AUSTRALIAN PRIMARY HEALTH CARE RESEARCH INSTITUTE

CENTRE FOR REMOTE HEALTH – FLINDERS UNIVERSITY & CHARLES DARWIN UNIVERSITY
MONASH UNIVERSITY FACULTY OF MEDICINE, NURSING AND HEALTH SCIENCES
THE UNIVERSITY OF QUEENSLAND

A SYSTEMATIC REVIEW OF PRIMARY HEALTH CARE DELIVERY MODELS IN RURAL AND REMOTE AUSTRALIA 1993-2006

John Wakerman
John Humphreys
Robert Wells
Pim Kuipers
Philip Entwistle
Judith Jones

September 2006

Acknowledgments

The research team would like to acknowledge the Australian Primary Health Care Research Institute and its Director, Professor Nicholas Glasgow, not only for funding the project, but also for experimenting with a novel research approach which has entailed interaction with the other research 'spokes' working on systematic reviews, as well as key Department of Health and Ageing staff, in order to facilitate the research transfer process.

We also acknowledge the expert assistance of Jessica Tyndall, Liaison Librarian at the School of Medicine Library at Flinders University, and the contribution of Lisa Lavey at Monash University.

Finally, we are grateful to the members of our Reference Group for their active and enthusiastic participation. They were Kim Snowball, Chris O'Farrell, Mick Gooda, Alma Quick, Chris Harrington, Gordon Gregory, Brita Pekarsky, Ian Cameron, David Lyle, Raymond Pong and Martha MacLeod.

The research reported in this paper is a project of the Australian Primary Health Care Research Institute, which is supported by a grant from the Australian Government Department of Health and Ageing under the Primary Health Care Research, Evaluation and Development Strategy. The information and opinions contained in it do not necessarily reflect the views or policies of the Australian Government Department of Health and Ageing.

Australian Primary Health Care Research Institute (APHCRI)
ANU College of Medicine and Health Sciences
Building 62, Cnr Mills and Eggleston Roads
The Australian National University
Canberra ACT 0200

T: +61 2 6125 0766
F: +61 2 6125 2254
E: aphcri@anu.edu.au
W: www.anu.edu.au/aphcri

PREFACE

The Australian Primary Health Care Research Institute (APHCRI) funded twelve studies in Stream Four of its research program in order to systematically identify, review and synthesise knowledge about primary health care organisation, funding, delivery and performance and then consider how this knowledge might be applied in the Australian context.

This systematic processing of knowledge will provide a strong basis on which national primary health care policy can be informed, clear insights into important knowledge gaps, and the foundation on which APHCRI can build subsequent streams of activity. The process of Stream Four will encourage interactions between researchers and policy advisers with the goal of increasing the capacity of researchers to respond to policy priorities on the one hand, and increase the capacity of policy advisers to utilise research evidence on the other.

A systematic review is an overview of primary studies which contains an explicit statement of objectives, materials, and methods and has been conducted according to explicit and reproducible methodology (1). Systematic reviews have largely been developed and utilised to determine the effectiveness of clinical interventions. Applying this approach to non-clinical or policy content is a developing field that poses new challenges.

It is important to balance the scope of such a review to make it 'do-able' within given resources and time on the one-hand, and still be useful to its target audience on the other. For example, international literature was excluded from this review because of time and resource limitations, as well as the fact that there are significant differences in rural and remote contexts and existing health systems.
This systematic review focused on material that is available within the public domain, such that readers can follow up on any studies about which they require more specific detail. Importantly the methods are explicit, detailed, rigorous, comprehensive, reproducible and verifiable. While every attempt was made to ensure a comprehensive capture of relevant literature, only publicly available material falling within the inclusion-exclusion criteria was reviewed. Other relevant material is known to exist, including some evaluations undertaken by government, but was not publicly available. The conduct of systematic reviews also has the potential to develop more effective links between policy makers and researchers, especially if the former have some involvement during the review stage and the latter are available to provide interpretation of findings in the policy phase.

Systematic reviews such as this can provide a useful summary and synthesis of available evidence about a specific and defined topic of policy interest. What follows then is the result of a systematic review which has utilised the best available evidence to inform and guide the development of appropriate policy and planning for the provision of primary health care services to small rural and remote communities.

List of Acronyms

ACCHS	Aboriginal Community Controlled Health Service
AHMAC	Australian Health Ministers' Advisory Council
AHMC	Australian Health Ministers' Conference
AMED	Allied and Complementary Medicine Database
APAIS	Australian Public Affairs Information Service
APHCRI	Australian Primary Health Care Research Institute
ATSIhealth	Aboriginal and Torres Strait Islander Health Database
CCT	Coordinated Care Trial
CINAHL	Cumulative Index to Nursing and Allied Health Literature
CME	Continuing Medical Education
CPHC	Comprehensive Primary Health Care
EBM	Evidence based medicine
EPC	Extended Primary Care
GP	General practitioner
HIC	Health Insurance Commission
H&S	Health and Society Database
IM	Information Management
IT	Information Technology
KWHB	Katherine West Health Board
MAHS	More Allied Health Services (program)
MBS	Medical Benefit Scheme
MHW	Mental Health Worker
MPS	Multi-Purpose Services
NRHA	National Rural Health Alliance
NSWRDN	New South Wales Rural Doctors Network
PBS	Pharmaceutical Benefit Scheme
PHCAP	Primary Health Care Access Program
PHC	Primary Health Care
PIP	Practice Incentives Program
RARMS	Rural and Remote Medical Services
RDAA	Rural Doctors Association of Australia
RHSET	Rural Health Support Education and Training
RRMA	Rural Remote Metropolitan Areas
VMO	Visiting Medical Officer
WHO	World Health Organisation

PREFACE 3
BACKGROUND AND RATIONALE 6
THE PROBLEM 6
RURAL HEALTH POLICY SINCE 1993 8
DEFINITIONS 10
MODEL 10
PRIMARY HEALTH CARE 10
OBJECTIVE 11
METHODS 11
FORMATION OF THE REFERENCE GROUP 11
DEVELOPMENT OF THE RESEARCH QUESTIONS 11
THE SEARCH STRATEGY 12
'Black' literature 12
'Grey' literature 14
Methodological limitations 14
RESULTS 17
DISCRETE SERVICES 18
INTEGRATED SERVICES 21
Shared care 22
PHC teams 24
Multi-Purpose Services 24
COMPREHENSIVE PRIMARY HEALTH CARE SERVICES 25
OUTREACH SERVICES 27
VIRTUAL OUTREACH 28
DISCUSSION 30
CONCEPTUAL FRAMEWORK 30
ENVIRONMENTAL ENABLERS 30
Supportive policy 30
Commonwealth - State relations 31
Community readiness 33
ESSENTIAL REQUIREMENTS 35
Workforce 35
Funding 35
Governance, management and leadership 36
Linkages 37
Infrastructure 37
EVIDENCE–INFORMED PRINCIPLES FOR THE DEVELOPMENT OF PHC PROGRAMS IN RURAL AND REMOTE AUSTRALIA 38
Environmental enablers 38
Essential requirements 39
CONCLUSION 41
REFERENCES 43
APPENDICES 58
Appendix 1: Reference group terms of reference and membership 58

Appendix 2: Electronic Database Search Terms 59
Appendix 3: Evolution of inclusion and exclusion criteria 60
Appendix 4: Data Extraction Sheet 62
Appendix 5: Data extraction evaluation supplement 65

BACKGROUND AND RATIONALE

One third of Australia's population lives outside its major cities (2). Of this non-metropolitan population, almost twenty percent is dispersed across more than 1,500 rural and remote communities with fewer than 5000 residents. Collectively these communities have a population the size of Sydney, Australia's largest city. Almost three-quarters of these small communities lie in RRMA zones 5 to 7 – the rural and remote areas furthest from large population centres (2). More than one-third of these small communities are losing population. Many are the very communities in which disadvantage is concentrated and life opportunities most limited (3-5).

People living in rural and remote communities of Australia face significant health disadvantage. Generally, mortality and illness levels increase with distance from major cities (6). Moreover, these communities are characterised by higher hospitalisation rates and higher prevalence of health risk factors compared to metropolitan communities (7-9). These rural and remote communities are further disadvantaged by reduced access to primary health care providers and health services (in part a function of health and medical workforce shortages), leading in turn to lower utilisation rates than in urban areas and consequent poorer health status for rural residents (6).

THE PROBLEM

What does this settlement pattern mean for the provision of health care services? The importance of the distinctiveness of the rural and remote context for health service provision should not be underestimated. In the words of Chenoweth & Stehlik, 'Providing services for people…in rural and remote areas where the population and service infrastructure is sparse presents particular challenges for both government and community sectors. These include additional costs, lack of service infrastructure and service options, transport difficulties and difficulties in recruitment and support of staff in government and community organisations' (10).

In Australia, 'the importance of providing appropriate, sustainable, high quality health care to all Australians, regardless of their socio-economic circumstances or geographical location, is paramount' (11). Recognising that health service delivery is enhanced by rural settlement nucleation, the problems confronting the provision of health care in remote areas where population density is low, settlements small, and distances large are aggravated by problems of isolation, population transience and the high capital costs of infrastructure. Coupled with this is the ongoing difficulty of recruiting and retaining an appropriate workforce.

Variations in the size, composition and degree of isolation of these communities result in considerable differences in the need for, and the abilities to sustain, health services. Often these isolated rural and remote communities are too small to provide local health services required by their inhabitants, so residents must access care from larger urban centres. Unfortunately, access to the services provided in larger centres remains a

problem for many residents of isolated settlements. Their inability to access health services when required, combined with use of sporadic services, results in health needs not being met, lack of continuity of care and an absence of monitoring of the effectiveness of services in terms of health outcomes (6). It is clear that 'models of care in rural and remote areas must differ from those in metropolitan communities, incorporating strategies to account for these problems.' (12).

Given the higher costs of delivering services, lack of economies of scale, and difficulties of staffing services, the question becomes one of how best to provide health care - whether to deliver services to people or people to services. For health authorities and providers of health care services, the sparsely distributed settlements in rural and remote Australia pose particular problems. 'The dilemma … is one of satisfactorily resolving the conflict between ensuring operational efficiency and cost minimisation and at the same time ensuring effective and equitable provision of accessible services' (13). For small communities in particular, the issue of how best to deliver, and enable access to, health services lies at the heart of the provision of effective health care.

In order to take account of the diverse range of health needs that characterise rural and remote communities, and to better meet the changing social, economic and political circumstances affecting most of rural and remote Australia, a range of approaches to the delivery of health and health-related services is required. Some of the approaches will need to be quite different to those that are effective and sustainable in the capital cities.

There have been numerous approaches and models of service delivery implemented and/or trialled in rural and remote areas over the past fifteen years, but there is still a lack of clarity and certainty about what works well, where and why. A number of authors have commented on the failure to garner knowledge through appropriate evaluation of initiatives, in order to enable the establishment of evidence-based service models, sustain and systematise them over time and transfer successful programs to other jurisdictions. Despite a large number of innovative pilot projects in small rural and remote communities, '...there is little systematic knowledge about the extent of innovative practice, a paucity of evaluation of such initiatives and few opportunities to disseminate learning from one area to another' (14). Shannon and co-authors reported that in the published literature on Indigenous health initiatives, 'There has been a repeated search for innovation which results in a high turnover of projects and recycling of ideas, rather than utilising the not insignificant knowledge currently available and properly evaluating its effectiveness' (15). What is required is not '… another round of regional projects, but rather the gathering and dissemination of systematic evidence on what already works in practice and how it can be rolled out to settings where integration is poor' (16).

What is also clearly apparent is that there is no 'one-coat-fits-all' solution to meeting the diverse needs of residents of rural and remote Australia. The range of 'innovative' service models is likely to vary from community to community. What they will share, however, is the ability to deliver accessible and appropriate care efficiently and effectively to meet the primary health care needs of the residents of areas characterised by small, dispersed populations with diverse health needs.

RURAL HEALTH POLICY SINCE 1993

The discrepancies in health outcomes and access to health services between urban and rural dwellers have been of concern in Australia for some time (17, 18). As a result, there has been a renewed and continuing policy interest in rural health at both national and State levels in Australia since the early 1990s, largely focussed at the national level on medical workforce supply problems. A detailed chronology of major national rural health policies in the 1990s and the driving forces and catalysts instrumental in fostering recognition of the need for health policies and programs specific to rural and remote areas have been documented elsewhere (19). The drivers in the early 1990s included advocacy about and recognition of medical workforce problems, and an evolving political landscape that fostered a stronger focus on rural electorates.

From the perspective of rural communities, key assumptions about rural health which have driven the recent policy debate have been:

- a growing body of evidence that the health of the rural and remote population is worse than that of its urban counterparts (6, 7, 20, 21); and
- evidence that the health care resources available for rural and remote populations are substantially less than those available in urban areas (6, 22, 23).

Specific rural health measures became features of annual budgets from the early 1990s. Two important examples were the establishment of the Commonwealth's Rural Health Support Education and Training (RHSET) Program and the Rural Incentives Program (24).

In 1994 the Australian Health Ministers' Conference (AHMC) issued the first National Rural Health Strategy. It was important in setting a cooperative framework between the Commonwealth, States and territories, and focusing policy attention on a number of rural health priorities.

The Strategy was renewed in 1999 with the release of '*Healthy Horizons, a framework to guide the development of health programs and services in rural, regional and remote Australia*' (8). *Healthy Horizons* is a unique rural health policy document in that it is jointly owned by all Australian governments and the key rural consumer and health professional organisations, through their umbrella body the National Rural Health Alliance (NRHA). Governments and the organisations in the NRHA are expected to provide 'achievement' reports against the principles and objectives embodied in *Healthy Horizons*, making it a generic yardstick for accountability purposes.

Since 1999 the Commonwealth has made two major budgetary commitments to rural health: in 2000 (More Doctors-Better Services) and 2004 (Rural Health Strategy) (25, 26). These were mainly a series of workforce measures, principally around the medical workforce, but with some important measures for other health professional groups. In the 2004 Commonwealth budget, 11 of the 15 specific measures included in the Rural Health Strategy related to the health workforce.

The Commonwealth's focus on workforce, particularly the medical workforce, reflects both the shortage of rural doctors (11) and the effective funding levers available to it under Medicare. The States, too, have focussed on workforce measures with some attention to capital and other service infrastructure requirements, including IT support

for rural health services, and some new models of health care, such as support for telehealth (27).

The focus of policy on workforce has already had some positive results. For example, rural and remote GP workforce numbers on a headcount basis have increased over the decade 1995-96 to 2004-05, compared with a decline in urban GP numbers (28). These figures do not take account of the general trend for GPs to work fewer hours and sessions, or of the fact that rural and remote GPs tend to work longer hours on average than their urban counterparts (6). So the change in the availability of effective full-time equivalent GPs is less clear.

Moreover, the almost total reliance on workforce supply measures nationally, with a small number of Commonwealth service delivery initiatives in response to 'market failure' in areas where services were not adequately provided, resulted in very little attention to a cohesive, systematic and comprehensive approach to primary health care service innovation and restructuring. There have been many trials, pilots and demonstration projects to introduce new or sustain existing local services, funded in part through Commonwealth programs such as RHSET. These have generally been *ad hoc* and not part of a broader planning and evaluation strategy that responds to the impact on the rural social fabric of globalisation, increased reliance on market solutions as a policy tool and policy emphasis on individuals being responsible for their own health and welfare (27).

This systematic review of the literature describing 'innovative' rural and remote models of comprehensive primary health care has been conducted in this context of urban-rural social and health differentials, and policy responses thereto.

DEFINITIONS

In this review, we frequently refer to 'models' and to 'Primary Health Care (PHC)'. These are defined as follows:

MODEL

The term 'model' is used to summarise complex relations within the real world. A model is always a simplified description of the real world, because it is designed to highlight only selected properties of a system and their inter-relationships. For the purpose of this review, the term model is used to capture the fundamental structure of primary health care services in rural and remote settings. It describes the principal interactions and relationships between the service components, and includes information about the organisation, distribution and utilisation of resources within the system.

PRIMARY HEALTH CARE

'Primary Health Care is essential health care based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community and country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination. It forms an integral part both of the country's health system, of which it is the central function and main focus, and of the overall social and economic development of the community. It is the first level of contact of individuals, the family and community with the national health system bringing health care as close as possible to where people live and work, and constitutes the first element of a continuing health care process' (29). We recognise that few services demonstrate all aspects of comprehensive PHC. This WHO definition is used not to exclude PHC service models that do not incorporate all these aspects, but to include those that display at least one or more of these aspects. For example, most PHC services in Australia involve general practice as a significant component.

OBJECTIVE

The objective of the research was to systematically review the available published literature describing innovative models of comprehensive primary health care in rural and remote Australia since the development and publication of the National Rural Health Strategy.

METHODS

In summary, the methods involved formation of a reference group to assist in guiding the study. The original research questions were refined in consultation with the reference group. Inclusion and exclusion criteria, which would determine the scope of papers retrieved and analysed, were defined in an iterative fashion, informed by the nature and volume of papers retrieved and in consultation with the reference group. Both published papers identified through a detailed electronic database search strategy and 'grey' literature (unpublished papers and other reports) were included. Data were extracted from the final group of papers that satisfied the inclusion criteria and analysed.

FORMATION OF THE REFERENCE GROUP

To assist in the development of this project and provide feedback a reference group was formed. This consisted of eleven recognised experts in aspects of rural and remote health, health economics, consumer issues, evaluation, PHC service provision and policy making at federal, State and territory levels. Included in the team were two health services researchers from Canada. All reference group members were sent project briefing material, terms of reference and project outputs. The Australian members attended two face-to-face meetings in Canberra. The Canadian members participated by separate teleconferencing and email, with one involved in direct discussion during a visit to Australia. The Terms of Reference and membership are listed at Appendix 1.

DEVELOPMENT OF THE RESEARCH QUESTIONS

The research questions were developed by the team in conjunction with the reference group. The questions were refined iteratively as the research developed. Table 1 documents the changes and rationale. The final questions (second change) are listed in the right hand column of the table, and are reproduced below.

1. What have been the key (i) remote and rural PHC models and (ii) policy changes in Australia since the National Rural Health Strategy, and what specific structural or financial issues have they addressed?
2. What were the barriers to and facilitators of the successful implementation of key PHC reforms affecting rural and remote health issues?
3. What are the characteristics of appropriate PHC service models for rural and remote Australia?
4. What are the evidence-informed principles and guidelines that can inform development of effective and sustainable PHC service models in rural and remote Australia?

THE SEARCH STRATEGY

The search for publications identified from electronic databases ('black') and other ('grey') literature was divided across two research sites based on familiarity with specific literature. The Victorian site at Bendigo focused on 'rural' publications. The Northern Territory site at Alice Springs concentrated on 'remote' literature.

'Black' literature

For the published peer-reviewed literature, a systematic search was carried out of databases likely to contain relevant data for the project. This search was assisted by the Liaison Librarian at Flinders University School of Medicine. Databases searched were Medline, CINAHL, EBM Reviews, and AMED through the metadatabase OVID, APAIS-Health, ATSIhealth, H&S, Meditext and RURAL through the metadatabase INFORMIT, and EMBASE. The search terms were developed by the team in consultation with the reference group and underwent a number of refinements during the search process to 'fine tune' extraction of relevant abstracts. Appendix 2 lists the search terms.

Table 2 shows the final inclusion/exclusion criteria which defined the scope and number of publications reviewed. These criteria were refined in an iterative process once the search had commenced. Appendix 3 details these changes to the criteria as papers were being reviewed and the rationale for the changes.

Table 1. Evolution of the research questions

Original Questions	Revised Questions First change 21st Nov.	Revised Questions Final change 14th Dec.
1 ***What have been the significant remote and rural PHC reform initiatives and models in Australia since the National Rural Health Strategy, and major reforms internationally, and what specific structural or financial issues have they addressed?***	1 ***What have been the significant (1) remote and rural PHC models and (2) policy reform initiatives in Australia since the National Rural Health Strategy, and what specific structural or financial issues have they addressed?*** Rationale for change: • Add model and policy reform to make question more specific	1 ***What have been the key (1) remote and rural PHC models and (2) policy changes in Australia since the National Rural Health Strategy, and what specific structural or financial issues have they addressed?*** Rationale for change: • Significant to key as pertains to the documents having the most impact • Changes replaces reform initiatives as a more neutral term • Changed in discussion with reference group
2 ***What have been the quality and appropriateness of evaluation methods – how well do they elucidate what works well, where and why - applied to these initiatives based on expected health outcomes or program objectives?***	This question removed Rationale for change: • Seen as a separate project that needs to be addressed another way	
3 ***What were the barriers to and facilitators of the success of PHC reforms addressing key rural and remote health issues?***	2 ***What were the barriers to and facilitators of the success of PHC reforms addressing key rural and remote health issues?*** Unchanged	2 ***What were the barriers to and facilitators of the successful implementation of key PHC reforms affecting rural and remote health issues?*** Rationale for change: • Indicates a focus on implementation of policy rather than a systematic review of policy changes
4 ***What are the evidence-based principles and guidelines that can inform development of PHC policy and implementation of sustainable programs in Australia?***	3 ***What are the evidence – informed principles and guidelines that can inform development of PHC policy and implementation of sustainable programs in Australia?*** Rationale for change: • Changed from evidence based to informed to more accurately reflect the policy process which is evidence informed rather than evidence based	3 ***What are the characteristics of appropriate PHC service models for rural and remote Australia?*** Rationale for change: • Questions 3 and 4 reversed to reflect a more logical progression – changed in discussion with reference group
5 ***What are the characteristics of appropriate PHC service models for rural and remote Australia?***	4 ***What are the characteristics of appropriate PHC service models for rural and remote Australia?*** Unchanged	4 ***What are the evidence – informed principles and guidelines that can inform development of effective and sustainable PHC service models in rural and remote Australia?***

Figure 1 summarises the selection process. A total of 3830 non-duplicate 'rural' titles and abstracts and 1561 'remote' non-duplicate titles and abstracts were read. All 'rural' and 'remote' abstracts were independently read by two reviewers. There was an 80% concurrence between readers of the 'remote' abstracts based on a sample of 324 abstracts. The 'remote' reviewers used a 'revealed preferences' approach whereby all assessments on which there was not agreement were discussed by the two reviewers in the context of the inclusion and exclusion criteria. In all cases, agreement was reached. For the 'rural' abstracts, whenever there was uncertainty about an abstract's relevance, they were discussed and then classified. Where a decision could not be reached on the abstract alone, the full paper was retrieved for consideration.

As a result, 111 'rural' papers and 113 'remote' full papers were retrieved. Nine rural papers could not be retrieved due to inaccurate or incomplete citations.

Following this process 35 'rural' papers and 96 'remote' papers were further discarded as, in contrast to the abstracts, the content of the full papers did not satisfy inclusion criteria.

All 'remote' papers discarded at this stage were read by a second reviewer. There was discussion and agreement by two reviewers about one paper which was re-instated. The remaining 76 rural papers and 17 remote papers were read and data extraction forms (see Appendix 4) were completed. Data were then assessed for quality and relevance (see Appendix 4). While quality was a consideration, it was relevance rather than quality that was adopted as the principal decision criterion for inclusion.

'Grey' literature

A more pragmatic approach was required in the selection of grey literature. Relevant material was identified from works already known to the researchers, to the reference group, from references listed in the black literature and from searches of websites of government departments, workforce agencies, professional associations, universities and similar organisations. Where a model was known but little information could be found in the black literature (such as the 'fly-in, fly-out female GP' model), additional material was sourced from internet searches using key words relevant to the particular model.

A total of 59 items of grey literature were retrieved as full documents for 'rural' and 47 for 'remote'. Of the 'rural' documents, 49 dealt with models of service delivery. A further eight contained context-relevant information and two did not meet the inclusion criteria. Of the 47 'remote' documents, 19 met the inclusion criteria. These data were extracted onto the standard data extraction sheets (Appendix 4). For evaluation studies, an additional data extraction sheet to facilitate extraction of evaluation data was utilised (Appendix 5). The full list of documents reviewed follows the 'Conclusion' section of the report below.

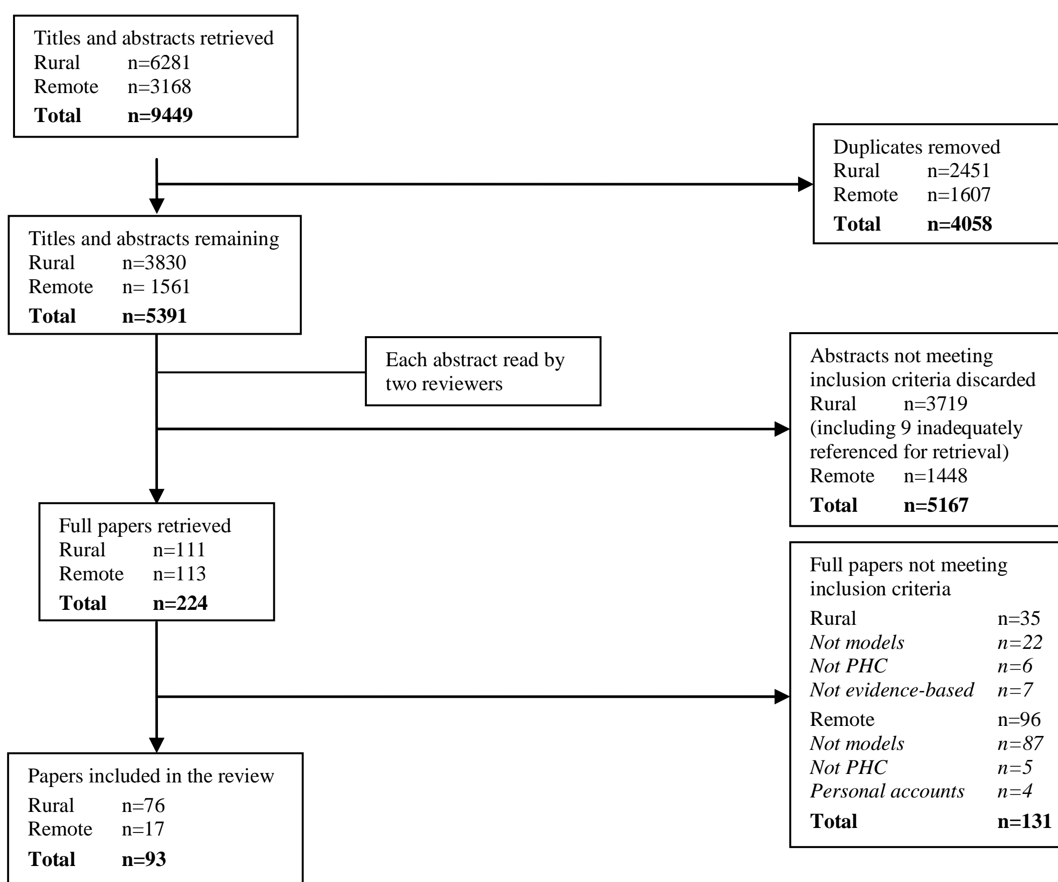
Methodological limitations

The overall scope of the review was limited by the initial terms of reference specified by the Australian Primary Health Care Research Institute for the study and the resources available. Exclusion criteria resulted in a number of salient issues not dealt with by this systematic review. For example, consideration of the impact of government policy outside the health sector (e.g. immigration policy and its impact on international medical graduates) was outside the scope of this review, as was the impact of education and training initiatives. Similarly, the effect of initiatives by professional groups, such as nurse practitioners, on rural and remote workforce supply was not considered within this systematic review.

Table 2. Inclusion and exclusion criteria

CRITERIA	INCLUSION	EXCLUSION
Time period	• 1993-2005	
Language	• English	
Place of study	• Australia	
Geographical delimitation	• Rural or remote	• No relevance to rural or remote
Aspect of health care	• Comprehensive primary health care model or component thereof	• Secondary or tertiary health care (unless specifically articulated or supporting primary care)
Objectives 1. What structural and financial issues are addressed? 2. What are the barriers to and facilitators of success 3. Characteristics of appropriate models 4. Evidence-informed principles or guidelines	• Identifies or addresses some specific structural or financial aspect of primary health service provision • Identifies reasons for success or failure leading to models uptake or sustainability over time • Some primary or secondary evidence base underpins research or statement • Key structural and financial characteristics are explicitly identified, considered or evaluated	• Problem description (not based on any evidence or intervention) • Descriptions of individual professional groups or activities (not models or systems)
Other		• Clinical intervention or trial • Education and training initiatives which do not inform a PHC service delivery model in a direct way.

Figure 1. Selection process for inclusion of papers in systematic review



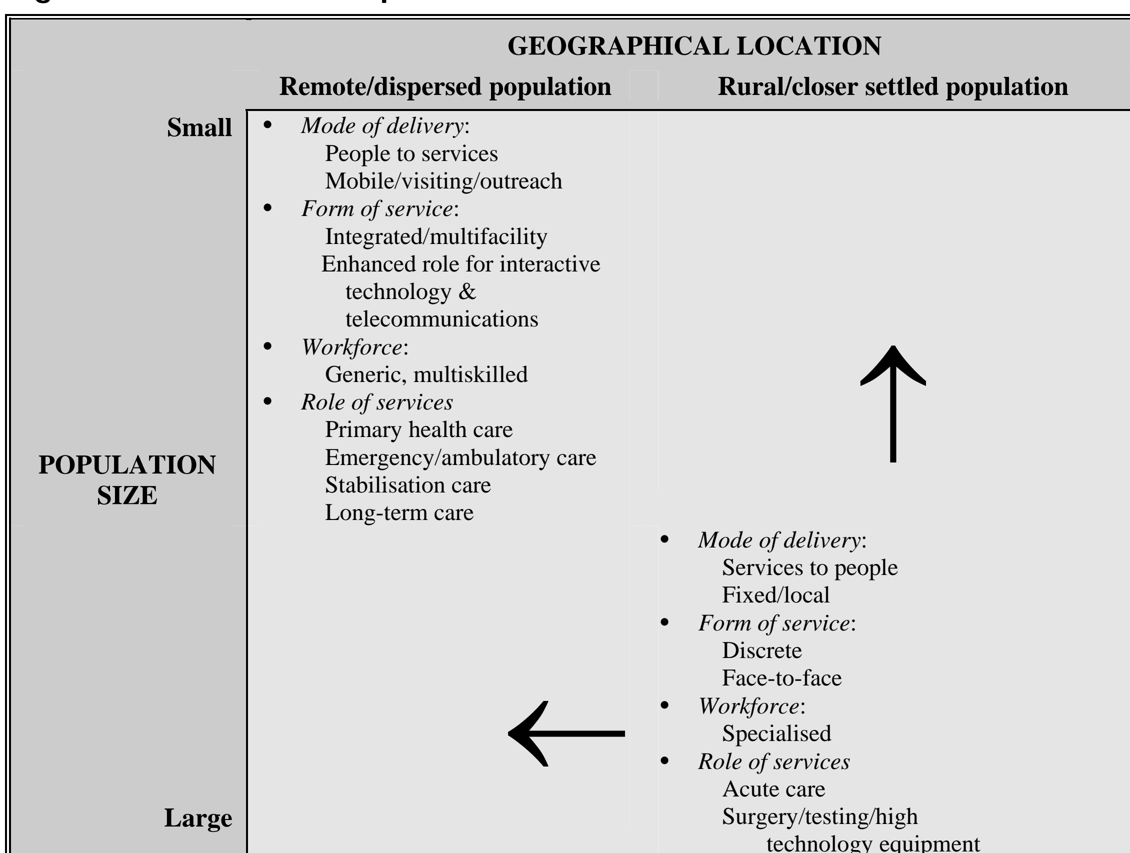
Another limitation was the fact that analyses of emerging initiatives, take some time to enter the literature, but were not available for review, although the reviewers may be aware of the issues involved. For example, some innovative primary health care models are currently being piloted (and in some instances considered to be successful) but have not yet been documented in the available literature.

A significant issue related to the difficult question of what is 'documented' (that is, initiatives described and discussed within the available 'black' and 'grey' literature) and what is 'known'. For example, one 'successful' initiative was documented but was known to have later failed. The reasons for the failure remain undocumented. Given that the study methods were confined to document review and, in the absence of data accounting for model failures, success factors must be assessed in relation to the documented period of a model's existence. It is not always possible to assess sustainability over time.

RESULTS

Review of the papers and reports derived from the search allowed the team to differentiate models into five broad categories, each with a different rationale and addressing particular sentinel issues. Generally the different categories of models apply to different geographical contexts, with a notable association with population size, and remoteness. While larger rural communities are generally able to support a greater variety of local, discrete, often more specialised health care services, increasing remoteness and diminishing population size constrain service model options and increase the impetus for the development of more integrated and comprehensive primary health services in order to maximise the economies of scale and use of existing health workforce.

Figure 2. Service model options within the rural-remote context



(Source: JS Humphreys, 2002: Health service models in rural and remote Australia, *in* D. Wilkinson & I Blue, *The New Rural Health: An Australian Text*, Oxford University Press, 273-296).

Figure 2 illustrates the association of service models with rural and remote context. More discrete services in larger, more closely settled towns are in the bottom right hand quadrant, moving through to a greater reliance on travel to services and outreach services in smaller, more isolated settlements in the top left hand quadrant.

This categorisation of models is not intended as a prescriptive template, nor are the categories mutually exclusive. Rather, it provides a useful typology that allows us to explore the features and applicability of these models to different contexts within rural and remote Australia. The five broad groupings are: Discrete Services, Integrated

Services, Comprehensive PHC Services, Outreach and Virtual Outreach. These are summarised in Table 3 and described below.

DISCRETE SERVICES

'Discrete' primary care services are delivered from an identifiable site located in the community they serve. Whilst a discrete service may be part of a broader integrated service (30), its primary purpose is to sustain a general practitioner service in situations confronting significant difficulties in recruiting and in retaining an adequate GP workforce in rural and larger remote communities. It accomplishes this through ensuring attractive practice opportunities for doctors and continuity for the community when doctors leave. For university practices there is the additional purpose of increasing workforce supply through providing placements for medical students and registrars, and possibly other health professionals.

There are several types of discrete models. The best-documented exemplar of this type of model is the *Easy Entry, Gracious Exit* model developed by the NSW Rural Doctors Network (31, 32). *University clinics* (33-36) are similar to the walk-in/walk-out models in that they focus on salaried GP positions. In contrast, a national study of viable models of rural and remote general practice proposed viable models that focus on ways to fund sustainable rural medical services through private general practice (37).

The viable models proposed have not been implemented or evaluated. Table 4 provides a summary comparative description of the three types of models.

The *Easy Entry, Gracious Exit* and *university clinic* models use community or university investment in practice capital items and infrastructure to attract doctors who wish to be free from practice management and ownership responsibilities. Such arrangements provide continuity for the community even after the doctor leaves, as practice premises and patient records, along with employment of practice support staff, remain under some form of community or university ownership and control.

These models are characterised by the ownership of practice premises and the practice business by a community and/or university entity which employs practice staff (32, 71). Doctors are contracted under various combinations of salary, percentage of billings, registrar positions and incentives such as housing and a vehicle. There is investment in infrastructure, including IT infrastructure, to provide premises which reach accreditation standard, to facilitate improved clinical and business management, and to provide continuity when GPs leave (38, 39). Practice governance is through a local Board of Management which may include the university and other agencies.

The 'Easy Entry, Gracious Exit' model

The 'Easy Entry, Gracious Exit' model was developed in the Shires of Walgett and Brewarrina in north west New South Wales in 2000 to address the chronic undersupply of doctors in this area. This area is characterised by high levels of socio-economic disadvantage and the lowest health status in NSW. Although several agencies were responsible for different aspects of health service provision in the region, there was no agency with overarching responsibility. The NSW Rural Doctors Network (NSWRDN) initiated meetings of significant stakeholders and community members in order to address the problem. Through planned action of all parties with some responsibility for health services in the region, a strategy of walk-in/walk-out arrangements was initiated to overcome the barriers known to deter doctors from taking up practice in the area. These included capital investment or lease commitments, the requirements of running the business side of the practice and the fear of becoming trapped due to exit difficulties.

A non-profit company, Rural and Remote Medical Services Ltd (RARMS) was created by the NSWRDN in 2001 to establish the walk-in/walk-out arrangements.

Enablers of the model included community commitment to finding solutions and local champions to drive the change to community ownership. In addition, the willingness of Commonwealth and State agencies to negotiate contracts of service to cash out some services enabled a reliable income stream from which RARMS could make more specific income estimates for prospective doctors. Initial Commonwealth grant funds enabled the provision of practice equipment and furnished doctor housing. More recently the Rural Medical Infrastructure Fund has supported the model.

Adoption of the model has resulted in more doctors (4 in 2001 to 8 in 2003) and an increased range of medical services available in the region, with increases in both public health and Health Insurance Commission (HIC) activity noted. Community confidence in the availability and continuity of services has increased, as have opportunities for local employment, particularly for practice nurses.

The Commonwealth Department of Health and Ageing funded RARMS to produce a guide for rural communities to design and implement a similar approach (38). Variants of the model have been developed by ten new General Practice Employment Entities in rural NSW (32). The RARMS model continues to evolve, so that questions of sustainability concern its ability to 'flex' with changing conditions and opportunities rather than the endurance of one fixed model.

Table 3. Typology of rural and remote models

CATEGORY	HEALTH SERVICE MODELS	RATIONALE/ SENTINEL ISSUE	REFERENCES TO EXEMPLARS
Discrete Services	• Walk-in / Walk-out (RARMS) • Viable models/sustainable models • University clinics	***Sustainable*** medical ***workforce*** (getting GPs into rural services)	• Easy entry/ gracious exit (32, 38, 39) • RDAA/Monash Viable Models Project (37), WA Wheatbelt (40, 41) • Cessnock (35, 42), Whyalla, Minlaton, Maitland, Roxby Downs (33, 34)
Integrated Services	• Shared care (4) • Co-ordinated Care Trials (CCTs - mainstream) • PHC teams (multidisciplinary) • Multi-Purpose Services Program	***Coordination*** between and ***access*** to services otherwise not available locally or not sufficient	• Tasmania • Eyre Peninsula (43), • Griffith Palliative Care (44-46), NSW Central West (47), SA Southern Region (48) • A/G's review (49), Upper Murray HCS (50), Corryong (51) Evaluations (52, 53)
Comprehensive PHC Services	• Aboriginal Controlled Community Health Services (including Aboriginal CCTs)	Primary focus on improved ***access*** to services	• KWHB (54, 55), SHSAC (56), Tiwi Health Board (57-59), Urapuntja Health Service (60).
Outreach Services	• Hub-and-spoke • Visiting/periodic services • Fly-in, fly-out	***Access*** to service for communities too small to support discrete rural service. A secondary driver relates to sustainable workforce	• NW Allied Health (61, 62) Northern District Community Health, Darling Downs (63) • Eyre Pen. (64), Far North SA (65),
Virtual Outreach Services (IT/Telehealth)	• Virtual amalgamation • Virtual clinics – video pharmacy/assessment & monitoring • Telehealth/telemedicine	Use of IT to increase ***access*** to and ***sustain*** service for communities too small to support discrete rural service	• Whyalla (66, 67), Eyre Pen.(68), Chiltern-Beechworth (69, 70)

Multiple sources of financing are identified and pooled to create a more predictable revenue flow, additional GP positions and improved retention (32). These include Medical Benefits Scheme (MBS) items, contracts for cashed-out Visiting Medical Officer (VMO) services to hospitals, public health activity or teaching roles (38). Doctors have an increased capacity to provide self cover for shared on-call and after-hours work. Locum arrangements for leave and continuing medical education (CME) activities are guaranteed by the employing entity (32). Adequate premises and Extended Primary Care (EPC) activity provide a platform for linkages with other providers and development of coordinated services, as well as student placement and registrar opportunities (35, 38).

Table 4. A comparison of the three types of discrete general practice models

	Easy entry-gracious exit	University clinics	Viable models study
Workforce	Recruits from larger pool due to limited investment requirement. Expanded GP role provides additional positions so can provide self-cover for after hours and on-call work.	Expands workforce through training role and registrar positions. Self-cover for after hours and on-call work. GP as team leader in integrated services.	Retention improved through improved income and sustainability. Registrar positions improve supply. Collaboration between practices to share after hours and on-call work.
Funding	Cashing out of VMO services, population health activity, EPC items, other Medicare and Retention Grants fund bulk-billing service.	Expanded Medicare, EPC items, academic teaching and training work fund bulk-billing service.	Fee for service funded through Medicare (with rural loadings) and patient co-payments, VMOs work under State awards, Retention Grants. Possible teaching roles, locum subsidies.
Governance, management & leadership	Community, agencies (eg Division, Area Health Service, Workforce Agency) represented on Board. Professional business management.	University, agencies, some community representation on Board. Professional business management.	Legislative and College-based through accreditation and credentialing. Strategic business plan, professional business management.
Linkages	Provides a platform for integration. Strong community & other linkages as above. Enables EPC activity	Integration provides opportunities for interdisciplinary training. Enables EPC activity.	Integration limited. Coordination supports EPC. MAHS funds support, but allied health workforce shortages not addressed.
Infrastructure	Community ownership through Rural Medical Infrastructure Fund, local government, PIP, Area Health Services. Collocation with hospital or community services.	University and community ownership through Commonwealth & State funds for capital works, with PIP, Area Health Services and private enterprise investment (eg Western Mining Corporation in Roxby Downs (34)). Co-location with hospital or community services.	Community or 3rd party landlords or, GP ownership with some government-guaranteed investment return. Infrastructure fund to purchase practices that cannot be sold on the open market. Public rural practice infrastructure fund that pays a guaranteed return funded through practice rent.
Works best where…	Community has difficulty in recruiting and/or retaining a private general practitioner. Population has limited capacity to pay fee for service.	Community cannot support sufficient general practitioners to meet its needs. Patient population agrees to student involvement in treatment.	Existing private practice lacks long term sustainability. Population can support some level of co-payment.

INTEGRATED SERVICES

The model types in this category offer a range of integrated primary health care services from sites located in the communities they serve. The scope is broader than just general practitioner services, but may include coordination with general practitioner services. The purposes of integrated services are (1) to provide single point access to a range of integrated services; (2) to provide sufficient numbers of health professionals to provide mutual professional support; and (3) to deliver services in accordance with the principles of primary health care.

The main driver is that the community lacks access to a range of allied health and specialist services in a coordinated, single point of access form, although the population is sufficient to sustain such a service. There is also a commitment by policy makers and agencies to restructure services along primary health care principles.

The 'Integrated Services' category includes a number of different models. The shared care model of mental health service provision addresses issues of access to and co-ordination of services across primary and specialist care. The Multi-Purpose Services (MPS) program provides a specific model of Commonwealth/State co-operation. These two models are described in further detail below.

Integrated service models emerge from a community health service or allied health team approach to primary health care services. Services are delivered by multidisciplinary teams of health professionals, including GPs in some instances. There are varying degrees of intra- and inter-sectoral integration. These might entail strategies such as co-location, cross-referrals or full seamless coordination of services across professional boundaries. Health professionals may be independent but operating within a service agreement, as in some Multi-Purpose Services (MPS) (72), or all may be employees of the same agency, as in rural health teams (65). There may be a common set of procedures, protocols, assessments and recording forms, or there may be mutual recognition of those of each agency by the other agencies involved (73).

Shared care

The burden of mental illness in Australian society is a national priority. The *National Survey of Mental Health and Well Being* (1997) found that almost one in five Australians aged 18 years or over met the criteria for a mental disorder at some time during the 12 months prior to the survey. Alarmingly, only 38% of those surveyed with a mental disorder had accessed health services.

For services to provide a mental health intervention spectrum that includes a focus on prevention, treatment and maintenance requires integration between inpatient and community-based services, and between specialist mental health care and primary health care. This is especially difficult in rural and remote areas where workforce is limited and service sites and target populations are dispersed (74). The drivers of rural mental health service models are improvement in access to, and co-ordination of services. The 'shared care' model lends itself well to meeting these requirements.

Considerable debate surrounds the term 'shared care'. In essence shared care (sometimes termed 'integrated primary care' or 'stepped collaborative care') refers to 'a team approach to care, with both primary and secondary care practitioners contributing to elements of a patient's overall care package, communicating effectively and working together to make that patient's pathway through the system as smooth as possible' (75).

Typically the model is designed to facilitate shared care arrangements between primary care providers and specialist services. In the case of mental health, it includes a strong education and training program to support primary care clinicians in delivering care to patients with milder or uncomplicated mental health problems, whilst specialist services provide care to patients with severe and complex disorders.

Shared care models not only enhance local availability by extending mental health interventions to a larger population of rural residents, but also provide a smoother patient pathway by facilitating progress of patients through what can be for rural residents a complex, fragmented and often inaccessible health care system. Moreover, while it increases the ability of primary health care professionals to tackle the problem at the 'front end' so that increased preventive interventions result in improved health outcomes through the pooling of scarce expertise, it also facilitates additional support for high-need patients. For the provider this model results in improved working

relationships, fewer call-outs for extended hours workers, reduced consultation rates in primary care, fewer in-patient admissions and earlier discharge, and increased family and home-based care. Some evidence exists to show that the model is relatively cost-effective and that increased flexibility in funding arrangements allowed providers to work outside conventional boundaries.

Barriers to the implementation of the shared care model include some initial reluctance of GPs to participate, an inadequate understanding of primary-secondary cultures, some confusion about roles and responsibilities and the need to clarify pathways of care, lack of formal training in mental health among primary care providers, and the need to enhance communication between primary and secondary providers. Ongoing problems include the lack of comprehensive evaluations of their cost-effectiveness and improvements in quality of clinical outcomes, issues associated with recruitment of workforce and problems of back-fill, and the sensitive nature and stigma often associated with mental health.

A primary mental health care model in rural Tasmania

"As there is currently very little research on the effectiveness of different service delivery models in rural areas, this study is important in that it has been able to establish that a mental health service that was local to clients in a rural setting was generally more effective at resolving psychological disturbance than services outside the community" (76).

This model evolved in response to a high suicide rate in an area characterised by inadequate treatment for mental illness. The model was designed to increase the availability of specialist mental health service providers in the area and to provide support to assist rural GPs in the delivery of mental health services. A shared-care arrangement between GPs and a psychiatric nurse was established to provide a free, local, confidential and effective counselling service.

The model employs a Mental Health Worker (MHW) in a rural general practice. The MHW conducts regular tutorials and case conferences with the GPs to improve their counselling skills; assists other local primary health care workers to identify, refer and counsel people; educates community groups and individuals about mental illness and the help available; educates and liaises with other counselling services; provides one-to-one counselling for patients; and conducts research into the prevalence of mental illness in the area.

Patients may self-refer to the MHW for counselling. They receive local assessment and local counselling where appropriate, as well as referral to the GP for ongoing care and to a psychiatrist or other agencies as appropriate. Importantly, the opportunity to self-refer to a local counsellor with a short waiting list allowed patients to make early use of the counselling service.

The model demonstrated an inexpensive way to advance community awareness and improve care for patients and their families. It also provided education and support to the GPs in treating mental health problems and increased their retention rates. Doctors reported an increase in their ability and confidence in diagnosing and treating common mental health problems; an increase in patient willingness to discuss mental health and to be referred; a decrease in levels of stress and isolation in dealing with mental health problems; a preference for case-conferences and 'corridor consultations' about specific patients; and an increase in the numbers of patients who reported that they would seek help from a GP, social worker or MHW for depression. A comparison study suggests that the model of a locally available mental health worker may have been more effective than no treatment or treatment as usual.

Critical enablers include a strong focus on education and training to support primary care clinicians, a mechanism for collaboration between primary care and specialist services, the availability of skilled specialists and local community mental health workers, and engaging all players early to ensuring collective ownership, trust, and good communication is established. The importance of an organisational structure to support liaison between health workers should not be underestimated, and some cultural and structural changes may be required within the existing health system.

PHC teams

An interdisciplinary team structure can facilitate communication, support and peer review (65). Improved integration can enhance workforce recruitment and retention and result in health service delivery more closely aligned with PHC principles (65).

A good example of this type of model is the **Port Augusta Hospital and Regional Health Service** in South Australia (65). Reorganisation of the service into thematic, multidisciplinary teams allowed a better primary health care approach and peer support. Management is through team leaders rather than through discipline-based hierarchies. Accountability for the Community Health Services Division has shifted from the medical superintendent of the hospital to a Director of Community Health Services and through to the CEO for the hospital and regional health service. Workforce supply issues were addressed through offering bursaries to final year students in exchange for service commitments, providing student placement opportunities and using inter-agency agreements to fund positions within the service, creating more attractive and sustainable positions to which it was easier to recruit.

Multi-Purpose Services

The Multi-Purpose Services (MPS) program is a joint activity involving the Commonwealth and the various State and territory governments. MPSs address the issue of an insufficient catchment population to sustain separate acute hospital, residential care, community health and home care services (generally from 1,000-4,000 persons), and an inability to access the mix of health and aged care services appropriate to local needs. Its purpose is to improve the quality of, and access to integrated health and aged care services in small rural communities.

Commonwealth funds for aged care and State government funds for other identified health needs are pooled for use by a single, integrated service, with the flexibility to reallocate resources according to local priorities and changes in needs (49, 50, 52, 77, 78). The services provided by a MPS may include residential aged care, acute care, community and allied health, rehabilitation and health education. Commonwealth payments are formula-based, taking account the numbers of places and care packages provided on a daily basis (49). There is a separate tripartite agreement for each MPS, between the Australian Government, State government and the MPS auspice (49), with a single, local management structure across all integrated services, enhancing community involvement and efficiency (50, 79).

Evaluations of MPSs have pointed out the need for the identification and collection of data for appropriate indicators for long term sustainability, but as yet the published literature does not provide any evidence of this (49, 52).

An exemplar MPS is the **Upper Murray Health & Community Services.** This service has increased access to services as evidenced by an increased range of services and increased utilisation relative to that available to the community before the establishment of the MPS (50, 52). In this model, medical services are provided by salaried GPs (51). Integration and service coordination have been promoted through point of entry advocacy, standardised multi-disciplinary assessment and outcome-based care planning and care coordination, including coordinated treatment and service planning (50).

COMPREHENSIVE PRIMARY HEALTH CARE SERVICES

Primary Health Care (PHC) as originally described in the Alma Ata declaration has become known as Comprehensive PHC (CPHC) in order to distinguish it from Selective PHC (80) and primary medical care, which are also often referred to as PHC. The Aboriginal Community Controlled Health Services (ACCHSs) in Australia have utilised CPHC as their model of health care delivery over the past 30 years, and provide some of the best examples of this model.

The main purpose of these CPHC services has been to improve health outcomes through improved access to services and through addressing underlying social determinants of health. The main drivers for the development of these services have been (1) poor access due to inadequate funding of services and low availability, as well as low acceptability of mainstream services to Aboriginal patients, (2) the relatively poor health status of the Aboriginal population and (3) a desire for community control of these services.

CPHC services are broader in their scope than most 'Integrated Services' models. They include primary clinical care, preventive and health promotion activity, as well as an education and development element in relation to workforce training and governance/ community capacity building (81).

They are characterised by a governance structure controlled by the community, with governance training allocated both priority and funding, and a management structure accountable to an elected health board. These health boards:

> '...created Aboriginal organisations with legitimacy and resources sufficient to enable them to mobilise collaborations between community agencies and institutions (schools, local councils, housing associations, etc) on matters of priority as well as to engage with the many other external agencies and departments which provide services within the communities' (81)

There were a number of critical enablers documented in the literature. One enabler was enhanced funding through the 'cashing out' of Medicare Benefits Scheme (MBS) & Pharmaceutical Benefits Scheme (PBS) funds, thereby allowing enhanced service provision (55). Financing flexibility allowing for responsiveness to local needs was achieved through funds pooling (55, 57-59). There was also a single reporting mechanism with agreed objectives, thus increasing efficiency, and appropriate IM/IT infrastructure. The services have a defined service population with common language or cultural links and a regional or sub-regional structure. This regional approach is also reflected in a number of planning studies reviewed (82-89).

There are a number of longstanding ACCHSs in urban, rural and remote areas. Because they have been extensively evaluated, the best documented remote exemplars include Katherine West Health Board (55) and the Tiwi Coordinated Care Trial (57-59). There are also a number of other remote PHC services which are less well documented (56, 60).

The Katherine West Health Board

The Katherine West Health Board (92) exemplifies the Aboriginal Controlled Community Health Service model. KWHB has an elected board of governance with representatives from each of the communities it services. It delivers a range of clinical and preventive programs and finances its operations from a funds pool derived from NT and Commonwealth funds, including MBS and PBS 'cashout'.

Early in 1997 Territory Health Services carried out community consultation in the Katherine West Region to ascertain the level of community support to participate in the first round of Coordinated Care Trials (CCTs). In July 1997 the Katherine West Coordinated Care Trial was approved and on 3rd February, 1998, KWHB became an incorporated body, commencing its operations on July 1st, 1998, the so-called 'live phase' of the trial.

A strong feature of the KWHB CCT was the time and resources that were necessary to prepare and establish critical community and service structures. Prior to the 'live phase' considerable effort was expended in building a sound foundation of community support and participation. Intensive consultations with community members and leaders ensued:

It took a long time, the whole consultation phase was about eight months and I'd say six of those eight months the communities held coordinated care at a distance (Marion Scrymgour) (92).

A second priority in preparation for the trial was governance training for the board. If genuine community control was an objective, then a serious commitment to increasing the knowledge and capacity of the board was considered essential. A consultancy firm, Pangea Pty Ltd, was employed to carry out the training. This was an important factor in the success of the organisation.

Over the years of the Trial, the cultural mediation practiced by Pangea and the Board under the name of 'training' turned out to be invaluable. (92)

By late 1999 the Katherine West CCT was in a position to reach its full potential (92) and the board produced a three phase strategy for operations. The objective of the first stage was to upgrade the clinics to provide a reasonable level of health service delivery, including the employment of GPs based in the communities, and an increase in numbers of nurses and Aboriginal Health Workers. Phase two involved increasing public health services. A nutritionist and environmental health officer were employed. There were insufficient funds to employ dental and mental health personnel. However the services employed allowed tripling the amount of time specialist staff could spend in the communities.

While still inadequate given the level of need, it was now at least possible to 'get some traction' in implementing community based programs to address these issues. (92)

Phase three of the strategy was to increase the number of clinical and non-clinical community based workers. However, sourcing sufficient funds proved difficult. The funds pooling mechanism was in theory to provide an adequate and reliable fund which

could be utilised flexibly by communities in line with their health priorities. However, despite the improvements in workforce numbers, expansion of public health activities and recognition as a successful remote area service, KWHB had insufficient funds for a full range of PHC activities to meet the high level of need in the region (92).

OUTREACH SERVICES

Outreach models are characterised by the periodic supply of services from one location which has services to other locations which do not. The arrangement may be either centrally located services providing services to satellite communities (90) or some other visiting arrangement, for example a GP resident in one community may visit a second community for short periods, or services are supplied on a fly-in fly-out basis.

Outreach services characteristically serve areas of diminished population density. The main driver is lack of availability of and access to health services in small, isolated communities. Outreach services are designed to improve access to health services for widely dispersed and isolated populations in a sustainable and efficient manner. They often co-exist with other model types, such as integrated and comprehensive PHC services.

Outreach services are commonly provided utilising a 'hub-and-spoke' model, whereby services are routed through a central hub to their respective target areas (spokes) (62). An exemplar of this model is the North West Queensland Allied Health Service (61). A similar, modified version of this model has been used in allied health service planning in the Northern Territory (91).

The key features of this model included an emphasis on planning, with extensive community consultation, and effective management, including 'community panels' to ensure community input. In the North West Queensland Allied Health Service, the local division of general practice was utilised as an auspicing agency for the service.

The service was delivered through functional allied health teams using a six month calendar of service delivery in conjunction with other visiting services in order to avoid clashes with other services in the communities. Each community was visited on a six weekly basis with allied health practitioners spending 2-3 days in the community in order to undertake direct one-to-one service provision, develop primary health care activities and case conference with local health professionals.

Therapy assistants were also trained in each community to support follow-up care between allied health visits, and develop skills of local people. Videoconferencing was used to support the therapy assistants, clients and carers.
Recruitment and retention issues were addressed systematically through (1) peer support by maintaining a critical mass of allied health workers and (2) a commitment to funded ongoing professional development support.

Finally, ongoing monitoring and evaluation, including an economic analysis, allowed the new service to address emerging issues and to provide a strong case for its effectiveness and financial sustainability.

VIRTUAL OUTREACH

Telehealth and telemedicine have been widely used in Australia over the past decade as a means of overcoming problems of access to health care and the shortage of health professionals in rural and remote areas. Telehealth refers to a health delivery system which allows for the provision of health care and related services at a distance between two or more locations using technology-assisted communications (93, 94). Telemedicine refers more specifically to the real time delivery of medical applications at a distance, through the transfer of information, including audio, video and graphic data, using telecommunications and involving a range of health professionals, patients and other recipients (95, 96).

Telehealth encompasses *communication* (including email, fax, telephone, video-conferencing, e-therapy, online groups); *information management* (including data bases and internet), and *patient assessments and management* (including clinical consultations, case management systems). Studies of telehealth (including clinical, educational and administrative services) include co-ordinating disability services, mental health video-conferencing, virtual clinics, telepharmacy, teledermatology, telepsychiatry, teleradiology, and telepathology. Many of the studies described within the vast telehealth and telemedicine literature relate to secondary care. The choice of those included here was governed by the extent to which they focused on aspects of primary health care. For example, in Tasmania the concept of telehealth is 'underpinned by a primary care approach based on the principles of collaboration, illness prevention, health promotion and professional and client education' (94). In addition, a level of data 'saturation' was reached at an early stage of review.

The extent to which telehealth and telemedicine constitute a model of care is a moot point. Kavanagh & Yellowlees (1995:1242), for example, noted that telepsychiatry will not replace existing services and is best described as a valuable tool to supplement these services (95). Almost by definition, telehealth shares many of the characteristics of successful hub-and-spoke arrangements discussed above. Technology has also facilitated aspects of shared care through rural mental health triage and case-management (97). Moreover, 'because telehealth is simply a means of delivering services rather than an intervention, it is not appropriate to rely on global and prospective assessments of its value, as might be appropriate for a particular medical procedure' (93).

Outside of the commercial interests of equipment suppliers, telehealth has been largely driven by the desire of governments, health services and rural consumers for improved access to quality health care in a way that saves patient travel and other costs. However, evidence shows that the utilisation of telehealth and telemedicine remains patchy and is not used to full potential, largely due to a number of barriers.

While educational and administrative uses for telehealth appear viable and likely to grow, several ongoing issues require resolution in relation to its use in clinical applications.

> 'Ensuring that processes are effective, reliable and safe is vital but achieving this does not necessarily result in viable service provisions. ... There is widespread evidence that the difficulty in sustaining telehealth lies not so much with the technology but with change management, building the confidence of clinicians

> and other users, and persuading clinicians and others to change their practices and embrace it' (98).

Based on anecdotal evidence and the results of pilot studies available to date, the benefits of effective use of telehealth in rural and remote areas are apparent. They include reduced length of stay, reduced demand on ambulance, reduced attendance at emergency departments (97); improved patient access to professional advice and counselling without needing to travel long distances; speed of decision-making; more immediate and comprehensive response to customers needs for medications and their use (99); wider professional contacts and improved understanding of health services offered by other providers and reduced feelings of isolation for local health workers (10, 100); and potential to attract and retain staff in rural areas where turnover is a continuing problem (98).

Literature on the cost-benefit evaluation of telemedicine, however, is limited and conflicting (101). While some studies indicate cost savings (102, 103), others are less conclusive and indicate that cost and remuneration issues remain a significant barrier (96, 104). The issue is probably best summarised by (98):

> 'Telehealth measurement systems need to quantify costs and benefits wherever possible but must also take account of intangible benefits (those that cannot be expressed in monetary terms). A balanced scorecard approach may provide a comprehensive measurement system across multiple telehealth dimensions, such as safety, effectiveness, quality, appropriateness and efficiency. While the pursuit of cost savings is attractive, telehealth, at least in the short term, is more likely to slow the pace of cost escalation rather than deliver realisable savings.'

A number of other barriers limit more widespread adoption and implementation of telehealth. These include *bureaucratic* barriers, such as outstanding medico-legal issues, remuneration for providers, and patient inconvenience by picking up costs of service; *procedural* barriers such as privacy and confidentiality of clients (including security of client files); lack of infrastructure and inequity of technology access particularly in remote areas, speed of line, equipment failure and internet problems, consistency and compatibility of equipment and standards, oversell by vendors, and issues of image quality and patient safety; and *participant hurdles* such as lack of doctor-patient interaction, intrusiveness of technology coming between workers and clients, dependence on individual clinical champions, lack of acceptance and/or unrealistic expectations of recipients, changes in traditional procedures of medical practice, and the need to ensure that the service respond to needs of rural health professionals and clients and not become just a service initiated from the city.

Despite significant government funding and advocacy, there is widespread agreement that the potential of telehealth applications has yet to be realised. 'More work must be done to demonstrate the accuracy, reliability, economics and clinical utility of telehealth' (98).

DISCUSSION

The systematic review provided the platform on which to develop a conceptual framework for further investigation of rural and remote PHC models. With guidance from the reference group, the framework and available evidence underpins a set of evidence-informed principles or guidelines to guide the decisions of policy-makers and others. The synthesis of data concludes with an overview of the state of current published evidence relating to rural and remote models of primary health care.

CONCEPTUAL FRAMEWORK

Synthesis of the data extracted from the systematic review resulted in the development of a conceptual framework that is useful and practical in considering rural and remote models of primary health care. In summary, this framework identifies the nature of significant broad environmental *enablers* which are crucial in preparing the environment for change. Health service options which might address these problems and needs are characterised by a number of *essential requirements* that need to be met. If these are largely satisfied, health maintenance and improved health outcomes can be achieved through improved access to PHC services.

Table 5 depicts these criteria. Chief among the environmental enablers are (a) supportive policy, (b) Commonwealth State relations, and (c) community readiness. The essential service requirements include: (1) workforce organisation and supply, (2) funding, (3) governance, management and leadership, (4) linkages, and (5) infrastructure. Table 5 also displays where different models might work most effectively and why. With increasing remoteness and decreasing population density, different model types assume prominence.

ENVIRONMENTAL ENABLERS

A supportive policy environment, Commonwealth-State relations and community readiness are critical environmental factors that enable the development and implementation of successful PHC services in rural and remote communities.

Supportive policy

Appropriate government policy is a pre-requisite to sustainable government funding for service delivery. Policies oriented to rural health, such as *Healthy Horizons* (8) set the principles and broad parameters for guiding the provision of services, while other policies, such as *Regional Health Services* and *Co-ordinated Care Trials*, focus more specifically on particular health sector programs. Some national policies have not been effective in meeting the needs of residents in rural and particularly remote areas. For example, under-expenditure of MBS and PBS in remote areas resulting from the lack of medical practitioners and pharmacists has resulted in the development of specific policies to overcome these difficulties.

The *Primary Health Care Access Program* (PHCAP) and the *Aboriginal Coordinated Care Trials* (CCTs) have allowed for cashing out and pooling of funds. Other policies outside the health sector, such as immigration policy that may restrict international medical graduates' employment, can also have an impact on rural and remote services.

Effective policies not only set the principles to guide the provision of services, but importantly facilitate their implementation. In many instances, relevant policy

statements suffered design failure by not addressing how they might be implemented. For example, failure to identify the timeframe for action, the roles and responsibilities of agents involved in policy roll-out for service provision, inadequate attention to resource implications and appropriate financing streams, and lack of an appropriate organisational structure or framework all hamper the implementation and evaluation of effective and sustainable models. A number of these limitations were identified in the systematic review as constraints hampering model success. There were also positive examples, such as funding for governance training for the community health boards in the CCTs (81). In other instances, policies evolved with the programs they support. For example, evaluations and reviews of the MPS program led to more precise definitions of the pre-conditions for community eligibility for the program and steps to correct the mismatch between performance indicators specified in the tripartite agreements and the reporting requirements (49, 52).

Commonwealth - State relations

Commonwealth - State relations facilitate a seamless health service. Arguably the most significant factor limiting policy implementation relates to existing political relationships and bureaucratic structures. The implementation of national policies, even with the imprimatur of States and territories, is impeded by the different State and Commonwealth powers, responsibilities and legislation that restrict the capacities of health authorities to undertake action. Current divided responsibilities result in cost and blame shifting, confusion and inefficiency. Rural and remote communities are less concerned about who funds or delivers the service, and more about the range, quality and efficiency of health care available.

Table 5. Essential service requirements and environmental enablers for PHC models in rural and remote communities

<table>
<tr><th rowspan="2">CONTEXT
Rural-Remote continuum</th><th rowspan="2">SERVICE OPTIONS</th><th colspan="3">Environmental enablers</th><th colspan="6">Essential service requirements</th></tr>
<tr><th>Supportive policy</th><th>Commonwealth State relations</th><th>Community readiness</th><th>Workforce organisation</th><th>Workforce supply</th><th>Funding</th><th>Governance, management & leadership</th><th>Linkages</th><th>Infrastructure</th></tr>
<tr><td>RURAL
(Characterised by larger, more closely settled communities)</td><td>Discrete
eg: ‘Easy Entry-Gracious Exit’ model</td><td colspan="9">The option for discrete primary health care services exists because community population catchments are sufficiently large to support them. The role of environmental enablers (while important) is less influential than in remote communities, and essential service requirements are more easily met even though supports are needed to address some aspects of services (such as workforce recruitment and retention).</td></tr>
<tr><td></td><td>Integrated
eg: Multi-Purpose Services, Shared Care, Coordinated Care models</td><td colspan="9">The need for service integration increases in order to maximise economies of scale and efficiencies in communities where individual services or competing services are not sustainable; single point of entry to the health system through locally available access pathways is important to co-ordinate patient care and reduce the need for patients to travel extensive distances; and maximise the range of locally available services.</td></tr>
<tr><td>↓</td><td>Comprehensive PHC
eg: Aboriginal Community Controlled Health Service model</td><td colspan="9">This option ensures a comprehensive primary health care service is available in small, isolated, high-need communities where there are few, if any, alternative ways for delivering appropriate health care. The need to ensure that environmental enablers facilitate the delivery of appropriate care, minimise cost-shifting and duplication of activity and reporting, and maximise community participation in the service development are paramount. Flexibility in meeting essential service requirements is essential to take account of local needs and circumstances.</td></tr>
<tr><td>REMOTE
(Characterised by small populations dispersed over vast areas)</td><td>Outreach/Virtual Outreach
eg: Hub and spoke; Fly-in, fly-out; Virtual clinics; Telehealth models</td><td colspan="9">This option addresses the health needs of communities with populations too small to support permanent local services by providing access through virtual or periodic visiting services. Opportunities for community involvement and management will be more limited than with locally-based services, while co-ordination with any existing services is critical. Outreach models often co-exist with other model types- discrete, integrated and comprehensive PHC services.</td></tr>
</table>

Any models which involve pooling of Commonwealth and State funds, or cross the boundaries of Commonwealth and State responsibilities require agreements and mechanisms for monitoring compliance. Successful MPS services were characterised by multi-party agreements prior to model implementation; agreed objectives of the service, tailored to the specific context, with agreed performance indicators; continuous monitoring, including annual reports and three year reviews. Commonwealth and State interests were represented by members of Joint Officers Groups in each State, who reviewed applications, oversaw implementation, ratified policies and procedures and monitored funding agreement reporting (49). This was similar in the Aboriginal CCTs which were also characterised by tripartite service agreements and a Trial Monitoring Group with representatives from the key organisations which gave an ability to re-negotiate details of the agreement as the trial progressed, as well as rapidly responding to problems as they arose (56).

Community readiness

Invariably, any new model of health service delivery will involve change, and community readiness to manage such change is a crucial enabler. Many groups and interests are likely to vie for input and involvement, and the plurality of interests inevitably results in some degree of opposition to implementation of innovative service models. Failure to adequately involve key agents, especially consumers, leads to a predominantly 'top-down' approach, which is contrary to the community development and ownership imperative that is central to a primary health care approach. Developing a model of service delivery and only then promoting it to the community as a final step is a barrier to successful implementation and sustainability (63).

The level of community readiness is variable depending on the type of model. From the systematic review it is possible to discern some common enablers which must be in place to ensure the successful roll-out of any model. These include some community commitment to the change; the identification of local health needs and strategies by which a new service would address them; the presence of a community champion for the proposed model; community capacity to be involved in the governance of the service; and an auspicing body with infrastructure capable of receiving and accepting responsibility for the funds. For community controlled models, there may need to be a significant investment of time and resources in training and capacity building for boards and health committees (55).

The nature, degree of and necessity for community engagement are complex issues. Although the North West Queensland Allied Health Service is not community controlled, 'community panels' afford community input. Battye & McTaggart (2003) concluded that the degree of community engagement in a range of successful Indigenous health projects was related to the nature of the intervention:

> 'the evidence did not support any one pre-eminent model or 'gold standard'' … 'while community participation was broadly seen as a key contributor to achievement, no single model of participation dominated, and in some cases, the issue of community engagement was not prioritised in the planning and implementation of the project.' (61)

Other commentators have observed that in the context of diminished emphasis on citizen's rights, community control is a 'two edged sword'(105). There should not be a 'burden of unrealistic expectations' on communities, particularly small remote communities, to run their own services in a context of 'relative poverty and denied

access to the basic social and community service infrastructure that other Australians regards as a right' (105).

In practical terms, ensuring that these enablers are in place allowed for the right people to come together at the right time in order to agree on the purpose of the service and how they would all know if it were meeting its objectives.

ESSENTIAL REQUIREMENTS

A number of essential requirements underpin an effective and sustainable PHC model. These include workforce, funding and financing, governance, management and leadership, and linkages. The requirements are linked and do not operate independently. For example, many workforce initiatives are dependent on adequate, sustainable financing arrangements (106).

Workforce

This crucial requirement underpinning sustainable models of PHC includes consideration of both supply (recruitment and retention) and the roles and mix of health professional staff. The literature is replete with evidence of the urgent need to address workforce problems, both professional (including retention issues, on-call, burnout and need for continuing professional education) and personal (such as lack of accommodation, long periods away from home, spouse and family issues). However, whilst most of the models examined address issues relating to workforce organisation, very few addressed the critical issue of workforce supply, particularly succession planning or back-fill arrangements.

The exceptions were the North West Queensland Allied Health Service (62) and the '*Easy Entry, Gracious Exit*' model (38, 39), which entailed the creation of 'packages' that included paid leave home, ongoing professional development, accommodation and addressed other infrastructure needs. Although they also included undergraduate student placement and GP registrar activity, no evidence of the impact of these specific strategies was provided. Generally, the hub-and-spoke model addresses workforce supply through building a critical mass of professionals within a larger regional centre or town, in recognition of the fact that recruitment to smaller towns, hamlets and communities is difficult or sometimes impossible.

At a minimum, the critical workforce requirements identified were:

1. Sufficient number and range of appropriately trained medical and other health professionals to meet community needs
2. A recruitment strategy, including: minimal start-up cost & capital investment for GP or other health professionals, housing, leave, and workload
3. A retention strategy, including: professional support, leave packages, and sustainable after-hours and on-call arrangements
4. Succession planning

Funding

Adequate sustainable funding is a critical factor underpinning any sustainable primary health service. Moreover, the financing arrangements (how the funding is allocated) need to be sufficiently flexible for the service to be responsive to local needs. Financing also needs to be sustained in a way that ensures that services maintain continuity of care for patients and that health outcomes are able to be evaluated. This requires a supportive policy that extends beyond demonstration projects, pilots and trials, and identifies sources of program funding to maintain the service. It was clear, too, that models of PHC that built around existing program funds were most likely to ensure sustainable delivery of health care.
Funds pooling (107) or notional funds pooling emerged as an effective strategy to appropriately redistribute funds (for example MPS) or provide additional funds in areas of high need (for example PHCAP, CCTs). PHCAP and the Aboriginal CCTs also entailed

cashing out of MBS and PBS funds which compensated communities for lack of access to these national schemes as a result of the non-availability of local GPs and pharmacists (108). Others also rely on local government contribution to salary and infrastructure (39).

Funds pooling (107) or notional funds pooling emerged as an effective strategy to appropriately redistribute funds (for example MPS) or provide additional funds in areas of high need (for example PHCAP, CCTs). PHCAP and the Aboriginal CCTs also entailed cashing out of MBS and PBS funds which compensated communities for lack of access to these national schemes as a result of the non-availability of local GPs and pharmacists (108). Others also rely on local government contribution to salary and infrastructure (39).

Pooling and cashing out were effective not only because of a more appropriate quantum of funding being made available, but also because flexibility in use of the funds resulted in a greater focus on local needs and, for example, re-orientation to greater disease prevention and health promotion activity (55, 56), a hallmark of a primary health care approach.

Funding arrangements also affect workforce supply. In the case of rural and remote general practice, for example, salaried GP positions rather than sole reliance on fee-for-service and blended payments can improve ease of recruitment, retention and succession planning (38, 39, 55).

Governance, management and leadership

As in all business and community organisations, strong governance, effective management and visionary leadership are pre-requisites for success and sustainability. This aspect of organisation includes appropriate governance structures inclusive of the community, clearly defined management structures, roles and responsibilities, with accountability to the governing body.

Rural and remote communities, typically areas of high health need, often lack sufficient depth of management and governance experience. In small communities, in particular, there is a relatively small pool from which managers and leaders are drawn, and without which services remain vulnerable. Several authors highlight the need for management with strong, central systemic support and local flexibility. Strong systemic support relates particularly to staff training, clearly defined and documented staff responsibilities and clear practice guidelines (54, 109-111).

Leadership can originate from different sources, sometimes from outside of the rural or remote community. For example, MPSs and CCTs resulted from national policies that led to change through external engagement with communities, involvement in needs assessment and planning processes, such that communities could then decide for themselves on the level of community participation required and desired.

Linkages

Despite their size and scale, most health services represent complex systems of activity, so effective linkages are required both within and between services. The authors recognise the differing terminology used to describe the linking up of services. For our purposes, the term 'integration' is used to refer to linking up within an organisation, and 'co-ordination' to the linking up of the service with related external agencies. Regardless of label, linkages are essential to rural and remote areas because of the geographical reality of distant and dispersed sites and services.

PHC promotes inter-sectoral collaboration. Whilst this systematic review focussed on the health sector, the need to co-ordinate both within and between sectors is recognised - '...by developing effective linkages with other agencies a service is able to increase its reach, increase its impact and value-add to other services'(62). Arguably this need increases with remoteness and diminishing size of communities.

The review demonstrated a wide range of linkage strategies that include integration of distinct services, co-location, memoranda of understanding, cross-referrals, common assessment procedures and common records (112). Some models directly address the issue of integration, as in the case of MPS. Clearly too, the hub-and-spoke model is dependent on effective co-ordination. The North-West Queensland Allied Health Service has defined a number of levels of linkage – high level, local, community and multi-level. This taxonomy provides a useful conceptual framework and description of the complexity and necessity of linkages in this context (62)

Infrastructure

All too often the importance of infrastructure, including physical infrastructure as well as IT/IM systems, is overlooked or taken-for-granted. In general, infrastructure is lacking in rural and remote areas (56, 86, 113). For some services, this has necessitated longer planning and implementation periods in order to ensure adequate infrastructure is in place prior to the roll-out of services. For example, with the CCTs, remote community housing was a pre-requisite for recruitment of community-based staff and visiting staff (56). Some services have been adept at the efficient utilisation of existing infrastructure. For example the North-West Queensland Allied Health Service has used the local Division of General Practice as an auspicing agency and delivered services through existing remote clinics (61). The success of the innovative GP models is predicated on minimising the disincentive to GP recruitment to small communities by providing GP practice infrastructure (38, 39). Equally important is the existence of adequate information infrastructure, which is essential to operational and strategic decision-making (54, 111), particularly with the advent of computer-based records, patient information access and transfer.

EVIDENCE–INFORMED PRINCIPLES FOR THE DEVELOPMENT OF PHC PROGRAMS IN RURAL AND REMOTE AUSTRALIA

A superficial scan of the literature pertaining to models of rural and remote health services in Australia yields a large number of offerings, as evidenced by the number of abstracts initially reviewed in this study. However, as this systematic review shows, only a relatively small number of studies provide any comprehensive and detailed evidence to show how and why only some models work to provide appropriate, effective and sustainable primary health care.

In fact, the number of comprehensive, high quality evaluations of specific models are extremely limited. Of the 161 documents reviewed only 36 constituted evaluations. Almost half of the papers reviewed (n=73) were descriptive accounts of implemented models. There were a further 52 notional models or evidence-based health service plans.

Nevertheless, drawing on this evidence base, particularly the exemplary models described in this report, we are able to derive a set of key evidence-informed principles and guidelines to inform PHC service development. A systematic formulation of such principles was a priority output identified by the Reference Group and consistent with the overall goal and mandate of the Australian Primary Health Care Research Institute. These principles are important for policy-makers, service providers and communities charged with responsibility for the development of new or enhanced PHC services in rural and remote areas. They are based on the conceptual framework and draw on evidence extracted from the systematic review. These data are organised in a fashion consistent with our conceptual framework shown in Table 5.

Environmental enablers

a) *Supportive policy:* The provision of effective, sustainable primary health services in rural and remote communities is predicated on an explicit rural and remote health services policy that provides the framework for sustainable health services, and specifically takes account of the unique rural and remote considerations that distinguish this context from that addressed by mainstream programs. At the same time, other health-related policies, particularly those from outside of the health sector (including education, transport, employment and housing), should be consistent with and indeed reinforce the goals of the rural and remote policy by supporting the up-stream determinants of health and health literacy.

b) *Commonwealth-State relations:* Commonwealth-State roles and responsibilities should be streamlined to enable health authorities to develop and implement sustainable models of primary health care appropriate to community needs and circumstances. Given the scarcity of health resources and the need to allocate them across widely divergent geographical settings, particular attention should be paid to avoiding inefficiencies and duplication of activities, funding and reporting requirements that characterises the existing Commonwealth and State arrangements.

c) *Community readiness:* Given that change management is probably the most sensitive and difficult aspect of any system innovation, maximising information and communication between the various parties involved is critical to successful implementation strategies. Central to this success is an appropriate level of

community involvement in the identification of health needs and planning of the health service. This includes:

- Defining the size, dispersion, composition and needs of the service population
- Assessing the adequacy and sustainability of current services, including unmet needs
- Arrangements for the appropriate level and nature of community involvement in the ongoing governance, review and evaluation of the service

Essential requirements

a) *Workforce organisation and supply*: The development of sustainable comprehensive PHC service models appropriate to rural and remote Australia requires measures to ensure adequate workforce supply and appropriate staffing mix. These workforce requirements include:

- A sufficient number and range of appropriately trained health professionals to meet community needs
- A recruitment strategy to address professional and personal needs, including minimal start-up costs & capital investment for staff, housing, leave, appropriate workload, and spouse and family support
- A retention strategy addressing professional support, continuing professional development (including travel costs and leave packages), and sustainable after-hours and on call-arrangements
- Feasible succession planning strategies

b) *Funding*: Funding should be adequate to meet identified health needs of the community, and financing should be appropriate, sustainable and clearly identified within program budgets. This requires:

- An adequate budget to cover salaries, infrastructure and indexed to meet all operational costs
- Sustainable and sufficiently flexible financing so that care can be delivered in diverse circumstances appropriate to community needs
- That all possible sources of financing have been identified with the facility to pool funds in order to maximise service efficiencies and economies
- An agreement that (i) involves all funders, service providers and community and (ii) clearly details funding quantum, financing mechanism, agreed objectives, performance indicators and consolidated reporting requirements

c) *Governance, management and leadership*:

- *Governance* structure and processes should be clearly defined, implemented and reviewed. Service accreditation should be mandatory to assist to ensure that appropriate mechanisms are in place. Specifically, the level and nature of community involvement needs to be identified and agreed. Where necessary, a costed governance training plan is included.
- *Management* structure and processes should be clearly documented and implemented to ensure that:
  - Service managers with appropriate skills are available
  - Human resource and finance systems are described
  - A risk management plan is documented, particularly with respect to workforce supply, key staff, service viability, and IT systems

- *Champions* or *leaders* from the service, community and government should be identified and actively engaged in the support and operation of the health service. In order to avoid excessive service dependence on any one particular leader, however, a succession plan is defined whereby potential new leaders are identified and groomed in readiness for change.

d) *Linkages*: All critical linkages at different levels are identified and documented. Every attempt should be made to maximise integrated activity and coherence within the health service, and to ensure efficient and effective co-ordination with external agencies and services relevant to patient care. Central to effective integration and coordination are agreements with key stakeholders so that:

- Clinical referral pathways ensure a seamless service
- Key external stakeholders are identified and roles defined
- Key systems are consistent, including standard treatment protocols, IM/IT systems

e) *Infrastructure* should be adequate and fully costed. This includes:

- New or upgraded physical infrastructure such as clinics, accommodation, equipment, vehicles and an operating budget to maintain them
- IM/IT systems appropriate to the service, its catchment population (particularly in areas of high population mobility), and agreed monitoring and reporting needs

CONCLUSION

Since the mid 1990s in Australia, there has been a generally favourable policy environment with respect to rural health. A vociferous electorate and effective advocacy groups, improved data relating to urban-rural health differentials and workforce shortages, and a responsive federal government (which has included some ministerial 'champions' of rural and Indigenous health) have driven policy that has resulted in significant education, training and service delivery resources for rural and remote areas. However, much of the additional national funding has been directed towards workforce issues, particularly targeting the medical workforce in rural and remote areas. In contrast, there has been little policy attention to the systematic development of sustainable comprehensive PHC service models in rural and remote Australia.

This study commenced with the assumption that after a productive decade of rural health activity and innovation since the first National Rural Health Strategy, the time was ripe to reflect upon what has been achieved in relation to innovative models of PHC. Rather than searching for more and more innovation, the need was to garner the knowledge gained over this period. Where appropriate, proven innovations and models could be identified, characterised and generalised.

However, whilst there are many descriptive accounts, evaluations are few. As a result, our systematic review of the Australian literature does not reveal an established body of knowledge about appropriate models based on sound and comprehensive evaluations. In particular, economic evaluation of health service innovations is all but non-existent. This is consistent with a policy environment that has funded many trials and pilots, and focused on workforce issues rather than the systematic development of comprehensive models of PHC service delivery.

This review does represent the first comprehensive synthesis of available knowledge relating to Australian rural and remote models of PHC. The synthesis has used the best available evidence to develop a conceptual framework with external validity that has been tested with the Reference Group. From this framework we have derived a set of evidence-based principles to guide the activities of those responsible for developing, funding and evaluating rural and remote health services.

The systematic review also revealed a number of exemplar models of PHC service delivery. These exemplars have been evaluated and are amenable to generalisation and evaluation in other regions.

Underpinning all rural and remote models is Australia's ineluctable geography and demography. Beyond the coastal population centres, successful and sustainable models are those which have addressed the diseconomies of scale which are a result of large distances and population dispersion. Successful models are those which aggregate a critical population mass, whether it be a discrete population in a country town or a dispersed population across a region. Evidence indicates that a minimum population base of about 5000 for rural and 2000 to 3000 people for remote communities is required to support an appropriate, sustainable range of PHC activities. This is not to say that communities of less than these populations should be denied access to PHC services, rather that ensuring access to an appropriate range of services

for a highly dispersed population will require some degree of population aggregation within an appropriate model.

The different models exemplified in this report provide some guidance as to appropriate options for different levels of population density. They range from the discrete general practice models than might be sustained in some country towns through to hub-and-spoke models that may be required for delivering a full range of PHC services to a group of smaller, more isolated communities. At the same time, these models are not mutually exclusive. Hence, a hub-and-spoke model may be characterised by some aspect of shared care or similar collaborative arrangement, while a discrete GP model may provide some outreach service to outlying populations. The important point is that each model has implemented sufficient measures to ensure sustainable delivery of accessible, appropriate, quality PHC services to meet the identified health needs of the populations served.

REFERENCES

List of systematic review references

Ah Kit, J., Prideaux, C., Harvey, P. W., Collins, J., Battersby, M., Mills, P. D., et al. (2003). Chronic disease self-management in Aboriginal communities: towards a sustainable program of care in rural communities. *Australian Journal of Primary Health, 9*(2-3), 168-176.

Allen, O. (1996). Anthill and other injuries: a case for mobile allied health teams to remote Australia. *The Australian Journal of Rural Health, 4*(1), 33-42.

Alsop, M., & Battye, K. (1999). Integration of general practitioners and mental health services: The Northern Queensland Integrated Mental Health Program. *Australian Journal of Primary Health - Interchange, 5*(2), 20-26.

Alt, M., & Beatty, D. (2003). *Finding solutions: delivering quality aged care in rural and remote Australia.* Paper presented at the 7th National Rural Health Conference, Hobart.

Andrews, G., Dunn, J., Hagger, C., Sharp, C., & Witham, R. (1995). *Pilot Multi-Purpose Services Program Evaluation Final Report.* Adelaide: Centre for Ageing Studies The Flinders University of South Australia; Health Solutions; Consortium for Evaluation Research and Training.

Atkinson, D., Bridge, C., & Grey, D. (1999). *Kimberly Regional Aboriginal Health Plan*: Commonwealth Department of Health and Aged Care.

Auditor General, N. S. W. (2006). *Cessnock Uni-Clinic Trust Financial Report for the year ended 31 December 2005*: New South Wales Parliament.

Auld, M. (1995, 3-5 Feb). *Barriers to introducing nutrition services in rural communities.* Paper presented at the 3rd National Rural Health Conference, Mt Beauty.

Australian Department of Health and Family Services. (1996). *Selected case studies in best practice: best practice in the health sector program: standards of care and workplace organisation*.

Australian Divisions of General Practice. (2006, 18 May 2006). Summary of the GAPS Model. Retrieved 20 September 2006, from http://www.adgp.com.au/site/index.cfm?display=711.

Bailie, R. S., Si, D., Robinson, G. W., Togni, S. J., & d'Abbs, P. H. N. (2004). A multifaceted health-service intervention in remote Aboriginal communities: 3-year follow-up of the impact on diabetes care. *Medical Journal of Australia, 181* (4), 195-200.

Barkas, R. (2003, 29-30 May 2003). *A model of comprehensive medical service provision by salaried general practitioners for an isolated rural community.* Paper presented at the Innovations in Health Service Delivery in Rural and Remote Australia Conference, Campbell, ACT.

Bartik, W., Kowalenko, N., Whitefield, K., & Wignall, A. (2001). Anxiety and depression in young people: a collaborative rural and remote service model. *Youth Studies Australia, 20*(3), 38-42.

Bartlett, B., & Duncan, P. (2000). *Top End Aboriginal Health Planning Study.* Coledale Plan Health Pty. Ltd.

Bartlett, B., Duncan, P., Alexander, D., & Hardwick, J. (1997). *Central Australian Health Planning Study: Final Report.* Coledale: OATSIHS, Commonwealth Department of Health and Family Services.

Basinski, D. (1998). Ports in a storm: a postnatal depression rural support services project. *Australian Journal of Primary Health - Interchange, 4*(3), 179-184.

Battye, K., White, C., Cronin, S., Bond, N., & Mitchell, C. (2004). *Solutions for the provision of Primary Care to Rural and Remote Communities in Queensland*: Queensland Rural Medical Support Agency.

Battye, K. M., & McTaggart, K. (2003). Development of a model for sustainable delivery of outreach allied health services to remote North-West Queensland, Australia. *Rural and Remote Health, 3*(3).

Berry, G. (2002). *Final Report Eyre Peninsula Virtual Amalgamation Project*: Eyre Peninsula Division of General Practice.

Blackburn, K., & Kemp, J. E. (1996). Dealing with border issues the primary health care way. *The Australian Journal of Rural Health, 4*(2), 73-79.

Boffa, J., & Fisher, M. (2000). *Aboriginal and Torres Strait Islander Health: implementation of the Primary Health Care Access Program (PHCAP) in four remote health zones in Central Australia and in the Northern Territory.* Paper presented at the PHAA, Canberra.

Booth, A. (1996). Health service delivery to outback South Australia: a story of organizational change. *International Journal of Health Care Quality Assurance, 9*(2), 15-19.

Boucher, M., & Lynch, M. (2003). *Easy Entry, Gracious Exit*. Newcastle: NSW Rural Doctors Network.

Boyce, R. A. (2001). Organisational governance structures in allied health services: a decade of change. *Australian Health Review, 24* (1), 22-36

Bryant, L., & Strasser, R. (1999). *The delivery of sustainable rural and remote health services. Background Paper for the Regional Australia Summit*. Canberra: Department of Transport and Regional Services.

Burns, C. B. (1995). *Feasibility Study and Service Plan of Health Services at Maningrida: Final Report.* Darwin: Menzies School of Health Research.

Burns, C. B., Clough, A. R., Currie, B. J., Thomsen, P., & Wuridgal, R. (1998). Resource requirements to develop a large, remote Aboriginal health service: whose responsibility? *Australian and New Zealand Journal of Public Health, 22* (1), 133-139

Cameron, I. (2003, 1-4 March). *Towards Unity for Health applied - the pentagon of partnership as a basis for a regional workforce structure.* Paper presented at the 7th National Rural Health Conference, Hobart.

Cameron, I. (2005). *Finding solutions in North West NSW:"Easy Entry, Gracious Exit" and the Rural and Remote Medical Services (RARMS) experience.* Paper presented at the Practice made perfect?, Coffs Harbour.

Cameron, I. (2006, 8-9 May). *Rural Workforce Agencies - Improving Practice.* Paper presented at the Practice made perfect? -The sequel, Sydney.

Campbell, A. (2005). The evaluation of a model of primary mental health care in rural Tasmania. *Australian Journal of Rural Health, 13*(3), 142-148.

Centre for General Practice Integration Studies University of NSW, Department of General Practice University of Melbourne, & Julie McDonald and Associates. (2001). *Mapping the role of general practice in strengthening the Australian Primary Health Care Sector 1990-2000*: Department of Health and Aged Care.

Chapman, T. (undated). *Local Government involvement in Primary Health Care issues in the wheatbelt region of Western Australia*: Western Australian Municipal Association.

Chenoweth, L., & Stehlik, D. (2002). Using technology in rural practice -- local area coordination in rural Australia. *Rural Social Work, 7*(1), 14-21.

Christensen, S., & Bakhilova, N. (2006, 8-9 May). *Enhancing the sustainability of rural practice.* Paper presented at the Practice made perfect? - The sequel, Sydney.

Clarke, P. M. (1998). Cost-benefit analysis and mammographic screening: A travel cost approach. *Journal of Health Economics, 17*(6), 767-787.

Cromwell, D., Senior, K., Owen, A., Gordon, R., & Eagar, K. (2003). *Can the National Palliative Care Strategy be translated into a model of care that works for rural Australia? An answer from the Griffith Area Palliative Care Service (GAPS) experience*. Wollongong: Centre for Health Service Development, University of Wollongong.

Crossland, L., & Veitch, C. (2005). After-hours service models in Queensland Australia: A framework for sustainability. *Australian Journal of Primary Health, 11*(2), 9-15.

Department of Health and Ageing. (2002). The Multipurpose Services (MPS) Model. Retrieved 1 September 2006, from www.health.gov.au/internet/wcms/publishing.nsf/content/ruralhealth-services-mps-model.htm.

Department of Health and Ageing. (undated). National Quality Improvement Framework for Multipurpose Services. Retrieved 1 September 2006, from http://www.health.gov.au/internet/wcms/publishing.nsf/ Content/ruralhealth-services-mps-service_quality.htm.

Dillon, E., & Loermans, J. (2003). Telehealth in Western Australia: the challenge of evaluation. *Journal of Telemedicine and Telecare, 9* (Suppl 2), S15-19.

Down, G., Jeffries, F., & Seward, M. (2000). *Towards Northern Wheatbelt GP sustainability*: WACRRM.

Dunbabin, J. (2003). *General practice ownership in rural and remote NSW: its impact on recruitment and retention*. Newcastle: NSW Rural Doctors Network.

Dunt, D., Day, S., & van Dort, P. (2002). *After Hours Primary Medical Care Trials. National Evaluation Report*: Centre for Health Program Evaluation.

Durey, A., & Lockhart, C. (2004). A review of community consultation in the development of a multi purpose service in rural and remote Australia. *Australian Health Review, 28*(1), 97-104.

Eagar, K., Pirkis, J., Owen, A., Burgess, P., Posner, N., & Perkins, D. (2005). Lessons from the national mental health integration program. *Australian Health Review, 29*(2), 189-200.

Entwistle, P. (2005). *Katherine East Coordinated Care trial: Quarterly reports to the national evaluators 2003-2005*: Centre for Remote Health.

Faulkner, K. (2001). Successes and failures in videoconferencing: a community health education programme. *Journal of Telemedicine and Telecare, 7*(Suppl 2), 65-67.

Fletcher, K. (2005). *Hay Medical Services.* Paper presented at the Practice made perfect?, Coffs Harbour.

Flick, B., Miller, P., Torzillo, P., & Wilson, J. (2000). *Aboriginal health services delivery in remote Australia: policy, program and practice considerations.* (4th ed). Melbourne: Longman Australia.

Gelber, H. (1998). The experience of the Royal Children's Hospital Mental Health Service videoconferencing project. *Journal of Telemedicine and Telecare, 4*(Suppl 1), 71-73.

Government of Western Australia. (2003). *The Country Health Services Review*. Perth: Department of Health.

Greenwood, J., Chamberlain, C., & Parker, G. (2004). Evaluation of a rural telepsychiatry service. *Australasian Psychiatry, 12*(3), 268-272.

Griffin, D. (1999). Renal Home Support Scheme quality initiative. *Journal of Quality in Clinical Practice, 19*(3), 179-181.

Guilfoyle, C., Wootton, R., Hassall, S., Offer, J., Warren, M., Smith, D., et al. (2003). User satisfaction with allied health services delivered to residential facilities via videoconferencing. *Journal of Telemedicine and Telecare, 9*(Suppl 1), S52-54.

Habibis, D., Hazelton, M., Schneider, R., Davidson, J., & Bowling, A. (2003). Balancing hospital and community treatment: effectiveness of an extended-hours community mental health team in a semi-rural region of Australia. *Australian Journal of Rural Health, 11*(4), 181-186.

Harvey, P. (2001). The impact of coordinated care: Eyre region, South Australia 1997-1999. *The Australian Journal of Rural Health, 9*(2), 69-73.

Harvey, P. (2004). Tantalus and the Tyranny of Territory: pursuing the dream of parity in rural and metropolitan population health outcomes through primary health care programs. *Australian Journal of Primary Health, 10*(3), 86-88.

Hassall, S., Wootton, R., & Guilfoyle, C. (2003). The cost of allied health assessments delivered by videoconference to a residential facility for elderly people. *Journal of Telemedicine and Telecare, 9*(4), 234-237.

Hatton, I., McDonald, K., Nancarrow, L., & Fletcher, K. (2003). The Griffith area palliative care service: a pilot project. *Australian Health Review, 26*(2), 11-18.

Hawke, M., & Byrne, J. (2000). Community-based early childhood assessment and intervention in rural settings: Transdisciplinary case management of developmental delay in children. *Australian Journal of Primary Health - Interchange, 6*(3-4), 130-140.

Health Workforce Queensland. (2005). *Solutions to the provision of primary care to rural and remote communities in Queensland*. Brisbane.

Hockey, A. D., Wootton, R., & Casey, T. (2004). Trial of low-cost teledermatology in primary care. *Journal of Telemedicine and Telecare, 10*(Suppl 1), 44-47.

Hoodless, M., & Evans, F. (2001). The multipurpose service program: The best health service option for rural Australia. *Australian Journal of Primary Health, 7*(1), 90-96.

Humphreys, J. (2002). Health service models in rural and remote Australia. In D. Wilkinson & I. Blue (Eds.), *The New Rural Health: An Australian Text* (pp. 273-296): Oxford University Press.

Humphreys, J., & Fraser, M. (2001). *The trialing and evaluation of alternative models of health services in small rural and remote communities*: Commonwealth Department of Health and Aged Care.

Humphreys, J., & Mathews-Cowey, S. (1999). *Models of health service delivery for small rural and remote communities*. Bendigo: La Trobe University.

Hyndman, I., & Ward, C. (2002). *A cooperative approach to sustainable rural general practice in neighbouring towns.* Paper presented at the WONCA, Melbourne.

Judd, F., Davis, J., Hodgins, G., Scopellitti, J., Agin, B., & Hulbert, C. (2004). Rural integrated primary care psychiatry programme: A systems approach to education, training and service integration. *Australasian Psychiatry, 12*(1), 42-47.

Judd, F., Fraser, C., Grigg, M., Scopelliti, J., Hodgins, G., Donoghue, A., et al. (2002). Rural psychiatry: Special issues and models of service delivery. *Disease Management and Health Outcomes, 10*(12), 771-781.

Kavanagh, S., & Hawker, F. (2001). The fall and rise of the South Australian telepsychiatry network. *Journal of Telemedicine and Telecare, 7*(Suppl 2), 41-43.

Kavanagh, S. J., & Yellowlees, P. M. (1995). Telemedicine--clinical applications in mental health. *Australian Family Physician, 24*(7), 1242-1247.

Kennedy, C., & Yellowlees, P. (2000). A community-based approach to evaluation of health outcomes and costs for telepsychiatry in a rural population: preliminary results. *Journal of Telemedicine and Telecare, 6*(Suppl 1), S155-157.

Kopel, H., Nunn, K., & Dossetor, D. (2001). Evaluating satisfaction with a child and adolescent psychological telemedicine outreach service. *Journal of Telemedicine and Telecare, 7*(Suppl 2), 35-40.

KPMG Consulting. (1999). *The Aboriginal & Torres Strait Islander Coordinated Care Trials - National Evaluation Report (Volume 1) - Volume 1 Main Report*: Office for Aboriginal and Torres Strait Islander Health.

KPMG Consulting. (2001). *The Aboriginal & Torries Strait Islander Trials National Evaluation Summary*: Office for Aboriginal and Torres Strait Islander Health.

KPMG Consulting, Axten Associates Pty Ltd, & Campbell Research & Consulting Pty Ltd. (2002). *Healthstreams Evaluation. Final Report*: Department of Human Services.

Ledek, V., Deane, P., Lambert, G., & Mc Keehan, C. (2002). Description of a rural Australian free call telephone mental health information and support service. *Australasian Psychiatry, 10*(4), 365-370.

Lee, S. J., McCarty, C. A., Taylor, H. R., & Keeffe, J. E. (2001). Costs of mobile screening for diabetic retinopathy: a practical framework for rural populations. *The Australian Journal of Rural Health, 9*(4), 186-192.

Lennox, G., & Piercy, N. (1993). *Innovation in rural health care*. Deakin: AHA.

Lessing, K., & Blignault, I. (2001). Mental health telemedicine programmes in Australia. *Journal of Telemedicine and Telecare, 7*(6), 317-323.

Leversha, A., Pendergast, C., Humphreys, J., Colley, C., Scavone, M., & Marty, S. (2003). An evaluation of videoconferencing in a rural community pharmacy. *Australian Pharmacist, 22*(2), 154-157.

Lim, A. C., See, A. C., & Shumack, S. P. (2001). Progress in Australian teledermatology. *Journal of Telemedicine and Telecare, 7*(Suppl 2), 55-59.

Local Evaluation Team. (2000). *Jirntangku Miyrta Katherine West Coordinated Care Trial Final Report.* Darwin: Menzies School of Health Research.

Lorraine, P. (1999). *The development of a sustainable health service in a small rural community: every cloud has a silver lining.* Paper presented at the 5th National Rural Health Conference, Adelaide.

Lynch, M. (2003). *Easy entry-gracious exit: testing new models for doctor recruitment and retention in chronically underserviced rural communities.* Paper presented at the 7th National Rural Health Conference, Hobart.

Maguire, T. (2005). *Wentworth Medical Practice.* Paper presented at the Practice made perfect?, Coffs Harbour.

Malcolm, H. (2000). A primary mental health-care model for rural Australia: outcomes for doctors and the community. *The Australian Journal of Rural Health, 8*(3), 167-172.

Malcolm, H. (2002). Primary mental health-care model in rural Tasmania: outcomes for patients. *The Australian Journal of Rural Health, 10*(1), 20-25.

Mann, L. J. (2001). Integrated assessment: A rural model in practice. *Australian Journal of Primary Health, 7*(1), 106-110.

Marcus, D. (1999). *Coordinating Care in an uncoordinated Health System: the development and implementation of coordinated care trials in Australia* (No. Current Issues Brief 11 1998-99). Canberra: Parliament of Australia.

Marley, J. (2006, 8-9 May). *Maximising doctor input using other professions.* Paper presented at the Practice made perfect? - The sequel, Sydney.

Matic, V. (2005). *From the horse's mouth: A GP's perspective on sustainable general practice in a remote setting.* Paper presented at the Practice made perfect?, Coffs Harbour.

Matic, V. (2006, 8-9 May). *Integrated Primay Care.* Paper presented at the Practice made perfect? - The sequel, Sydney.

Matthew, C. (2005). *Cessnock Uni-clinic.* Paper presented at the Practice made perfect?, Coffs Harbour.

McCann, T. V., & Baker, H. (2003). Models of mental health nurse-general practitioner liaison: promoting continuity of care. *Journal of Advanced Nursing, 41*(5), 471-479.

McDermott, R., Knight, S., Abbott, K., Ariotti, L., & Devitt, J. (1994). *A Review of Urapuntja Health Service, Central Australia, undertaken for the Aboriginal and Torres Strait Islander commission.*

Meade, B. J., & Dunbar, J. A. (2004). A virtual clinic: telemetric assessment and monitoring for rural and remote areas. *Rural and Remote Health, 4*(3).

Mills, I. (1995, 3-5 Feb). *The Dalwallinu multi-purpose service one year on: what have we done? why did we do it?* Paper presented at the 3rd National Rural Health Conference, Mt Beauty.

Mills, I. (1997). Recruiting General Practitioners to rural areas: one community's experience. *Australian Journal of Rural Health, 5*, 194-197.

Mills, P., & Harvey, P. (2003). Beyond community-based diabetes management and the COAG coordinated care trial. *Australian Journal of Rural Health, 11*(3), 131-137.

Misan, G., White, P., McKenzie, W., & Paskett, E. (2002). *Final Report on the Whyalla General Practice Virtual Amalgamation Project*. Whyalla: Spencer Gulf Rural Health School.

Mitchell, J., Robinson, P., Seiboth, C., & Koszegi, B. (2000). An evaluation of a network for professional development in child and adolescent mental health in rural and remote communities. *Journal of Telemedicine and Telecare, 6*(3), 158-162.

Mitchell, J. G. (1999). The uneven diffusion of telemedicine services in Australia. *Journal of Telemedicine and Telecare, 5*(Suppl 1), S45-47.

Monash University Centre for Rural Health, The University of Queensland North Queensland Clinical School, & Flinders University Rural and Remote Health Unit. (1998). *Models of Sustainable Rural and Remote General Practice Services: A Dream Come True?* (Consultancy Report): Commonwealth Department of Health and Family Services.

Munn, P., Cheers, B., & Petkov, J. (2003). Extent of service coordination in rural South Australia. *Rural Social Work, 8*(1), 38-49.

Nel, P., & Pashen, D. (2003). Shared antenatal care for indigenous patients in a rural and remote community. *Australian Family Physician, 32*(3), 127-131.

Neumayer, B., Chapman, J., & Whiteford, G. (2003). Role of multi-purpose service programs providing residential aged care in rural Australia: A discussion paper. *Australian Journal of Rural Health, 11*(6), 287-291.

Neville, N. (1993). *A model of allied health service delivery to country communities in the Upper Eyre Peninsula.* Paper presented at the 2nd National Rural Health Conference, Armidale.

Nicoll, P., Jackson, D., Then, E.-L., & Matyk, P. (2004). *Department of Health and Ageing's management of the Multipurpose Services Program and the Regional Health Services Program.* (No. Audit Report 40 2003-04): Australian National Audit Office.

Nissen, L., & Tett, S. (2003). Can telepharmacy provide pharmacy services in the bush? *Journal of Telemedicine and Telecare, 9*(Suppl 2), S39-41.

NSW Rural Doctors Network. (2005). *Alternate models of rural general practice management*. Newcastle: NSW Rural Doctors Network.

O'Kearney, R., Garland, G., Welch, M., Kanowski, L., & Fitzgerald, S. (2004). Factors predicting program fidelity and delivery of an early intervention program for first episode psychosis in rural Australia. *Australian e-Journal for the Advancement of Mental Health, 3*(2).

O'Meara, P., Hall, R. H., Strasser, R., & Speck, V. (1998). Developing a funding model for an after-hours primary medical care service in a rural town. *Australian Health Review 21*(3), 104-115.

O'Meara, P., & Strasser, R. (2000). *Evaluation of an after hours medical service in Moe.* Paper presented at the 5th Biennial Australian Rural Remote Health Scientific Conference - Infront Outback, Toowoomba.

O'Toole, K., Nesbitt, P., & Macgarvey, A. (2002). Amalgamation of health services in south-west Victoria: reinvention or survival? *The Australian Journal of Rural Health, 10*(1), 51-56.

Owen, A., Perkins, D., Senior, K., Cromwell, D., Eagar, K., & Gordon, R. (2002). *The Griffith Area Palliative Care Service: Second Evaluation Report*. Wollongong: Centre for Health Service Development, University of Wollongong.

Owen, A., Perkins, D., Senior, K., & Eagar, K. (2001). *The Griffith Area Palliative Care Service: a baseline assessment of its evaluability, sustainability and generalisability*. Wollongong: Centre for Health Service Development, University of Wollongong.

Owen, C., Tennant, C., Jessie, D., Jones, M., & Rutherford, V. (1999). A model for clinical and educational psychiatric service delivery in remote communities. *Australian and New Zealand Journal of Psychiatry, 33*(3), 372-378.

Perkins, D. A. (1999). *Towards integrated mental health services in rural and remote Australia.* Paper presented at the 5th National Rural Health Conference, Adelaide.

Philip, T., Welch, M., Aldridge, G., Fisher, H., & Cross, M. (2000). Setting the standards: A report on a GP/Mental Health Service liaison project in a rural area. *Australian Journal of Primary Health - Interchange, 6*(3-4), 215-221.

PRHCIT. (1996). Telehealth in rural and remote Australia: Report of the Project for Rural Health Communications and information Technologies.

Ramsay, J., Wakerman, J., Jensen, H., & Farthing, A. (2005). *Central Australian Allied Health Planning Study.* Alice Springs: Centre for Remote Health.

Robinson, G., & Bailie, R. (2000). *Tiwi Coordinated Care Trial Final Local Evaluation Report.* Darwin: NTU Centre for Social Research.

Robinson, G., & Bailie, R. (2000). *Tiwi Coordinated Care Trial Transition Year Evaluation report.* Darwin: NTU Centre for Social Research.

Robinson, G., Bailie, R., & Togni, S. (2002). *Tiwi Coordinated Care Trial Post Transition Year*. Darwin: Centre for Northern Australian & Asian Research.

Robinson, G., d'Abbs, P., Togni, S., & Bailie, R. (2003). Aboriginal participation in health service delivery: Coordinated care trials in the Northern Territory of Australia. *International Journal of Health care Technology and Management, 5*(1-2), 45-62.

Rose, G. (2006, 8-9 May). *Primary Health Care Services University Led.* Paper presented at the Practice made perfect? - The sequel, Sydney.

Rosina, R., Starling, J., Nunn, K., Dossetor, D., & Bridgland, K. (2002). Telenursing: clinical nurse consultancy for rural paediatric nurses. *Journal of Telemedicine and Telecare, 8*(Suppl 3), S3:48-49.

Rowbotham, G., & Baxter, P. (1999). *Hepburn integrated aged care project.* Paper presented at the 5th National Rural Health Conference, Adelaide.

Rural Doctors Association of Australia, & Monash University School of Rural Health. (2003). *Viable Models of Rural and Remote Practice. Stage 1 and Stage 2 Reports*. Canberra: Rural Doctors Association of Australia.

Rural Workforce Agency Victoria. (2001). *A Snapshot of Sustainable Rural General Practice Projects in Victoria* (Issues Paper No. 6 Workforce Issues Paper). Melbourne: Rural Workforce Agency, Victoria.

Sach & Associates, & Centre for Applied Gerontology. (2000). *Multi-Purpose Services Program Evaluation (Victoria)*: Commonwealth Department of Health and Aged Care and (Victorian) Department of Human Services.

See, A., Lim, A. C., Le, K., See, J. A., & Shumack, S. P. (2005). Operational teledermatology in Broken Hill, rural Australia. *Australasian Journal of Dermatology, 46*(3), 144-149.

Smith, A. C., Isles, A., McCrossin, R., Van der Westhuyzen, J., Williams, M., Woollett, H., et al. (2001). The point-of-referral barrier--a factor in the success of telehealth. *Journal of Telemedicine and Telecare, 7*(Suppl 2), 75-78.

Smith, D., & Wilkin, C. (1996). A round peg in a square hole: changes in a rural health service. *Australian Journal of Primary Health Interchange, 2*(2), 63-71.

Snook, V. (1997). The challenges of adopting a primary health care model for Aboriginal health services: a case study in the Derby region. In *Rural and remote Australia: health for all by the year 2000. Conference papers 4th National Rural Health Conference. Perth, Western Australia February 9-12 1997* (pp. 587-591): National Rural Health Alliance.

Snowball, K. (1994). Multipurpose services - a potential solution for rural health and aged care. *Australian Journal of Rural Health, 2*, 37-40.

Stanley-Davies, P., & Battye, K. (2004). *The Division with the Vision: Development of the North West Queensland Allied Health Service by North and West Queensland Primary Health Care. Evaluation of Stage 1*.

Swain, G. (2005). *Gunnedah Shire Council.* Paper presented at the Practice made perfect?, Coffs Harbour.

Taylor, J., Blue, I., & Misan, G. (2001). Approach to sustainable primary health care service delivery for rural and remote South Australia. *The Australian Journal of Rural Health, 9*(6), 304-310.

Taylor, J., Dollard, J., Weetra, C., & Wilkinson, D. (2001). Contemporary management issues for Aboriginal Community Controlled Health Services. *Australian Health Review, 24*(3), 125-132.

Tobin, M. J. (1996). Rural psychiatric services. *Australian and New Zealand Journal of Psychiatry, 30*(1), 114-123.

Toyne, P., & Granites, R. J. (1995). *Mind in cyberspace, feet on the ground: utilising new and existing communications technology for health service delivery to Aboriginal people in remote areas.* Paper presented at the 3rd NRHA Conference, Mt Beauty.

Trott, P., & Blignault, I. (1998). Cost evaluation of a telepsychiatry service in northern Queensland. *Journal of Telemedicine and Telecare, 4*(Suppl 1), 66-68.

Vines, R. F., Richards, J. C., Thomson, D. M., Brechman-Toussaint, M., Kluin, M., & Vesely, L. (2004). Clinical psychology in general practice: A cohort study. *Medical Journal of Australia, 181*(2), 74-77.

Viney, R., & Haas, M. (1998). Funding arrangements for telehealth: encouraging efficiency rather than proliferation. *Australian Health Review, 21*(3), 34-48.

Wakerman, J., Bennett, M., Healy, V., & Warchivker, I. (1997). *Models of remote area service delivery based on consumers' preferences: Preliminary findings of the review of NT government remote health services in central Australia.* Paper presented at the 4th National Rural Health Conference, Perth.

Wakerman, J., Bennett, M., Healy, V., & Warchivker, I. (1997). *Review of the Northern Territory Government Remote Health Services in Central Australia*. Alice Springs: Menzies School of Health Research.

Wakerman, J., & Field, P. (1998). Remote area health service delivery in Central Australia: primary health care and participatory management. *Australian Journal of Rural Health, 6*(1), 27-31.

Wakerman, J., Tregenza, J., & Warchivker, I. (1999). *Review of Health Services in the Kutjungka Region of Western Australia: Final Report*.

Walker, J., Hill, R., & Green, L. (2000). Tassie's tele-rrific telehealth network: Linking primary health care services for better rural health outcomes. *Australian Journal of Primary Health - Interchange, 6*(3-4), 108-117.

Warchivker, I., Mitchell, J., Sherwood, J., Levers, S., & Wearne, S. (2003). *Ltyentye Apurte Primary Health Care Needs Assessment and Strategic Plan Draft Report.* Alice Springs: Centre for Remote Health.

Watson, J., Gasser, L., Blignault, I., & Collins, R. (2001). Taking telehealth to the bush: lessons from north Queensland. *Journal of Telemedicine and Telecare, 7*(Suppl 2), 20-23.

Weiland, L., Chandler, R., Rimmer, D., Bell, A., Battye, K., Sharkey, D., et al. (2005). *Health Reform Project and Social Enterprise Proposal: Cape York.*: Cape York Institute.

Westbury, N., & Sanders, W. (2000). *Governance and service delivery for remote Aboriginal communities in the Northern Territory: challenges and opportunities.* (No. 6/2000). Canberra: Centre for Aboriginal Economic Policy Research.

Wilkes, L., Mohan, S., White, K., & Smith, H. (2004). Evaluation of an after hours telephone support service for rural palliative care patients and their families: A pilot study. *Australian Journal of Rural Health, 12*(3), 95-98.

Wilkinson, D., & Symon, B. (2001). Amalgamation and collaboration in rural general practices: early experience with the GP links program in rural South Australia. *The Australian Journal of Rural Health, 9*(2), 80-84.

Wilkinson, D., Symon, B., Newbury, J., & Marley, J. E. (2001). Positive impact of rural academic family practices on rural medical recruitment and retention in South Australia. *The Australian Journal of Rural Health, 9*(1), 29-33.

Williams, R. I. (1998). Assessing the feasibility of providing mental health services to remote communities with the Royal Flying Doctor Service. *Mental Health in Australia, 8*(1), 69-75.

Wilson, A., & Cullen, M. (2001). The greater murray accessline. *Australasian Psychiatry, 9*(4), 351-355.

In-Text Reference List

1. Greenhalgh T. How to read a paper: Papers that summarise other papers (systematic reviews and meta-analyses). BMJ. 1997 September 13, 1997;315(7109):672-5.
2. Australian Institute of Health and Welfare. Rural, regional and remote health, a guide to remoteness classifications. Canberra: AIHW; 2004. Report No.: AIHW Cat. No. PHE 53.
3. Humphreys J. Rural health and the health of rural communities. 1998 Worner Research Lecture. Bendigo: La Trobe University; 1998.
4. Rural and Remote Mental Health Services Working Party. Report for Western Australia's State Mental Health Strategic Plan 2003 - 2008. Perth; 2003 August.
5. Vinson T. Community Adversity and Resilience: the distribution of social disadvantage in Victoria and New South Wales and the mediating role of social cohesion. Richmond: The Ignatius Centre for social policy and research; 2004 March.

6. Australian Institute of Health and Welfare. Rural, regional and remote health, indicators of health. Canberra: AIHW; 2005. Report No.: AIHW Cat. No. PHE 59.
7. Australian Institute of Health and Welfare. Health in rural and remote Australia. Canberra: AIHW; 1998. Report No.: AIHW Cat. No. PHE 6.
8. National Rural Health Policy Forum and National Rural Health Alliance. Healthy Horizons: a framework for improving the health of rural, regional and remote Australians. Canberra: National Rural Health Policy Forum; 1999 March 1999.
9. Sadkowsky K, Hagan P, Kelman C, Liu C. Health services in the city and the bush: measures of access and use derived from linked administrative data. Canberra: Commonwealth Department of Health and Aged Care; 2001 September 2001. Report No.: Occasional Papers: New Series Number 13.
10. Chenoweth L, Stehlik D. Using technology in rural practice -- local area coordination in rural Australia. Rural Social Work. 2002;7(1):14-21.
11. Productivity Commission. Australia's Health Workforce. Productivity Commission Research Report. Canberra: Commonwealth of Australia; 2005.
12. Nissen L, Tett S. Community pharmacists improving health outcomes in rural and remote Queensland. Australian Pharmacist. 2002;21(11):874-6, 8-80.
13. Humphreys J. Social provision and service delivery: Problems of equity, health, and health care in rural Australia. Geoforum. 1988;19(3):323-38.
14. Asthana S, Halliday J. What can rural agencies do to address the additional costs of rural services? A typology of rural service innovation. Health and Social Care in the Community. 2004;12(6):457-65.
15. Shannon C, Wakerman J, Hill P, Barnes T, Griew R. Achievements in Aboriginal and Torres Strait Islander Health. Darwin: Cooperative Research Centre for Aboriginal and Tropical Health; 2003 November.
16. Eagar K, Pirkis J, Owen A, Burgess P, Posner N, Perkins D. Lessons from the national mental health integration program. Australian Health Review. 2005;29(2):189-200.
17. Department of Community Services and Health. A Fair Go for Rural Health. Canberra: Department of Community Services and Health; 1991.
18. Hospitals and Health Services Commission. Rural Health in Australia. Canberra: Australian Government Publishing Service; 1976.
19. Humphreys J, Hegney D, Lipscombe J, Gregory G, Chater B. Whither rural health? Reviewing a decade of progress in rural health. The Australian Journal of Rural Health. 2002;10(1):2-14.
20. Australian Institute of Health and Welfare. Rural, regional and remote health. A study on mortality. Canberra: AIHW; 2003. Report No.: AIHW Cat. No. PHE 45.
21. Australian Institute of Health and Welfare. Rural, regional and remote health. Mortality trends 1992-2003. Canberra: AIHW 2006. Report No.: AIHW Cat. No. PHE 71.
22. Best J. Rural health stocktake: Advisory Paper to the Commonwealth Department of Health and Aged Care.; 2000.
23. National Rural Health Alliance. Rural Health - 30% Fair Share, Position Papers 2000-2001. Canberra: NRHA; 2001.
24. Holub L, Williams B. The General Practice Rural Incentives Program, development and implementation: progress to date. The Australian Journal of Rural Health. 1996;4(2):117-27.
25. Department of Health and Ageing. Regional Health Strategy - Fact Sheet 3. Australian Government Department of Health and Ageing; 2000.

26. Department of Health and Ageing. Health Fact Sheet 4 - A Continuing Commitment to Rural, regional and Remote Australians. Australian Government Department of Health and Ageing; 2004.
27. Humphreys J. Revisiting the well-being of remote communities twenty years on - a time for celebration and reflection. 8th National Rural Health Conference; 2005 10-13 March; Alice Springs: NRHA; 2005.
28. Australian Government Department of Health and Ageing. General Practice Statistics. Table 6: GP headcount by RRMA. 2006 Feb 2006 [cited 2006 11 September]; Available from: http://www.health.gov.au/internet/wcms/publishing.nsf/Content/health-pcd-statistics-gpnos.htm
29. WHO. Declaration of Alma Ata, Report on the International Conference of Primary Health Care. Alma Ata, USSR: World Health Organisation; 1978.
30. Fridgant Y, Powell Davies G, O'Toole B, Betbeder-Matibet L, Harris M. Integration of general practitioners with hospitals and community health services: a qualitative examination. Australian Journal of Primary Health Interchange. 1998;4(4):68-78.
31. Cameron I. Towards Unity for Health applied - the pentagon of partnership as a basis for a regional workforce structure. 7th National Rural Health Conference; 2003 1-4 March; Hobart; 2003.
32. Lynch M. Easy entry-gracious exit: testing new models for doctor recruitment and retention in chronically underserviced rural communities. 7th National Rural Health Conference; 2003; Hobart: NRHA; 2003.
33. Taylor J, Blue I, Misan G. Approach to sustainable primary health care service delivery for rural and remote South Australia. The Australian Journal of Rural Health. 2001;9(6):304-10.
34. Wilkinson D, Symon B, Newbury J, Marley JE. Positive impact of rural academic family practices on rural medical recruitment and retention in South Australia. The Australian Journal of Rural Health. 2001;9(1):29-33.
35. Matthews C. Cessnock Uni-clinic. Practice made perfect?; 2005; Coffs Harbour: NSW Rural Doctors Network; 2005.
36. NSW Rural Doctors Network. Alternate models of rural general practice management. Newcastle: NSW Rural Doctors Network; 2005.
37. Rural Doctors Association of Australia, Monash University School of Rural Health. Viable Models of Rural and Remote Practice. Stage 1 and Stage 2 Reports. Canberra: Rural Doctors Association of Australia; 2003.
38. Boucher M, Lynch M. Easy Entry, Gracious Exit. Newcastle: NSW Rural Doctors Network; 2003.
39. Cameron I. Finding solutions in North West NSW:"Easy Entry, Gracious Exit" and the Rural and Remote Medical Services (RARMS) experience. Practice made perfect?; 2005; Coffs Harbour: NSW Rural Doctors Network; 2005.
40. Chapman T. Local Government involvement in Primary Health Care issues in the wheatbelt region of Western Australia: Western Australian Municipal Association; undated.
41. Down G, Jeffries F, Seward M. Towards Northern Wheatbelt GP sustainability: WACRRM; 2000.
42. Rose G. Primary Health Care Services University Led. Practice made perfect? -The sequel; 2006 8-9 May; Sydney: NSW Rural Doctors Network; 2006.
43. Harvey P. The impact of coordinated care: Eyre region, South Australia 1997-1999. The Australian Journal of Rural Health. 2001;9(2):69-73.
44. Cromwell D, Senior K, Owen A, Gordon R, Eagar K. Can the National Palliative Care Strategy be translated into a model of care that works for rural Australia? An answer from the Griffith Area Palliative Care Service

(GAPS) experience. Wollongong: Centre for Health Service Development, University of Wollongong; 2003.

45. Owen A, Perkins D, Senior K, Cromwell D, Eagar K, Gordon R. The Griffith Area Palliative Care Service: Second Evaluation Report. Wollongong: Centre for Health Service Development, University of Wollongong; 2002.
46. Owen A, Perkins D, Senior K, Eagar K. The Griffith Area Palliative Care Service: a baseline assessment of its evaluability, sustainability and generalisability. Wollongong: Centre for Health Service Development, University of Wollongong; 2001.
47. Smith D, Wilkin C. A round peg in a square hole: changes in a rural health service. Australian Journal of Primary Health Interchange. 1996 May 2(2):63-71.
48. Hawke M, Byrne J. Community-based early childhood assessment and intervention in rural settings: Transdisciplinary case management of developmental delay in children. Australian Journal of Primary Health - Interchange. 2000;6(3-4):130-40.
49. Nicoll P, Jackson D, Then E-L, Matyk P. Department of Health and Ageing's management of the Multipurpose Services Program and the Regional Health Services Program.: Australian National Audit Office; 2004. Report No.: Audit Report 40 2003-04.
50. Hoodless M, Evans F. The multipurpose service program: The best health service option for rural Australia. Australian Journal of Primary Health. 2001;7(1):90-6.
51. Barkas R. A model of comprehensive medical service provision by salaried general practitioners for an isolated rural community. Innovations in Health Service Delivery in Rural and Remote Australia Conference; 2003 29-30 May 2003; Campbell, ACT; 2003. p. 18-20.
52. Sach & Associates, Centre for Applied Gerontology. Multi-Purpose Services Program Evaluation (Victoria): Commonwealth Department of Health and Aged Care and (Victorian) Department of Human Services; 2000 November 2000.
53. Andrews G, Dunn J, Hagger C, Sharp C, Witham R. Pilot Multi-Purpose Services Program Evaluation Final Report. Adelaide: Centre for Ageing Studies The Flinders University of South Australia; Health Solutions; Consortium for Evaluation Research and Training; 1995.
54. Bailie RS, Si D, Robinson GW, Togni SJ, d'Abbs PHN. A multifaceted health-service intervention in remote Aboriginal communities: 3-year follow-up of the impact on diabetes care. Medical Journal of Australia. 2004 181 (4):195-200
55. Local Evaluation Team. Jirntangku Miyrta Katherine West Coordinated Care Trial Final Report. Darwin: Menzes School of Health Research; 2000.
56. Entwistle P. Katherine East Coordinated Care trial: Quarterly reports to the national evaluators 2003-2005: Centre for Remote Health; 2005.
57. Robinson G, Bailie R. Tiwi Coordinated Care Trial Final Local Evaluation Report. Darwin: NTU Centre for Social Research; 2000 May 29th.
58. Robinson G, Bailie R. Tiwi Coordinated Care Trial Transition Year Evaluation report. Darwin: NTU Centre for Social Research; 2000.
59. Robinson G, Bailie R, Togni S. Tiwi Coordinated Care Trial Post Transition Year. Darwin: Centre for Northern Australian & Asian Research; 2002.
60. McDermott R, Knight S, Abbott K, Ariotti L, Devitt J. A Review of Urapuntja Health Service, Central Australia, undertaken for the Aboriginal and Torres Strait Islander commission.; 1994 July.

61. Battye KM, McTaggart K. Development of a model for sustainable delivery of outreach allied health services to remote North-West Queensland, Australia. Rural and Remote Health. 2003;3(3).
62. Stanley-Davies P, Battye K. The Division with the Vision: Development of the North West Queensland Allied Health Service by North and West Queensland Primary Health Care. Evaluation of Stage 1; 2004.
63. Auld M. Barriers to introducing nutrition services in rural communities. 3rd National Rural Health Conference; 1995 3-5 Feb; Mt Beauty: NRHA; 1995. p. 361-7.
64. Neville N. A model of allied health service delivery to country communities in the Upper Eyre Peninsula. 2nd National Rural Health Conference; 1993; Armidale: NRHA; 1993. p. 87-90.
65. Booth A. Health service delivery to outback South Australia: a story of organizational change. International Journal of Health Care Quality Assurance. 1996;9(2):15-9.
66. Misan G, White P, McKenzie W, Paskett E. Final Report on the Whyalla General Practice Virtual Amalgamation Project. Whyalla: Spencer Gulf Rural Health School; 2002.
67. Wilkinson D, Symon B. Amalgamation and collaboration in rural general practices: early experience with the GP links program in rural South Australia. The Australian Journal of Rural Health. 2001;9(2):80-4.
68. Berry G. Final Report Eyre Peninsula Virtual Amalgamation Project: Eyre Peninsula Division of General Practice; 2002.
69. Hyndman I, Ward C. A cooperative approach to sustainable rural general practice in neighbouring towns. WONCA; 2002; Melbourne: WONCA; 2002.
70. Rural Workforce Agency Victoria. A Snapshot of Sustainable Rural General Practice Projects in Victoria. Issues Paper. Melbourne: Rural Workforce Agency, Victoria; 2001 Oct 2000. Report No.: 6 Workforce Issues Paper.
71. Maguire T. Wentworth Medical Practice. Practice made perfect?; 2005; Coffs Harbour: NSW Rural Doctors Network; 2005.
72. Lorraine P. The development of a sustainable health service in a small rural community: every cloud has a silver lining. 5th National Rural Health Conference; 1999; Adelaide: NRHA; 1999.
73. Mann LJ. Integrated assessment: A rural model in practice. Australian Journal of Primary Health. 2001;7(1):106-10.
74. Judd F, Fraser C, Grigg M, Scopelliti J, Hodgins G, Donoghue A, et al. Rural psychiatry: Special issues and models of service delivery. Disease Management and Health Outcomes. 2002;10(12):771-81.
75. Lester H. Shared care for people with mental illness: a GP's perspective. Advances in Psychiatric Treatment. 2005;11:133-41.
76. Campbell A. The evaluation of a model of primary mental health care in rural Tasmania. Australian Journal of Rural Health. 2005;13(3):142-8.
77. Snowball K. Multipurpose services - a potential solution for rural health and aged care. Australian Journal of Rural Health. 1994;2:37-40.
78. O'Toole K, Nesbitt P, Macgarvey A. Amalgamation of health services in south-west Victoria: reinvention or survival? The Australian Journal of Rural Health. 2002;10(1):51-6.
79. Alt M, Beatty D. Finding solutions: delivering quality aged care in rural and remote Australia. 7th National Rural Health Conference; 2003; Hobart: NRHA; 2003.

80. Walsh J, Warren K. Selective primary health care:an interim strategy for disease control in developing countries. Social Science and Medicine. 1980;14C:145-63.
81. Robinson G, d'Abbs P, Togni S, Bailie R. Aboriginal participation in health service delivery: Coordinated care trials in the Northern Territory of Australia. International Journal of Health care Technology and Management. 2003;5(1-2):45-62.
82. Atkinson D, Bridge C, Grey D. Kimberly Regional Aboriginal Health Plan: Commonwealth Department of Health and Aged Care; 1999.
83. Bartlett B, Duncan P. Top End Aboriginal Health Planning Study. Coledale Plan Health Pty. Ltd.; 2000.
84. Bartlett B, Duncan P, Alexander D, Hardwick J. Central Australian Health Planning Study: Final Report. Coledale: OATSIHS, Commonwealth Department of Health and Family Services; 1997.
85. Burns CB. Feasibility Study and Service Plan of Health Services at Maningrida: Final Report. Darwen: Menzies School of Health Research; 1995.
86. Burns CB, Clough AR, Currie BJ, Thomsen P, Wuridgal R. Resource requirements to develop a large, remote Aboriginal health service: whose responsibility? Australian and New Zealand Journal of Public Health. 1998 22 (1):133-9
87. Wakerman J, Bennett M, Healy V, Warchivker I. Models of remote area service delivery based on consumers' preferences: Preliminary findings of the review of NT government remote health services in central Australia. 4th National Rural Health Conference. Perth: Menzies School of Health Research; 1997.
88. Wakerman J, Tregenza J, Warchivker I. Review of Health Services in the Kutjungka Region of Western Australia: Final Report; 1999.
89. Weiland L, Chandler R, Rimmer D, Bell A, Battye K, Sharkey D, et al. Health Reform Project and Social Enterprise Proposal: Cape York.: Cape York Institute; 2005.
90. Allen O. Anthill and other injuries: a case for mobile allied health teams to remote Australia. The Australian Journal of Rural Health. 1996;4(1):33-42.
91. Ramsay J, Wakerman J, Jensen H, Farthing A. Central Australian Allied Health Planning Study. Alice Springs: Centre for Remote Health; 2005.
92. KWHB. Something Special: The inside story of the Katherine West Health Board. Canberra: Aboriginal Studies Press; 2003.
93. Viney R, Haas M. Funding arrangements for telehealth: encouraging efficiency rather than proliferation. Australian Health Review. 1998;21(3):34-48.
94. Walker J, Hill R, Green L. Tassie's tele-rrific telehealth network: Linking primary health care services for better rural health outcomes. Australian Journal of Primary Health - Interchange. 2000;6(3-4):108-17.
95. Kavanagh SJ, Yellowlees PM. Telemedicine--clinical applications in mental health. Australian Family Physician. 1995;24(7):1242-7.
96. Mitchell JG. The uneven diffusion of telemedicine services in Australia. Journal of Telemedicine and Telecare. 1999;5(Suppl 1):S45-7.
97. Wilson A, Cullen M. The greater murray accessline. Australasian Psychiatry. 2001;9(4):351-5.
98. Dillon E, Loermans J. Telehealth in Western Australia: the challenge of evaluation. Journal of Telemedicine and Telecare. 2003;9 (Suppl 2):S15-9.

99. Leversha A, Pendergast C, Humphreys J, Colley C, Scavone M, Marty S. An evaluation of videoconferencing in a rural community pharmacy. Australian Pharmacist. 2003;22(2):154-7.
100. Guilfoyle C, Wootton R, Hassall S, Offer J, Warren M, Smith D, et al. User satisfaction with allied health services delivered to residential facilities via videoconferencing. Journal of Telemedicine and Telecare. 2003;9(Suppl 1):S52-4.
101. Meade BJ, Dunbar JA. A virtual clinic: telemetric assessment and monitoring for rural and remote areas. Rural and Remote Health. 2004;4(3).
102. Hassall S, Wootton R, Guilfoyle C. The cost of allied health assessments delivered by videoconference to a residential facility for elderly people. Journal of Telemedicine and Telecare. 2003;9(4):234-7.
103. Trott P, Blignault I. Cost evaluation of a telepsychiatry service in northern Queensland. Journal of Telemedicine and Telecare. 1998;4(Suppl 1):66-8.
104. Faulkner K. Successes and failures in videoconferencing: a community health education programme. Journal of Telemedicine and Telecare. 2001;7(Suppl 2):65-7.
105. Flick B, Miller P, Torzillo P, Wilson J. Aboriginal health services delivery in remote Australia: policy, program and practice considerations. 4th ed. Melbourne: Longman Australia; 2000.
106. Humphreys J, Wakerman J, Wells R. What do we mean by sustainable rural health services? Implications for rural health research. Australian Journal of Rural Health. 2006;14:33-5.
107. KPMG Consulting. The Aboriginal & Torres Strait Islander Coordinated Care Trials - National Evaluation Report (Volume 1) - Volume 1 Main Report.: Office for Aboriginal and Torres Strait Islander Health; 1999.
108. Boffa J, Fisher M. Aboriginal and Torres Strait Islander Health: implementation of the Primary Health Care Access Program (PHCAP) in four remote health zones in Central Australia and in the Northern Territory. PHAA; 2000; Canberra; 2000.
109. Ah Kit J, Prideaux C, Harvey PW, Collins J, Battersby M, Mills PD, et al. Chronic disease self-management in Aboriginal communities: towards a sustainable program of care in rural communities. Australian Journal of Primary Health. 2003;9(2-3):168-76
110. McDermott R, Tulip F, Schmidt B, Sinha A. Sustaining better diabetes care in remote indigenous Australian communities. British Medical Journal. 2003;327(23 August):428-30.
111. McDermott R, Tulip F, Schmidt B, Sinha A. Sustaining better diabetes care in remote indigenous Australian communities. Quality & Safety in Health Care 2004;13(4):295-8.
112. Munn P, Cheers B, Petkov J. Extent of service coordination in rural South Australia. Rural Social Work. 2003;8(1):38-49.
113. Wakerman J, Bennett M, Healy V, Warchivker I. Review of the Northern Territory Government Remote Health Services in Central Australia. Alice Springs: Menzies School of Health Research; 1997.

APPENDICES

Appendix 1: Reference group terms of reference and membership

Terms of reference:

1. To assist the research team with identification of and access to relevant grey literature
2. To advise on the scope of the systematic review, with specific reference to development of inclusion and exclusion criteria
3. To comment on the development of a detailed search strategy
4. To assist with the development of a system to appropriately categorise reforms for the purpose of analysis
5. To advise on policy drivers and impediments to the use of evidence in policy development
6. To work with the research team to develop and implement a research transfer strategy within the Australian Primary Health Care Research Institute process
7. To comment on draft project outputs

Members:

- Kim Snowball – St John of God, Western Australia
- Chris O'Farrell - AHMAC Rural Sub-Committee
- Alma Quick – Department of Health & Ageing Rural Health Branch
- Chris Harrington - Department of Health & Ageing Office for Aboriginal and Torres Strait Islander Health
- Gordon Gregory – National Rural Health Alliance
- Brita Pekarsky – University of South Australia
- Dr Ian Cameron - NSW Rural Doctors Network
- Prof David Lyle – Broken Hill University Department of Rural Health, University of Sydney
- Mick Gooda – Co-operative Research Centre for Aboriginal Health
- Prof Ray Pong – Laurentian University, Canada
- A/Prof Martha MacCleod – University of Northern British Columbia, Canada

Appendix 2: Electronic Database Search Terms

Term ID	Term	Usage notes
Qualifiers		
Q1	((Australia) AND (rural OR remote)) AND	Indicative searches 1 & 2
Q2	((Australia) AND (rural) AND	Indicative search 3
Q3	((Australia) AND (remote) AND	
Search Terms		
T1	Primary health care)	
T2	(organisation OR governance))	
T3	Funding arrangements)	
T4	Service delivery)	
T5	(monitoring OR performance assessment))	
T6	Policy)	
T7	(indigenous OR aboriginal))	
T8	Service model)	
T9	(primary health care AND initiatives))	
T10	Evaluation)	
T11	(barriers OR facilitators))	
T12	Primary healthcare)	
T13	(costs AND cost analysis))	
Exploded Terms		
T14	Health care –Health care economics and organizations-Economics	Medline MeSH Include all terms below this level, AND-ED with Q2 or Q3
T15	T14 –Costs and Cost Analysis	Medline MeSH Use if too many irrelevant hits with T14
T16	Health economics –Economic evaluation	EMBASE Include all Terms below this level
T17	Economics –Cost analysis	CINAHL
More free-text Terms		
T18	(Finance OR financing))	
T19	(Fund OR Funding OR Fundholding))	
T20	(Service AND (Delivery Or Model))	Replaces T4 & T8
T21	(Monitoring OR Performance Assessment OR Evaluation))	Replaces T5 & T10
T22	(Policy OR Policies OR Reform))	Replaces T6
T23	(Barriers OR Facilitators OR Challenges))	Replaces T11
T24	(Organisation OR Organization OR Governance OR Management))	Replaces T2

Appendix 3: Evolution of inclusion and exclusion criteria

INCLUSION			
Criteria	**Initial**	**Final**	**Reason for change**
Time period	• 1993-2005	• 1993-2005	No change
Language	• English	• English	No change
Place of study	• National/International	• Australia	• Focus on models relevant to Australia • Limit scope to manageable size
Geographical delimitation	• Rural or remote	• Rural and remote	No change
Aspect of health care	• Comprehensive primary health care model	• Comprehensive primary health care model or component thereof	To broaden scope to include papers that could usefully inform the construction of a PHC model
Objectives 1. What structural and financial issues are addressed? 2. What are the barriers to and facilitators of success 3. Characteristics of appropriate* models 4. Evidence-informed principles* or guidelines	• Identifies or addresses some specific structural or financial aspect of primary health service provision • Identifies reasons for success or failure leading to models uptake or sustainability over time • Key structural and financial characteristics are explicitly identified, considered or evaluated • Some primary or secondary evidence base underpins research or statement	• Identifies or addresses some specific structural or financial aspect of primary health service provision • Identifies reasons for success or failure leading to models uptake or sustainability over time • Key structural and financial characteristics are explicitly identified, considered or evaluated • Some primary or secondary evidence base underpins research or statement	No change No change No change No change
Other			

EXCLUSION			
Criteria	**Initial**	**Final**	**Reason for change**
Time period			
Language			
Place of study			
Geographical delimitation	• No relevance to rural and remote	• No relevance to rural and remote	No change
Aspect of health care	• Secondary or tertiary health care (unless specifically articulated or supporting primary care)	• Secondary or tertiary health care (unless specifically articulated or supporting primary care)	No change
Objectives 1. What structural and financial issues are addressed? 2. What are the barriers to and facilitators of success 3. Characteristics of appropriate models 4. Evidence informed principles or guidelines	• Problem description (not based on any evidence or intervention)	• Problem description (not based on any evidence or intervention) • First person accounts or assertions without any corroborating evidence • Descriptions of individual professional groups or activities (not models or systems)	• No change • Added 4.04.06 – Exclude non-evidence based literature • Added 17.02.06 – Exclude papers which focused on descriptions of professional groups, not models of PHC
Other	• Clinical intervention or trial	• Clinical intervention or trial • Education and training initiatives which do not inform a PHC service delivery model in a direct way.	• No change • Added 4.04.06 – Exclude papers on education and training not directly informing or integral to models of PHC

Appendix 4: Data Extraction Sheet

Identification **reviewer initials** [ ] **2**

3 Author name/s	4Year publ.	5Title

Context

6Year/s of study	Place of study –*tick which apply* 7☐ rural ☐ remote ☐ both ☐not stated 8☐ Population <5K ☐ Population >5K 9State/s/Territory (list)	10Place of study town name/s

Population

11Service type-*describe*	12Provider type-*describe* *e.g. Govt. NGO, ACCHS*	Target client characteristics -*tick which apply* • Age range 13 [ ] • Sex 14☐ males ☐ females ☐ both • Exclusively Indigenous service provision 15☐ yes ☐ no • Other significant characteristics -*describe* 16

Service role

Purpose–*tick which apply*

18☐ accessibility

19☐ funding

20☐ choice

21☐ efficiency/cost effectiveness

22☐ workforce

23☐ coordination

24☐ integration

25☐ other –*specify*

Model description

26 Coverage *tick one*

☐ Community ☐ Regional ☐ State ☐ National

Origin

Does the model derive directly from a government policy or program?

27☐ No ☐ Yes …*(Name Policy/Program)* 28………………………………………………………………

29 Model type –*tick which apply*

☐ Vertical program ☐ Comprehensive PHC ☐ MPS ☐ other –*specify*

☐ Coordinated care ☐ Mobile/visiting service ☐ regional network

☐ Stepped care ☐ Hub & spoke ☐ workforce models

Key aspects –*tick which apply*

30☐ Organisation/governance

31☐ Funding

32☐ Workforce

33☐ C'wealth/state relations

34☐ Infrastructure

35Other -*detail*

Innovation/intervention

36What are the distinct characteristics of the innovative model?
37Study level ☐ Notional ☐ Implemented ☐ Implemented & evaluated

Design & methods

Is this paper an evaluation? ☐ Yes *(complete an Evaluation sheet)* ☐ No *(Is an evaluation of this model available? If so, complete an Evaluation Form for the evaluation, and attach.)*			
38Study size/scope -*details*			
39 ☐ Qualitative ☐ Quantitative ☐ Mixed methods			
Design		Method –data source	
40☐ RCT	45☐ Narrative analysis	49☐ Interview	53☐ Database/s
41☐ Quasi-experimental	46☐ Participant observation	50☐ Survey/questionnaire	54☐ Document review
42☐ Descriptive	47☐ ethnography	51☐ Focus group notes/transcript	
43☐ Case study	48☐ Mathematical modelling	52☐ Observation	
44☐ Content analysis			

Outcome measures

55 What worked?
56 What evidence that it worked or might work?
57 Facilitators of success identified?
58 Barriers to success identified?

Quality assessment

Is the study underpinned by a strong body of knowledge:

59 Informed by a literature review ☐ Yes ☐ No

60 Informed by an explicit conceptual basis (eg PHC, community development, etc)? ☐ Yes ☐ No

61 How 'representative' is this of the eligible population of rural/remote communities/services?

☐ very ☐ moderately ☐ not very ☐ not at all ☐ insufficient info

62 Is the object of enquiry clear & unambiguous? eg: clear objectives & indicators

☐ Yes ☐ No

63 Are target service characteristics clearly & explicitly stated?

☐ Yes ☐ Partly ☐ No

64 Is there an adequate description of new/innovative characteristics?

☐ Yes ☐ No

65 Does method accord with objectives of study? eg: randomness, sample size, saturation#s, statistical significance etc

☐ very well ☐ moderately well ☐ not very well ☐ not at all ☐ not applicable

66 Are methodological limitations acknowledged?

☐ Yes ☐ No

67 Are substantive limitations of study described? Are conclusions supported by data/study evidence? Do conclusions 'make sense'/have a coherent logic? Are conclusions consistent with existing knowledge/experience/corroborating evidence (and if not, what are the implications of this?). Are findings transferable?

☐ Fully ☐ Partly ☐ Not at all

Comments

68 What is important to the APHCRI study from this item?

1. Comment on the sustainability of the model.
2. What emergent themes or issues?

Appendix 5: Data extraction evaluation supplement

Identification -ID of record to which this attached ………. **reviewer initials 2**

3 Author name/s	4Year publ.	5DocumentTitle

Context

6Year/s of evaluation	Nature of evaluation –*tick which apply* 7□ Process 8□ Impact 9□ Outcome 10□ All of the above	11Evaluation auspicing agency *tick one* □ Funder □ Health authority/agency □ Governance body/Board □ Other *specify*

Purpose

12 Stated Purpose of evaluation

Evaluation outcomes

13 What were the evaluation's findings with respect to what about the **model** is working successfully?
14 What were the evaluation's findings with respect to sustainability of the **model**?
15 What were the evaluation's findings with respect to any unintended outcomes resulting from the **model**?
16 What were the evaluation's recommendations with respect to changes to ensure the sustainability of the **model**?
17 What were the evaluation's recommendations with respect to generalisability of the **model** (ie roll-out)?

Please make any additional comments overleaf.