater cultural diversity was a fundamental contribution that had become part of the local identity, especially in Whyalla and Bordertown. Another common contribution from migrants, according to community members and employers, was filling crucial employment roles and financially investing in regional and rural towns.

Table 1: Key settlement facilitators and barriers

<table>
<thead>
<tr>
<th>Settlement facilitators</th>
<th>Settlement barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social support</td>
<td>Lack of English language skills</td>
</tr>
<tr>
<td>Employment opportunities</td>
<td>Negative employment experiences</td>
</tr>
<tr>
<td>Support from other services</td>
<td>Lack of access to interpreters</td>
</tr>
<tr>
<td>Lifestyle</td>
<td>Bureaucratic red tape</td>
</tr>
<tr>
<td></td>
<td>Problems accessing services</td>
</tr>
<tr>
<td></td>
<td>Social isolation</td>
</tr>
<tr>
<td></td>
<td>Unmet expectations</td>
</tr>
</tbody>
</table>

Effects of settlement on migrant wellbeing

Humanitarian migrants in particular, experienced improved wellbeing as a result of relocation to a place where they did not fear for their safety or that of their families.

In contrast, other participants experienced difficult settlement circumstances that had adverse impact on their mental health and wellbeing. For instance, one recent skilled migrant commented that the experience of being unable to find suitable employment diminished their self-esteem. Another participant, whose partner (a skilled migrant) had experienced difficulties with their sponsoring employer, reported that their partner was experiencing depression linked to their work problems. Several other participants spoke about their own experiences of depression and hardship when they first arrived. For many migrants these problems had
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lessened over time as they became more settled and financial problems eased.

Migrants in several focus groups talked about a gap between their pre-arrival expectations and the reality of the new location, which impacted on their wellbeing in the initial settlement period. Participants felt that there were issues with representatives from Australian government agencies (both state and federal) or employers giving unrealistic information before they arrived, especially about job opportunities.

Another participant said that she would have delayed her migration to Australia by at least a year if she had known beforehand how hard it was going to be. She felt her settlement experience would have been better if she had stayed longer in her home country to save more money, as her initial period in SA was marked by substantial financial hardship and difficulties in finding work.

Discussion

The project identified regional variability in the approach to settlement, based on numbers of migrants and visa streams. The different approaches were partly driven by the government funding provided for different visa classes. In addition, while one region had been involved with intensive migrant support for a few years, another location, although having a significant history of migration, had only recently implemented a coordinated approach. However, all the approaches had a common desire to reduce the difficulties experienced by migrants as they settle in a particular location. The project found that the approaches could be enhanced by strategies that help migrants become part of a community while also meeting their individual needs when they arrive, regardless of their visa class.

The project provided a unique opportunity for the agencies involved to obtain, first-hand, current and robust qualitative research through the focus group and interview process. The existing relationship of the service providers and community leaders with DTED and Multicultural SA through regional networks was integral to the success of the project, and played a pivotal role in allowing the researchers access to the community members and migrant groups.

Direct engagement with migrants, employers and community groups through the research enabled a different and richer perspective of the impact of existing policies. It highlighted the differences between the state government agencies’ perspectives of priorities and the regional priorities. For example, supporting the development of a reasonable level of English proficiency in the spouses of skilled migrants and humanitarian migrants was recognised as a key issue at a regional level by all three groups.

The important role of members of the local community became evident throughout the process, particularly in relation to supporting the integration of newly arrived migrants into the community. Regional communities in SA have historically been built on the migration of people from overseas, and are proud of the mutually inclusive role that migration has had with the future prospects and growth of their towns.

Community members included in the focus group research expressed empathy towards the new arrivals and sought to support them where they could. However, they also felt that they, as the community, required support to be able to meet the needs of the migrants.

Additionally, direct involvement of agency staff (DTED and DH) in the research was particularly valuable as it provided them with a deeper understanding of the issues raised by the participants and of the research process, which in turn helped with development of the recommendations.

The recent trend of population movement has been away from regions to other states and metropolitan areas. This has resulted in some significant challenges:

- Population decline makes it difficult to attract and retain rural and remote populations.
- The sustainability of small rural and remote local governments becomes uncertain and impacts negatively on service delivery.
- Economic restructuring and industry adjustment is more difficult without access to people with the necessary or desired skills.

Positive settlement of new waves of migrants is therefore important in assisting regional communities to attract and retain population, which helps them meet their economic, social and environmental goals.

Key outcomes

A key outcome of this project was a series of policy recommendations for each of the agencies involved, which have been signed off by the Chief Executives of DTED, DH and Multicultural SA. These recommendations will inform future decisions by DTED...
Rural health in the 21st century

and potentially other government departments on ways to improve policies and programs in order to achieve positive settlement outcomes for migrants and the regional communities that they settle in.

Importantly, the process of developing the recommendations drew strongly on the outcomes of the research—paying particular attention to the direct messages from the migrants, community members and service providers.

Recommendations which related to the broad categories of settlement identified previously include:

> Employment: Exploring ways to improve training and further education opportunities for migrants.
> Access to services: Improving awareness of interpreting and translating services, particularly in the health portfolio.
> English Language Proficiency: Exploring opportunities for improved English language learning of migrants.
> Social Support: Increasing community awareness of the value of migration in regional areas.

An evaluation of this project has been undertaken by researchers from the South Australian Community Health Research Unit, Flinders University of South Australia. Their report will be made publicly available through the HiAP website once it has been finalised. Early indications show that the project has had positive outcomes, including project partners developing a better understanding of other government agencies and the people within them, demonstrated success in collaborating across government and the potential for working collaboratively on other issues. Evidence has also shown that some of the recommendations and findings from the project have begun to be addressed at both state and community levels, including the organisation of cultural activities to help strengthen links between migrants and their communities.

Conclusion

The settlement barriers that migrants face are numerous, complex and variable, based on both the individual and the host community they are settling in. However, there are also positive impacts of migrants settling in regional areas of SA, including their contributions to the community and the economic functioning of the region.

“Settlement” is a process that can take years, or even decades, to occur. Enhancing the current approach and supporting communities to receive migrants will improve societal, economic and individual wellbeing and reduce costs to society in the future.

The project presented a valuable opportunity to visit the regions and see how migration operated in practice. From the government perspective, it was critical to understand the issues, for example how migrants were settling in, their impressions of life in regional SA, what they expected from government, how communities and employers received migrants and whether migrants’ aspirations of life in a new country were being met.

The project also reinforced the critical aspects of settlement and identified those areas where government has the opportunity to have an influence. This is important in a process such as HiAP, where the focus is on the actions that government can implement to better deliver outcomes for the community and the state.

The project has provided an opportunity for further policy and program development in regional migration settlement to be undertaken in the future. Broad areas of focus for DTED will be:

> working closely with the appropriate migration groups within government to investigate options to improve access to services essential to migrant settlement, notably English language learning, and further education and training opportunities
> increasing the level of advocacy and information exchange with the Commonwealth on regional settlement and visa issues
> increasing community awareness of the value of migration in regional communities as an important component of supporting migration settlement
> developing employer awareness to understand the implications of different visas and promote the benefits of migration.

For more information on this project and the HiAP approach, please visit:


* Discussions of ‘good settlement’ often refer to ‘integration’ of migrants and refugees. Integration can be defined as: ‘...the ability to participate fully in economic, social, cultural and political activities, without having to relinquish one’s own distinct ethno-cultural identity and culture. It is at the same time a process by which settling persons become part of the social, institutional and cultural fabric of a society’.*

Individual, community and economic wellbeing all play an important role in the outcomes of the settlement process.
Rural ageing-in-place: community connectedness, health and wellbeing—an opportunity for new technologies?

Helen Feist  
Senior Research Associate  
National Centre for Social Applications of Geographic Information Systems (GISCA) The University of Adelaide

Kelly Parker  
Research Associate  
GISCA, The University of Adelaide

Natasha Howard  
Research Fellow  
University of South Australia

Graeme Hugo  
Director of GISCA, ARC Professorial Fellow  
The University of Adelaide

Introduction

The Linking Rural Older People to Community through Technology project (the project) aims to improve access and connection to the wider community for older Australians in rural and remote locations through the use of new communication technologies. The focus on community connectedness is framed within a demographic and geographical perspective, particularly understanding the influence of rural spaces and places on ageing-in-place and social connections. The study region for the project is the Murray Lands Statistical Division, South Australia. This 3-year, multiphase project is funded by the Australian Government Department of Health and Ageing and managed by the Murray Mallee Aged Care Group Inc., a community service provider based in Murray Bridge. Researchers from the National Centre for Social Applications of Geographic Information Systems (GISCA) at the University of Adelaide are carrying out the research.

The first two phases of this project involved a paper-based survey and follow-up in-person interviews with people aged 55 years and older living in the region. A wide range of data was collected including information about participants’ connections to their communities and how the size, composition and proximity of different aspects of community were related to participant variables including self-reported health. Self-reported health assessed by a simple single-item measure has been shown to be a robust predictor of...
Health and wellbeing. There is evidence in Australia that the proportion of people rating their health as ‘fair’ or ‘poor’ increases as they age. Community participation (in the form of voluntary work and involvement in sporting and recreational groups) is also positively associated with self-reported ‘very good’ and ‘excellent’ health.

Background

Over 90% of Australians aged 65 years and older are living in the community or ‘ageing-in-place’. Consideration of ‘place’ in this context is particularly important in rural environments. Australian rural places often have low population densities; smaller, more dispersed social groups; and an increased likelihood of family and friends being located at greater distances from the older person. There are also usually poorer transportation options in rural areas and greater regionalisation of services. In terms of sociocultural dimensions, rural people may have limited localised social opportunities, different value sets and personal biographies compared with their urban counterparts. The challenges involved in ageing-in-place in a rural environment may vary widely depending on the older person’s ‘place in the lifecourse, on the community settings in which they live, and on the ways they construct their relationships to people and place’.

There is often an assumption that rural communities have strong, localised kinship and friendship networks without any real knowledge of the actual social ties and patterns of connection. In order to understand the importance of these networks in rural regions, it is necessary to understand how community is defined by older people.

Community connectedness and social networks, which have established links to positive ageing, health and wellbeing, provide opportunities for support, engagement, and access to assistance and information and community resources. ‘Social integration is a major element in wellbeing and strongly influences other aspects of life such as health’.

Method

The first two phases of this project involved a paper-based survey and follow-up in-person interviews with people aged 55 and over living in the region. A wide range of data were collected including information about participants’ connections to their communities and how the size, composition and proximity of different aspects of community were related to participant variables including self-reported health.

The project survey (n = 858) and follow-up interviews (n = 191) explored a number of factors related to community connectedness, including the type of community networks participants have, how satisfied they are with their level of community involvement and the length of residence at their current address. These variables are explored here by participants’ self-rated health responses to the survey. Using the SF1, the first question in the Short Form 36 (SF-36), as a measure of subjective health.

The project used a spatial approach to study, and both general community members and community aged care service users were sampled. Nearly 20% of the total Murray Lands population aged 55 and over, were approached to be surveyed and the survey response rate was 22.6%. A detailed explanation of the sampling approach is available in previous publications. An overview of the socio-demographic characteristics of survey respondents are presented in Table 1.

Results

The majority of survey participants (over 86%) felt satisfied with their level of community involvement. Generally, those who were older, living in more remote areas and who have been living at the same address for a longer period of time were more likely to be satisfied with their level of community involvement. Family appeared to be the most important social network link for many older people. The State of Ageing in South Australia report highlights that 80% of older people stated that support in a time of crisis came from family, while friends and neighbours were only nominated by about half this proportion. Table 2 shows that self-rated health was much lower for respondents who nominated having no contact with family, with 61% of this group rating their health as fair or poor. It did not appear to matter if family were living close or far away—having some form of family contact was better for self-rated health. Satisfaction with community involvement was also clearly related to family network type. Those respondents who reported having no family or no contact with family were also less likely to be satisfied with their current level of community involvement (62% compared with 87% of total respondents).
Table 1: Socio-Demographic Characteristics of Survey Respondents (n = 858)*

<table>
<thead>
<tr>
<th>Socio-Demographic Characteristics</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>55 - 64</td>
<td>138</td>
<td>16.1</td>
</tr>
<tr>
<td>65 - 79</td>
<td>433</td>
<td>50.5</td>
</tr>
<tr>
<td>80+</td>
<td>285</td>
<td>33.2</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>308</td>
<td>35.9</td>
</tr>
<tr>
<td>Female</td>
<td>543</td>
<td>63.3</td>
</tr>
<tr>
<td>Household Type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Live Alone</td>
<td>382</td>
<td>44.5</td>
</tr>
<tr>
<td>Live with Others</td>
<td>474</td>
<td>55.2</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than High School</td>
<td>522</td>
<td>60.8</td>
</tr>
<tr>
<td>Completed High School</td>
<td>145</td>
<td>16.9</td>
</tr>
<tr>
<td>Trade Certificate/Apprentice Diploma</td>
<td>147</td>
<td>17.1</td>
</tr>
<tr>
<td>University Degree or higher</td>
<td>36</td>
<td>4.2</td>
</tr>
<tr>
<td>Gross Household Income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to $10000</td>
<td>96</td>
<td>11.2</td>
</tr>
<tr>
<td>$10001 - $20000</td>
<td>342</td>
<td>39.9</td>
</tr>
<tr>
<td>$20001 - $50000</td>
<td>275</td>
<td>32.1</td>
</tr>
<tr>
<td>$50001 - $100000</td>
<td>45</td>
<td>5.2</td>
</tr>
<tr>
<td>Over $100000</td>
<td>7</td>
<td>0.8</td>
</tr>
</tbody>
</table>

* Missing data excluded from analysis

Table 2: Self-rated health by type of family network*

<table>
<thead>
<tr>
<th>Self-rated health</th>
<th>Family nearby (n = 268)%</th>
<th>Scattered family (n = 474)%</th>
<th>No family contact (n = 105)%</th>
<th>TOTAL (n = 858)%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent / very good</td>
<td>22.8</td>
<td>29.5</td>
<td>15.0</td>
<td>25.5</td>
</tr>
<tr>
<td>Good</td>
<td>36.9</td>
<td>36.9</td>
<td>23.0</td>
<td>35.0</td>
</tr>
<tr>
<td>Fair/poor</td>
<td>38.8</td>
<td>32.9</td>
<td>61.0</td>
<td>38.6</td>
</tr>
<tr>
<td>Not stated</td>
<td>1.5</td>
<td>0.6</td>
<td>1.0</td>
<td>0.9</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>99.9</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

* single response variable  
* total does not sum to 100.0 % due to rounding.

Figure 1 shows that more than half of all survey respondents said they had friends living nearby and regular contact with neighbours. The propensity to have networks with friends and neighbours varied based on self-reported health. Those reporting better health were more likely to have friends nearby, regular contact with neighbours, scattered friends or a large circle of friends compared with respondents who reported fair or poor health. Respondents reporting fair or poor health more often nominated having one or two friends that they rely on.

![Figure 1: Type of networks with friends and neighbours* by self-rated health](image)

In the second phase of the project, interviews were conducted with a subset of survey participants (n = 191) from the first phase. Participants were asked to list all the ‘people and activities’ that were important to them. On average, they listed a total of 15 social network ties; however, the overall size of networks was found to vary across a range of characteristics, including self-reported health at the time of the survey. Figure 2 shows that participants who reported their health as excellent or very good were much more likely to have a large social network compared with those with fair/poor self-reported health, and participants with fair/poor self-reported health were more likely to have a small-sized social network.

![Figure 2: Overall network size by self-rated health](image)
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Discussion

Notions of community and connections to localised support from family, friends and neighbours are very important aspects of growing older; yet, geographic location alone does not create a sense of place. Community as a place-based notion has recently become more contested. With the advent of more sophisticated communication technologies, increased population mobility and changing kinship structures, ‘communities of interest’ that are removed from the bounded parameters of place have gained more credence by creating a sense of social identity.18-20

Feelings of connectedness develop from relationships between people as well as between people and spaces.21

Previous studies have attributed increased connectivity and socialisation to the use of new technologies,22-24 which offer the opportunity for relationships between people to occur regardless of location and place. However, adoption of new technologies as a means of connecting to community requires access. Rural and remote Australia has a relatively small population spread over vast areas, making access to broadband and mobile phone coverage problematic in some locations. Figure 3 highlights the disparity in rates of internet use for South Australians living in non-metropolitan areas compared with those living in metropolitan areas. This disparity is reflected in trends Australia-wide.25 Also apparent is that South Australians aged 65 years and older are less likely to have internet access compared with those younger than 65 years of age. Research confirms that the use of new technologies decreases as age increases;25-27 however, what is unclear is if this lower rate of adoption and use of technology by older people is due to lack of access to internet connections, perceived high costs associated with these technologies, lack of education and opportunity, or a lack of interest in or comfort with new technologies within this cohort.

Research has found the use of new technologies decreases as age increases25, 26, 27. The survey results of the current project found moderate to high comfort levels for established technologies such as radio, television and the microwave across all of the older age groups, as shown in Figure 4. However Figure 4 also shows that self reported moderate to high comfort levels for newer technologies such as automated teller machines (ATM), mobile phones and personal computers decreased as the age of participants increased. On a more positive note, 31.1 % of survey respondents reported that ‘new technologies make it easier to stay in touch with family and friends’ and 22.6 % reported that they would ‘use new technologies more if I had more advice and support’. Almost one quarter of respondents aged 80 years and over indicated that they would use new technologies if they were easier to use. With advances in new ‘user-friendly’ technologies adoption rates may increase in older cohorts if they are offered positive opportunities for introduction and interaction with these devices.
Conclusion

The role that new technologies can play in connecting older people to other people within their existing networks and to wider community and interest networks needs to be explored further, as these connections are associated with subjective health and wellbeing. New technologies represent an ideal medium to foster and strengthen both localised, place-based community connections and dispersed social network ties. They also offer improved access to relevant information and services for older people living in rural communities and the potential for increased autonomy in decision-making about their own health. Myths that older people are disengaged from the wider world and unable to embrace new technologies should be dispelled. We need to enable access and understand the needs and preferences of older people for learning and using new technologies, and incorporate these into daily life and service provision.

In the past decade the number of international studies investigating older people and their use of new technologies such as personal computers, the internet and mobile phones has increased, although it is still an emerging field of interest. There is very little research in this field in Australia and none in rural areas with this age cohort. There is a need to examine the applicability of even newer technologies, such as touch screen computers, web-based mobile phones and devices such as Apple iPads®, to older generations in Australia, in particular within the diverse geographies and populations of rural places.

The next phase of this project will engage 48 study participants with their choice of a laptop or Apple iPad®, 3G internet connection and individualised training and support in order to enhance community connections. Changes to participants’ community engagement, access to information, and contact with both existing and new social networks after using these technologies will be measured through pre- and post-tests and ongoing weekly activity log sheets. Preliminary pilot phase results suggest that older people are keen to embrace new technologies and that newer, user-friendly technologies combined with reliable, faster 3G internet connections will enhance access to general information, services and local connections within communities. It is anticipated that relationships with wider social networks, in particular communication with dispersed family and friends, will improve. Participants have expressed interest in accessing email and VOIP applications such as Skype® to maintain these social connections. There is potential for subjective health and wellbeing to be improved by facilitating these new modes of connection within this older, rural population.

References


From tree change to e-change—Willunga becomes a digital village

Genevieve Bell
Director
Interaction and Experience Research, Intel Labs
at Intel Corporation
South Australian Thinker in Residence 2008–10

Contributing authors
Carolyn Anderson
Director
Science and Information Economy
Department of Further Education, Employment, Science
and Technology
Government of South Australia

Alison Kershaw
Senior Policy Officer
Science and Information Economy
Department of Further Education, Employment, Science
and Technology
Government of South Australia

Introduction
Over the last three years the Federal Labor Government has articulated an ambitious set of reforms geared at transforming healthcare delivery, education, productivity and innovation. In order to make such reforms a reality, Australia must also embrace new forms of infrastructure and new technology platforms. In April 2008, the government introduced a new plan for a National Broadband Network (NBN) to the Australian public. While Australia was an early adopter of dial-up internet, we have significantly slipped in our position on the current internet league tables. The NBN seeks to connect all Australian homes, businesses and public sector institutions to high-speed broadband—the transformative infrastructure of the 21st century. Through a combination of fibre-optics, satellite and fixed wireless broadband, Australians will enjoy a much richer set of experiences, applications and services.

Disappointingly, the NBN is currently being promoted to businesses, citizens and consumers on the speed of the network and that it is the only broadband solution, thus ignoring some of the NBN’s more powerful implications. First, broadband via 3G or 4G phone networks provides the mobility that people demand and will be complementary to rather than a replacement for high-speed broadband to premises. Second, the NBN offers the promise of ubiquity, connecting up all premises, schools, hospitals, businesses and community centres—all Australians can have access to the network and its benefits. Last, the NBN offers more than just enhanced web content on computers. It will also deliver a greater density of devices, applications and services with an internet connection, including mobile phones, televisions, consumer electronic devices and even electrical meters.

The NBN might well be the largest infrastructure project in Australia’s history, but it is not the technical details that will interest and excite Australians as the future users of the network. Clearly, a high-speed network that delivers robust connectivity to dwellings, social institutions and organisations through an increasing density of smart, interconnected devices has implications for a range of different sectors, experiences and activities. Indeed, all Australians—the tech-savvy, existing non-users, occasional users and naïve users—must be encouraged and supported to get interested and get connected. In so doing, this 21st century infrastructure will become a reality and a practical part of our daily lives.

The NBN and South Australia
Over the last two years, I (Genevieve Bell) have spent a great deal of time in South Australia (SA). As the state’s 15th Thinker in Residence, I was tasked with exploring how South Australians used new information and communication technologies (ICTs), and then helping the state think about how to benefit from these technologies. I travelled 13 000 km to 45 different communities and had almost 500 conversations and interviews across schools, communities, government and businesses. I also participated in formal interviews and meetings, day-in-the-life activities, formal community conversations, the SA Stories Project and an Office for Youth A-Team (in the Riverland).

In my time travelling through the state, it rapidly became clear that talking about technology with South Australia’s citizens also meant talking about everything else. Conversations about technology were also about kids, community, education, citizenship, democracy, work, leisure time, holidays, privacy, health care, water, farms and the future. In those conversations it also became very clear that people are NOT looking to technology to solve everything. They see technology as a tool—it must work in a way that meets a need, solves a problem or adds value; otherwise, it is just another
device that gathers dust. These attitudes, of course, have significant implications for the NBN as it rolls out in SA.

My report as Thinker in Residence is divided into four areas that are critical to SA’s future:

1. Broadbanding the state. It is critical to ensure that all South Australians get access to the best broadband services available, and that regional and remote communities are not further disenfranchised.

2. Switching on the state. In order to make the most of the NBN, the public and private sectors will have to undertake a significant investment in SA. We will need to train and empower everyone to be confident and successful online citizens, and this includes digital literacy and cyber engagement.

3. Strong communities. While the NBN will have a strong impact on individual lives, it also has the chance to drive new forms of community engagement, supporting and enhancing existing community activities.

4. SA’s future. The NBN rollout will take nearly a decade to complete, which means that now is the time to start investing in new areas of research, development and innovation, including around environment and sustainability, new urbanisation, transportation and ageing.

The advent of the NBN has provided a focal point around which many of my recommendations can be contextualised and developed. My final report is available at www.thinkers.sa.gov.au.

The NBN and health care

The impending NBN can do much to promote the health and wellbeing of citizens through enabling access to vital health professionals, services and products. As Kevin Buckett, Director, Public Health, SA Health, writes: ‘Our health is mostly determined by factors outside the operational sphere of the health sector, so the health sector must move beyond managing the healthcare system and seriously address those determinants of health in other spheres—education, housing, transport, employment, income, welfare etc.—where they impact on health.’ ICTs will act as enablers across all the sectors listed above and allow individuals to affect their own health outcomes.

Clearly, a high-speed and ubiquitous internet has significant implications for the delivery of health care in Australia. E-health, as it is sometimes called, is much more than online patient healthcare records—much, much more. Until now, health services have been based very much on location—patients are required to be co-present in surgeries, pharmacies etc. E-health breaks the co-presence nexus and allows in-home and remote access to key services such as digital medical imaging, consultation, health monitoring and diagnostics. ICTs and the internet enable provision of service and support, as well as access to and sharing of information, and are a means of furthering connections, both personal and professional.

The opportunity, for both the healthcare system and individual healthcare workers, to take full advantage of the potential of the NBN is too good to miss. For healthcare workers there will be opportunities to develop new skills to support and guide patients to become well and maintain wellness through the application of the new high-speed broadband. This is likely to be through use of a combination of both offline and online resources; for example, a patient living in a regional area may be given a brochure but also referred to an online support group and given an appointment for an online consultation with an Adelaide-based specialist. This blend of offline and online healthcare is likely to become the norm.

Technology will be a tool that healthcare workers will have in their ‘bag of tricks’, but how the tool is used is yet to be fully explored. For example, there are currently at least two iPhone applications that enable healthcare workers to access a range of pain management assessment tools and information.

E-health will potentially also allow patients to be more active and involved in the management of their own health, which will mean that patients will need to be digitally literate to take full advantage of the new opportunities. Healthcare workers will also need to develop their own digital literacy so that they can professionally support patients using new modes of e-health services and information.

We can also make the argument that these new technologies and infrastructures will help individuals and the public health system find solutions to complex issues regarding the wider concept of wellbeing rather than simply health. There will be opportunities for exploration and innovation to develop solutions to specific problems and to address very specific needs. New models of health practice are likely to be developed alongside new business models.
The implications of the NBN go beyond service delivery. New models of funding, billing and payment for those delivering and receiving services will need to be developed. Governments must provide funding for new hardware, software and training for all healthcare workers. This will potentially have huge implications for hospitals and other healthcare providers as they will need to reallocate resources to new services, new technologies and training for staff and patients. The infrastructure that supports the healthcare system will also need to adapt and change. Medicare and the private health insurance providers will need to develop pricing and funding models for new modes of service delivery. Will an online consultation cost the same as a face-to-face consultation? Will a patient be bulk billed? These and many other questions will need to be answered.

Patients and consumers of healthcare services live and operate in complex offline and online networks, accessing information and support from a range of sources. Health care in the 21st century will be about holistic responses to health and wellbeing problems rather than just pills. This has already been clearly demonstrated in the work of Professor Ilona Kickbusch and Health in All Policies.

A call to action: Willunga—South Australia’s first digital village
Willunga is 46 km south of Adelaide’s CBD. With a population of 2104, its main industries are viticulture, tourism, horticulture and agriculture, and associated industries. In 2011 Willunga will be the first release site for the NBN in SA. What might be done in Willunga with and around the NBN is an important challenge for local, state and federal agencies.

First, we need to work to ensure that all residents are equipped to get online and take advantage of the range of experiences, applications and services that the NBN will make possible. Creating a digitally literate community will enable more Australians to share in and explore the opportunities provided by ICTs and the NBN. Furthermore, being digitally literate can have an impact on a person’s sense of wellbeing, their sense of connection to communities, both local and global, and their ability to access information and services.

With this in mind, a digital literacy framework developed by the South Australian Government, in response to my report, will be trialled and tested in Willunga. It will enable non-accredited and accredited providers to engage the community in the development of skills in digital literacy, and provide an opportunity for a seamless pathway with multiple access points through to accredited training and higher level qualifications.

But I think we can take the e-change in Willunga one step further. Willunga has a large number of ancillary health services that could form the backbone of a wellbeing network that would include healthcare services and providers, organic produce shops, churches, service groups, a recreation centre, B and Bs etc. There is, however, no aged care facility in Willunga, although there are facilities in the adjacent towns. Research shows that it is the aspiration of most people to remain living in their own home for as long as possible before transitioning to aged care facilities. This places pressure on families and the health system to support this, which can be very difficult if family or health care is not situated in close proximity. As an example of the potential of the NBN, it could be used to provide in-home tele-presence videoconferencing to connect elderly people currently living in their homes with a local health and wellbeing network comprising local doctors’ surgeries, pharmacies, physios, chiropractors, library, community centre and service providers.

Clearly, first-release sites such as Willunga provide a unique opportunity to explore new ways of providing health and wellness services using high-speed broadband. And this is an opportunity we should take!

References
Male health: facts, determinants and national and South Australian policy responses

Gary Misan
Associate Research Professor
Centre for Rural Health and Community Development
University of South Australia

John Ashfield
Director
Education and Clinical Practice
Australian Institute of Male Health and Studies

Introduction

2010 was a watershed year for the health of Australian males with the release of Australia's first ever National Male Health Policy (NMHP). Until then, men's health in Australia had attracted little meaningful policy attention at the national level. In contrast, Australia has had a National Women's Health Policy since 1989 as well as Offices for Women at the federal level and in every state and territory of Australia—there are no Commonwealth or state equivalents for Australian males.

That such a policy is overdue is not because data on male health has not been available until now. In fact, in 1988 the Health for all Australians report noted that: ‘Men in Australia die from nearly all non-sex-specific leading causes at much higher rates than do women...’ and that ‘... These differences in health status largely reflect the prevalence of preventable factors.’

In macro terms, nothing much has changed in over 30 years. Thus, the aim of this paper is to offer a summary of male health status in Australia and South Australia (SA), and a brief critique of the NMHP and the South Australian Men's Health Strategic Framework 2008–2012. The purpose is to highlight current issues for male health in Australia by drawing on state and national morbidity, mortality and health utilisation data, as well as local and international literature regarding the likely determinants that impact on male health outcomes. The paper then explores in what public health framework they are positioned, what they say about the key determinants of male health, whether recommendations address special needs and special groups of men, what current gaps exist and what opportunities exist for South Australian health systems to respond.

Males account for almost half of both our state’s and the national population. They have specific and special needs that deserve specific national and state policy responses as well as an equitable distribution of national and state health resources to meet those needs. This paper, as much as possible, avoids comparisons with the health status of women because to do so implies that it is non-problematic. It also inappropriately sets a benchmark for men's health and immediately places male health policy in an adversarial and deficit context. Similarly, comparisons between male and female health determinants are avoided, as is comment on the effectiveness or otherwise of women's health policy and related initiatives.

Male health

Male health extends beyond the purely biological aspects and encompasses a range of issues affecting the health and wellbeing of men and boys. While concepts of masculinity, gender and societal expectations play a part in how males understand and experience health, socioeconomic, cultural, ethnic, educational, environmental, occupational, social and other factors are key determinants of the health status of the Australian male.

At the outset, disparities in national and state mortality statistics for males and females call for better targeting of male health policy. Statistics indicate that, over the last 20 years, death rates for both males and females have declined but males still die more often than females in all age groups. At both state and national levels, average male life expectancy is 79.3 years, compared with 83.9 years for females. In remote and very remote areas average male life expectancy is about 4 years less again. For Aboriginal males average life expectancy is 59 years, 6 years less than for Aboriginal females. These figures, when extrapolated by population, represent approximately 22400 national and 1765 South Australian additional male deaths per year compared with female deaths—compelling enough reason for concern about the health of Australian males.

Life expectancy aside, mortality rates for males for most non-sex-specific causes of death are higher than for females across all age ranges. These figures are
corroborated by other measures including years of life lost, potentially avoidable deaths and calculations of excess mortality,7 the details of which provide clear indicators for male health policy.

The leading causes of male death nationally are ischaemic heart disease (IHD), trachea and lung cancer, stroke, chronic lower respiratory disease, prostate cancer, dementia and Alzheimer’s disease, colorectal cancer, blood and lymph cancer (including leukaemia), diabetes, suicide and prostate cancer.8 These causes account for approximately 60% of all male deaths and point to potential priority areas for male health policy.

In SA the leading causes of male death are IHD, lung cancer, suicide and self-inflicted injuries, stroke, colorectal cancer, road traffic accidents, chronic obstructive pulmonary disease, prostate cancer, pneumonia, cirrhosis of the liver and type 2 diabetes.9 Males in this state die from avoidable causes 85% more often than females, highlighting a need for more male-specific disease prevention and early intervention strategies as key components of male health policy.3 Morbidity measures suggest further opportunities to improve male health outcomes. In SA male rates for diabetes are 27% higher than for women, and 10% higher for heart, stroke and vascular disease.9

Men in the 15–29 years age group have higher death rates from injury than in other age groups. Males are also three times more likely to die from vehicle accidents than females, with 60% of deaths occurring in younger men. The incidence of suicide is also higher in younger males.7 This suggests that strategies specifically engaging and targeting young males are required over and above the public health messages cautioning young drivers in general about risks associated with driving, including when under the influence of alcohol or other drugs.

Nationally, males are at least three times more likely than females to die from suicide. This has been a persistent trend since 1999, with males in remote regions being more likely than their urban counterparts to commit suicide.10,11 Farmers are more likely than non-farmers to commit suicide, highlighting the need to address the additional risk of this subgroup.12,13 SA has the highest rate of suicide among the mainland states, with rates increasing with remoteness.14

Determinants of health

While mortality, morbidity, disease burden, risk factor attribution and other measures of health are useful in profiling male health and potential priorities for policy development, they don’t provide an overarching insight of the causality of ill health. What then are the key determinants of male health?

The common dogma of ‘males behaving badly’—often cited as the reason for poor male health—has little basis in evidence.7 This paradigm considers that being male is of itself a pathological state calling for personal and behavioural change. In this view men are deficient in help-seeking and health care, and inclined to gratuitous risk taking—all factors leading to poor health. These views have been challenged in recent times6,17,18,20,21 since they ignore critical sociocultural determinants of male health and male health-seeking behaviour. There is also notable absence of evidence supporting a direct correlation between gender attributes and health.15

Contrary to this notion is clear evidence that much male death and burden of disease is attributable to historical, social, economic, geographic, environmental and cultural factors,3,7,22,23,24,25 which are most demonstrable in Australia in Aboriginal and Torres Strait Islander populations.7,26 Research suggests that ill health is the result of a combination of influences, including socioeconomic disadvantage, low income, low levels of education and working in blue-collar occupations, that result in persistent and adverse changes to physical and biological functioning. These changes are triggered by psychosocial processes and health behaviours that, in turn, are a result of exposure to adverse social, physical, economic and environmental circumstances. The latter are influenced by macro-level factors including government policy, the economy, civic society and broader global forces. There is also a direct link between social factors and morbidity resulting from accidents, injury and violence.22 These findings indicate that coordination of policy across a number of jurisdictions is required if we are to comprehensively address male health issues.

In addition to health determinants, many of the risk factors common to both fatal and non-fatal disease are preventable, including smoking (cancer, cardiovascular disease; CVD); high blood pressure (CVD); overweight and obesity (CVD, diabetes, cancer); low levels of physical activity (CVD, diabetes, cancer); high cholesterol (CVD); alcohol (injury, mental illness, cancer, CVD); diet (CVD, cancer); and occupational exposure.
Rural health in the 21st century

and hazards (injury, cancer, CVD). In light of these data, male-specific prevention strategies, including for special subgroups of males, should be key components of male health policy. In practical terms, the most likely determinant of a man’s health is where he is situated on the social gradient. Although the social gradient has implications for both males and females, males appear more adversely affected by lower socioeconomic status (SES) than females. Males from low-income households living in disadvantaged areas with lower levels of education and employed in blue-collar jobs generally report the poorest health. Data shows that premature mortality for males in the most socially advanced group of the population is higher than that for females in the most socially disadvantaged group, and the rate for males from the lowest SES group is nearly double that of the most socially disadvantaged females. Men with lower SES are more likely to make poorer lifestyle choices and to work in dangerous, health-damaging occupations. Male blue-collar workers experience significantly higher death rates for all causes and for most specific causes. Socioeconomically disadvantaged men are more likely to report chronic disease or adverse health indicators or associated risk factors, and are less likely to be able to access health services.

Where people live (social geography) is another determinant of health, including the prevalence of selected diseases, injury (greatest in the 25–64 years age group) and diminished mental health. Compared with those in major cities, males in regional and remote areas are less likely to report very good or excellent health and more likely to report fair or poor health. Prevalence for chronic disease or adverse health indicators or associated risk factors, and are less likely to be able to access health services.

Increased remoteness is also associated with increased prevalence of poor health behaviours. For example, country males are more likely to drink alcohol in harmful quantities, smoke, exhibit sedentary behaviour, be overweight or obese, and consume a poor diet. They are also more likely to demonstrate alcohol-related personal risky behaviour and consume cannabis and other illicit drugs. Exposure to hazardous machinery and chemicals, combined with the long and strenuous hours of many rural occupations, can also be detrimental to men’s health. Access to health services may be limited because of lesser numbers of health professionals in rural areas, the need to travel or take time away from work, or limited operating hours of health services.

South Australian statistics generally correspond with national figures although SA has a higher proportion of males who live outside major urban centres compared with the national average (72.4% versus about 66.6%, respectively). All-cause death rates are significantly higher for males living in remote and very remote SA, in part due to the disproportionate concentration of Aboriginal people. The difference is noted mostly among adolescent and young adult males.

SA males disadvantaged by poverty or geographical remoteness are at higher risk of ill health. SA males most at risk of premature death include Aboriginal males, those with low education levels, the un- or underemployed, the homeless, those with low SES and those living in rural and remote areas. The prevalence of males with at least one chronic condition and who report good or better health generally decreases with decreasing socioeconomic status, as well as with increasing remoteness. Death rates from both premature and avoidable causes are strongly correlated with socioeconomic disadvantage. Similar correlations exist for high unemployment rates, dental ill health, presentations to accident and emergency (A&E) departments, and hospital admissions for mental and behavioural problems. Male cancer rates are substantially higher than for women in the 55 years and older age group, although there is little difference across SES or remoteness indexes.

Males in SA access general practitioner, medical specialist and community health services (except community mental health) less often than women. Potentially avoidable rates of hospital admission are higher for males than for females and increase with remoteness, possibly resulting from lesser availability of primary healthcare services in these areas. Rates of utilisation of mental health services are inversely related to South Australian patterns of SES, being higher with
lower SES. The inference arising from these findings is that male health policy in SA should include specific strategies that target males from socioeconomically disadvantaged, younger, Aboriginal, and rural and remote area groups.

In general, male experience of social inclusion, as well as social control and cohesiveness, are important determinants of social and emotional wellbeing, health and longevity. Research has shown independent causal association between the prognosis of coronary heart disease and social isolation, lack of quality social support and depression. Other studies demonstrate that risk of death due to the absence of meaningful social relationships is comparable to the well-known risk factors of smoking, alcohol, high cholesterol, poor diet and lack of exercise. Lack of control over work and life decisions, which is more common among low SES groups and those in lower paying jobs, also adversely impacts health. Thus, strategies to improve social support, control and inclusion are crucial in policy considerations.

Occupational health and safety (OH&S) remains a key area of concern. The most dangerous, deadly and health-diminishing work in Australia is performed overwhelmingly by men, and males experience 70% of the burden of disease related to injury. Nationally, 15 serious workplace injuries occur every hour and at least one work-related death occurs every day, with males accounting for 94% of all work-related fatalities. Around 2000 deaths related to occupational exposure to hazardous substances occur each year, again mostly in men. Even though statistics have improved over the last decade or more, they are clearly still unacceptable. Since 2002 the incidence of work-related fatalities has decreased by 25% and those of serious injuries by 22%, but Australia still lags behind comparable countries. Continuing, serious and coordinated effort by government and industry to achieve targeted reductions is still required.

Requisite features of male health policy

Most of the above determinants are the result of modifiable factors, so it seems rational to expect that strategies to address them should form the key tenets for male health policy. A reasonable premise is that reduction of excess risk to health from whatever cause should be acknowledged as a guiding principle that underpins all public health policy. However, some factors that impact on health are outside the jurisdiction of health departments and other agencies.

In order to affect a holistic approach to health and better coordinate a whole-of-government approach, health policy should articulate with policy that affects macro-level social and economic conditions, improves living and working conditions, empowers individuals, strengthens social and family networks, and improves health system equity. Such policy includes economic, health, welfare, housing, transport, taxation, OH&S, law and order, family law, land rights, environment, social inclusion and others. Not to do so undermines the key tenets of the ‘new public health’ paradigm, which promotes the need to address the interplay between health, socioeconomic and cultural factors, education, environment and social capital, and mandates a whole-of-government approach to health combined with intersectoral cooperation between government and non-government organisations (NGOs) and communities.

Local data suggests that male health policy should target several broad areas: prevention, early detection and treatment, service delivery and research. The conditions that account for the majority of the burden of chronic disease are deserved priority targets. The policy should also be aimed at subgroups of males who are most at risk, giving particular attention to socioeconomic determinants of health and affordable access to health services. For the more general male population, policy should focus on strategies that promote service access, increase numbers of male health workers, provide additional male-specific services, and make existing services significantly more male friendly. Social marketing strategies that improve health literacy and promote effective use of primary care, community health and specialist services should also be incorporated. Policy should reflect male-specific strategies that aim to reduce exposure to modifiable risk factors, facilitate healthy lifestyle choices, target young male drivers and improve overall work safety.

Due regard should be given to biological factors that determine differential health outcomes for males compared with females, including increased incidence of foetal complications, congenital malformations and chromosomal abnormalities in males at birth, and deaths from prostate cancer in older men. There should also be emphasis on education initiatives to up-skill service providers in working effectively with men. Finally, an equitable approach is required to funding that augments research into more-effective
detection and screening of male-specific afflictions, and more-effective ways of respectfully engaging males in the pursuit of better health. As a notable example, prostate cancer, the second leading cause of cancer death after lung cancer, kills more men each year than breast cancer in women. Yet, NHMRC expenditure for prostate research during 2000–10 fell far short (by 56%) of funding for breast cancer for the same period.33

National and South Australian men’s health ‘policy’

The National Male Health Policy 2010

On the above requisites the NHMP scores reasonably well. The policy is framed within a context of positive acknowledgment of: the role of males in society; the disparity in health status between males and females, which goes beyond sex or gender differences; the special needs of males in general and of subgroups of males (e.g. living in rural and remote areas) in particular; and the need for collaboration between government, health services, communities and individuals to effect change.

The NMHP exhorts gender equity in health—in which males and females have equal opportunity to achieve good health.49 The policy acknowledges that health and wellbeing are contingent upon making positive changes in economic and social health-minimising conditions. However, rather than identifying key, specific strategies to achieve this for disadvantaged males, the NMHP appears to defer to the government’s social inclusion agenda as a panacea, potentially jeopardising the focus on specific male health issues, including those of Aboriginal and Torres Strait Islander and socially disadvantaged males.50 Coordinated actions—specifically targeting men and boys—between federal and state government departments and other agencies will be required if real and meaningful change is to occur.

A number of priority areas for action are identified by the policy, including: calling for the development of improved service delivery models and changes to language used in health promotion programs; acknowledging groups of males who are at risk of poorer health; recognising transition points across the life course that require special interventions, services or information; valuing the important role that older males have in mentoring and caring for younger generations; and recognising that, to effectively engage males, prevention programs need to be tailored and targeted, taking into account the strategies and environments that are most likely to reach at-risk groups.

The policy is unfortunately diminished by repeated reference to the ‘men behaving badly’ paradigm, emphasising the need for men to change a range of so-called ‘risky’ behaviours, and to be more vigilant in attending health education sessions and seeking more frequent medical advice. While acknowledging that many men work in dangerous or health-diminishing occupations and are exposed to toxic substances in the workplace, the policy suggests only the need for continued monitoring and safety awareness rather than making a serious attempt to address key risks. Finally, the policy makes no reference to the need to train health workers in better understanding men’s health needs or how to effectively engage with men.

The NMHP allocates small tranches of funding for specific initiatives, for example to support the Australian Men’s Sheds Association; to develop health promotion resources for men’s sheds; to provide fatherhood support and services to Aboriginal and Torres Strait Islander males; to build an evidence-base in male health including establishing a national longitudinal study; and to commission regular statistical bulletins on male health. The need for additional research is also acknowledged. While the policy outlines potential actions for each of its six health priority areas, only the small tranches of funding already mentioned appear likely to be forthcoming. It appears that existing programs will be expected to give effect to the unfunded emphases and principles of the policy. History and experience suggest that this reflects unfounded optimism.

The South Australian Men’s Health Strategic Framework 2008–2012

The South Australian response to male health was framed by the release of the South Australian Men’s Health Strategic Framework 2008–2012 (the Framework).9 This document took a positive view of the increasing concern of men to health issues and the corresponding positive changes in their health-seeking behaviour. The framework describes the influence of both biological as well social determinants on male health. At risk sub-groups of males, including Aboriginal males are identified. The Framework exhorts a primary health care and population health approach, a coordinated response across sectors, together with health service initiatives appropriate to the health needs
of different populations of SA men, including those in rural and remote areas and Aboriginal males.

The framework comprises 3 main objectives supported by 17 key directions. The directions, as they stand, are laudable but do not outline specific men’s health initiatives. The challenge remains to translate the framework into policy supported by centrally co-ordinated planning and funding for male-specific initiatives.

**Where to for male health in SA?**

Beyond dispute are the significant health issues for males across the age spectrum in SA. The at-risk groups identified by the Framework deserve additional consideration. Improving access to health services, particularly in country SA, should be a priority. Considerations include easily accessible after-hours health care, male-friendly primary healthcare environments, male-friendly general practitioners, services that target Aboriginal males, provision of primary healthcare services in non-traditional environments (e.g. workplaces, men’s sheds, clubs and pubs) and increased numbers of male primary healthcare workers in general.

There are few dedicated men’s health workers and no formal training programs for health service staff who want or need to work with men. Yet, there are several men’s health groups based in SA able to provide training and education, together with professional development, in cooperation with government and tertiary institutions.51, 52

Similarly, even though SA has the oldest network of ‘men’s sheds’ in the country,53 there is no infrastructure or other state support for them. With a few exceptions, this leaves what ought to be vibrant communities that provide important social and other supports for older men,54 barely sustainable.

More state-supported research is needed to address priority issues for men’s health in SA and to identify better ways to engage men with the health system. Research and preventive health initiatives that specifically target the physical and mental health needs of men in predominantly male industries such as mining and related services is also required. The royalty stream from the ‘mining boom’, together with the growing number of men working in mining, petrochemical and other hazardous industries, presents a leadership opportunity for partnership between government and industry in safeguarding male health and wellbeing.

While there are a number of short-term male health programs being delivered at the individual agency level, there is no statewide coordination or allocation from state budgets. Mapping, evaluating and then coordinating implementation of the most effective of the current strategies would seem a worthwhile and low-cost research objective.

There are a number of male health initiatives throughout Australia that, although not comprehensively evaluated, are examples of programs shown to improve men’s health outcomes and these are summarised in Text Box 1. They may serve as models for South Australian health service policymakers, planners and providers. In sum, with relatively modest targeted funding, significant gains could be made in addressing male health issues, beginning by modelling programs shown to be successful elsewhere, addressing gaps in existing policy and sensibly augmenting Commonwealth programs.

**Text Box 1: Examples of programs shown to improve men’s health outcomes**

> Toll Holdings Second Step Program (secondstep@toll.com.au)
> Men’s Resource Centre (Albany, Western Australia; WA)
> Bendigo Men’s Health Clinic,
> “Less Gut” Wonders (Port Pirie Health Service, SA)
> Diabetes Management along the Mallee Track 55
> Men’s Health Nights (Victoria) 56
> ‘Three in One’ men’s project (Wollongong, New South Wales (NSW) 57
> Diabetes Education Project (WA) 58, 59

There are also a number of programs for Indigenous males—Yura Yulang Men’s Program, (Campbelltown, NSW), Aboriginal Men’s Group (Redfern, NSW), MiB (Males in Black; Port Augusta, SA)—to name a few.
Summary
There is a growing interest in and concern about male health, both in Australia and overseas. There will be increasing prompting of government and NGO health policy and planning authorities to take up the challenge of making an appreciable difference to male health outcomes. Essential to this must be a gender appreciative approach (which has proven successful for women’s health), an approach that appropriately addresses the crucial determinants and particular needs of male health. This will require little more than modest funding along with the creative utilisation and adjustment of existing resources. However, perhaps the most fundamental prerequisite for progress in male health is that we actually value males and their indispensable contribution to the Australian community.

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Community participation in the Whyalla Intergenerational Study of Health (WISH): looking back on the possible influences of knowledge, trust and power

Matthew T Haren
NHMRC Post-doctoral Fellow
Sansom Institute for Health Research and Centre for Rural Health and Community Development, University of South Australia;
Spencer Gulf Rural Health School
University of South Australia and The University of Adelaide

Angie Stokes
Manager Sustainability
OneSteel Whyalla;
Chair, WISH Community Advisory Group

Judy Taylor
Senior Research Fellow
Centre for Rural Health and Community Development
University of South Australia;
Spencer Gulf Rural Health School
University of South Australia and The University of Adelaide

Robyn A McDermott
NHMRC Practitioner Fellow
Sansom Institute for Health Research
University of South Australia
On behalf of the WISH Investigators and the WISH Community Advisory Group

Introduction

Lay knowledge is developed through what can be seen, touched and smelled (i.e. tangible evidence) and the prevailing community viewpoint (i.e. what is regarded as ‘common sense’). Thus, it is grounded in the experience of everyday life in the community.¹ In contrast, scientific knowledge is grounded in theory and methodological principles, and is developed by qualified individuals and academic institutions. In community research, there is potential for conflict between these forms of knowledge, and this can influence community trust and confidence in the study.²

In the North American context, Scammell et al. (2009) reported the existence of distrust in different elements of research that appeared socially, contextually
and experientially derived, and which influence the acceptance of study findings. They suggest that lay knowledge, trust and power are the lens through which a community views and judges health research. This paper retrospectively examines the potential for these factors to influence community participation in an observational health study in a regional community. Participation is defined and examined as: (1) participation in the research process through community consultation; and (2) participation through informed consent to the provision of data as a subject in the healthy study.

Research context, design and methods

Broad research context

In 2006 collaboration was conceived between three existing adult cohort studies with a focus on the biological, psychosocial and environmental determinants of chronic health conditions in Adelaide, South Australia (SA). The goals were to harmonise protocols across cohorts, collect a new wave of data, initiate a regional cohort and recruit dependent children of participating adults. The existing research capabilities of the Spencer Gulf Rural Health School (SGRHS) in Whyalla made the city a pragmatic choice for the regional site.

The Whyalla research context

Whyalla is an industrial, outer regional city in SA with social, economic, political and physical environs that may pose excess health risk. Internal and external perceptions of health in Whyalla may be dominated by the visible issue of ‘red dust’ from the processes of iron ore transport, crushing and screening by the major industry—an iron ore miner and steel manufacturer. This company employs, directly and indirectly, 3000 of the city’s 15000 working-age adults, and was the main source of income for 35% of the population in 2000. This was reflected by a greater than 20% enrichment of blue-collar workers in the city in 2006.

Previous research has suggested higher than expected levels of obesity, asthma, chronic lung disease, and chronic liver disease and lung cancer in Whyalla. In 2006 a study suggested that smoking and alcohol consumption alone were unable to explain the poorer respiratory and hepatic health in the population, and inconclusive suggestions about a link with fugitive dust from industrial sites were made. Due to the ecological design of the study, behavioural, sociodemographic and co-morbidity explanations cannot be excluded. Within this context, WISH was designed to:

1. estimate the population prevalence and social distribution of: (a) cardiovascular disease; (b) diabetes and cardiometabolic risk; (c) asthma and chronic obstructive pulmonary diseases (COPD); and (d) anxiety, depression and psychological distress
2. compare prevalences with state and national population data and with collaborating metropolitan cohorts
3. examine parent–child dyad and individual-level variation in chronic conditions and intermediate phenotypes
4. engage in knowledge translation with the community and explore opportunities for both ongoing longitudinal research and community interventions.

Community consultation processes

Involvement of community residents throughout the research process has been promoted by the US Institute of Medicine as a way of achieving mutual exchange between lay and scientifically derived forms of knowledge. In theory, this should build trust in the research, moderate positions of power and result in more complete and policy-relevant interpretations of findings. Consultations with key local government, industry and regional development leaders in Whyalla in 2007 aimed to inform and gain support for the proposed health study. The project had already been conceptualised, partly designed and funded prior to consultation with these groups. In 2008 a community advisory group (CAG) was established using stakeholder databases of SGRHS. Representatives from local government; industry; the health, economic development and education sectors; and community organisations were invited, and the first meeting was held 4 months after study recruitment began.

Sampling frame, contact strategies and recruitment

Recruitment occurred between February 2008 and July 2009. Due to the commonality of mobile-phone-only households, the residential housing database of Planning SA for Whyalla was preferred as the sampling frame over the Electronic White Pages. The residential housing database of Planning SA for Whyalla was preferred as the sampling frame over the Electronic White Pages.
therefore household contact and recruitment was a multistage process (Figure 1). Invitations to participate, addressed to ‘The Householder’, were mailed to 2500 randomly selected households and coordinated with a community-wide media campaign informed by individual consultations and later by the CAG. Householders were invited to register online or by phone, providing their telephone number and basic demographic information.

In stage two, sample addresses were matched to White Pages® listings using SENSIS services. Direct matches were made for 1183 households, for which contact by telephone could then be made. Unmatched households were contacted by doorknocking. Calling cards were left if nobody was found at home, and households were visited at least twice.

Computer assisted telephone interviews (CATI I and II) were conducted by trained interviewers using established protocols to recruit one adult and, where present, one dependent child aged 0–17 years from each household. Where multiple adults or children resided in the household, those who last had their birthday were selected. Households without telephones, or those who preferred face-to-face contact, were interviewed in-home. Appointments for clinical assessments were made, and information and questionnaire packs were mailed or hand delivered.

Data collection
Participation in consultation and advisory group meetings was obtained from meeting notes. Sociodemographic data of participants, and age group, sex and reason for refusal from non-participants, were collected where possible via CATI. Comparative sociodemographic data were extracted for Whyalla-defined suburbs from the 2006 Census to analyse representativeness of the cohort. Notes from consultation and CAG meetings were scanned for references to knowledge, trust and power, or related concepts, and used to interpret the quantitative participation findings. Meetings were neither established with this intent nor designed specifically to elicit such information, and notes were not subject to thematic analysis. Findings from this exercise are therefore hypothesis generating and should be tested by subsequent research.

Self-report and objectively measured health outcome and exposure data were collected using a combination of telephone interviews, paper and electronic questionnaires, and clinical assessments, but are not reported in this paper. A full list of data collected is available on the study website (http://sgrhs.unisa.edu.au/SGRHSProjects/project.asp?Project=271). All participants provided written informed consent (and/or consent from legal guardians). All procedures and protocols were approved by the Human Research Ethics Committee of the University of South Australia and the Aboriginal Health Research Ethics Committee of South Australia.

Data management and analyses
Data are stored on secure servers at SGRHS and UniSA. Where indicated, data were weighted to the age and sex distribution of the Whyalla population in 2007 and the inverse likelihood of being recruited. Analysis was performed using STATA 10.1 for Windows (StataCorp, College Station TX USA).

Results
Community participation in the research process
Community consultations in 2007 achieved support from local government, industry and regional development. Distrust in and perceived disempowerment by previous health research was present in these sectors due to lack of communication and involvement. The subsequent formation of the CAG was championed by stakeholders. Three meetings were held in 2008 and one in 2009. Chaired by the study manager, the meetings focused on public awareness and recruitment, and attendances were: 15/16 invitees (representing 10 different organisations) in April; 10/11 (7) in June and 10/10 (7) in September; and 21/27 (8) in August 2009. Local government and hospital and health services were represented at all meetings; local industry at three; and the Aboriginal Health Service at one; while the education and social welfare sectors and the Division of General Practice did not attend any meetings.

Recruitment trends, participation and response rates
Temporal trends in the completion of CATI (blue bars) and clinical assessment (red bars) are shown in Figure 1 (bottom panel) by contact mode (CATI I/II). The peak in CATI II completion from April to June 2008 identifies the response to SENSIS matching. The recruitment via CATI I from August to December 2008 and again in March 2009 largely identifies the response to doorknocking.
The participant flow from household sampling to CATI and clinic attendance is shown in Figure 2. The CATI response rate was 51% and the adult clinic response rate was 32.4%. Of the adults who attended clinics, 30.9% had eligible children residing in their household, and from 55% of these a randomly selected child was enrolled in the study. Non-participation in CATI did not appear to be related to age or sex, and the most frequent reasons for non-participation were: ‘just don’t want to participate’ (33%); ‘too busy’ (29%); ‘too sick’ (8%); or ‘information discarded/not received/not understood’ (6%).

Population representativeness and demographic characteristics of the cohort
Sociodemographic characteristics of participating adults are summarised in Table 1. Married people were over-represented by approximately 20%, while never-married people were under-represented by approximately 10%. The sample was 10% under-represented by state housing administration renters. There was a 5% over-representation of UK/Ireland-born adults.

Discussion
Community participation—integration of knowledge
The two participation routes examined in this paper were: (1) community consultation and advisory group meetings; and (2) recruitment as a subject in the health study. WISH experienced a high level of community participation in the research process through CAG meetings in 2008–09; however, not all relevant sectors were represented. The level of community advisory participation did not translate to high participation levels among residents randomly sampled for recruitment into the study. The final response rates to both CATI (51%) and clinical assessments (32.2%) were approximately 15–20% lower than what had been achieved in the hands of the recruitment team in similar suburban metropolitan studies in previous years.14,15 The cohort displayed some differences to the Whyalla population in social characteristics, for example marital status and residential tenure type, suggesting a social pattern to participation. Non-participation, however, did not appear to relate to age or sex, and the majority of non-participants cited ‘just don’t want to [participate]’ or ‘too busy’ as reasons for non-participation.

Lay knowledge (through the CAG) was sought to inform strategies to maximise recruitment. In June 2008 open recruitment to volunteers outside of the random sample was suggested. This was rejected by investigators due to potential selection bias but remained a point of discussion in CAG meetings after recruitment was completed, demonstrating the difficulty in integrating both forms of knowledge. A solution may have been to maintain a randomly selected cohort (for representativeness), supplemented with a self-selected cohort (to maximise absolute numbers), and this approach could be reviewed as an option in future studies. Other strategies that were implemented included: ‘talking up’ WISH with family and friends; organisational newsletters and meetings; approaching randomly selected households in person; community television; and Whyalla Show and shopping centre booths (Figure 1, media campaign panel).

The high level of non-attendance at clinic appointments presented scientific and management challenges. Inconvenience was identified as a potential barrier by the CAG, and strategies to make clinic attendance more convenient included splitting appointments, home visits and provision of transportation. Despite implementation of all strategies, 22% of adults scheduled for appointments subsequently withdrew. Analysis of CATI refusal data showed that only nine people (<3%) cited ‘inconvenient scheduling’ as a reason for non-participation, suggesting that this may not have been a major barrier to clinic attendance.

Community participation—trust and power
From community consultations in 2007, it was evident that a lack of community engagement by agencies conducting previous research had led to feelings of distrust and disempowerment. However, past experience did not appear to negatively affect participation in community consultation with WISH. This may be because the lead organisation of the study was based in Whyalla and had existing relationships of trust with stakeholders.

A disempowered ‘culture of apathy’ of the general population was a recurring theme in transcripts from CAG meetings in relation to the high level of non-attendance at clinic appointments and low participation generally. This is reflected by the main reason cited for non-participation—‘just don’t want to [participate]’. Scammell et al. (2009) found that perceived powerlessness by residents in relation to the economic and political forces of community governance
Rural health in the 21st century

**Figure 1: Contact and recruitment strategy and timeline for Whyalla Intergenerational Study of Health**
was related to strong doubt about the success of community participation in health studies. A culture of apathy implies impact across a range of community happenings. It is unknown how widespread this perceived culture is, what subgroups of the population it exists in or how it has been acquired. This barrier to community participation deserves further study, both generally and as it relates to health.

Applications and extensions of the research—integrating knowledge, building trust, sharing power

The first report from WISH is due for public release in early 2011 and will be available from the study website. The report was reviewed by the CAG, which is responsible for development of the public dissemination strategy and application of the findings to the Whyalla Health Service Plan and the Whyalla Community Plan. Improving recognition of the way in which information about health is obtained (‘research literacy’) may foster better acceptance and understanding of research, and the CAG has highlighted this as a spin-off benefit of WISH. Future goals of the CAG are to broaden stakeholder engagement; inform analysis and interpretation of baseline data; and contribute to future research with the cohort and application of findings through policy advocacy, service provision and practice, and intervention design and implementation.

Conclusion

WISH has built on previous health studies in the Whyalla population, with a primary focus on the prevalence and social distribution of cardiometabolic, respiratory and psychological ill-health. The study has fostered community participation but did not initiate it from study conception, and some sectors remain disengaged. Community participation in the research process has been high despite some previous experiences leading to distrust and disempowerment. Recruitment to the health study, however, did appear to have social barriers that may relate to a ‘culture of apathy’, but this hypothesis requires further exploration.
### Table 1: Sociodemographic representativeness of computer assisted telephone interview and clinical samples of Whyalla Intergenerational Study of Health with respect to overall adult population of Whyalla

<table>
<thead>
<tr>
<th></th>
<th>Whyalla (2006, ABS) Census</th>
<th>WISH CATI(^1) sample (n=1143)</th>
<th>WISH clinical assessment sample (n=726)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (aged ≥18 years)</td>
<td>n (crude)</td>
<td>weighted</td>
</tr>
<tr>
<td><strong>Age (years)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 to 24</td>
<td>0.116</td>
<td>89</td>
<td>0.078</td>
</tr>
<tr>
<td>25 to 34</td>
<td>0.162</td>
<td>172</td>
<td>0.150</td>
</tr>
<tr>
<td>35 to 44</td>
<td>0.208</td>
<td>241</td>
<td>0.211</td>
</tr>
<tr>
<td>45 to 54</td>
<td>0.177</td>
<td>205</td>
<td>0.179</td>
</tr>
<tr>
<td>55 to 64</td>
<td>0.150</td>
<td>212</td>
<td>0.185</td>
</tr>
<tr>
<td>65 to 74</td>
<td>0.108</td>
<td>144</td>
<td>0.126</td>
</tr>
<tr>
<td>75 +</td>
<td>0.079</td>
<td>80</td>
<td>0.070</td>
</tr>
<tr>
<td><strong>Sex, male</strong>(^2)</td>
<td></td>
<td>0.501</td>
<td>474</td>
</tr>
<tr>
<td><strong>Dwelling ownership</strong>(^3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Own/purchasing</td>
<td>0.577</td>
<td>745</td>
<td>0.652</td>
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<tr>
<td>Rent (Housing Trust)</td>
<td>0.241</td>
<td>237</td>
<td>0.207</td>
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<tr>
<td>Rent (private/company)</td>
<td>0.059</td>
<td>153</td>
<td>0.134</td>
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<tr>
<td>Refused</td>
<td>0.031</td>
<td>8</td>
<td>0.007</td>
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<tr>
<td><strong>Country of birth</strong>(^4)</td>
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<td>Australia</td>
<td>0.730</td>
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<tr>
<td>UK/Ireland</td>
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<td>0.195</td>
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<td>0.095</td>
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<td><strong>Australian Aboriginal or Torres Strait Islander, yes</strong></td>
<td>0.036</td>
<td>28</td>
<td>0.025</td>
</tr>
<tr>
<td><strong>Marital status</strong>(^5)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Married/live-in partner</td>
<td>0.498</td>
<td>661</td>
<td>0.578</td>
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<td>Widowed</td>
<td>0.079</td>
<td>113</td>
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<tr>
<td>Divorced/separated</td>
<td>0.143</td>
<td>167</td>
<td>0.146</td>
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<tr>
<td>Never married</td>
<td>0.280</td>
<td>196</td>
<td>0.171</td>
</tr>
<tr>
<td><strong>Household size, median</strong></td>
<td></td>
<td>2.400</td>
<td>1143</td>
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<tr>
<td><strong>Unemployed</strong>(^6), yes</td>
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<tr>
<td><strong>Occupation</strong>(^7)</td>
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<td>Manager</td>
<td>0.049</td>
<td>21</td>
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<tr>
<td>Professional</td>
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<td>Technician/trade</td>
<td>0.092</td>
<td>196</td>
<td>0.171</td>
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<td>0.052</td>
<td>77</td>
<td>0.067</td>
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<tr>
<td>Clerical/administrative</td>
<td>0.059</td>
<td>137</td>
<td>0.120</td>
</tr>
<tr>
<td>Sales worker</td>
<td>0.042</td>
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<td>0.136</td>
</tr>
<tr>
<td>Machine operator/driver</td>
<td>0.065</td>
<td>47</td>
<td>0.041</td>
</tr>
<tr>
<td>Labourer</td>
<td>0.071</td>
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<td>Never worked/unable/undefined</td>
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<td>37</td>
<td>0.032</td>
</tr>
<tr>
<td>Home duties</td>
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<td>44</td>
<td>0.038</td>
</tr>
</tbody>
</table>

Notes:
- CATI: computer assisted telephone.
- Proportions for WISH are of the total study or weighted sample aged 18 years and over.
- Proportions for census are of the population aged 18 years and over.
- Proportions for census are of the total population.
- Proportions for census are of the population aged 20 years and over.
- Proportions for census are of the population aged 15 years and over.
- Occupation in WISH is primary lifetime occupation, whereas Census data is current occupation.
Through the CAG, it is anticipated that equality of power will be achieved across sectors and the research team, establishing confidence in the research and investment in the direction and utility of this community health project.

Acknowledgments

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References

Screening for colorectal cancer in remote, rural and metropolitan South Australia: analysis of the National Bowel Cancer Screening Program data

Angelita Martini
Sara Javanparast
Paul R Ward
Stephen Cole
Paul Aylward
Genevieve Baratiny
Tiffany Gill
George Tsourtos
Gary Misan
Carlene Wilson
Graeme Young

† Flinders University
‡ The University of Adelaide
© Cancer Council SA

Context and background
The early detection of colorectal cancer (CRC) is a major clinical and public health concern. CRC is now the second most commonly diagnosed cancer in Australia and has the second highest cancer mortality rate.1 Around 1 in 19 men and 1 in 28 Australian women will develop the disease before 75 years of age.1 In 2005 there were 4165 deaths from CRC in Australia, accounting for almost 11% of all cancer deaths.1 Cancer mortality rates vary according to the remoteness of a person’s place of residence.1 The average annual death rate for CRC during 1998–2001 in Australia was highest in inner and outer regional areas (13.4% and 13.3%), followed by major cities (12.8%), remote areas (12.4%) and very remote areas (7.7%).2 Survival is inversely related to the degree of cancer progression, and up to 90% of all deaths from CRC may be preventable with early detection.3

A number of randomised controlled trials have demonstrated the effectiveness of CRC screening for reducing its incidence and mortality.4 However, these benefits have been limited by a number of factors including the accuracy of screening technology,4 the willingness of eligible populations to participate,5 access to CRC screening5 and primary healthcare practitioners,9 geographical location,10 Indigenous status, and a range of social, demographic and economic factors.11,12

The Australian CRC population-based screening program, the National Bowel Cancer Screening Program (NBCSP), was implemented in South Australia (SA) in January 2007. The NBCSP aims to facilitate Australia-wide access to CRC screening services. Phase one of the program (August 2006 – June 2008) offered free screening by faecal occult blood test (FOBT) to people recorded on the Medicare and Department of Veterans Affairs registers who turned 55 or 65 years of age between 1 May 2006 and 30 June 2008 (the NBCSP Register). The FOBT screening kits were also offered to people who had been invited to screen in the 2003 NBCSP and who were aged between 55 and 74 years on 1 January 2003. Eligible participants were sent invitation packages by Medicare that included an immunological FOBT kit, and were requested to mail their FOBT sample to a central pathology service for analysis. Participants who returned a positive result were advised by mail to visit a general practitioner (GP) to arrange further examination.

However, provision of the NBCSP to all population subgroups does not result in equity in screening uptake. In SA disparities exist in bowel cancer screening participation. People of male gender, in lower age groups, of lower socioeconomic status, from culturally and linguistically diverse (CALD) groups, and Indigenous people have lower rates of participation. This result is consistent with the national statistics on NBCSP participation rates.

Aim of study
This study aimed to explore the association between screening participation and different sociodemographic indicators in SA. This was part of a broader study that included a qualitative exploration of the barriers to and facilitators of NBCSP participation among selected ethnic groups, Indigenous Australians and people who speak English at home. This paper also draws on these qualitative findings in discussing the uptake of screening in rural, remote and metropolitan areas of SA.

Study design and methodology
The project was conducted over three stages, employing a mixed methodology approach including a literature review and quantitative and qualitative methods.

In stage 1, de-identified data for the South Australian population invited to participate in phase one of the NBCSP (between January 2007 and July 2008) were provided by Medicare Australia. The dataset included
the age, sex and postcode of those people sent the FOBT (i.e. invitees—the denominator in participation rates) and the age, sex, postcode, Indigenous status and language spoken at home of those who completed the FOBT (i.e. participants—the numerator in participation rates). Ethics committee approval was granted by the Departmental Ethics Committee of the Commonwealth Department for Health and Ageing and by the Social and Behavioural Research Ethics Committee of Flinders University.

The postcode variable was converted into two new separate variables for use in the analysis. First, each postcode was coded according to the Index of Relative Social Disadvantage (IRSD), which is a composite measure based on selected Census variables such as income, educational attainment and employment status. The IRSD scores for each postcode were then grouped into quintiles for analysis, where the highest quintile comprised the 20% of postcodes with the highest IRSD scores (the most advantaged areas). Second, each postcode was converted into a measure of ‘remoteness’ using the Accessibility/Remoteness Index of Australia (ARIA). This is an index of the accessibility of postcodes to service centers or, conversely, of remoteness of postcodes. The ARIA has both a 5-point and a 3-point scale. We chose to use the 3-point scale, which includes the categories of metropolitan, rural and remote areas.

Stage 2 of the study employed a qualitative method to explore barriers to, enablers of and cultural appropriateness of bowel cancer screening in SA. In-depth interviews were conducted with three population subgroups. Group 1 included South Australians from three ethnic groups: Greek, Vietnamese and Iranian. Criteria for selection of ethnic groups were based on population size in SA, average population age, average length of stay in Australia, resources available to ensure study feasibility, and whether the community had already been studied on this question. The second group included Anglo-Australian residents who were native English speakers. Based on our postcode mapping in stage 1, we selected locations with the highest and lowest rates of participation and advertised in local papers in selected areas to recruit study participants. Group 3 included Indigenous Australians living in SA. Participants were selected from males and females aged between 50 and 75 years.

Data analysis
Statistical data were analysed using the Statistical Package for the Social Sciences version 15.0. In total there were 92279 invitees during phase one of the NBCSP (January 2007 to July 2008 in SA), including the 17497 who had been involved in the pilot phases of the NBCSP. The pilot invitees were removed from the data analysis because their prior exposure to CRC screening may have had a confounding effect on NBCSP participation. Therefore, our final dataset for analysis included 74782 South Australians who had been invited to undertake CRC screening for the first time by the NBCSP. It was not possible to ascertain if these people had previously been offered, or participated in, CRC screening.

Mapping and analysis of the NBCSP data was performed by placing Australian Bureau of Statistics (ABS) Census of Population and Housing data and NBCSP data for Adelaide into a geographic information system (GIS) using ESRI ArcGIS software, MapInfo, Microsoft Access and Microsoft Excel. Data was aggregated to postcode and participation was then mapped according to overall participation rates, sex and age. Postcodes with less than 20 participants (9 in the Adelaide Metropolitan area and 48 in rural and remote SA) were considered to have insufficient data for mapping.

Bivariate analysis using chi-square ($\chi^2$) tests was undertaken to analyse the associations between participation in the NBCSP and sociodemographic variables (age, sex, Indigenous status, language spoken at home, IRSD and ARIA). All variables associated with NBCSP participation rate at the $p<0.25$ level at a univariate level were then entered as independent variables into a logistic regression analysis (block-enter method), with participation rate in the NBCSP as the dependent variable. The final multiple regression model was checked for collinearity and included only those variables that were statistically significant and added to the fit of the model.

Qualitative data were analysed in the following manner. Following transcription and checking for accuracy, interview data were loaded into the qualitative software package NVivo 8. A coding structure that combined inductive and deductive elements was developed by Sara Javanparast (co-author) in collaboration with the other research team members. The coding structure emphasised the following key concepts
from the research questions—perceptions about disease prevention, perceptions about cancer and cancer prevention, knowledge and experience about bowel cancer, participation in bowel cancer screening, barriers and enablers for screening test uptake, cultural issues and recommendations. In addition to these deductively derived codes, the team also generated codes inductively to capture unexpected concepts in participants’ accounts. This combined coding structure was used to code all of the data, and the same structure was applied across all study groups to enable comparisons between groups.

Results

Stage I: Epidemiological analysis of the NBCSP in South Australia

Based on the findings of stage I, 46.9% of invitees of the SA NBCSP agreed to participate in the program by completing and returning their FOBT and participant details form. Our findings revealed that rates of participation varied according to place of residence, gender, age, socioeconomic status, ethnicity and Indigenous status. Table 1 profiles the South Australian NBCSP participants within these categories.

Figures 1 shows the overall participation rates in rural and remote SA for phase one of the NBCSP, plotted for each postcode region.

Postcode

In the Adelaide Metropolitan region there were generally higher participation rates in the south and east, and lower participation rates in the centre, west and outer north. Geographical variation in participation rates was also revealed in rural and remote SA, with higher participation in the south-east. The highest participation rate in rural SA was 70%, compared with 79% in the metropolitan area (Figures 1). However, in the north, east and west of regional SA, there were large areas excluded from analysis because of insufficient invitees per postcode.

ARIA

Overall participation rates were similar in metropolitan and remote areas (45.6% and 46.0% respectively) and rates were slightly higher in rural areas (48.6%). The rural and remote SA participation rates were statistically significantly different (p<0.001) by gender (46.7% for males and 53.3% for females), age (45.2% for 55 year olds and 52% for 65 year olds) and socioeconomic status (43% in most deprived quintile through to 50% in most affluent quintile).

Table 1: Profile of South Australian NBCSP participants

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Metropolitan</th>
<th>Rural/ remote</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>12447</td>
<td>45.1</td>
<td>3223</td>
</tr>
<tr>
<td>Female</td>
<td>15126</td>
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<td>3684</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>55 to 58</td>
<td>25700</td>
<td>56.9</td>
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<td>65 to 67</td>
<td>11869</td>
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<td>3202</td>
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<td>Neither Aboriginal nor Torres Strait Islander</td>
<td>26489</td>
<td>96.1</td>
<td>6612</td>
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<td>72</td>
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<tr>
<td>Highest</td>
<td>7831</td>
<td>28.5</td>
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</table>

SEIFA: Socio-Economic Indexes for Areas

Age

Participation across SA was 42.8% for 55 year olds and 51.2% for 65 year olds. These figures demonstrate a statistically significant difference in participation rate on the basis of age (p<0.0001).

* Additional graphs representing rural and remote SA and metropolitan Adelaide phase one NBCSP participation rates by age, gender and postcode are available from Paul R Ward (paul.ward@flinders.edu.au).
Gender
The participation rate was higher for women (49.9%) than men (43.9%). In the Adelaide Metropolitan area there were generally higher participation rates in the south-east and lower rates in the centre, north and north-west. Similar patterns of gender disparity in screening participation were found in rural and remote areas, with significantly more postcodes recording high female participation rates of 60–100% compared with male rates.

IRSD / SEIFA
Participation rates varied significantly (p<0.001) by IRSD quintiles and SEIFA classifications. There was a gradient in participation linking increasing affluence with increasing participation, although, after the middle quintile, participation rates began to plateau. The participation rate for the lowest IRSD quintiles was 40% compared with 48.1% for the highest quintile.

Language other than English
The dataset included details of the language spoken at home for the NBCSP participants (but not for invitees), which is particularly important for a postal screening program. Given the large number of languages spoken, we created a dichotomous variable for comparison purposes—spoke English only at home versus spoke a language other than English at home. Of the people who participated in the NBCSP, 8.0% (CI 95% 7.7–8.3%) reported speaking a language other than English at home, compared with 17.0% for the same age group in SA in the 2006 Census. As this proportion is not within the confidence interval of the sample, the proportion of NBCSP participants who spoke a language other than English at home was statistically significantly lower than we would have expected. This suggests an inequity on the basis of language spoken at home.

Indigenous status
Self-reported Aboriginal and Torres Strait Islander status was available only for participants who completed the FOBT, with the Indigenous status of invitees who failed to return their FOBT unknown. The total proportion of Indigenous participants was 0.24% (CI 95% 0.20–0.30%). Given that the reported proportion of Indigenous people of the same age group within SA in the 2006 Census was 0.54%, and that this proportion is not within the confidence interval of the sample, the proportion of Indigenous people who participated in the NBCSP was statistically significantly lower than we would have expected. However, given that we do not have sufficient details about the Indigenous status of invitees, we cannot compute an overall participation rate.

Stage 2: Participant interviews
The second stage of the study explored participants’ perceptions about cancer and cancer prevention programs (with a focus on bowel cancer), as well as barriers to and facilitators of bowel cancer screening uptake. In total we interviewed 114 people: 24 Iranian, 23 Greek, 24 Vietnamese, 27 Anglo-Australian and 16 Indigenous.

In general, the majority of our participants were preventive oriented and used the maxim ‘prevention is better than cure’. A wide range of actions were reported by study participants as measures to promote health and prevent disease, including healthy eating, physical activity, regular medical check-ups, mental health and stress management, avoiding smoking and alcohol consumption, and building social capital through community group involvement and as serving community members. A number of themes were identified, the most common being a double identity of cancer, a lack of awareness about bowel cancer and screening, and facilitators of and barriers to screening uptake.

Double identity of cancer
The concepts of cancer and cancer prevention were discussed during interviews. Our study showed that cancer has a double identity within population groups. At one end of the spectrum cancer is perceived as a dreaded, feared and horrible disease. However, at the other end it is seen as a treatable disease like other chronic diseases. These two framing identities, although completely contradictory, exist side by side in the community. Importantly, the Anglo-Australian group were more likely to emphasise the second framing, while the other groups identified the first framing, seeing cancer as an incurable disease leading to death.

Lack of awareness
With respect to bowel cancer, our study revealed a lack of awareness about the disease and its screening tests among all members of study groups. A large number of the participants did not have any information about
Suggestions to overcome the lack of awareness about bowel cancer included public education using national and local media, culturally friendly sessions and national campaigns.

Facilitators to screening
Factors that were considered to be facilitators of screening uptake were peace of mind, the chance to detect cancer in the early stages, no cost for the test, having a personal history of cancer, being able to do the test privately, having done other screening tests,
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doctors’ recommendations, obligation and respect to what is offered for peoples’ health, reminder letters and being encouraged by family and friends.

Barriers to screening
Based on the barriers identified by different groups of participants, a few remedial actions were recommended to improve the rate of participation in the NBCSP. Overcoming language barriers was commonly recommended by people with different ethnic backgrounds. The engagement of medical practitioners in the program was the most effective action suggested by many of the Anglo-Australian people. The most frequent barriers to bowel cancer screening cited by the study participants were embarrassment, doubt about test accuracy, difficulty in dealing with faeces and sending the sample via mail, lack of knowledge about the screening test, a fatalist view about cancer and unwillingness to know the result, fear of doing further invasive tests, inability to read English and following the instructions, and lack of a physician’s recommendation.

Discussion and conclusion
In this study we examined the association between sociodemographic characteristics and screening participation among those aged 55 and 65 years in metropolitan Adelaide and rural and remote SA who had received a written invitation to participate through the NBCSP. In order to gain a deeper understanding of the barriers and facilitators of screening participation, we also conducted qualitative interviews with Indigenous people and other cultural groups who speak a language other than English at home (Greek, Vietnamese and Iranian people), as these are known to have lower participation rates. For comparative purposes Anglo-Australian people were also interviewed.

Overall, our analysis revealed lower NBCSP participation rates for men compared with women, for populations residing in areas of relative disadvantage, for 65 year olds compared with the 55 year old group, and for people from metropolitan and remote areas compared with those from rural areas. In addition, comparison with the most recent Census data indicated that South Australian participants in the NBCSP who reported speaking a language other than English at home, and those who reported an Indigenous background, were under-represented. These differences in screening participation rates, while potentially explainable in part by other factors, highlight the high likelihood of inequity for CRC screening in SA. These findings are consistent with results from other cancer screening programs, which suggest that inequitable patterns of participation may arise from a variety of factors including those associated with gender, ethnicity, socioeconomic status and Indigenous status. The uptake of cancer screening is particularly poor for older rural and remote residents, men, Indigenous people, lower socioeconomic groups and those living in Far North SA.

Our findings are also consistent with the national data on CRC screening participation for metropolitan, rural and remote areas, with people of male gender, in the younger of the two age groups (i.e. aged 55 years at the time of screening), living in areas of relative disadvantage, who do not speak English at home, and Indigenous people having lower rates of participation. While there are common and group-specific barriers and enablers that prevent or facilitate screening uptake nationally, this study revealed that group-specific inequalities also exist within NBCSP participation in SA. While being preventive oriented, identifying cancer as a treatable disease was less evident among the ethnic groups and Indigenous people interviewed. A sense of dreading the disease combined with poor awareness of screening and language difficulties may also contribute to explaining inequities in screening uptake.

This study did not address the inequity in opportunity to participate for some population subgroups, for example people who do not appear on the NBCSP invitee Medicare register, prisoners, those without regular mail service or the homeless. The overall participation rates also obscure the differences in rates shown on various maps.

Variation between regions in the rates of CRC screening of different subpopulations is conveniently visualised in the participation maps subdivided by postcode. The utility of such maps is to assist in planning services and interventions aimed at maximising participation in FOBT-based CRC screening. The maps also serve as baseline data for visualising the effectiveness of future interventions aimed at increasing participation, particularly in subpopulations.
References
RFDS as a preventive health agency in the rural and remote setting

John Setchell
General Manager - Health Services
Royal Flying Doctor Service

The purpose of this paper is to outline the various preventive primary healthcare programs conducted by the Royal Flying Doctor Service (RFDS) throughout Australia, and to demonstrate the extensive role that the organisation has in this area of health care.

History
The RFDS was established by the Reverend John Flynn in 1928; he envisaged that a 'mantle of safety' would be provided to those people who worked and lived in the remote and outer rural areas of the continent. The initial services related to a doctor, pilot and aircraft travelling to an injured or unwell patient and transporting them back to a hospital setting for medical care. In 1928, 225 patients were transported and 30000 km flown. Over time the services grew and flight nurses were added to the crew mix, such that in the 2009–10 financial year 38852 patients were transported and 25592455 km were flown.

For many Australians their perception of the role of the RFDS continues to be only that of teams of doctors, nurses and pilots travelling to remote locations to treat and transport injured and unwell patients. However, for many years the RFDS has also provided primary care services to residents of remote Australia. In 1995 it produced a strategic plan—The Best for the Bush—that clearly articulated a significant role for the RFDS in the broadest range of health-service delivery based around comprehensive primary care principles. Since the publication of this document, the following types of preventive health programs have been developed:

> general practitioner (GP) and community health nurse (CHN) remote clinics
> rural women’s GP services (RWGPS)
> mental health programs
> health promotion programs
> healthy living programs
> Aboriginal and Torres Strait Islander health programs

In 2009–10146014 patients were treated throughout Australia at numerous locations serviced by RFDS primary care clinics, 91623 patients were treated by RFDS doctors via our remote telephone consultation service, and 7305 immunisations were given by our community health nurses.

General practitioner and community health nurse traditional remote clinics
For many years the RFDS has provided visiting GP and Community Health Nurse clinics to remote locations throughout the country. These clinics are conducted at a range of locations including remote area nursing posts, Aboriginal community health centres, pastoral properties and remote roadhouses. The clinics provide patients with regular GP consultation and treatment services, and data demonstrate that reason for visit patterns and diagnoses given to patients’ conditions are comparable with those found in suburban general practice—hypertension, diabetes, obesity, injuries and poisoning, and respiratory conditions being the most common diagnoses. One of the most important preventive health functions of these clinics is the provision of immunisation services in locations that would otherwise not have immediate and local access—7305 immunisations were provided in 2009–10. An important aspect of both the GP and CHN work at the various locations is the provision of health education / health promotion services through individual patient consultations and as part of group presentations to communities.


Rural women’s GP services
In the late 1990s the difficulties confronted by women living in rural and remote locations in being able to consult a female GP were identified as a major barrier to effective preventive women’s health services in these locations. Low pap smear screening and breast screening rates were two key elements identified. In order to address this shortcoming, the RFDS was awarded a contract by the Commonwealth Department of Health to establish and deliver a program of visiting

female GPs to areas where male GP services were available but not female GP services. This program commenced in 1999 and has become an exemplar of good practice, addressing gender choice of practitioner, but is not a solution to workforce shortages. In the first full year of operation of this program (2000–01), 1877 patient consultations were conducted at 164 clinics; and in 2009–10, 18977 patient consultations were conducted at 1565 clinics. The main reasons for visits in 2009–10 were Pap smears, depressive disorders, breast checks, contraception and menopause, demonstrating a significant preventive health focus. In addition, a total of 487 women attended specific health promotion activities conducted by the RWGPS doctors on matters such as menopause, osteoporosis management, breast screening procedures, mental health wellbeing and cancer screening.

Mental health programs

The identification of mental health as an area of need within the RFDS network was noted in the Best for the Bush document—in particular, the need to develop preventive mental health strategies for rural and remote residents in times of drought, other natural disasters and local traumatic events. The Queensland Section of the RFDS pioneered this work with the writing of a mental health ‘first aid’ program, presented via CD-ROM covering matters such as how to identify a friend or work colleague who may be suffering from a mental health condition, how to understand the language of mental health, and how to work out the best approach to mental health care. The program has been accessed by several hundred health professionals in the rural and remote regions and used by comparable numbers of residents. With the advent of web-based technologies, the intent is for this program to be transferred to the national RFDS website (www.flyingdoctor.org.au), itself a valuable health education resource.

Psychologists, mental health nurses and allied health workers have been employed in Queensland to support this program, and these teams have been active in the provision of preventive services through the Wellbeing Centres in Aboriginal and Torres Strait Islander communities in Far North Queensland. Additional preventive mental health services are provided from our bases in Alice Springs and Broken Hill as a component of the Department of Health and Ageing’s Mental Health Services in Rural and Remote Areas (Stage 2) program. In these two locations teams of mental health nurses provide community development and mental health outreach services to remote communities. A mental health nurse works from our Port Augusta base providing mental health consultation and education services to patients in the remote areas of South Australia.

Health promotion programs

The Best for the Bush strategic document established a direction within RFDS health services to address the paucity of health promotion and health education programs that were available within the remote areas of Australia. The document endorsed the benefit that such programs could deliver. Consequently, over the last 10 years a wide range of health promotion programs have been implemented by the four operating sections of the RFDS. These include the Healthy Living Program in South Australia, funded by an international philanthropic organisation (the Li Ka Shing Foundation), which provides on-site practical education and support on healthy eating and exercise to residents in remote locations; the On the Road program in Western Australia (WA), sponsored by BHP Billiton Iron Ore, which provides a road-based vehicle that delivers health screening and health education programs throughout remote areas of WA; the Far North Queensland Wellbeing Centres located within a number of Aboriginal communities, which provide, among a range of services, mental health and drug and alcohol education; and the dental screening and treatment program delivered by the RFDS South Eastern Section from Broken Hill.

Summary

From this high-level overview of the services provided by the RFDS across Australia, it is clear that our work is much more than aeromedical evacuation of the sick and injured. Programs that provide primary care, screening, health education and health promotion, and that underpin the provision of preventive health care to rural and remote Australia, are a core element of the work of the RFDS.

* Available from Mr Robert Williams, RFDS National Office – 02 8259 8100
Parenting Eating and Activity for Child Health (PEACH™) in the Community: (PEACH™ IC): translating research to practice

Anthea Magarey
Senior Research Associate, Nutrition and Dietetics
Flinders University

Jo Hartley
Research Associate, Nutrition and Dietetics
Flinders University

Rebecca Perry
Research Associate, Nutrition and Dietetics
Flinders University

Rebecca Golley
Postdoctoral Fellow, Public Health, Sansom Institute of Health Research
University of South Australia

Introduction
Recent national data indicate that over one in five children and adolescents are overweight or obese.1 The health consequences of excess weight in childhood are well documented,2 as is the persistence into adolescence and adulthood and the additional health burden this conveys.3,4 Effective treatment of childhood overweight is an important secondary prevention strategy.5 The key elements of intervention in child weight management are moderation of energy intake, increased physical activity and decreased sedentary activity, achieved through behaviour modification with parental involvement and support.6,7

The Parenting, Eating and Activity for Child Health (PEACHTM) program is a group-based family-focused weight management program for overweight children aged 4–10 years.8 It incorporates the cornerstones of child weight management described above. Additionally, parenting skills training is included to enhance parent capacity to undertake changes in the family diet and lifestyle to support child weight management. Parents attend the 6-month program, comprising 13 fortnightly sessions (10 x 90-minute group sessions and 3 individual phone calls). A National Health and Medical Research Council (NHMRC)-funded trial (ACTR 00001104) conducted in Adelaide and Sydney with 169 families of 4–9 year olds showed that a reduction of 10% in relative weight loss (child body mass index and waist circumference z scores) was achieved at the end of the intervention (6 months from baseline), and was maintained in the following 18 months without further program contact.8,9 While the initial weight loss is similar to that reported in other child weight management trials,10,11,12 the long-term maintenance of this loss is better than published adult outcomes.6,13

It is recognised that research settings are unique, and therefore it is important to understand whether achievements in a research setting are transferable to real-life community practice settings—PEACHTM in the Community (PEACHTM IC). PEACHTM IC complements SA Health's Obesity Prevention and Lifestyle (OPAL) program, which targets environmental change by providing an effective intervention for those already overweight. This paper describes the process of translation and presents data on the evaluation of this process.

Steps towards translation
Three years of funding† has supported:

> modification of the PEACHTM program based on facilitator and participant feedback in the original trial, and addition of graphic design to the parent handbook, resulting in a 96-page spiral-bound colour book14
> development of a 2-day facilitator training workshop and facilitator materials for implementation (program slides with notes and checklist, recruitment materials)
> creation of a website (www.peach.net.au), through which interested practitioners can register their interest in facilitator training and families can register their interest in attending a PEACHTM program
> Flinders University (FU) staff time to support facilitators as they implement the program (training, recruitment, program delivery, evaluation).

Ethics approval was sought and it stipulated that information sheets and consent forms had to be provided to all participants (facilitators and families), a process that is not usual practice for community health programs.

†Funding was provided by SA Health (2008-11) to implement the PEACHTM program in a practice setting, with additional support (2008) from Mazda Foundation (via Flinders Foundation).
Facilitator training

The free 2-day facilitator training provides health professionals with knowledge, skills and confidence to implement the PEACHTM family weight management program. The objective is to enhance their capacity to support families of overweight children. The training includes:

- the background rationale and theoretical underpinnings of the PEACHTM program
- an overview of the program content
- role-play activities to develop confidence in delivery of the parenting and problem-solving components of the program.

Considerable effort was required to attract facilitators, despite the PEACHTM program being listed as a priority program by SA Health. Recruitment also occurred through email notices, attendance at professional network meetings and personal approaches. Initially, training was limited to those practitioners in a position to implement the program in their workplace, but it was expanded to any interested person. Six workshops have been held since April 2009. Of the 40 professionals (50% dietitians) who attended, the majority were females working in metropolitan Adelaide with less than 3 years of experience in weight management.

Evaluation

Evaluation of the facilitator training (process and effectiveness) and program satisfaction provides important data on the effectiveness of the translation process. The former entails three questionnaires: pre and post training, and post-program delivery. An additional questionnaire was incorporated early in 2010 aimed at those who had completed training but had not implemented the program in their workplace within 6 months. Evaluation of program effectiveness entails pre- and post-program measurement of child height, weight and waist circumference; parent completion of child diet and activity behaviours; pre-program parent-completed family background questionnaire; and post-program parent-completed program satisfaction questionnaire. All data collection tools are provided by FU and de-identified data is returned to FU for data entry and analysis.

Facilitator training evaluation (n = 40)

Pre- and post-training questionnaires were completed by all 40 participants, with the majority expressing satisfaction with the pace of the training, course structure, activities, and usefulness of the resources and training modules. Suggestions for change were made, which are being actioned for future training sessions.

Participants were asked to rank their knowledge, skills and confidence in three key areas of child weight management on a 5-point Likert scale of high, medium–high, medium, medium–low, low. Data presented in Table 1 of pre- and post-training rankings indicate that training has made a positive contribution to workforce development.

<table>
<thead>
<tr>
<th></th>
<th>Family-focused weight management</th>
<th>Lifestyle support</th>
<th>Behaviour modification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>Pre</td>
</tr>
<tr>
<td>Knowledge</td>
<td>2</td>
<td>31</td>
<td>9</td>
</tr>
<tr>
<td>Skill</td>
<td>3</td>
<td>21</td>
<td>6</td>
</tr>
<tr>
<td>Confidence</td>
<td>4</td>
<td>28</td>
<td>7</td>
</tr>
</tbody>
</table>

Previous studies with dietitians have reported low confidence and perceived skills in facilitating behaviour change, and anecdotally reported low confidence in working with families to manage children’s weight. Our training has increased practitioner knowledge, skills and confidence, which are important aspects of workforce development in the area of best practice child weight management.

Program implementation

Two groups, with a total of 13 families, have completed training. However, it is too early to present any evaluation data of pre- and post-training child anthropometrics, child dietary and activity behaviours, and parent program satisfaction.

Barriers to the translation process

A number of barriers have been encountered in the process of translating this effective research program into the real-life setting of community practice. First, with respect to training, there has been difficulty in engaging practitioners to attend training and embrace the program. This may be due to a lack of commitment by workplaces as a result of the changing and/or
uncertain roles of staff, the instability of staff due to short-term contracts, the relatively new funding models in community health, the fact that obesity management is not a high priority at the primary care level, or that PEACHTM is perceived by some as not relevant to their target population, who have varying levels of need and literacy. Further, the nature of PEACHTM (family-focused, group sessions, 6-month length) challenges existing practice, which is typically one-to-one counselling or no service.

Second, with respect to implementation of the program, there have been varied levels of commitment by workplaces. For example, despite their post-training enthusiasm, practitioners have experienced competing demands as PEACHTM is one of a range of available programs and not a priority in some locations. Staff movements—changing roles or maternity leave (7 of those trained)—have limited opportunities for some. Workplaces may not have suitable rooms for groups, and the program format of 10 fortnightly sessions does not match the usual service delivery model of weekly sessions over a single school term. Contributing factors to the difficulty in recruiting families to attend the program have been problems with respect to advertising, the fact that many families are not aware that their child has a weight problem and so are not actively seeking help, the lack of defined referral pathways, the nature of the program for families (group based versus 1:1 with the dietitian or health worker, and the 6-month length), and the challenge of finding a suitable session time for all families in their busy schedules.

The final barrier identified relates to program evaluation. It can be challenging for practitioners to collect data beyond routine process evaluation. Repeated phone calls and/or appointments may be required to have families attend the follow-up assessment, which requires anthropometric measures as well as distribution and collection of questionnaires. In the case of the participating families, most lack experience of being involved in the formal evaluation of a service and may lack an understanding of the importance of the collection of evaluation data. Additionally, they may find the text required by ethics committees in patient information sheets overwhelming.

Understanding the translation process
The limited but expanding literature on translating research to everyday practice provides understanding as to why implementation in the community setting is low. Interestingly, there is a paucity of successful health promotion interventions being implemented in applied settings.16 The difficulty of translating research to practice and the potential challenges are well described in the literature, which identifies the need for a staged approach, time and patience to effect change. Theories such as the diffusion of innovation theory,17 staged approach18 and the RE-AIM (Reach, Efficacy or Effectiveness, Adoption, Implementation, Maintenance and Cost) framework19 help describe the dissemination process and identify potential barriers and likely challenges. We have applied such theories to the PEACHTM IC experience to assist in conceptualising and modelling the processes involved, and to provide understanding for the gap between research and practice to enhance the process in the future.

Conclusion
The PEACHTM family weight management program is an evidence-based program for children aged 4–10 years that results in relative weight loss of approximately 10% after 6 months and is maintained in the longer term. The PEACHTM in the Community project aims to translate this effective program from the research to the practice setting. The specific 2-day facilitator training has had a positive effect on practitioner knowledge, skills and confidence. However, the limited implementation of the program is concerning. A number of barriers that may explain this low activity have been identified; while many have been addressed and modifications made, many challenges remain. We will continue to address these obstacles and train and support facilitators as they implement PEACHTM in their community settings.
Rural health in the 21st century

References


Communicable Disease Control Branch

Disease Surveillance and Investigation Report 1 July to 31 December 2010

Compiled by Louise Flood, public health registrar, Communicable Disease Control Branch

The Communicable Disease Control Branch (CDCB) conducts statewide surveillance for notifiable diseases enabling analysis of health data and initiation of specific public health actions to prevent further spread of disease. Specified data are provided regularly to the National Notifiable Diseases Surveillance System.

Weekly summaries of notifiable diseases in South Australia (SA), as defined in the Public and Environmental Health Act 1987, are published on the SA Health website. Included are counts of notified infections, information about current cluster and outbreak investigations, in addition to historical data.

Some investigation and control activities are conducted in conjunction with partner agencies that provide additional expertise and authorities under other Acts in SA. These agencies include OzFoodNet Australia, SA Pathology, Biosecurity SA (previously Primary Industries and Resources SA), and Environmental Health Officers (EHO) from local government. Partners in SA Health include Food Policy and Programs, Health Protection Programs and Scientific Services.

Summary

Between 1 July and 31 December 2010, 12585 notifications were collected by the CDCB.

In the second half of 2010, 2782 cases of sexually transmitted diseases (STDs) and blood borne viruses were notified to STD surveillance section. Thirty-one cases of tuberculosis and 46 cases of non-tuberculous mycobacterial infection were notified to SA Tuberculosis Services. These data are not further analysed in this report, but are included in the summary of notifiable diseases (Table 2).

There were 10745 notifications of vaccine preventable disease including 4886 cases of pertussis and 4227 cases of influenza; 1595 notifications of enteric disease; 202 notifications due to vector borne disease and 9 notifications due to zoonotic infections.

Investigation and control activities included:

> 15 cases of Shiga-toxin producing *Escherichia coli* infection
> 13 cases of invasive meningococcal disease
> 1 case of hepatitis A
> 4 cases of typhoid fever
> 5 cases of Q fever
> 1 case of leptospirosis
> 1 case of brucellosis
> 4 cases of *Legionella pneumophila* serogroup 1

Four possible foodborne outbreaks with the causative agent *Campylobacter*, *Salmonella Typhimurium* phage type 9, norovirus and pathogen unknown were investigated. There were 10 cluster investigations with the causative agent *Salmonella* in nine clusters and *Campylobacter* in one cluster. There were 33 non-foodborne clusters of gastrointestinal disease, all but three occurring in aged care facilities.

VECTORBORNE DISEASE

The endemic arboviruses, Ross River virus and Barmah Forest virus, are both spread by the bite of an infected mosquito. Both infections usually demonstrate cyclic patterns of disease, with a peak in summer. SA Health releases an annual health alert in early summer to raise awareness of these infections. A prevention program, the *Fight the Bite* campaign, has operated in SA since December 2004.

**Ross River infection and Barmah Forest infection**

Symptoms of infection with Ross River virus and Barmah Forest virus include arthralgia, rash, flu-like symptoms and swollen glands. Blood tests confirm the diagnosis usually by demonstration of specific antibodies in acute-phase sera.

Between 1 July and 31 December 2010, 158 cases of Ross River virus infection were notified, compared to 199 in the second half of 2009. Cases comprised 56 males and 102 females with an age range from three to 89 years. Since the epidemic of 2005–2006, the background level of Ross River virus infection has been higher than previous inter-epidemic periods. This may partly reflect increased testing due to increased awareness of the disease (Figure 1). Reported geographical location of infection acquisition was...
widespread, with the Murray Mallee region the most common (42 cases, 27%) (Table 1).

There were 23 cases of Barmah Forest virus infection notified in the July to December period, compared with 16 in the same period of 2009. Cases comprised 10 males and 13 females, with an age range of five to 89 years and mean age of 50 years. The Murray Mallee region was the most common reported location of infection acquisition (10 cases, 43%) (Table 1).

Dengue fever
Dengue fever is transmitted by the bite of an infected mosquito (usually *Aedes aegypti*). Dengue fever is characterised by fever, headaches, myalgias, arthralgias, nausea, vomiting and rash. Dengue diagnosed in SA is acquired either in Northern Australia or overseas.

During the second half of 2010, 18 cases of dengue fever were notified, compared to seven cases in the same period of 2009. Cases included 11 males and seven females with an age range of 18 to 64 years. All cases reported recent travel to Asia.

Malaria
Malaria is a parasitic disease transmitted by mosquitoes infected with *Plasmodium* species. Malaria is endemic in many tropical and subtropical countries. Malaria is characterised by fevers, myalgias, headache, diarrhoea and vomiting. Many complications may ensue including acute encephalopathy, anaemia, renal failure and coagulation defects, and malaria remains a significant cause of mortality worldwide.

The three cases of malaria notified in the second half of 2010 were all acquired overseas. Cases comprised one male and two females, aged from 14 to 48 years. Two cases, caused by *Plasmodium vivax*, reported exposure in Papua New Guinea and one case, caused by *P. falciparum*, reported exposure in Africa. Nineteen cases occurred in the same period of 2009.

**Table 1: Reported geographical location of infection acquisition for cases of Barmah Forest virus and Ross River virus 1 July to 31 December 2010**

<table>
<thead>
<tr>
<th>Geographical Areas</th>
<th>Barmah Forest virus infection</th>
<th>Ross River virus infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metropolitan Adelaide</td>
<td>3 (13%)</td>
<td>24 (15%)</td>
</tr>
<tr>
<td>Adelaide Hills</td>
<td>0 (0%)</td>
<td>1 (1%)</td>
</tr>
<tr>
<td>Barossa, Light and Lower North</td>
<td>1 (4%)</td>
<td>2 (1%)</td>
</tr>
<tr>
<td>Fleurieu and Kangaroo Island</td>
<td>0 (0%)</td>
<td>11 (7%)</td>
</tr>
<tr>
<td>Murray Mallee</td>
<td>10 (43%)</td>
<td>42 (27%)</td>
</tr>
<tr>
<td>Limestone Coast</td>
<td>0 (0%)</td>
<td>2 (1%)</td>
</tr>
<tr>
<td>Yorke and Mid North</td>
<td>1 (4%)</td>
<td>19 (12%)</td>
</tr>
<tr>
<td>Far North</td>
<td>1 (4%)</td>
<td>7 (4%)</td>
</tr>
<tr>
<td>Eyre and Western</td>
<td>1 (4%)</td>
<td>19 (12%)</td>
</tr>
<tr>
<td>South Australia not otherwise specified</td>
<td>0 (0%)</td>
<td>4 (3%)</td>
</tr>
<tr>
<td>Interstate</td>
<td>0 (0%)</td>
<td>9 (6%)</td>
</tr>
<tr>
<td>Overseas</td>
<td>0 (0%)</td>
<td>1 (1%)</td>
</tr>
<tr>
<td>Unknown</td>
<td>6 (26%)</td>
<td>17 (11%)</td>
</tr>
<tr>
<td>Total</td>
<td>23 (100%)</td>
<td>158 (100%)</td>
</tr>
</tbody>
</table>

**ZOONOSES**

**Hydatid disease**

Hydatid disease is caused by the larvae of the tapeworm *Echinococcus granulosus* and usually occurs via contact with dogs which have eaten infected offal from sheep and other herbivores. The parasite forms slowly enlarging cysts that can occur in any organ but are most common in the liver or lungs.
Hydatid infection is frequently asymptomatic and is now rare in SA. In the second half of 2010, one case of hydatid disease was reported in a 68 year-old female from metropolitan Adelaide, whose medical history suggested past rather than recent infection.

**Q fever**

Q fever is a zoonotic disease caused by *Coxiella burnetii*. Cases often have direct exposure to animals, commonly sheep, cattle or goats, which are natural reservoirs for this infection. Typically, cases are working-age persons who have occupational exposure to animals in the meat and livestock industries. Q fever infection is asymptomatic in approximately half of infected persons. Symptoms may include: fever, headache, fatigue, muscle aches, confusion, cough, vomiting and diarrhoea, and longer term complications include endocarditis.

During the second half of 2010 five cases of Q fever were recorded, compared with eight cases in the same period of 2009 (Figure 2). Cases comprised two males and three females aged between 21 and 51 years. Four cases reported plausible occupational exposures for this infection. None of the cases were vaccinated for Q fever. Q fever vaccination is recommended for persons with possible occupational exposure to *C. burnetti* (see [http://www.health.gov.au/internet/immunise/publishing.nsf/Content/Handbook-qfever](http://www.health.gov.au/internet/immunise/publishing.nsf/Content/Handbook-qfever)).

**Leptospirosis**

Leptospirosis is a bacterial zoonotic disease caused by species of *Leptospira*. Many wild and domestic animals are reservoirs of *Leptospira* serovars due to chronic renal infection. Leptospires can remain viable in the environment for many weeks; hence, transmission can occur through contact with soil, vegetation or water contaminated by animal urine, in addition to direct animal exposure. Leptospirosis has a wide spectrum of severity from asymptomatic disease to a mild febrile illness to fatal disease.

One case of leptospirosis was notified in the second half of 2010. The case was a 64 year old male who had recent travel to South East Asia. No cases of leptospirosis were notified in SA during 2009.

**Brucellosis**

Brucellosis is a zoonotic disease caused by *Brucella* bacteria. It is characterised by fever, headache, weakness and joint pains. Untreated, the illness can last many months, with long-term complications common. Transmission is through close contact with infected animals or ingestion of contaminated unpasteurised dairy products.

One case of brucellosis (caused by *Brucella suis*) was notified in the second half of 2010. The case was a 33 year old man from metropolitan Adelaide who reported occupational exposure to feral pigs and goats. This was the fourth case of brucellosis and the only case of *B. suis* infection notified since 1 January 2005.

**Ornithosis (Psittacosis)**

Ornithosis is a bacterial disease caused by infection with *Chlamydia psittaci*. The clinical picture is usually atypical pneumonia and complications may include encephalitis and myocarditis. Parrots and other birds are reservoirs for *C. psittaci* and apparently healthy birds may be infected.

In the July to December 2010 period there was one notified case of ornithosis. The case was a 44 year old man who had pet parrots. There were two cases in the same period in 2009.

**VACCINE PREVENTABLE DISEASES**

**Influenza**

Influenza is a potentially fatal illness characterised by fever, headache, myalgias, cough, fatigue and
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rhinorrhea. Transmission of influenza virus is by airborne droplets or fomites. There is increased risk of complications in persons under two years of age, persons over 64 years and persons with certain medical conditions. Annual vaccination is recommended for persons at high risk of severe disease (see http://www.immunise.health.gov.au/internet/immunise/publishing.nsf/Content/immunise-influenza).

In May 2008 influenza became a notifiable disease for laboratories and doctors in SA. CDCB undertakes syndromic surveillance by collating datasets from SA pathology and clinical sources. Clinical diagnoses of ‘influenza-like illness’ are collected from two sources: Royal Australian College of General Practitioners members participating in the Australian Sentinel Practice Research Network (ASPREN) and emergency departments of several public hospitals. Together, these data provide a weekly picture of confirmed influenza infections and influenza-like illness activity state wide. A prominent spike of influenza and influenza-like illness is noted in winter and spring in 2010; although lower than the spike of 2009 associated with the H1N1 pandemic, it is significantly higher than other winter/spring increases in the 2006 to 2008 period (Figure 3).

H1N1 2009 swine influenza continued to dominate influenza notifications. In the second half of 2010, 4227 influenza infections were notified, compared to 9588 in the same period of 2009 and 475 in the same period of 2008. Cases comprised 1980 males and 2246 females aged from less than one year to 98 years (Figure 4). 4065 cases (96%) were due to influenza A virus and 162 cases (4%) were due to infection with influenza B virus. 3483 (86%) of the influenza A cases were caused by H1N1 2009 swine influenza. In the second half of 2010, there were three deaths associated with an influenza infection, all due to H1N1 2009 swine influenza.

The age distribution of notified cases of infection with influenza A not H1N1 2009 swine influenza, H1N1 influenza and influenza B is shown in figure 4. Persons less than 25 years comprised a sizable proportion of notified cases including: 60 per cent of notified cases with influenza B, 53 per cent of notified cases with H1N1 2009 swine influenza and 47 per cent of cases with other strains of influenza A. The age distribution of notified cases could be skewed by increased testing in certain age groups (e.g. school children).

Invasive Haemophilus influenzae

The bacterium Haemophilus influenzae causes a wide range of illness including otitis media, pneumonia, meningitis, epiglottitis, joint infections, and cellulitis. Introduction of the H. influenzae serotype b vaccine in 1997 resulted in a reduction of invasive H. influenzae serotype b infections including meningitis and epiglottitis.

There were nine cases (five males and four females) of invasive H. influenzae infection in the second half of 2010, compared with six cases in the second half of 2009. The age range was 15 to 93 years, with a mean age of 65 years. None of the isolates from these cases were able to be serotyped.

Figure 4: Per cent of notified cases of influenza in SA by influenza type and age group at notification (years), 1 July 2010 to 31 December 2010.
**Invasive pneumococcal disease**

*Streptococcus pneumoniae* is carried asymptomatically and harmlessly in the upper respiratory tract of many individuals; however, invasive pneumococcal disease, e.g. pneumonia or meningitis, occurs when organisms invade beyond the upper respiratory tract. Two vaccines help protect against some of the 90 identified serotypes of *S. pneumoniae*. A 23-valent vaccine is commonly used for adults; and a 7-valent vaccine for infants and children.

Between 1 July and 31 December 2010, 86 cases of invasive pneumococcal disease were notified. There were 93 cases for the same period in 2009. Cases comprised 54 males and 32 females, with an age range from less than one year to 92 years and mean age of 42 years. Fifteen cases (17%) were aged less than five years. Thirteen of the notified cases were in Aboriginal Australians (mean age 29 years), in two cases the Indigenous status was unknown and 71 cases were not Indigenous (mean age 44 years). There were six deaths due to invasive pneumococcal disease, all occurring in non-Indigenous persons with medical co-morbidities (age range less than one year to 86 years).

There has been a significant decrease in the number of notifications of invasive pneumococcal disease since the peaks of 2002 and 2004, with the decrease particularly pronounced in the less than five years old age group and the 65 years and over age group (Figure 5).

**Pertussis**

Pertussis (whooping cough) is caused by the bacterium *Bordetella pertussis*. Classical pertussis is characterised by a prodromal period of rhinorrhea, runny eyes and mild cough, followed by a prolonged phase (up to three months) characterised by paroxysmal cough with inspiratory whoop and post-tussive vomiting. In adults and vaccinated children infection may be asymptomatic or symptoms may be atypical e.g. chronic cough without whoop or vomiting. Infants under six months of age have the highest rates of mortality and complications (e.g. pneumonia and encephalopathy). Deaths in persons over 10 years of age are rare. Pertussis vaccine is included on the National Immunisation Program Schedule.

Pertussis demonstrates cyclic patterns over time, appearing as dramatic increases in disease roughly every three to five years. An increase in notifications began in September 2008, with the peak month of notifications occurring in October 2010. The current epidemic demonstrates a bimodal pattern and is significantly higher than other cyclic increases since 1996. Some of the increased notifications may be due to increased frequency and sensitivity of laboratory testing.

In the second half of 2010, 4886 cases of pertussis were notified, compared to 3484 in the same period of 2009 (Figure 6). Cases comprised 2049 males and 2836 females with an age range of less than one year to 95 years. Cases were geographically dispersed throughout SA. Fifty-four cases were identified as occurring in Indigenous Australians, 4055 cases occurred in non-Indigenous Australians and in 777 cases the Indigenous status was not stated.

Sixty-five per cent of cases (3191) were aged over 15 years. Seven per cent (328) of cases were aged less than five years at the time of diagnosis. These proportions are similar to the same period in 2009. Of the cases aged less than five years, 250 (76%) were fully or partially vaccinated; 44 (13%) were not vaccinated (of which 13 were too young for vaccination) and in 34 (10%) instances the vaccination status could not be determined.

There was one death in a one month old unvaccinated baby (too young for vaccination). This was the first pertussis-related death in SA in an under five year old since January 1995.
**Rotavirus**

Rotavirus infection causes a wide spectrum of illness from asymptomatic infection to fatal gastroenteritis associated with watery diarrhoea, vomiting, fever and severe dehydration. It is a major cause of hospitalisation for children under five years. Vaccination was introduced in July 2007 and notification of rotavirus infection commenced in May 2008 in SA.

In temperate regions there is usually a seasonal peak in winter. In the second half of 2010, 570 cases of rotavirus infection were notified, compared with 148 for the same period in 2009 (Figure 7). A seasonal winter peak is demonstrated. The increased cases in 2010 compared with 2009 may reflect a true increase in disease, increased testing rate, increased notification rate or a combination. Cases comprised 269 males and 301 females aged from less than one year to 101 years, with 124 notifications (22%) in persons less than two years of age and 153 notifications (27%) in persons aged two to four years.

Of the cases aged less than two years of age at notification, 22 (18%) were unvaccinated (of which 11 (9%) were too young for vaccination), 86 (69%) had received at least one vaccination and vaccination status was unknown for 16 (13%).

**Varicella-zoster virus infection**

Varicella-zoster virus infection is manifested as chicken pox and shingles. Chicken pox is usually characterised by a febrile illness with vesicular rash. Complications of chicken pox occur in approximately one per cent of cases. Shingles is characterised by a painful blistering rash that may occur upon reactivation of latent varicella-zoster virus.

A monovalent varicella vaccine became available in Australia in 2000 and was included in the National Immunisation Program Schedule from November 2005. Although not on the National Immunisation Program Schedule, a zoster vaccine (Zostavax) is recommended for persons 60 years and over (although multiple contraindications exist, see http://www.health.gov.au/internet/immunise/publishing.nsf/Content/Handbook-zoster).

During the second half of 2010, 966 cases of varicella infection were reported, compared to 972 cases reported for the same period of 2009 (Figure 8). Cases comprised 442 males and 524 females and were aged from less than one year to 99 years.
Medical notification characterised 210 (22%) varicella-zoster infections as chickenpox and 602 (62%) as zoster (Figure 8). Cases notified as chickenpox had an age range of less than one year to 90 years with 86 per cent of cases aged less than 30 years (mean age 14 years). Cases notified as shingles ranged in age from of less than one year to 99 years with 87 per cent aged 20 years or more (mean age 51 years).

**Mumps**
Mumps is an acute viral illness characterised by fever and swelling of the salivary glands. It can be associated with respiratory symptoms, orchitis, pancreatitis and hearing loss. Prior to vaccination becoming available, mumps was a childhood disease with peak incidence in the five to nine year age group. Children are now routinely offered two mumps vaccinations as part of the National Immunisation Program Schedule. Many aged adults aged approximately 30 to 45 years received a single mumps vaccination, hence, may be susceptible to mumps infection. Adults in this age group are encouraged to seek revaccination with MMR vaccine (see http://www.health.gov.au/internet/immunise/publishing.nsf/Content/Handbook-mumps).

During the second half of 2010, there was one case of mumps. This was in a male aged 30 to 39 years who reported childhood mumps and childhood mumps vaccination. There were two cases of mumps in the second half of 2009.

**Measles**
Measles is a highly infectious viral disease characterised by fever, malaise, cough, coryza and conjunctivitis. Complications may include otitis media, pneumonia and encephalitis. Measles is no longer endemic in Australia.

There was one case of measles in the second half of 2010 in a 29 year old unvaccinated female who had recently travelled to Germany. Two close contacts required post exposure prophylaxis with normal human immunoglobulin.

**ENTERIC DISEASES**
In the second half of 2010 there were 1595 notifications of enteric infection which accounted for 13 per cent of all disease notifications to CDCB.

**Foodborne disease investigations**
The CDCB investigated an outbreak of Campylobacter infection associated with a hotel with six confirmed and 12 presumptive cases identified. The suspect vehicle was steak served with chicken liver pate. Appropriate public health action was taken.

A suspected foodborne outbreak that occurred in attendees at a training function was investigated in August 2010. Eight of 11 attendees became unwell with vomiting and diarrhoea of short duration, however, the causative agent was not identified.

In September the CDCB investigated a community based outbreak of Salmonella Typhimurium phage type 9 (STM 9) infection with 10 cases notified within a fortnight. Hypothesis generating interviews revealed that four of the 10 cases had dined at a common restaurant. No food samples from the restaurant were positive for STM 9. Three of the 10 cases comprised a social cluster involving two siblings and a neighbour.

An outbreak of norovirus infection occurred in a restaurant in December 2010 involving one confirmed and 18 presumptive cases. Illness was characterised by diarrhoea and vomiting of rapid onset and short duration. Investigation revealed that a food-handler had been symptomatic whilst preparing food.

There were 10 cluster investigations with single clusters caused by: Salmonella Typhimurium (STM) phage type 12A, STM phage type 135, STM phage type 193, STM phage type 44, STM untypable, Salmonella Montevideo, Salmonella Infantis, Campylobacter and two clusters caused by STM 9.

**Non foodborne outbreaks**
In the second half of 2010, 33 clusters of gastrointestinal infectious disease were notified to the CDCB: 29 within aged care facilities, three in persons who attended restaurant based functions and one at a training centre. The causative agent was rotavirus in nine clusters, norovirus in 14 clusters, adenovirus in one cluster, likely adenovirus in one cluster and unknown in eight clusters. In clusters occurring in aged care facilities a total of 725 persons were reported as ill. One norovirus infection outbreak in an aged care facility involved 169 persons.

The CDCB liaises with the aged care facility involved to ensure resolution of the outbreak with key elements.
Campylobacteriosis
Campylobacter species causes gastroenteritis frequently accompanied by fever. Complications may include: reactive arthritis and Guillain-Barré syndrome. Many animals including poultry and cattle are reservoirs of Campylobacter species.

Campylobacter infection accounted for 71 per cent of enteric notifications in the second half of 2010 (1135 cases), compared to 872 cases during the same period of 2009 (Figure 9). Cases comprised 623 males and 512 females, with an age range of less than one year to 93 years and a mean age of 39 years. Fifteen per cent of cases were aged less than 10 years at diagnosis.

Salmonellosis
Salmonella species infection is usually characterised by gastroenteritis with symptoms including diarrhoea, fever, abdominal pain, headache, nausea and sometimes vomiting. Complications may include: septic arthritis, endocarditis, cholecystitis, menigitis, pericarditis, pyelonephritis and pneumonia. Salmonella species are found in many animals including poultry and domestic pets.

Salmonella infection is generally the second most commonly notified enteric infection in SA. Between July and December 2010 there were 343 notifications of Salmonella infection, which was consistent with the 301 cases notified in the second half of 2009 (Figure 9). In the second half of 2010, Salmonella infection comprised 22 per cent of enteric disease notifications. Cases comprised 161 males and 182 females, with an age range from less than one year to 94 years. Cases resided in a range of rural and metropolitan locations in SA.

Laboratory tests characterise Salmonella isolates by serotype and phage type. Between July and December 2010, STM 9 was the commonest serotype (54%). Among the 185 cases attributed to infection by the STM serotype were isolates classified into 20 different phage types. STM caused 59 infections; STM 135a caused 18 infections, STM 135 caused 13 infections, STM phage type 108 caused 31 infections and STM 193 caused 14 infections.

Cryptosporidiosis
Cryptosporidiosis is a parasitic infection caused by the protozoa Cryptosporidium hominis and C. parvum. Infection is characterised by watery diarrhoea with abdominal pain although fever, malaise and vomiting may occur. Asymptomatic infections are common. Cryptosporidium parasites can be found in a range of vertebrates as well as humans. Transmission is via the faecal-oral route including through ingestion of contaminated food or water. Accidental ingestion can occur whilst swimming, hence, persons diagnosed with cryptosporidiosis should be excluded from swimming for 14 days after symptoms disappear.

Twelve sporadic cases of cryptosporidiosis were reported in the second half of 2010 compared to 33 for the same period in 2009 (Figure 10). Cases comprised seven males and five females, with an age range of one year to 42 years and a mean age of 14 years. Residents from both metropolitan and rural areas of SA were among the cases.
Cryptosporidiosis cases with reported risks potentially requiring public health action are referred to local government EHOs, as well as the Water Quality Section of SA Health’s Scientific Services Branch.

**Hepatitis A**

Hepatitis A virus causes illness of varying clinical severity, ranging from asymptomatic infection to prolonged relapsing hepatitis. Prior to the onset of jaundice, prodromal symptoms may include fever, nausea, anorexia, malaise and abdominal discomfort. Hepatitis A has a prolonged incubation period of 15 to 50 days, hence, the source of exposure is frequently difficult to identify. Most cases in SA are imported from countries where hepatitis A is endemic. Outbreaks due to contaminated food or water have been reported in Australia including the 2009 Australia wide outbreak associated with semi-dried tomatoes (Figure 11).

One case of hepatitis A was reported during the third quarter of 2010, compared with eight cases for the same period of 2009. The case was a 44 year old male who reported recent overseas travel to countries where hepatitis A infection is endemic. Contact tracing is undertaken for all cases of hepatitis A infection and vaccine or immunoglobulin is recommended for close contacts.

**Paratyphoid fever**

The bacterium *Salmonella Paratyphi* causes an acute illness characterised by fever, headache, anorexia, malaise, cough, rash and change in bowel habit (constipation is more common than diarrhoea). There is a spectrum of clinical severity ranging from asymptomatic to severe disease; however, paratyphoid fever is usually less severe than typhoid fever. There was one case of paratyphoid fever notified in the second half of 2010 compared with no cases in the second half of 2009. The case was a female less than one year of age who usually resided in Indonesia.

**Typhoid fever**

Typhoid fever is characterised by sustained high fever, headache, malaise, anorexia, abdominal discomfort, cough, rash and change in bowel habit. Untreated typhoid fever has significant mortality. Typhoid fever is caused by *Salmonella Typhi* which is spread by ingestion of food or water contaminated by faeces or urine of persons infected with *S. Typhi*. Unlike other *Salmonella* infections, up to 10 per cent of infected persons become asymptomatic carriers of the infection. *S. Typhi* infections notified in SA are generally acquired overseas.

Four cases of *S. Typhi* infection were notified in the second half of 2010 compared to one case in the same period of 2009. Cases comprised three males and one female aged from one year to 62 years. All reported recent travel to Asia. Contact tracing was undertaken covering the period of infectiousness in Australia. No contacts became infected.

**Shiga-toxin producing Escherichia coli (STEC)**

*Escherichia coli* is usually carried harmlessly in the colon of many animals including humans. Some strains of *E. coli* may produce Shiga-toxin. Infection with Shiga-toxin producing *Escherichia coli (STEC)* is associated with a broad clinical spectrum from asymptomatic infection to bloody diarrhoea with abdominal cramping. In a small proportion of cases infection progresses to Shiga toxin mediated haemolytic uraemic syndrome (HUS) that is characterised by haemolytic anaemia, thrombocytopenia and acute renal impairment. In SA, all faecal specimens from patients with bloody diarrhoea are screened in a central SA pathology laboratory for genes encoding the STEC toxins, enabling prompt notification of such infections.

Between 1 July and 31 December 2010, 15 cases of STEC infection were reported (no deaths), compared to 30 for the corresponding period in 2009. Cases comprised five males and ten females aged one year to 82 years (mean 36 years). Laboratory testing by SA pathology further characterised isolates as positive for Shiga toxin 1 gene (three cases), Shiga toxin 2 gene (two cases), both Shiga toxin 1 and Shiga toxin 2 genes (eight cases) and in one case the carriage of Shiga toxin gene 1 or 2 was unknown. Cases resided in a range...
of rural and metropolitan locations. All cases were interviewed with a standard risk questionnaire to collect comprehensive food and environmental data. No links were found between cases.

**Shigellosis**

*Shigella* is a bacterium that can cause gastrointestinal disease with typical symptoms including fever, bloody diarrhoea, vomiting and stomach cramps. However, infection with *Shigella* also may be mild or asymptomatic. Transmission is via direct or indirect faecal-oral spread through person-to-person contact or ingestion of contaminated food or water. Few *Shigella* bacteria are needed to cause infection and humans are the only significant reservoir. Appropriate antibiotic treatment shortens the illness and reduces the risk of transmission.

In the second half of 2010 there were 36 notifications of shigellosis compared to 24 cases in the second half of 2009 (Figure 12). The agent was characterised as *Shigella sonnei* in 15 cases (14 cases biotype g and one case biotype a), *S. flexneri* in 18 cases, *S. boydii* in two cases and *S. dysenteriae* in one case. Cases comprised 16 males and 20 females with an age range of one year to 64 years and mean age of 29 years. Of the 36 cases, seven identified as Aboriginal and in nine the Indigenous status was unknown. All the cases in persons known to be Aboriginal were caused by *S. flexneri*. Twenty-four cases had recently migrated or travelled overseas.

![Figure 12: Notified cases of shigellosis by year and week of notification, 1 January 2005 to 31 December 2010](image)

**Yersiniosis**

Yersiniosis is an uncommon acute illness caused by *Yersinia* species. Symptoms may include: diarrhoea, fever and abdominal pain. Spread is by ingestion of contaminated food or water, or occasionally by blood transfusion.

Four cases of *Yersinia enterocolitica* infection were notified between July and December 2010, compared with 12 cases in the corresponding period of 2009. Cases comprised three males and one female, aged less than one year to 37 years. All cases were locally acquired.

**OTHER DISEASES**

**Invasive meningococcal disease**

*Neisseria meningitidis* is carried harmlessly in the nose and throat of approximately 10 per cent of the population, with transmission via close prolonged contact. Septicaemia and meningitis are the two most common forms of notified invasive meningococcal disease. In Australia, approximately 5-10 per cent of persons with invasive meningococcal disease die. Invasive meningococcal disease is most common in persons aged less than five years and aged between 15 and 24 years, although it can occur at any age. Routine meningococcal C vaccination was implemented in 2003 with a resultant decrease in cases associated with serogroup C infection (Figure 13). In SA, the predominant serogroup of *N. meningitidis* responsible for disease remains serogroup B, for which no vaccine is available.

Thirteen cases (no deaths) of invasive meningococcal disease were reported in the second half of 2010, compared with eight for the corresponding period in 2009 (Figure 13).

Twelve infections were due to *N. meningitidis* serogroup B and one due to *N. meningitidis* serogroup C. Cases comprised seven males and six females, with an age range of less than one year to 51 years. In accordance with national guidelines, prompt contact tracing occurred with all cases. Information, clearance antibiotics and vaccination were recommended as appropriate.

**Legionellosis**

Infection with the environmental bacterium Legionella classically causes atypical pneumonia. *L. longbeachae* is found in potting mix and compost and *L. pneumophila* can colonise water sources. Persons with impaired immunity e.g. due to smoking, respiratory or cardiovascular disease, have increased susceptibility to disease.
Nineteen cases of Legionellosis were reported during the second half of 2010, from both metropolitan and rural SA. No links were identified between any cases. Laboratory tests attributed three cases to Legionella pneumophila serogroup 1, one case to L. pneumophila serogroup 6 and 15 cases to L. longbeachae (Figure 14). All cases of L. pneumophila serogroup 1 are referred to Health Protection Programs for environmental investigation.

The L. pneumophila serogroup 1 infection notifications occurred in two males and two females with an age range of 61 to 69 years. Environmental swabs identified L. pneumophila serogroup 1 at the home of one case and the workplace of another case.

Of the 15 cases due to L. longbeachae, ten were male and five were female, with ages ranging from 42 to 86 years and mean age of 67 years. Two cases were without underlying chronic illness or obvious high risk exposure. There was one death due to L. longbeachae in an elderly man with underlying medical co-morbidities.

**Creutzfeldt-Jakob disease**

Classical Creutzfeldt-Jakob disease is a rare progressively fatal prion disease manifested usually by dementia, confusion and motor dysfunction with usual onset in persons over 40 years. The majority of cases are sporadic although cases may be familial or iatrogenic (e.g. associated with administration of human pituitary hormones). The diagnosis is confirmed on autopsy. Variant Creutzfeldt-Jakob disease usually affects a younger age group and frequently begins with psychiatric and sensory disturbances.

In the second half of 2010 there were two notified cases of fatal sporadic Creutzfeldt-Jakob disease, in a female and a male both aged in their fifties.

*These data are provisional and subject to further revision.*
Table 1: Notifiable diseases in South Australia: 1 July to 31 December 2010 and annual comparisons 2005–2010.

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1 Data collected by Sexually Transmitted Diseases Services  
2 Data collected by SA Tuberculosis Services  
3 notifiable since 1 May 2008
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The Managing Editor
Public Health Bulletin South Australia
Public Health
SA Health
PO Box 6  Rundle Mall SA  5000
Fax (08) 8226 7102
Email phbsa@health.sa.gov.au

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For more information

www.health.sa.gov.au
phbsa@health.sa.gov.au
Department of Health
PO Box 6, Rundle Mall, SA 5000
Fax: 8226 7102


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