POPULATION HEALTH AND PUBLIC HEALTH IN AUSTRALIAN RURAL GENERAL PRACTICE: A CASE SERIES OF RESEARCH, CLINICAL APPLICATIONS AND EDUCATIONAL STRATEGIES

A Thesis submitted to meet the requirements of the degree of

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Declaration

- I certify that this Thesis complies with rule 9 (2) of the University of Newcastle doctoral degree by research rules.

- I certify this Thesis constitutes my own original research.

- Thesis chapters specify my contribution to work published conjointly with other researchers.

- I hereby certify that the work embodied in this Thesis is the result of original research and has not been submitted for a higher degree to any other University or Institution.

John Fraser __________________
Acknowledgements:

For Libby, Emily and Anna, without you all of this would not have been possible.

I wish to acknowledge the support of my Thesis supervisors Professor John Marley and Professor Dimity Pond and also my work colleague, Associate Professor Christian Alexander.

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Table of Contents

DECLARATION.......................................................................................................................... 2

ACKNOWLEDGEMENTS: ......................................................................................................... 3

TABLE OF CONTENTS............................................................................................................ 4

ABSTRACT ................................................................................................................................ 7

EXECUTIVE SUMMARY ........................................................................................................ 9

BACKGROUND ....................................................................................................................... 9

AIMS ..................................................................................................................................... 11

METHODS ............................................................................................................................. 12

RESULTS...............................................................................................................................14

CONCLUSIONS....................................................................................................................... 16

CHAPTER 1: INTRODUCTION .............................................................................................. 19

DEFINITIONAL ISSUES...........................................................................................................22

SIGNIFICANCE OF RESEARCH PAPERS IN CHAPTER 1 ..........................................................28

CHAPTER 1: PUBLICATIONS ..................................................................................................32

1.1 Population health and public health in Australian General Practice........................26

1.2 Fraser J, Professional autonomy: Is it the future of general practice? .......................32

IMPLICATIONS OF PAPERS IN CHAPTER 1 TO THESIS AIMS .............................................33

CHAPTER 2: APPLYING POPULATION HEALTH AND PUBLIC HEALTH APPROACHES
IN RURAL AUSTRALIA...................................................................................................... 36

PERIOD AND GEOGRAPHIC LOCATION OF RESEARCH IN CHAPTER 2 ..............................37

DEFINING HEALTH NEEDS ..................................................................................................38

DEFINING A POPULATION ....................................................................................................42

SIGNIFICANCE OF RESEARCH PAPERS IN CHAPTER 2 ..........................................................43

CHAPTER 2: PUBLICATIONS ..................................................................................................51

2.1 Information technology improving health care delivery in Arnhemland....................51

2.2 Evaluation of a child health program to prevent and treat anaemia in Arnhemland. 51

2.3 Permethrin: A top end viewpoint and experience.....................................................51

2.4. Use of a men’s group in health promotion in rural areas.........................................52

IMPLICATIONS OF PAPERS IN CHAPTER 2 TO THESIS AIMS .............................................53

CHAPTER 3: IMPORTANCE OF CASE STUDY DESIGN IN RURAL HEALTH RESEARCH ..........56

SIGNIFICANCE OF RESEARCH PAPERS IN CHAPTER 3 ........................................................59

CHAPTER 3: PUBLICATIONS ..................................................................................................62

3.1 High incidence of squamous anal carcinoma in Arnhemland..................................62

3.2 Acute pelvic pain associated with an intra-osseous lipoma of the hip joint..............62

3.3 Dyspnoea worsened by salmeterol...........................................................................62

3.4 Shoulder Radiographs and Cautionary Tales...........................................................62

3.5 Ethics of HIV testing in general practice without informed consent: A case series. 62

3.6 Using brown snakes to organise patient free days....................................................63

IMPLICATIONS OF PAPERS IN CHAPTER 3 TO THESIS AIMS .............................................64

CHAPTER 4: ETHICS OF CONDUCTING AND PUBLISHING RURAL HEALTH
RESEARCH.............................................................................................................................66

SIGNIFICANCE OF PAPERS IN CHAPTER 4 ........................................................................68

CHAPTER 4 PUBLICATIONS ...................................................................................................70

4.1 A case report: ethics of a proposed qualitative study of hospital closure in an Australian rural community .................................................................70

4.2 Publish and perish: A case study of publication ethics in a rural community ..........70

IMPLICATIONS OF PAPERS IN CHAPTER 4 TO THESIS AIMS .............................................71
CHAPTER 5: RESEARCH, POPULATION HEALTH AND PUBLIC HEALTH APPROACHES TO RURAL HEALTH WORKFORCE RECRUITMENT AND RETENTION. 73

SIGNIFICANCE OF RESEARCH PAPERS IN CHAPTER 5 .......................................................... 75
CHAPTER 5 PUBLICATIONS ...................................................................................................... 82
  5.1 The Promotion of Health Careers to High School Students in the New England Health Area: The Views of High School Career Advisers ...................................................... 82
  5.2 Health Career Promotion in the New England Area of New South Wales: A Program to Support High School Career Advisers ................................................................. 84
  5.3 Australian rural high school students' interest in health careers: implications for our future workforce? .................................................................................................................. 85
  5.4 Promoting health careers to our future rural workforce ................................................... 86
  5.5 The Medical Specialist Workforce Servicing the New England Health Area .................... 87
  5.6 Occupational Violence in an Australian Health Care Setting: Implications for managers ................................................................................................................................. 87
  5.7 Professional career needs of general practitioners and registrars working in north-western New South Wales ........................................................................................................ 88

IMPLICATIONS OF PAPERS IN CHAPTER 5 TO THESIS AIMS .................................................................................. 89

CHAPTER 6: RESEARCH, POPULATION HEALTH AND PUBLIC HEALTH APPROACHES TO RURAL HEALTH PROFESSIONAL CONTINUING MEDICAL EDUCATION .......... 88

SIGNIFICANCE OF RESEARCH PAPERS IN CHAPTER 6 .................................................. 91
CHAPTER 6 PUBLICATIONS ..................................................................................................... 97
  6.1 Hepatitis C education needs of rural general practitioners working in northern New South Wales ......................................................................................................................... 97
  6.2 Hepatitis C caseload and models of care for rural GPs working in northern New South Wales ............................................................................................................................ 97

IMPLICATIONS OF PAPERS IN CHAPTER 6 TO THESIS AIMS .................................................................................. 98

CHAPTER 7: RESEARCH AND EDUCATIONAL APPROACHES IN TRAINING A RURAL HEALTH WORKFORCE ......................................................................................... 100

CHAPTER 7 PUBLICATIONS .................................................................................................... 105
  7.1 A guide to using role-plays in GP registrar teaching ............................................................... 105
  7.2 Teaching practical procedures in general practice: A primer for supervisors of medical students and registrars ............................................................................................ 106
  7.3 How to plan, deliver and evaluate a training session ............................................................... 106
  7.4 The New England Advanced Life Support in Obstetrics Workshop and Resources Package 2003 .................................................................................................................... 107
  7.5 Evaluation of an interpractice visit program for rural Australian General Practice Registrars ............................................................................................................................ 107

IMPLICATIONS OF PAPERS IN CHAPTER 7 TO THESIS AIMS .................................................................................. 109

CHAPTER 8: TRAINING THE NEXT GENERATION: DEVELOPING POPULATION HEALTH AND PUBLIC HEALTH TRAINING IN RURAL AREAS ...................................................................... 110

SIGNIFICANCE OF PUBLISHED PAPER IN CHAPTER 8 ................................................... 111
CHAPTER 8 PUBLICATIONS ..................................................................................................... 118
  8.1 Evaluation of a general practice registrar training post in public health in rural New South Wales ................................................................. 118
  8.2 General practice training in public health: Two parallels converging .................................. 119
  8.3 The use of bupropion for smoking cessation in rural New South Wales .................................. 119
  8.4 Caregivers’ inability to identify childhood adiposity: a cross-sectional survey of rural children and their caregivers’ attitudes ................................................................. 119
  8.5 Evaluation of the impact of a Research Methods Support Group to increase research capacity in the New England Regions of rural New South Wales .................................. 120

IMPLICATIONS OF PAPERS IN CHAPTER 8 TO THESIS AIMS .................................................................................. 121

CHAPTER 9: CONCLUSIONS AND FUTURE DIRECTIONS .................................................. 122

APPENDICES ............................................................................................................................... 126

1 FRANCES HARDEY FAULDING MEMORIAL FELLOWSHIP AWARD .......................................................... 126
Abstract

Background

General practice’s population health and public health role is being promoted internationally to improve health outcomes. 1-6

This Thesis aims to:

- Describe and evaluate projects which are relevant to exploring the interface of population health and public health with Australian rural general practice; and

- Describe and evaluate projects which can increase population health and public health expertise and capacity amongst our future rural general practice workforce.

Methods

This Thesis uses a descriptive design. A series of research papers published in the peer reviewed literature are presented in each chapter. These papers are used as case studies to explore the aims of this Thesis. A variety of quantitative and qualitative methods have been used to conduct research in remote communities of the Northern Territory, rural South Australia and New South Wales from 1992 to 2005.

Results

Public health and population health can interface with Australian rural general practice in sustainable models described in case studies within this Thesis.
There is a continuum of roles in this interface from population health in practice, public health, ‘new’ public health and leadership. Population health activities include screening and promotion of lifestyle factors to patients.\textsuperscript{7} Public health activities can be developed to extend the reach of health programs to the broader community. This may include participation in population based surveillance systems and health promotion projects.

Promoters of ‘new’ public health \textsuperscript{8,9} support an expansion of public health’s scope to include advocating social development through community participation and empowerment. Leadership can extend to policy development and liaison with general practice, population health and public health practitioners to promote collaborative models of health care.

A sustainable model of increasing rural workforce recruitment via developing workforce capacity in public health and population health has been developed and evaluated as part of this Thesis.

Conclusions
This Thesis presents rural Australian case studies demonstrating integration of population health and public health roles with general practice. Vertically integrated workforce models have been developed, as part of this Thesis, which can facilitate recruitment to the rural health workforce. In the long term, educational models have been developed and evaluated as part of this Thesis. These models can increase the population health and public health expertise and capacity of this workforce.
Executive Summary

Background

An expansion of general practice’s population health and public health role is promoted internationally. 1-6 Advocates of this process consider improvements in collaboration between general practice with population health and public health can improve health outcomes. 1-6

Clearer definitions of the aims and goals of this process are required to facilitate integration between the disciplines. Australian general practice, population health and public health are distinct disciplines with similarities and differences. Key stakeholders including health professionals, government and the public often differ in their viewpoints about what constitutes an appropriate interface between general practice with population health and public health.

Despite these different viewpoints, there appears to be broad support to foster integration between general practice, population health and public health. All have the potential to complement each other working in collaboration. This is based upon environmental and social determinants of health 10-12 being intrinsically linked to the clinical presentations of patients. In practice, barriers limit this approach. 1,5 An inverse care law continues to exist in health care provision with the “availability of good health care varying inversely with the need for it in the population.” 13

Workforce shortage results in an emphasis on acute care at the expense of preventative services especially in rural areas. 14 Population health, public
health and medicine including general practice have evolved into different
disciplines with (at times) competing values and philosophies.

In order to meet the health needs of populations, workforce shortages have
(due to necessity) lead to synergic clinical, population health and public health
roles for many health professionals in rural and remote Australia. 14-17 This
synergy will be explored in depth throughout the chapters of this Thesis.

Addressing equity of access to health services and improving health
outcomes are a concern for general practice and the broader health
profession in the 21st century.18 There is a prominent emphasis on evidence-
based medicine and efficient use of limited health resources in our society.

Despite this, residents of rural Australia experience limited access to health
services and general practitioners (GPs) find (at times) limited applicability of
tertiary health care research to patients in a rural general practice setting. 19 20
Barriers to the implementation of relevant research into clinical, population
health and public health practice limits the application of existing evidence to
improve rural health care delivery.19 20

Case studies are an important tool in rural health research to describe new
diseases and epidemics, to recognise side effects, to study mechanisms and
to evaluate therapy and education. 21 This case study research generates
hypotheses for more detailed research to confirm hypotheses.
A prerequisite to developing this evidence (clinical, population health and public health) is to build rural health research capacity. Equipping rural general practitioners with a combination of general practice skills (including procedural medicine), population health and public health expertise is complementary to this process.

The rationale for this approach is that to effectively address a community’s health needs, a general practitioner’s clinical role is complemented by population health and public health skills. Residents of rural areas expect treatment for acute and chronic conditions. This is a means for general practitioners to gain credibility with the communities within which they work. General practitioners trained in population health and public health have skills and the opportunity to work with key stakeholders within communities. There are opportunities to conduct applied research in order to plan, develop and evaluate preventative and health promotion programs. This combination of skills has great potential to influence and advocate for improvements in rural health status. 15,22

Aims

This Thesis aims to:

- Describe and evaluate projects which are relevant to exploring the interface of population health and public health with Australian rural general practice; and
- Describe and evaluate projects which can increase population health and public health capacity amongst our future rural general practice workforce.
Methods

This Thesis uses a descriptive design. A series of research papers published in the peer reviewed literature are presented in each chapter. These papers are used as case studies to explore the aims of this Thesis. Chapters discuss the significance of each paper’s research findings in their own right and the implications of each case to support the arguments of this Thesis. A variety of quantitative and qualitative methods have been used to conduct research in remote communities of the Northern Territory, rural South Australia and New South Wales from 1992 to 2005. Ethics approval has been obtained from respective regional ethics committees. Chapters and papers describe methods in depth.

- Chapter 1 (Introduction) focuses on defining this field of study and explores interfaces between population health, public health and general practice.
- Chapter 2 (Applying population health and public health approaches in rural Australia) describes examples of projects with population health and public health approaches which have been conducted while continuing to provide general practice services to the local community.
- Chapter 3 (Importance of case study design in rural health research) describes examples of case studies encountered in rural general practice which have been published in the peer reviewed literature.
- Chapter 4 (Ethics of conducting and publishing rural health research) explores ethical differences in planning and publishing rural health research.
research. This is relevant to increasing the evidence base of rural health research.

- Chapter 5 (*Research, population health and public health approaches to rural health workforce recruitment and retention*) demonstrates the application of strategic research to develop an evidence base to assist workforce program development. These programs have the ultimate aim of improving recruitment and retention of rural health professionals. Maintenance of a skilled and motivated rural health workforce is a prerequisite to the achievement of an increase in the clinical, population health and public health capacity of health professionals in rural areas of Australia.

- Chapter 6 (*Research, population health and public health approaches to rural health professional continuing medical education*). This chapter uses a case study of rural general practitioners’ (GPs’) views on hepatitis C continuing medical education to explore barriers between available evidence and its implementation in rural areas.

- Chapter 7 (*Research and educational approaches in training a rural health workforce*). This chapter describes and evaluates educational programs to increase training capacity for rural health professionals. This is relevant to this Thesis due to the synergy between clinical (including procedural) medicine, population health and public health roles in rural practice.

- Chapter 8 (*Training the next generation: Developing population health and public health training capacity in rural areas*). This chapter describes and evaluates a program to increase population health and public health capacity for GP registrars in training and to expand rural health research
capacity for all health professionals. Population health and public health projects undertaken during training are included in this chapter.

- Chapter 9 (Conclusions and future directions).

Results

Population health and public health can interface with Australian rural general practice in sustainable models described in case studies within this Thesis. There is a continuum of roles in this interface from population health in practice, public health, ‘new’ public health and leadership including policy development. Population health activities include screening and promotion of lifestyle factors to patients.\(^7\) Public health activities can be developed to extend the reach of health programs to the broader community including patients not presently accessing general practices. This may include participation in population based surveillance systems and health promotion projects coordinated by divisions of general practice.

Promoters of ‘new’ public health \(^8,9\) support an expansion of public health’s scope to include advocating social development through community participation and empowerment. Leadership can extend to policy development and liaison with general practitioners, population health and public health practitioners to promote collaborative models of health care.

The extent of this involvement will depend on community need, available workforce and the interest of clinicians to expand skills in this area of interest. Case studies of models presented in this Thesis are an important basis to support further research to promote the integration of general practice with
A sustainable model of increasing rural workforce recruitment via the development and provision of training in public health and population health has been developed and evaluated as part of this Thesis.\textsuperscript{23,24}

Population health and public health integration with Australian general practice is important and is receiving increasing emphasis. This is reflected and recognised by myself receiving national and state awards for components of this Thesis. These projects demonstrate sustainable models of providing clinical services with a population health and public health emphasis and workforce recruitment and training opportunities for general practitioners in population health and public health.

I was awarded the Francis Hardey Faulding Memorial Research Fellowship Award 1995 for a Research Treatise in General Practice by the Royal Australian College of General Practitioners. The treatise entitled 'The Implementation and Application of Information Technology to improve Primary Health Care 1992-94.' comprised case studies of projects applying population health and public health approaches in rural Australia.

I was awarded the New England Area Health Service Quality Award for Consumer Participation 2003 and the National Rural and Remote Quality Improvement Award Australian Council on Healthcare Standards 2003 for the project ‘Promoting health careers to our future rural workforce.’ This project comprised a case series of projects emphasising research, population
health and public health approaches to rural health workforce recruitment and retention. I was a finalist, in the education and training section in the Baxter 2004 NSW Health Awards for the project ‘General practice training in public health: Two parallels converging’. This project describes an educational model for increasing population health and public health capacity of rural GP registrars in training.

In 2005, I was awarded the General Practice Education and Training Medical Educator of the Year Award. This recognised my contribution to medical education development, research and delivery in the New England region of New South Wales.

In 2005, the vertically integrated rural workforce models presented in this Thesis attracted international recognition. A series of collaborative projects have linked the New England region of New South Wales with rural health professionals in Northern Thailand.\textsuperscript{25,26} There is scope for ongoing cooperation between the two regions which share many similarities in terms of rural health professional shortages and an urban rural division with worsening morbidity and mortality linked to remoteness.\textsuperscript{27,28}

Documentation of these awards and international programs are listed in the appendices of this Thesis.

Conclusions

This Thesis presents rural Australian case studies which demonstrate integration of population health and public health roles with general practice.
Vertically integrated workforce models have been developed, as part of this Thesis, which can facilitate recruitment to the rural health workforce. Educational models have been developed and evaluated which can increase the population health and public health skills of the general practice workforce as components of this Thesis. An external review of these models has recommended further development and expansion of these programs to increase the population health and public health capacity of the Australian general practice workforce.\textsuperscript{23,24}

A case for a continuum of required population health and public health skills for GPs is supported by this Thesis. Core population health skills are required by all GPs.\textsuperscript{29,30} Based on GP interest and community health needs there is scope to expand skills in population health, public health\textsuperscript{22,31} and ‘new’ public health including development of skills in community empowerment and social development.\textsuperscript{8-10} This continuum of skills is supported by the recommendations of the Public Health Working Group (which I chaired) who assisted in the development of the revised Royal Australian College of General Practitioners’ Curriculum.\textsuperscript{32}

There is scope and need for some GPs to develop leadership in the interface between general practice, population health and public health to assist in policy development in the 21\textsuperscript{st} century to improve health service delivery and health outcomes in general practice.\textsuperscript{1,33} This is particularly true, in rural Australia\textsuperscript{34} where the high morbidity and mortality of the population emphasises the importance of this approach.
Evidence based practice and policy development are needed to guide this process and also to address the poor health status of Australia’s rural population. This requires development of a rural health evidence base (in clinical medicine, population health and public health). Strategies to build rural health research capacity are required to produce this evidence. Equipping rural general practitioners with a combination of general practice skills (including procedural medicine), population health and public health expertise is complementary to this process. This training can be used as a recruitment tool to attract more general practitioners to work in a rural area. Offering this training to general practitioners can provide variety and increased job satisfaction assisting in retention.

The GP registrar in population health/public health training model has been sustained in the New England region for four years, with ongoing demand for this type of training from GP registrars. There has been recognition of the suitability of this training and recommendations for it to be expanded to other regions of Australia.\textsuperscript{23,24} The GP of the future needs clinical, population health and public health skills to manage a multidisciplinary team. This combination of skills is consistent with recommendations of the World Health Organization in training health professionals into the 21st century.\textsuperscript{18} This proposition is further explored in chapter 9 in future directions.
Chapter 1: Introduction

Chapter 1 focuses on defining Australian general practice, population health and public health and exploring how these disciplines inter-relate in the present Australian health care system.

An expansion of general practice’s population health and public health role is promoted internationally.\(^1\)-\(^6\) Advocates of this process consider improving collaboration between general practice with population health and public health can improve health outcomes.\(^1\)-\(^6\) Clearer definitions of the aims and goals of this process are required to facilitate integration between the disciplines. Australian general practice, population health and public health are distinct disciplines with similarities and differences. Key stakeholders including health professionals, government and the public often differ in viewpoint about what constitutes an appropriate interface between general practice with population health and public health.

Despite these different viewpoints, there appears to be broad support to foster integration between general practice, population health and public health. All have the potential to complement each other working in collaboration. This is based upon environmental and social determinants of health\(^10\)-\(^12\) being intrinsically linked to the clinical presentations of patients. In practice, barriers limit this approach.\(^1\),\(^5\)
An inverse care law continues to exist in health care provision with the “availability of good health care varying inversely with the need for it in the population.” \(^{13}\) In Australia, poorer disadvantaged groups, while using acute care services in general practice are the lowest users of preventative care. \(^{11}\)

The inverse care law is likely to be particularly marked in rural areas of Australia, as poor infrastructure including transport and lower numbers of GPs reduce access to health services, while rural GPs’ high workload in meeting the demands of acute care often prevents expansion of preventative health services. \(^{14}\)

Population health, public health and medicine including general practice have evolved into different disciplines with (at times) competing values and philosophies. Systems approach methods have been used to analyse health care to explore interactions between organisations, patients and health professionals within a health care system. These approaches can assist in exploring reasons for the present inequitable access to health care for all citizens. \(^{35-37}\)

Medical sociology is a useful tool to explore the medical system and can assist in studying role delineations which have evolved between health professionals in the provision of health care. \(^{31}\) A combination of these tools can be used to extrapolate the impact of organisational changes within the Australian health care system. \(^{36}\)
Within this context, definitions of each discipline are useful as they assist in delineation of each health professional’s perceived role. Organisational change models for promoting population health and public health in Australian general practice have to date been collaborative in nature. True collaboration requires agreement from all parties as to their roles and functions within a system.

Different stakeholders have divergent and (at times) conflicting priorities about general practice’s interface with population health and public health. The collaborative nature of policy in this area has been rejected by Kamien observing that most change to date has been imposed by the government funding of general practice and linking this to health outcomes. Practice incentive payments for immunisations and preventative care in diabetes are examples of this process. He sees limited involvement of GPs or their patients in decision making. This is a barrier to true progress in collaboration.

Despite this, as early as 1982 Murtagh contends that the key to “success in family practice is to accepting responsibility for continuing care of the individuals and families in the practice population.” He suggests a series of now common tools to assist population health activities in general practice including efficient medical records with summaries, patient recall lists and patient education materials.

This acceptance of responsibility for the care of a practice population particularly applies in rural areas of Australia where the general practitioner
and pharmacist are seen as the most important sources of preventative health advice for rural residents. Despite the rural GPs’ privileged position, socioeconomic and environmental influences as well as patients’ beliefs and attitudes will reduce an individual’s compliance with their doctors’ advice. To improve compliance, rural GPs need to consider what barriers exist for their patients in completing treatments and or changing their lifestyle risk factors. For example, Watts found a non compliance rate of 30% in filling their prescriptions in a cohort of patients with asthma in rural South Australia.

A series of definitions have been developed by key stakeholders in the interface of general practice with population health and public health. To explore this topic in depth, it is useful to explore operational definitions of these disciplines.

**Definitional issues**

Australian general practice overlaps between meeting the needs of individuals and communities. It is based within the private sector. The RACGP states:

“General practice is part of the Australian health care system and operates predominantly through private medical practices, which provide universal unreserved access to whole person medical care for individuals, families and communities. General practice care means comprehensive, coordinated and continuing medical care drawing on biomedical, psychological, social and environmental understandings of health.”
A comparison with primary health care, (while not a central aim of this Thesis), is important to explore developments in public health including ‘new’ public health philosophy. The RACGP’s definition of general practice differs from primary health care as defined by the World Health Organization’s Declaration of Alma-Ata which states:

“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 care system, of which it is the central function and main focus, and of the social and economic development of the community.”

A comparison of the two definitions shows primary health care to be much broader in outlook than general practice, extending health care to be a tool for social and economic development. Primary health care is universally available, rather than it being provided to patients who are able to access a general practice. General practice within Australia is a component of primary health care which is also provided by nurses and other health professionals.

Components of primary health care’s philosophy including self determination and the promotion of social and economic development, share many similarities with public health. Public health began with a social movement to
advocate improved living conditions in the 19th century. It focused on sanitation and had limited initial involvement with medical practitioners.  

Public health within Australia was promoted in the early twentieth century by the work of Cumpston who was the first Commonwealth-Director General of Health. Amongst his achievements was the establishment of a Federal Department of Health, development of quarantine services, child and maternal services and disease surveillance. An early emphasis of the public health movement in the 1920’s was “applied public health” to ensure the white settlement of rural northern Australia. Unless settlement and development of northern Australian and New Guinea occurred “invasion by Asia or by serious epidemic disease” was thought to be inevitable. To this end, a national hookworm eradication campaign was developed to reduce the burden of anaemia in the tropical north.  

Today, public health, has a collective focus and continues to consider the health of all people. Public health as a discipline is a “combination of science, practical skills, beliefs that is directed to the maintenance and improvement of the health of all people.” It is multi-disciplinary in focus with medical doctors, nurses, health promoters, epidemiologists, sociologists, environmental officers and health economists working in this field.  

Public health’s interface within medicine as a whole can be further defined. Public health medicine is practised by medical practitioners. The Australasian Faculty of Public Health Medicine defines public health medicine as:
"that branch of medical practice which is primarily concerned with the health and care of populations. It is concerned with the promotion of health and prevention of disease, with the assessment of a community’s health needs and with the provision of services to communities in general and to specific groups within them."

Calls for a ‘new’ public health movement arose from the Ottawa Charter for Health Promotion in 1986. Limited progress in delivering primary health care’s aims resulted in the importance of health promotion in achieving “Health for All by the year 2000 and beyond”.

Health promotion extended beyond the promotion of healthy lifestyles and was defined as:

“the process of enabling people to increase control over, and to improve, their health. To reach a state of complete physical, mental and social well-being, an individual or group must be able to identify and realize aspirations, to satisfy needs, and to change or cope with the environment. Health is, therefore, seen as a resource for everyday life, not the objective of living. Health is a positive concept emphasizing social and personal resources, as well as physical capacities. Therefore, health promotion is not just the responsibility of the health sector, but goes beyond healthy lifestyles to well-being.”
The ‘new’ public health promotes implementation of the Ottawa Charter for health promotion. Five strategies for success include:

- Building health policy;
- Creating supportive environments;
- Strengthening community action;
- Developing personal skills; and
- Reorienting health services.

There is now convincing evidence that social determinants of health have an important influence on health. Often social and economic determinants such as poverty and unemployment are beyond the control of the individual. In all societies of the world, a social gradient in health is observed with wealthier members of a population living longer and experiencing less illness. Poverty is the major underlying social determinant of health. Health promotion strategies emphasise the need to improve equity via active participation of the community. The importance of improving equity to achieve “health for all” has been endorsed by the most recent Jakarta declaration on leading health promotion into the 21st Century and formation of the World Health Organisation’s Commission on Social Determinants of Health in 2005.

‘New’ public health practice has links and continues to use skills from traditional public health. Australian promoters of ‘new’ public health support an expansion of public health’s scope to include advocating social development. This has been particularly evidenced in the Aboriginal Medical
Service movement within Australia. The important concepts of ‘new public health’ as it applies in Australia are that:

“health status is influenced by many factors in society; it cannot be improved unless communities actively participate in the process and good health can be a tool for social development.”

This statement reinforces the importance of equity as a basis for improving health.

In contrast to other relevant definitions, the literature shows population health is an ill-defined term. It can refer to a concept, referring to the health of a defined population (such as a general practice patient list) or a field of study linking health outcomes, determinants of health and interventions. During this Thesis, population health skills are considered to be those skills such as screening and preventative health services (e.g. immunisations) which can be provided to a defined population. This can be a group of surgery patients or other populations. Defining surgery patients as a population, can be problematic as this group is poorly defined and often shared between a number of GPs in the Australian health care system. Patients in Australia can attend many GPs for different conditions or see no GP at all.

Nevertheless, population health skills (coordination of prevention in practice) are core skills for all GPs from which higher order public health, ‘new’ public health and leadership skills can be developed.
Significance of research papers in chapter 1

Papers in this chapter explore how population health and public health relate to Australian general practice. The papers published in this chapter identify and explore differing definitions of these disciplines with both common and (at times) competing goals.

The significance of the first published paper in this chapter, relates to the need to understand that differing views may be held by government, consumers, other health professionals and general practitioners about their expectations of what constitutes a key domain of Australian general practice: “population health in the context of general practice”. Furthermore, the endorsement that “public (population) health is a core component of general practice” needs clarification and role delineation to ensure general practice can effectively collaborate with other disciplines.

In the first published paper of this chapter, an educational framework is developed promoting a continuum of training from core skills in population health within general practice required by all GPs. There is scope to expand the skills of GPs with special interests in this field to obtain skills in public health, ‘new’ public health and leadership advisory roles in the interface between general practice and these disciplines. A practical example of childhood obesity is used to illustrate how the continuum could be implemented into practice. Two of the registrars in chapter 8 have undertaken projects in childhood obesity as part of their training as academic GP registrars in population health and public health.
The first published paper in this chapter expands on a previous review of this interface by Fry and Furler. In this review the interface of population health with general practice was undertaken, however, use of the term ‘public health’ was avoided. The authors undertook this decision to emphasise “a concern with how general practice and broader primary health care programs can contribute to improving the health of whole populations.” Additionally, they wished to avoid confusion by some people interpreting public health to mean “health services funded by public money”.

The approach of excluding public health is problematic for general practice, in view of peak organizations, such as the Royal Australian College of General Practitioners referring almost interchangeably to ‘population health’ and ‘public health’ within the domain, “population health in the context of general practice.” Additionally, there has been an increased emphasis placed on improved collaboration between general practice and other sectors of the health sector and community.

A key step for collaboration between general practice organizations, divisions of general practice and wider community organizations requires GPs to understand this continuum between population health in practice to broader public health and “new” public health roles and leadership including advocacy.

This is supported by a recent review undertaken by the National Information Service of projects funded by General Practice Evaluation Program with a population health focus from 1992-1998. Most projects (90%) failed to meet
objective criteria of meeting at least 4 of a group of 8 criteria for undertaking a population approach including the project: defining a target population; having a group approach rather than focusing on individuals; involving health promotion; involving a multidisciplinary investigation team; involving an organised approach to prevention; developing communication systems and collaboration between levels of the health system or undertaking education of consumers.\textsuperscript{56} The report recommended increased linkages between general practice and population health in any future funded research in this field.

The second published paper in this chapter combines sociological\textsuperscript{31} and systems approaches\textsuperscript{36,37} to explore the present status of general practice within Australia. The paper highlights complexities in the present health system in terms of role delineation, expectations, power, control and autonomy. Within this context, collaborative models of change to increase the interface of general practice with population health and public health are unlikely to be successful unless further research is undertaken into general practice systems and organisational change. The paper asks a series of question for further research including: “How can a truly public health focus be implemented in general practice?” and “Does the GP of the future aspire to be a protocol driven automaton or, rather, a team leader managing a health professional team with clinical, health care planning, research, public health and professional development roles?” The findings of this Thesis give examples of case studies which have developed the latter roles in Australian general practice.
The second paper in this chapter, explores the nature of professional autonomy and the fact GPs are embedded within a broader health system which influences practice. A systems approach to organisational change is applied in this paper to explore the tension between maintaining professional autonomy and incorporating new work concepts and practices into general practice such as working with other health professionals in teams or incorporating a broader population health and public health role in a community.

Implicit in adopting new multidisciplinary approaches to the GP’s work is the need to work with other health professionals and organizations all with their own agendas. The need to consider the patient is paramount to organisational change. The paper argues that unless the patient’s needs are addressed more regulation is likely in general practice. This paper builds on the work of Strumberg 36 arguing that systems approaches have utility for planning organisational change in general practice including the focus of this Thesis, fostering the interface of general practice with population health and public health. Systems approaches to organisational change are a key skill for all health professionals in the 21st century.18

There is increasing interest in the use of systems theory and approaches to improve health outcomes in general practice and tertiary care.18 These strategies share many similarities with health promotion’s enabling and advocating strategies for change in reorientating health care systems.47
Chapter 1: Publications

1.1  Population health and public health in Australian General Practice

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Fraser J. Population health and public health in Australian General Practice: Changes, challenges and opportunities *Australian Family Physician* 2005; 34:177-179.

1.2 Fraser J, Professional autonomy: Is it the future of general practice?

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This chapter demonstrates that describing the present interface between general practice, population health and public health is complex. Previous attempts to describe this interface, have simplified its description by including population health alone and excluding public health. The exclusion of public health’s contribution to the interface simplifies a complex system artificially. It is important to recognise there are nuances in the differences and similarities between population health and public health.

Criticism of general practice’s lifestyle individualistic SNAP (Smoking, Nutrition, Alcohol, Physical Activity) approach by the ‘new’ public health movement may reflect confusion between definitions of general practice and primary health care. The first (general practice) is controlled by health professionals (GPs) and provides comprehensive health care to private fee paying patients. The second (primary health care) advocates universal health care for all, associated with social and economic development to empower communities.

This discussion reflects complexities in the present health system in terms of role delineation, expectations, power, control and autonomy. Within this context, collaborative models of change to increase the interface of general practice with population health and public health are unlikely to be successful unless strategic research in systems approaches to organisational change is undertaken. Kamien’s view that most change in this area is imposed by government has some weight within an analysis of this environment.
contrasts with his own experiences of conducting health programs in Bourke in the 1970’s where the GP was seen as a change agent and advocate for disadvantaged groups.58

A systems approach to increase the role of GPs in population health and public health has more likelihood of success as this model can incorporate the complexity of the present system and model the likely impact of incremental changes to the present health care system.35,36

This chapter presents a continuum of models which could be developed in Australian general practice to expand the interface of population health and public health with general practice. Systems research in health care demonstrates diversity is important to ensure ongoing provision of quality health care. Rather than advocating a universal model for all situations, diversity enables GPs to adapt to change.37 This has particular application in rural areas where there is much debate about the definition of ‘rurality’ and there is a diversity of health needs of a different rural communities.59,60

Diversity can develop a series of solutions, which can be further implemented through collaborations with other GPs.61 Chapter 2 will present a series a case studies demonstrating the feasibility of conducting public health and population health projects to a broader population outside the traditional confines of a surgery.
Expansion of population health and public health to include those citizens outside a surgery is important, as social determinants of health\textsuperscript{12} and the inverse care law\textsuperscript{13} both confirm that those most in need of health care are least likely to access health services. In Australia, preventative care is accessed least often by the poorest members of society who are most likely to benefit from this care due to their higher levels of morbidity.\textsuperscript{11}

The projects presented in chapter 2 were conducted within the existing health system, in situations where funding and infrastructure supported population health and public health work of general practitioners. Most were conducted within Aboriginal health services where primary health care\textsuperscript{43} and ‘new’ public health are actively supported.\textsuperscript{47,48} One project was conducted within mainstream general practice. The expansion of projects of this nature to other sites within the Australian health system would require improved support and infrastructure changes for GPs to pursue population health and public health activities\textsuperscript{1,5} and reconsideration of healthy community policy to promote the best ways of servicing socially disadvantaged groups within the community.
Chapter 2: Applying population health and public health approaches in rural Australia.

As mentioned in Chapter 1, population health, public health and general practice have the potential to complement each other working collaboratively. In practice, however, barriers limit this approach \(^1,^5\) and most funded projects to increase capacity in population health in general practice, fail to meet objective criterion of utilising this approach. \(^5^6\)

Many aspects of the health care system create disincentives to the expansion of population health and public health in general practice. These include: a fee for service remuneration system rewarding number of patients seen; limited time; limited training in population health and public health; limited contact between GPs and other health professionals within the health care system; lack of status of public health work and limited capacity for GPs to expand their services to patients unable or unwilling to attend their surgeries. \(^5\)

Chapter 2 describes a case series of published projects applying population health and public health approaches. These were conducted while providing general practice services to local communities.

Collaborative models of organisational change in general practice \(^6^1\) have been implemented recently in Australia. These organisational change models present case studies of effective successful changes to groups of GPs; discuss their outcomes; and the rationale for their success. Dissemination of information amongst collaborations of GPs can explore how these novel
changes can be adapted, utilised and expanded elsewhere in the health care system.\textsuperscript{61} Often implemented changes from collaborations of GPs can be incremental. Small changes, however, can have large effects on complex systems such as the Australian health care system.\textsuperscript{35-37}

*Period and geographic location of research in chapter 2*

In Chapter 2, I describe case studies of research demonstrating population health and public health approaches within general practice conducted at two rural sites.

From 1992-1995, I worked as inaugural principal medical officer to a newly formed Aboriginal Health Service. This was an independent Aboriginal controlled organisation promoting primary health care and public health in a remote region of Australia. From 1996-1998, I was employed as a part time senior lecturer within the Department of General Practice, University of Adelaide and worked as a rural general practitioner, at Minlaton Medical Centre, on the Yorke Peninsula of rural South Australia.

During this appointment, I assisted in the development of an academic rural teaching practice of the University of Adelaide. This practice became a centre for clinical excellence within the University Department of Rural Health within South Australia.\textsuperscript{62} The mission statement of the Minlaton Medical Centre focused on the academic areas of teaching, community service and research within the University of Adelaide.
Defining health needs

I have found working in rural and remote communities develops a synergistic relationship between the clinical and population health and public health roles of a clinician. In order to meet the health needs of populations, workforce shortages have (due to necessity) lead to synergic clinical, population health and public health roles for many health professionals in rural and remote Australia.\textsuperscript{15, 14, 17}

This synergy is reinforced by the recommendations of the Australian Medical Council Specialist Accreditation Committee\textsuperscript{63} whose report into specialist public health training states:

\begin{quote}
\textit{The diversity of roles performed by public health medicine specialists and trainees may have significant implications for the Faculty’s strategic development of its educational programs. In some settings in Australia, for example the Northern Territory, public health medicine specialists and trainees combine public health and primary care clinical roles, and this is seen as an appropriate and important linking of population medicine to clinical practice.}
\end{quote}

Rural health experiences limited access to health services and finds (at times) limited applicability of tertiary care research to a rural general practice setting.\textsuperscript{19, 20} Furthermore, barriers to the implementation of relevant research findings into practice limit the application of existing evidence to rural health care.\textsuperscript{19, 20} A prerequisite to developing this evidence (clinical, population health and public health) is to build rural health research capacity.\textsuperscript{60}
Equipping rural general practitioners with a combination of general practice skills (including procedural medicine) with population health and public health expertise is complementary to this process.

The rationale for this approach is that to effectively address a community's health needs, a general practitioner's clinical role is complemented by population health and public health skills. Residents of rural areas expect treatment for acute and chronic conditions. This is a means for general practitioners to gain credibility with the communities within which they work. Kamien describes the importance of providing clinical services to establish rapport with communities prior to conducting his epidemiological studies in Bourke in the 1970s. 58

General practitioners trained in population health and public health have skills and expertise to work with key stakeholders within communities. There is scope to conduct applied research in order to plan, develop and evaluate preventative and health promotion programs. This combination of skills has great potential to influence and advocate for improvements in rural health status. 15,22,63

Chapter 1 defined public health, in part, as having a collective focus concerning the health of all people. 46 It includes “the promotion of health and prevention of disease, with the assessment of a community's health needs and with the provision of services to communities in general and to specific groups within them.” 22
This definition fails to define whose perspective the practitioner uses to define the health needs of a community. Differing concepts of health and illness in Aboriginal 64,65 society and other cross cultural settings 66 have been well documented, and similar concepts have been raised in mainstream society. 10 Labonte 10 emphasises the need to link biomedical and behavioural models of disease with social and environment determinants of health. This argument is strengthened by the World Health Organization’s declarations to support health promotion and social determinants of health. 47-49

To facilitate this process, modification is needed in terms of policy legislation, education, partnerships and advocacy with the community. 47-49 This patient-centred approach involving advocacy for change is exemplified in the Royal Australian College of General Practitioners curriculum. 30 It contrasts with the definition of general practice as presented in chapter 1, which emphasises private individualistic comprehensive care. 42

Patients will rarely alter behaviour until the financial and social benefits outweigh the social and financial costs of change. 67,68 GPs’ role in screening and immunization are well recognised to have significant impact upon the health of Australians. 9 GPs’ effectiveness in promoting lifestyle change is more limited 69 with at most 2-4% of patients changing lifestyle behaviours after brief advice from doctors. This is perhaps not surprising, as knowledge, is only one of many factors which patients need to consider in order to change behaviour. 70 They must be motivated and significant barriers to changing behaviour in the environment need to be considered. 67,68
This approach is reinforced by the World Health Organization’s emphasis on addressing social determinants of health. There is now a strong evidence base to demonstrate socio-economic status, stress, employment status, nutrition and social support all influence health. The most vulnerable members of society, with the worst health status, will be least able to change their environment. Healthy community policies need to be promoted. This includes areas as broad as protection of the environment, developing social capital and collaboration between governments and other key stakeholders. The World Health Organization identifies “poverty as the greatest threat to health”. Wilkinson and Marmot consider the main implications for health policy as:

“Life contains a series of critical transitions: emotional and material changes in early childhood, the move from primary to secondary education, starting work, leaving home and starting a family, changing jobs and facing possible redundancy, and eventually retirement. Each of these changes can affect health by pushing people onto a more or less advantaged path.

People who are disadvantaged in the past are at the greatest risk in each transition. This means welfare policies need to provide not only safety nets but also springboards to offset earlier disadvantage.”

In view of this discussion, it is likely that individual lifestyle approaches to health promotion in general practice are likely to have limited impact unless they can be linked to broader community health policy.
Defining a population

Many GPs would consider that their role primarily relates to their patients. This viewpoint lends itself to “population health.” In one sense, population health can be operationally defined as knowing the common diseases affecting the population of a community. Community can be defined in many ways including a town or a group of people (patients) attending a surgery.

In this context, population health can operate better within the existing general practice structures and the private sector. The Joint Advisory Group on General Practitioners and Population Health (JAG), a subcommittee of the National Public Health Partnership has been established to promote these goals. The JAG group has adopted a targets approach to population health strategies and identified four key performance areas for improvement of the health of Australians within general practice. These are the behavioural risk factors of Smoking, Nutrition, Alcohol and Physical activity.

Similarly, population health approaches can be applied in practice implementing best practice guidelines in preventative care including immunisation and screening. The problem with these approaches is some patients attend multiple sites for their health care, while other choose or are unable to access any GP. These approaches place responsibility on the individual for their health status, with modification of the social determinants of health considered outside the scope of these programs. Population health, however, can be more broadly applied to all members of a population in a geographic region. This model is more readily applied to rural practice, as a
lack of health professionals limits patients’ choice and capacity to access a variety of health care providers.

**Significance of research papers in chapter 2**

The first two published papers in this chapter relate to programs undertaken while in general practice in the Northern Territory. They differ in their approach to mainstream population health strategies applied in general practice. Rather than providing population health to patients attending a surgery, they use a population health approach of providing preventative health care to an entire remote population. Several rural GPs and health researchers have previously utilised a population health approach to define the health needs and describe the epidemiology of diseases of a rural community in this manner.

Furthermore, the research papers in this chapter demonstrate the application of public health approaches to improve health status through health promotion, environmental health programs and advocacy to improve resource allocation for the population. The published papers demonstrate that patient barriers to accessing health care services were reduced by decentralising clinical services and implementing a health information system to monitor health service delivery. The programs described in this chapter share some similarities to the decentralised provision of medical services and development of health programs described by Kamien.

The projects described in this chapter are consistent with some of the Ottawa
Charter for Health Promotion strategies including: building health policy, creating supportive environments, strengthening community action and reorientation of health services. There is clear evidence that a combination of these strategies is more effective than single track approaches.

In 1992, the Rural Health Strategy recommended that indicators should be developed to measure performance in health delivery, to measure the health status of populations and to measure outcomes of targeted programs in rural areas. Accurate rural health information was and continues to be essential to planning strategies to address population health and public health issues in rural areas of Australia. These views are endorsed and emphasised repeatedly by Humphreys.

My research demonstrated a computerised medical record system, Health Planner, assisted in achieving these goals for an Aboriginal Health Service in a remote region of the Northern Territory. Cross-sectional study designs at the point of service delivery and mortality/hospitalisation separation studies had been used previously as methods of assessing the health needs of a community. The major limitations of these studies are that they do not identify those with asymptomatic significant disease, or those residents who fail to access services. By using a computerised medical record and recall system and providing health screening for all adults and children in the community improved documentation of the health status of the population in a remote region was achieved.
In effect, this became of a form of 'new public health'. Collection of rural data in a standardised form gave respective health boards control, by informing them about their health status. By providing this service, informed decisions could be undertaken to address health issues in the local community. Providing local Aboriginal councils with data about their community health status, also assisted in grant applications for funding to improve health status.

The Health Planner database was used to substantiate funding applications for environmental health initiatives and health promotion grants. In 1992, use of a computerised medical records and recall systems was novel with a slow uptake of computerisation. Improved health records can improve access and continuity of health care. The information technology paper was cited as an example of health service delivery to improve access and continuity of care for the poor by Cornelius. In her 1997 study of American impoverished patients attending health clinics, Cornelius found loss of continuity of care increased health care costs by a third. This has significant health planning implications.

Skills developed in information technology during this research were recognised by myself attending a Northern Territory Panel to evaluate Information Technology in the Northern Territory in 1995. This was linked by a video conference to a national planning meeting for information technology throughout rural Australia. An ongoing version of Health Planner, Ferret continues to be used in over 56 Aboriginal Medical Services. There is an ongoing commitment to expand information technology services to assist
health care delivery by the Commonwealth Department of Health and Ageing.\textsuperscript{83} Currently, projects have been developed linking Ferret with state funded health care services. These projects aim to improve continuity of care for residents of remote and rural Australia.\textsuperscript{82-84}

The second research paper in chapter 2 describes a childhood anaemia program conducted in remote communities. This paper demonstrates how information technology can be used to evaluate health programs by collating longitudinal data and analysing sub-groups within a defined population. This paper was used to support an application by the Consumer Health Forum to obtain a release of albendazole in Australia for my patients. This was needed due to the high prevalence of anaemia in the area and the fact, Trichuris trichuris, the main parasite was only partially treated by a single dose of mebendazole.

This paper’s data was cited and compared with the findings of a national Australian childhood study of anaemia using participants of the National Survey of Lead in Children Study 1995.\textsuperscript{85} Mackerras et al study\textsuperscript{85} found a prevalence of childhood anaemia nationally of 3.3 percent considerably lower than my results of 28.7 percent of children. In my paper anaemia was defined as a haemoglobin less than 11 grams per decilitre. Interestingly, the prevalence of childhood anaemia found in remote regions of the Northern Territory was higher that the 13 percent described by Kamien in Bourke in the 1970s.\textsuperscript{58}

Conducting regular health reviews for adults and children allowed the health
status of the population to be documented. Our program differed from previous screening in that patients identified with health conditions were diagnosed, assessed and placed on a regular recall list to organise ongoing health care.

The findings of the health audits are described in detail in: Fraser J, Defining the Health Needs of An Outstation Population in a Remote Area. internal report. 1995. (This paper discusses how an annual health review was used to define the prevalence of morbidity and health needs of an outstation population in a remote region.)

and;

Fraser J, Using a Health Review as a Method of Controlling Syphilis in a Remote Area. 1995 (This paper discusses a successful intervention used to reduce the prevalence of syphilis. This project used educational programs, combined with screening linked to adult health reviews and treatment interventions to achieve this aim.)

I was awarded the Francis Hardey Faulding Memorial Research Fellowship Award in 1995. This is a national award for research in general practice and community medicine awarded by the Royal Australian College of General Practitioners. My treatise was entitled “The Implementation and Application of Information Technology to improve Primary Health Care 1992-94.” Ethical approval for analysis of data collected during the annual health reviews was obtained from Royal Darwin Hospital Ethics Committee. My treatise comprised the first two published papers and listed the internal reports
mentioned above.

The Australasian Faculty of Public Health Medicine has produced guidelines about the disclosure of information concerning small community research.\textsuperscript{86} The remaining two papers about the health needs of the region and syphilis control were considered to contain sensitive information about regional outstation communities: as communities may have been identified and the results may have carried stigma for the communities involved these papers were used as internal planning reports. The ethics of small community rural research is expanded further in Chapter 4.

The integration of health information technology to improve health service delivery to a population is now endorsed nationally by a series of HealthConnect pilot projects.\textsuperscript{87}

The third published paper in this chapter describes a scabies control program. This further illustrates how a GP can become involved in health promotion relevant to population health and public health working in a multi disciplinary team. This was relevant to my clinical practice as an epidemic of post-streptococcal glomerulonephritis secondary to impetigo had developed in some communities.\textsuperscript{88} Impetigo secondary to scabies was felt to be the likely source of these infections.

Part of the community control program involved an education program. Microscopes were used to magnify scabies to teach residents about the
scabies life cycle. Visual images assisted in overcoming some of the difficulties in cross cultural health promotion where English is a second language. This technique of utilising microscopy in health promotion of worm and scabies control continues to be used in the Northern Territory. Part of the success of the childhood anaemia and scabies programs was the collaboration between the medical team and the Aboriginal communities. This prerequisite for successful parasite control programs was recently reinforced in an editorial to the Medical Journal of Australia.

To my knowledge this was the first time drug sensitivities to scabies had been tested using the method described in my paper. This method was further developed by the Menzies School of Health Research, who confirmed ongoing drug resistance of scabies collected from patients in the Northern Territory. In 2004, scabies drug resistance to ivermectin was documented in the Northern Territory using the in vitro methods developed and modified from my original work in 1994. This was the first time ivermectin resistance has been described in the literature. Undertaking this research project in 1994, I was able to advocate for the importation of permethrin under a special access scheme prior to its general licensing in Australia.

The fourth published paper demonstrates the application of health promotion population health and public health principles is also relevant to the rural general practitioner working in a rural farming community. Men delay attendance for treatment of acute conditions and preventative care. Murtagh discusses the important role of the GP in promoting health to men in
Australia in a series of cases. This is supported by Smith et al and Humphreys et al who both indicate the GP has an important role in health promotion to the entire rural population.

The fourth paper in this chapter focuses on a successful men’s health program in rural South Australia. The target population for this project was men aged over 25 year living in the Yorke Peninsula region of South Australia. Since the time of this project, there has been an expansion of men’s health programs in Australia. Divisions of general practice have replicated a number of men’s health program in other regions.
Chapter 2: Publications

2.1 Information technology improving health care delivery in Arnhemland

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2.2 Evaluation of a child health program to prevent and treat anaemia in Arnhemland


2.3 Permethrin: A top end viewpoint and experience

2.4. Use of a men’s group in health promotion in rural areas

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Implications of papers in chapter 2 to Thesis aims

This chapter demonstrates that despite the complex interface of population health, public health and general practice, GPs can develop extended population health and public health roles in the present Australian health care system. Documenting these examples, is useful to foster future organisational change in general practice.\textsuperscript{61}

The orientation of health care services within the Northern Territory to a broader population health and public health focus facilitated and enabled expansion of my interest in this type of work. Communication and networks between health professionals, community groups and GPs in South Australia facilitated the health promotion activities focusing on men’s health presented in this chapter. Additionally, my South Australian general practice was supportive of an extended population health and public health role being affiliated with the University of Adelaide with goals of community service, research and education. In part, this chapter assists in meeting the aims of this Thesis by describing and evaluating examples of projects which have implemented population health and public health approaches in Australian rural general practice.

Rather than changing a large system, GPs may have more leverage in working with local key stakeholders to foster opportunities to expand a population health and public health focus in local communities. The papers presented in this chapter can be used as examples to foster collaborative
changes in general practice. As discussed earlier in this chapter, sharing models of successful examples of application of population health and public health practices in general practice could be used to influence others to change their practice.

The research papers presented in chapter 2 are examples of how practising GPs can increase the evidence base of rural health in Australia. Addressing equity of access to health services and improving health outcomes are a concern for general practice and the broader health profession in the 21st century. There is a prominent emphasis on evidence-based medicine and efficient use of limited health resources in our society.

Despite this, rural health experiences limited access to health services and finds (at times) limited applicability of tertiary care research to a rural general practice setting. Furthermore, barriers to the implementation of relevant research findings into practice limit the application of existing evidence to rural health care.

Case studies are an important tool in rural health research to describe new diseases and epidemics, to recognise side effects, to study mechanisms and to evaluate therapy and education. This case study research generates hypotheses for more detailed research to confirm these hypotheses. Cases studies can be used to increase the evidence base of rural health. The utility of the case study in rural health research is explored in chapter 3.
A prerequisite to developing a rural health evidence base (clinical, population health and public health) is to build rural health research capacity. Equipping rural general practitioners with a combination of general practice skills (including procedural medicine) with population health and public health capacity is complementary to this process. This combination of skills can be mutually beneficial for communities and GPs. Improved job satisfaction, academic career development and variety can assist in health professional recruitment and retention. This will be explored in later in chapter 8.
Chapter 3: Importance of case study design in rural health research

This chapter explores the utility of the case study in rural health research to develop a rural health evidence base. The forefather of general practice research, Pickles\(^99\) exemplifies the importance of descriptive case studies to develop hypotheses to support further research and investigation in medical science. Pickles, collected qualitative and quantitative data, developing case definitions to study epidemics in his practice in the Yorkshire Dales in the 1930’s. He was the first GP to use population health and public health approaches in his general practice.

Some would argue in the age of evidence based medicine whether there is any role for the case study. Vandenbroucke refutes these claims outlining the strengths of case reports lies in describing new diseases, recognising side effects, studying of mechanisms of disease, to suggest new therapies and to study medical education and management of health services.\(^{21}\) Case studies can therefore be considered the building blocks of clinical medicine, population health and public health. The utility of the case is reflected by the fact that case studies continue to comprise at least 7% of articles published in general practice and general medicine journals.\(^{100}\)

Evidence based medicine characterizes a hierarchy of evidences with case studies and the opinions of experts having lowest ranking compared to randomized controlled trials.\(^{101}\) This hierarchy must differ in applying an evidence based approach to population health and public health as there is
often a lack of randomized controlled trials to answer questions. Furthermore, randomized controlled trials can be considered inappropriate in some evidence based population health/ public health decision making, as the manipulation of a limited set of variables artificially simplifies and unrealistically describes a complex system. The environment, community norms, behaviours, social opinions, political priorities and commercial considerations are important drivers to evidence based decision-making in developing population health and public health programs.

In this context, the term evidence based medicine undervalues these considerations in developing a comprehensive framework to evidence based population health/ public health practice. Many of these factors will only be measured or considered in case reports and the views of key stakeholders. A portfolio approach has been promoted as best practice. This portfolio approach considers available evidence to address public health priorities, while, also considering potential promising interventions with incomplete evidence.

Presently, the amount of published evidence and research arising from urban regions outweighs comparable rurally based research in clinical medicine, population health and public health. With this dearth of information, a portfolio approach is warranted in rural health research bridging the link between what is known presently and what should be evaluated next in action research.
There are, however, examples of prospective analytical studies which have been conducted in rural areas, to increase evidence at a national and international level. These studies were conducted in rural areas, due to the methodological advantages of these sites. Rural research projects are less prone to loss to follow up in monitoring a cohort, as rural regions often have a clearly defined medical referral system, and there is less migration in rural populations. Notable examples of this approach include: cardiovascular studies in Bunbury, Western Australia\textsuperscript{108} and Dubbo, New South Wales\textsuperscript{109}, fracture epidemiology in Dubbo\textsuperscript{110} and falls prevention in the north coast of New South Wales.\textsuperscript{111,112}

Humphreys et al\textsuperscript{77} characterises Australia’s “metropolitan mindset”, observing that a capital city dominance in most research, economic and government activities is a major barrier to progress in rural health. Rural health research is important, as the populations and health needs of this group are often different to their urban counterparts, with worse outcomes from preventable causes of mortality and morbidity.\textsuperscript{34,77}

The limited amount of published rural health research impedes evidence based decision making in clinical medicine, population health and public health in rural settings.\textsuperscript{107,113} There are limitations in generalising and translating tertiary institution studies to primary care.\textsuperscript{19,20} Deidentified case studies have been advanced as a means of promoting rural health research to address the dearth of published research from small communities and
populations.\textsuperscript{114} Publication is often a prerequisite to attract research staff and resources in competitive grants.

The benefit of case study methods is that limited resources are required to raise the research profile and capacity of rural regions. Caution needs to be exercised to ensure study designs using case studies follow ethical guidelines for conducting human research.\textsuperscript{115,116}

Chapter 4 develops this theme discussing ethical issues involved in conducting and reporting on small community research.

\textit{Significance of research papers in chapter 3}

Published papers in this chapter provide examples of case studies encountered in my work as a rural general practitioner and medical educator in rural and remote Australia. These cases have been published nationally and internationally in the peer reviewed literature. Journal guidelines for publication of cases were followed and informed consent to publish cases was obtained from patients.

The first published paper in this chapter is a case series investigating patients with anal carcinoma in my general practice in the Northern Territory. Public health guidelines were followed for investigating this cluster.\textsuperscript{117} Exposure to human papilloma virus was found in three of the four cases. There were insufficient cases to justify a case control study to confirm this association. Other researchers have since confirmed this association in larger studies.\textsuperscript{118}
I was contacted by the cancer council to express their interest in this observation after reporting this cluster.

Consistent with the work of Kljakovic\(^1\) other cases presented in this chapter can respectively be classified as: unusual or rare; confirmatory (exploring a mechanism of action); diagnostic error; ethical; and finally a case written for an educational purpose.

The second published paper in this chapter describes a rare condition of an intra-osseus lipoma of the acetabulum. To my knowledge, this was the first description of a patient with an intra-osseous lipoma of the acetabulum causing severe referred abdominal pain to require laparotomy.

I was surprised to receive an email and telephone call from a patient in the USA with the same condition in 2005. She complained of pain in her groin consistent with my patient’s presentation. I provided this patient with references to assist her in her decision whether to proceed to biopsy of her lipoma. This case was useful to revise the diagnostic approach to hip and buttock pain in adults which is associated with many pitfalls including missed neoplasia.\(^{119}\)

The third published paper is a mechanisms of action case study. This case explores a patient’s paradoxical response to salmeterol from my clinical practice. Rare paradoxical bronchospasm with salmeterol is now an accepted side effect of this drug.\(^{120}\)
The fourth published paper, in this chapter explores errors in diagnosis associated with shoulder imaging. This reinforces the need to reassess a provisional diagnosis when the usual clinical course of an illness is not followed. The case illustrates the importance of noting ‘red flags’ or differences in the usual clinical presentation as noted by Murtagh. This observation for differences in the normal clinical course of a condition shares many similarities with Pickle’s original work in epidemiology.

The fifth published paper in this chapter explores systems errors and ethics in practice using a case series of two patients. Australian policies require all patients requesting a HIV test to give informed consent and to obtain pre-test counselling. Bioethical principles were used to explore an approach to managing inadvertent HIV testing of patients without their consent.

This case series was cited by Frith who contended that there was a case for patients to decide to undergo HIV testing independent of medical care. The case series was also cited by Sokol who reflected that: “Each case highlights the practical and theoretical difficulties that doctors face in everyday practice.” Sokol contended that patients have duties to their doctor and that at times doctors have a justified case for withholding information.

The sixth published paper in this chapter explores the humour and wit which can be encountered working as a rural GP and medical educator.
Chapter 3: Publications

3.1 High incidence of squamous anal carcinoma in Arnhemland

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3.2 Acute pelvic pain associated with an intra-osseous lipoma of the hip joint

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3.3 Dyspnoea worsened by salmeterol

Reproduced with permission Journal Royal Society of Medicine.

3.4 Shoulder Radiographs and Cautionary Tales

Fraser J. Shoulder Radiographs and Cautionary Tales. Australian Family Physician 2004; 33:967. (Copyright J Fraser)

3.5 Ethics of HIV testing in general practice without informed consent: A case series

Reproduced with permission of Journal of Medical Ethics
3.6 Using brown snakes to organise patient free days

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This chapter demonstrates that case study designs can be used to study a variety of clinical, educational and public health topics relevant to rural health. This type of study can be undertaken with minimal resource implications. The case studies presented in chapter 3 raise hypotheses, which can generate further research questions and investigations. The advantage of this approach is that case studies can be used as building blocks to develop a rural health evidence base, which, in turn, may contribute to a reduction in the currently dominant ‘metropolitan mindset’ adversely affecting progress in rural health. This is necessary to move towards a more equitable distribution of resources to rural areas. In order to expand this evidence base, strategies to increase rural health research capacity needs to be developed. These are discussed in chapter 8.

Other rural GPs have used the case study design as a means to justifying local provision of health services to rural patients (for example, introduction of patient controlled analgesia) or to demonstrate the impact remoteness can have on preventable causes of mortality (for example, asthma).

Some disadvantages exist in using case study designs in rural health research. Clinicians who undertake research (whether clinical, population health or public health in nature) in a small community assume two, at times, competing roles, namely the role as a clinician and the role as a researcher. Chapter 4 discusses the need to separate research and clinical roles in rural
health research to adequately inform ethical decision making in planning and conduct of research.

Methodological issues in conducting small community research are discussed in chapter 4. There is a potential for research subject responses to be influenced by the lack of choice of other health services or their relationship with their GP. An example, demonstrating this potential bias was the observation of reduced rates of health complaints by rural patients. These patients were reluctant to complain about local health services as they had limited other health professionals to access. ¹²⁸

In addition, the benefits of publication of research to increase evidence needs to be weighed against risks to the individual, community and organisation in small community research.
Chapter 4: Ethics of conducting and publishing rural health research

This chapter discusses ethical and methodological issues in conducting rural health research. These issues apply similarly to clinical, population health and public health research or education research. This is relevant to the aims of this Thesis as a consideration of the ethics of rural health research is a prerequisite to achieving increases in the evidence base of rural health and research capacity amongst rural health professionals.

Changes have occurred to the conduct and planning of rural research since the epidemiological research of Pickles, Kamien, Coolican and Murtagh of their patients. These authors describe no consent process for publishing and researching case reports of patients and epidemiological data from residents of small communities in their practices. Small amounts of demographic data such as gender and profession would have made these patients identifiable.

Today, the rural researcher has to weigh the benefits and risks of conducting research. This is especially important in using qualitative research approaches. The GP and qualitative researcher both use similar patient centred approaches, but their roles are different. The GP uses motivational interviewing to modify patient behaviour and interventions to treat illness. In contrast the researcher documents the subject’s viewpoint without wanting to influence their attitudes or change their present state of health.
Research subjects have the right to autonomy and confidentiality. Maintaining these rights in a small population may be difficult, as small amounts of demographic information will make the community or subject identifiable. This becomes particularly problematic when sensitive issues are researched. Reporting the prevalence of illness in a community may cause the community to be labelled with a stigma rather than benefiting the community.\textsuperscript{86} An example illustrating this case occurred with HTLV-1 testing of serum collected from Aboriginal people in the Northern Territory. The press reported the high prevalence of this condition in a discriminatory manner, causing adverse effects for these communities.\textsuperscript{134}

A balance between the rights of the individual, community and researcher and the likelihood of benefits or harm arising from the research needs to be assessed by an ethics committee and the researcher. Compared to Pickles’ era, current concerns about confidentiality and access to general practice records have been seen as being deleterious to public health.\textsuperscript{135} A British research team experienced significant delays in conducting a national case-control study of Creutzfeld-Jakob disease. They argued and advocated for reforms to present privacy legislation to better balance the rights of the individual and community.\textsuperscript{135}

Research ethics committees consider one of their main duties to be the protection of the well-being of research participants.\textsuperscript{116} This needs to be balanced against the protection of the rights and duties of society and researchers. Local input into research is vital to ensure ethical conduct of health research.\textsuperscript{136} At times, research approved in an urban setting can be
validly rejected on ethical grounds by a local rural research ethics committee.\textsuperscript{136} Often the proposal will not recognize the logistics of translating the research from an urban setting to a small rural or cross cultural population.\textsuperscript{86} There is an increased recognition of differences ethics committees face conducting their work in rural areas when compared to their urban counterparts.\textsuperscript{137}

\textit{Significance of papers in chapter 4}

The first published paper in this chapter, explores the interface between the role of GP and qualitative researcher. This paper adds to the literature by providing a framework for evaluating the ethics of research in a small community utilising bioethical guidelines and a community jury of citizens. At present, there are limited guidelines for GPs who wish to research their own patients using qualitative research. This paper provides a framework to assist GPs in decision making about their proposed research.

The second published paper in this chapter, discusses the ethics of publication of results which could impact upon the research subjects adversely within a small identifiable community. At times, researchers, ethics committees and managers may have different views on the suitability of publishing research results from small communities. Health care management frameworks for ethical decision making must contend with uncertainty and a lack of complete knowledge.\textsuperscript{138} There is a need to manage risk, with the potential for harm to the organization being weighed against the benefits of research. \textsuperscript{137,139-141}
Differences between the views of managers, researchers and subjects and the impact of publishing research upon these groups must be considered in publishing findings. This is particularly problematic in rural areas with small populations making the subjects identifiable.

This paper’s findings are comparable to a recently study of public health practitioners working in Scotland who identified multiple and sometimes conflicting responsibilities in analysing the ethical aspects of their job. Ethical decision making is often tempered by a more pragmatic approach due to constraints such as lack of time.
Chapter 4 Publications

4.1 A case report: ethics of a proposed qualitative study of hospital closure in an Australian rural community.

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available at
http://fampra.oupjournals.org/cgi/content/full/21/1/87?ijkey=72fknH15PjfpE&keytype=ref

4.2 Publish and perish: A case study of publication ethics in a rural community

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Implications of papers in chapter 4 to Thesis aims

This chapter demonstrates that rural health research is conducted in an environment containing many key stakeholders with (at times) competing goals and priorities. Consultation with key stakeholders is an important skill to plan research. The output or expected findings of research projects need to be considered important and useful by the research team and funding organisation. When resources are directed to support research an opportunity cost is incurred. The researcher and manager need to consider whether better health outcomes can be achieved by directing resources to other projects or clinical services.

Research can be used as a means to engage communities and to foster community participation in health care. Similarly, health research can be used as an organisational tool to restructure health services. These strategies to foster rural health research are consistent with the Ottawa Charter for Health Promotion strategies including: building healthy policy; creating supportive environments; strengthening community action; and reorientation of health care services.

Rural ethics committees and researchers need to consider small population size, confidentiality and the autonomy of individuals routinely in the design of studies in rural health. Chapter 8 will report on a project to foster research in rural areas. Adequate clinical, population health and public health service provision to rural areas is difficult to achieve without sufficient health professionals to meet demand.
In chapter 5, we discuss how strategic rural health professional workforce research can be conducted to assist programs to improve recruitment and retention. Recruitment and retention strategies are complementary but are inherently different.  

Health professionals can be defined as a population. This population can be influenced by strategies, incentives and barriers. All of these factors can impact upon recruitment and retention within a complex health care system.
Chapter 5: Research, population health and public health approaches to rural health workforce recruitment and retention

This chapter demonstrates the application of strategic research to develop evidence to support workforce program development in a rural area. In chapter 3, I discussed the need to increase rural research capacity to increase the evidence base of rural health. In chapter 4, I discussed ethical differences in the design and publication of rural health research.

Workforce research and promotion programs have the ultimate aim of improving recruitment and retention of rural health professionals. In chapter 1, I described the complexity of the Australian health system within which GPs work. Any program to foster recruitment and retention of health professionals must consider a diverse range of key stakeholders. These key stakeholders will have (at times) competing goals.

An important skill in rural health workforce is the ability to work with key stakeholders to develop a supportive environment to foster recruitment and retention programs. This is the nature of true collaboration as discussed in chapter 1. The complex system of recruiting and retaining health professionals has been linked to a pipeline with many influences on health professional output.

An adequate supply of competently trained health professionals is essential for addressing equity of access to health care services and to meet the
population health and public health needs of rural and remote Australia.  

Maintaining a skilled and motivated rural health workforce is a prerequisite for increasing clinical, population health and public health capacity in rural areas. Workforce research requires both national and regional approaches to adequately describe a complex system. Feminisation, lifestyle changes and increased community demands have strong influences on estimating the number of Australian health professionals required in the future.

A vertically integrated approach to health professional workforce training has been promoted in Australia and internationally and is reinforced in the published papers in this chapter. This approach optimises coordination of training and mentoring between school students, undergraduates, vocational registrars and the existing health professional workforce. A basic tenet of rural health workforce strategies has focused on rural origin being an important predictor of graduates following a rural health career. This has been observed in Australia and America for graduates of medicine. Recent Australian research has confirmed a strong association between doctors working as rural GPs with rural origin and training in rural areas.

In addition to rural background, gender is an important predictor of working hours and practice location after graduation. Female medical graduates are less likely to work in rural and remote areas than their male counterparts in Australia. In 2000, a Rural Doctors Network study of rural female medical practitioners identified that, compared to their male colleagues, females
doctors were likely to work fewer hours and less likely to be available for ‘on call’ services. 38% of present rural female General Practitioners indicate that their spouse's occupation is a major reason for working in a rural area.  

GPs require adequate tertiary speciality services, nurses and allied health professionals to optimise care. This lends itself to a multidisciplinary approach promoting horizontal integration between health professional recruitment projects. Optimising coordination between key stakeholders is central to this process. Strategic research needs to focus on the main barriers to entering and remaining in the rural health professional workforce. This research assists in prioritising recruitment and retention workforce programs.

**Significance of research papers in chapter 5**

The first four published papers in this chapter demonstrate how population health and public health approaches can be used in rural health professional workforce programs. Key features of this approach include; mapping a system, planning and implementing strategic workforce research, involvement of key stakeholders and the development of workforce policies and programs in a rural region.

In 1998, there was limited research into the needs of rural high school career advisers. The first four published papers in this chapter, describe an integrated approach of conducting research with this key audience, upskilling this group, providing assistance to improve opportunities to raise and foster interest in rural high schools and to promote more high school students to
enter a health career. A multidisciplinary approach was undertaken promoting allied health, nursing and medicine to rural high school students.

The first published paper in this chapter reports on strategic research into the needs of rural high school advisers. Brainstorming and flow charting\textsuperscript{158} with key stakeholders was used to diagnose the problem of health professional recruitment in the New England region. Flow charting involves a systems approach of mapping all steps in a process. The group identified recruitment of rural high school students was a rate limiting step in the process of recruiting the future health professional workforce. Career advisers were central to this process and identified as the study population.

This paper was undertaken in association with Dr Christian Alexander. In my capacity, as director of Hunter New England Area Rural Training Unit, I supervised this research and was actively involved in all stages of the design, analysis and writing of this project. This paper found that career advisers required access to interested health professionals who could act as mentors for aspiring rural high school students. The findings of this paper are cited by Durey et al\textsuperscript{159} who found similar needs amongst West Australian high school students who were asked about barriers they encountered in pursuing a health career.

The second paper evaluates interventions conducted to address this need. This included promotional activities to change attitudes amongst career advisers that rural students were unable to achieve the necessary marks to
enter a health career. A broader public health approach was applied in this paper including the formation of a network between career advisers and health service representatives to optimise coordination between education and health organisations.

The third published paper presents recent data about the demographics of high school students who express interest in health careers at health career markets. This paper suggests that the trends of feminisation in the health sector may increase with more female high school students presently considering entry to a health career. To my knowledge, this is the first rural high school quantitative data on health career choice to be published. Our finding of a high ratio of rural high school females interested in a health career compared to males is consistent with the gender stereotyping of health professional occupations described by rural West Australian high school students who “perceived health professions as female occupations.”

The fourth published paper in this chapter, reports on long term outcomes of ‘Promoting health careers to our future rural workforce’. I was awarded the New England Area Health Service Quality Award for Consumer Participation 2003 and the National Rural and Remote Quality Improvement Award Australian Council on Healthcare Standards 2003 for this work. This projects demonstrates a marked increase in the number of local rural students gaining entry to medicine.
Based on the framework of Rogers, Veale and Weller,\textsuperscript{56} this project meets many of the requirements of a population health approach to health career recruitment. The project involved health promotion (about careers) to a target audience (career advisers). A multidisciplinary approach was used with communication between the health sector, Department of Education and the broader community.

Present, long term rural health professional recruitment strategies continue to emphasise the importance of promoting health careers to local high school graduates.\textsuperscript{160,161} Programs mentoring rural high school students to assist entry to medicine\textsuperscript{162} and nursing\textsuperscript{163} have been recently piloted in America. Mentoring needs to continue at other levels of the workforce pipeline.\textsuperscript{144} Role models can have an important influence on career pathways of undergraduates pursuing both rural general practice and speciality training.\textsuperscript{164}

The fifth published paper in this chapter was conducted to develop strategic research in the needs of the specialist workforce of the New England region of rural NSW. This paper found a need for locum services for specialists. This published paper was undertaken in association with Dr Christian Alexander. In my capacity, as director of Hunter New England Area Rural Training Unit I supervised this research and was actively involved in the project. The paper is cited in a report which evaluates a piloted program of locum special obstetric services in Canada.\textsuperscript{165} In 2005, in view of this research
experience, I was asked to participate in a reference group to develop an obstetric locum service in Australia. 166

The findings of our study of the New England specialist workforce project are consistent with other recent reviews of the specialist workforce in Australia. 167,168 Conducting local regional workforce research (such as this project) and combining these findings with a top down national approach is particularly useful to understand complex workforce systems in rural areas. This approach follows the recommendations of Hays et al. 146

The sixth published paper in this chapter uses a multidisciplinary approach to study occupational violence experienced by health professionals in the workplace. This has a major public health significance, due to the effect of injury from violence in the workplace and also the impact of this violence on recruitment and retention.

This was the first time a multidisciplinary approach has been used to study occupational violence in health. A case definition of violence was developed. A public health approach of surveying all sectors and departments found that violence was evenly distributed and was no more common in areas such as emergency departments or psychiatry. This paper was undertaken in association with Dr Christian Alexander. In my capacity, as director of Hunter New England Area Rural Training Unit, I supervised this research and was actively involved in all stages of the design, analysis and writing of this project.
In an editorial, Grazier\textsuperscript{169} considers this paper “provides breadth and depth to our understanding of the types of violence faced regularly by practitioners in the clinical setting and the methods used by victims to cope. Although the paper was conducted in Australia, it offers “lessons for the U.S. health system in suggesting ways managers can reduce workplace violence.”

In 2005, our findings of rural GPs’ experience of violence was cited and compared with a cohort of urban based GPs.\textsuperscript{170} Magin et al found 63.7% of urban GPs had experienced at least one episode of violence over the previous 12 months. This compared to a prevalence of 48% in the New England occupational violence study.

The seventh published paper in this chapter, presents a comparison of the learning, support and training needs of doctors from an Australian and overseas background. This is the first comparative quantitative data of this type to be conducted in Australia.

The study found GPs and registrars identify many common learning and support needs regardless of origin and gender. This study supports the design of integrated educational programs focusing on stated, specific information deficits and programs to address professional needs rather than targeting individual groups be they overseas trained doctors, GPs, registrars or gender based.
In 2005, a qualitative study of the needs of Overseas Trained Doctors identified personal, professional and family issues and integration with the community effected retention of doctors. In view of our paper’s findings of similar expressed professional and educational needs from Australian and overseas trained doctors and registrars there is a valid case to replicate the Overseas Trained Doctor qualitative study with a sampling framework of both Australian and overseas trained doctors.

The seventh published paper in this chapter was undertaken in association with Dr Christian Alexander. In my capacity, as director of Hunter New England Area Rural Training Unit, I supervised this research and was actively involved in all stages of the design, analysis and writing of this project.
Chapter 5 Publications

5.1 The Promotion of Health Careers to High School Students in the New England Health Area: The Views of High School Career Advisers.


5.3 Australian rural high school students’ interest in health careers: implications for our future workforce?

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5.4 Promoting health careers to our future rural workforce.
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5.5 The Medical Specialist Workforce Servicing the New England Health Area


5.6 Occupational Violence in an Australian Health Care Setting: Implications for managers

5.7 Professional career needs of general practitioners and registrars working in north-western New South Wales.

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*Implications of papers in chapter 5 to Thesis aims*

This chapter demonstrates examples of strategic rural health workforce research. This research can be used to advise design of programs to improve rural health professional recruitment and retention. Health professionals can be defined as a population. Population health approaches relevant to workforce development include defining the needs of this population. Broader public health approaches include the development of incentives in the work environment conducive to recruitment and retention and collaborative networks between education and health to optimise the use of program resources.

Workforce recruitment and retention strategies benefit from a systems approach. Vertical integration is a form of systems approach analysis. Mapping influences on each stage of training will impact on other sections of the system. These effects will not necessarily be linear. Flowcharting can be used to predict influences on the system. The input of key stakeholders is essential. These organisations have great influence on the system as a whole.

This approach to workforce development has many similarities with the Ottawa Declaration for Health Promotion including: building health public policy to support health professionals; creating supportive environments; strengthening community action (by increasing community input into the recruitment process involving for example, parents); developing personal
skills (for example, continuing medical education) and reorientation of health services.

In 2005, the vertically integrated rural workforce models presented in this Thesis attracted international recognition. A series of collaborative projects have linked the New England region of New South Wales with rural health professionals in Northern Thailand.\textsuperscript{25,26} There is scope for ongoing cooperation between the two regions which share many similarities in terms of rural health professional shortages and worsening morbidity and mortality linked to remoteness.\textsuperscript{27,28}

This chapter demonstrates early outcomes of the high school career program in the New England region with more rural high school students entering health careers including medicine. This long term recruitment strategy has a long lead time. Retaining our existing workforce is also important. Continuing medical education is seen as an important support to foster retention to reduce professional isolation and to improve health outcomes. Some forms of continuing medical education, however, are ineffective in changing clinician behaviour.\textsuperscript{172}

Continuing medical education as a means of translating evidence into clinical care to improve health outcomes is discussed in chapter 6. In chapter 3, we discussed that there was a limited amount of rural health research being conducted internationally. A second step to improve health care delivery requires effective implementation of available research to influence practice.
Barriers to the implementation of research into clinical practice are discussed in chapter 6. This discussion is relevant to the aims of this Thesis as: expansion of the rural health evidence base (including clinical, population health and public health); and increasing the rural health workforce’s capacity to evaluate and implement relevant research, are both important to improving health outcomes.

With an increase in health professional workforce capacity, there is scope to increase clinical services and research in general practice with an emphasis on population health and public health. These issues will be explored in chapters 7 and 8 respectively.
Chapter 6: Research, population health and public health approaches to rural health professional continuing medical education

This chapter considers the implementation of evidence into clinical, population health and public health practice. At present, there is a gap between the outcomes of academic research, and its implementation by clinicians to improve patient care and the health of populations. This has been termed a crisis for academic medicine.\textsuperscript{173} The Effective Practice and Organisation of Care Group of the Cochrane Collaboration has been established to improve professional practice by improve the translation of new evidence into practice by health professionals.\textsuperscript{174}

During the implementation process of disseminating new evidence, research findings are often promoted by the development of clinical practice guidelines and informing and upskilling health professionals through differing types of continuing medical education.\textsuperscript{172,175,176}

This process is complex; multiple studies have shown the development of guidelines and their dissemination, as a sole intervention, to be ineffective in changing clinician behaviour. Problems in knowledge translation have been described as a crisis for academic medicine. They are a major public health issue\textsuperscript{173} as resources are limited; and most resources are devoted to research with limited budgets to disseminate new information.

To date there has been limited evaluation as to the best means of disseminating findings to promote best practice. Furthermore, evidence-
based medicine implementation programs have used clinical practice guidelines to reduce practice variation in order to improve efficiency.\textsuperscript{177} Some clinicians are known to resist change when it is imposed and regulated with limited involvement of colleagues.\textsuperscript{178} Additionally, systems research shows that family practice is a complex system and non linear in its function.\textsuperscript{35-37} Introducing guidelines without consideration to their impact on the other parts of the system, may reduce variation with adverse counter productive effects on quality, outcomes and the capacity GP to cope with change.\textsuperscript{37}

To optimise implementation of guidelines by clinicians, multiple educational strategies should be utilised based on a learning needs assessment.\textsuperscript{172,179} Watts describes a multidisciplinary collaborative approach between rural and metropolitan hospitals to improve post operative pain management in a rural hospital.\textsuperscript{126} Approaches such as this can be very resource intensive, however, their impact on changing clinician behaviour is likely to be highly effective as many stakeholders are consulted and involved in the process. There is a need to evaluate the cost effectiveness of various interventions to translate evidence into practice.\textsuperscript{179,180}

Previous studies have considered GPs’ attitudes towards use of evidence-based medicine generically.\textsuperscript{181} Bero et al and Davis and Taylor-Vaisey\textsuperscript{176,179} all consider the effectiveness of dissemination of evidence-based medicine via clinical practice guidelines is dependent on the quality of the guidelines, the effectiveness of the dissemination strategies, characteristics of the message, the practice environment and characteristics of the target
audience of clinicians. The provision of continuing medical education for rural health professionals is an important aspect of workforce recruitment and retention strategies in Australia. Rather than focus on evidence based medicine as a whole, this chapter argues that communication strategies and need assessments for different guidelines may need to be developed to optimise implementation.

This chapter uses case studies of rural GPs' needs and views about continuing medical education in hepatitis C management and GPs' present workload in this field to explore what are the barriers and useful tools to promote improved dissemination of clinical practice guidelines.

At present, there is a gap between the outcomes of academic research, and its implementation by clinicians to improve patient care. In Chapter 3, I discussed the importance of developing a rural research base to remedy the present limited amount of rural research being published internationally.

There are limitations of applying tertiary randomised controlled trials to general practice due to: patients’ co-morbidities; limited access to resources in rural areas and the need to consider patient needs in recommending treatments. This was further developed by a recent study by Laerum et al who outlined the need for a patient centred approach to complex patients in general practice with multiple chronic conditions. They recommended undertaking a functional assessment of the patient’s psychological and physical needs to plan and optimise care.
Educational outreaches, reminders, multifaceted interventions and interactive educational meetings are found to be consistently effective in changing behaviour of clinicians. Education materials such as published guidelines and didactic lectures have little or no effect on clinical practice.

Local area issues and logistics need to be considered in implementing new guidelines. There is likely to be local barriers and promoters of changes to health care and the preparedness of clinician to receive information on a topic and consider change will vary by location. Consistent with adult learning principles, GPs are likely to prioritise their learning based on their perceived needs. Competing learning needs between those identified by the practitioner and those identified by patients, communities or public policy can arise. This is reflected in the RACGP curriculum with national health priorities, domains and common presentations determining content. The first published paper in this chapter, demonstrates that the hepatitis C workload of GPs varies markedly in rural NSW.

The second published paper in this chapter, demonstrates how varying workloads will lead to prioritising of learning needs. This is reflected by the qualitative comment by a rural GP about their learning needs about hepatitis C cited in the second paper.
"The people organising this should appreciate that hep C is only one of hundreds of common problems and only one of the many serious health problems we as GPs have to see. You can’t expect us to work 10 h a day plus then attend to a seminar every second night”

Many needs assessments and evaluations of clinical practice guidelines involve a survey of the knowledge and attitudes of the subjects (clinicians) who were the target audience of the guideline. This is usually conducted a period of time after the guidelines are distributed. Often this shows a poor uptake of the clinical guidelines, often criticising the clinician about their inability to keep up to date. 190-192 This can further discourage a group often overworked and under resourced which the guideline developer wishes to engage.

Involving academics and clinicians in the development of a guideline has mixed results. A study implementing dental guidelines benefited from clinician input, 193 while other studies showed minimal impact of local clinicians developing their own guidelines. 194,195 The impact is likely to be due to interface between the various factors identified by Bero et al and Davis and Taylor-Vaisey as mentioned previously in this chapter. 176,179

Allowing clinicians to identify the need for a guideline and then implement this change is likely to be more effective than change being imposed from outside. 178 The case study of a multidisciplinary team approach to the implementation of post operative pain relief in a rural hospital is an example of
A needs assessment to facilitate implementation of new guidelines needs to consider the work environment, as well as, clinical and patient needs. The speed of implementation or diffusion will depend on the characteristics of the innovation, the complexity of the recommended changes and its compatibility to present accepted norms.  

**Significance of research papers in chapter 6**

This chapter argues that research approaches to evaluating a poor uptake of a clinical guideline needs to be expanded. Ideally, a needs assessment to clarify learning needs and a marketing strategy should precede clinical guideline development. Using this approach, evaluation can focus on what are the main problems in the marketing strategy to better inform clinicians about this change. Few studies have focused on conducting needs assessments for specific continuing medical education topics. This will be expanded in this chapter’s published papers.

In the published papers of this chapter, pre-testing found GPs were reluctant to participate in research which focused on their knowledge and attitudes to hepatitis C and their interaction with intravenous drug users. The market for continuing medical education about hepatitis C in our study was highly skewed with a small number of GPs (8%) providing the bulk of clinical services in northern NSW. 63% of GPs were aware of clinical guidelines. The fact 37% were unaware of these guidelines raises the question of how best to market new guidelines via other information strategies.
The GP hepatitis C education market was divided between GPs with a high workload in hepatitis C (with the potential to become local experts and advocates) and those who needed to access information when it was required to service a small number of patients. This latter group requested up to date information via CD ROMs and the internet. A significant unmet educational need was found with GPs requesting access to various forms of CME. We also identified access to resources affected continuing medical education availability with 9% of responding GPs lacking internet access.

The fact that some of these GPs favoured less effective CME such as didactic lectures, needs to be weighed against the acceptability of other forms of CME and whether they would attend an educational event involving more interactive methods. A variety of strategies need to be used in any communication strategy.

Performing a needs assessment, as a part of a marketing strategy increases costs, but can assist in dissemination and uptake of new information. In areas, of high public health significance such national health priorities or hepatitis C, (which is the commonest communicable infection in Australia affecting 1% of the population) it may be warranted. Better guideline implementation of important common conditions by GPs is likely to effect the treatment of many patients, compared to less common rarer conditions.

Rather than look at evidence-based medicine as a whole a better approach may be to prioritise areas with a detailed needs assessment including a
marketing strategy to implement change. This approach needs collaboration between continuing medical education providers, clinicians and academics.

The public health implications of poor implementation of research are immense. In Canada, guideline pre-testing occurs through peer review and evaluation with a range of implementation strategies recommended. Since our research, another survey demonstrating poor GP knowledge about hepatitis C has been replicated in the United Kingdom after the implementation of new guidelines. This group of GPs gave feedback that guidelines distribution alone is ineffective. They requested increased interaction with the guideline developers by seminars, interactive question and answer sessions and a CD ROM. These needs are similar to those expressed by our group of Australian rural GPs.

Increasingly clinicians are recognising the needs for multiple learning approaches to assimilate new information. This needs to be balanced against cost. This highlights the need to assess the cost effectiveness of various approaches to implement guidelines into practice. Clinicians are a heterogeneous group. The published papers on hepatitis C in this chapter show that the clinical practice of GPs vary greatly. The significance of implemented guidelines is often individualised for each GP reflecting their individual caseload and interest.

Conversely, as presented in the previous chapter, differing demographics amongst GPs such as gender, stage of training and country of original degree
may not necessarily mean differences in perceived learning needs. Evidence needs to support knowledge translation and implementation programs to optimise outcomes.
Chapter 6: Publications

6.1 Hepatitis C education needs of rural general practitioners working in northern New South Wales.


6.2 Hepatitis C caseload and models of care for rural GPs working in northern New South Wales.

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This chapter has discussed barriers to the translation of research findings into practice. Continuing Medical Education (CME) is an important tool for retention of the health professional workforce in rural areas. This workforce will prioritise their learning needs based on interest, skills and clinical workload. These priorities may differ from those of patients, government or the health needs of a community. An Australian example illustrating this further was a recent qualitative research undertaken with GPs, carers and patients with developmental disability in rural areas. This study found some GPs lacked skills, time and knowledge to adequately treat this group, while patients reported considerable difficulties in accessing health services.

Papers presented in this chapter show a preference by GPs for traditional styles of continuing medical education such as didactic lectures. This is consistent with other research into CME. These methods have less impact on changing behaviour than interactive teaching methods. This chapter shows that the demand for different CME topics is likely to be heterogeneous amongst GPs. Programs to disseminate information on topics of national health priority and increasing significance such as hepatitis C are likely to benefit from a needs assessment with their target group of GPs. This is likely to improve the penetration of an information dissemination marketing program to the target group of health professionals.
A skilled rural health professional workforce requires a variety of skills for competent practice. In chapter 1, we discussed clinical, population health and public health roles are often complementary in rural areas. The Royal Australian College of General Practitioner’s Curriculum identifies five domains for competent clinical practice: communication skills and the patient-doctor relationship; applied professional knowledge and skills; population health and the context of general practice; professional and ethical roles; and organisational and legal dimensions. 30

Similar to the findings on the effectiveness on CME 172,176, the companion to the curriculum recommends a variety of diverse teaching methods to deliver the curriculum.198 These include: direct observation and feedback; role play; critical appraisal; case review; learning in small groups; audit and self reflection through diaries. Chapter 7 presents applied research and evaluations of rural medical education teaching activities undertaken training recent cohorts of Australian general practice registrars in the New England region of New South Wales.

As discussed in chapter 1 and 5, training an adequate number of trained health professionals to meet the clinical needs of a community, is a necessary first step to expanding this workforce’s skills in population health and public health. This will be presented in chapter 8.
Chapter 7: Research and educational approaches in training a rural health workforce

In chapter 1, we discussed the fact that workforce shortages had lead to a synergistic relationship between clinical, population health and public health roles for many health professionals in rural and remote Australia. Access to medical education programs is seen as an important influence upon the recruitment and retention of rural health professionals. Practical skills training programs are rated highly by rural GPs as these skills are needed to provide comprehensive care to patients and contribute to their job satisfaction.

As a result, this chapter evaluating a variety of educational strategies to improve training for rural GPs is central to the overall aims of this Thesis. A trained workforce is required to provide clinical services to complement any expansion of population health and public health within Australian rural general practice.

The interdependency of clinical, population health and public health roles is reflected by the Royal Australian College of General Practitioners curriculum with scope for considerable overlap between the respective domains of general practice and recent observations of the Australian Medical Council recognising the link between specialist public health practice and clinical services. To achieve competency in the domains of general practice a range of teaching methods are recommended. This includes role play to
enhance communication skills training and practical skills training to enhance GPs capacity to provide a range of procedures in general practice.

Significance of published papers in chapter 7

The first published paper in this chapter focuses on using role play in medical education. Despite recommendations to incorporate role play into communication skills training, these methods tend to be under-utilised in training with a need to better research and evaluate these methods.

Considerations in planning role play are discussed in this paper. The need to consider the safety of the learner and patient in role plays have been reinforced by other authors. Using actors allows different methods to be used such as ‘rewind’ which are not available in a real consultation.

The second and third published papers outline a framework for teaching practical procedures. The third paper applies and evaluates this method of teaching using the example of teaching shoulder joint injections. These papers expand on previous research in skills training in Australian General Practice which assumed high confidence in performing a procedure indicated competence to teach.

A variety of teaching methods are recommended and evaluated to assess competency and to provide a supportive environment to continue skills acquisition in the work environment after initial task skill training. Jackson and Diamond have argued that once trained there is little evidence to support
the contention that rural GPs need to perform a minimum number of procedures annually to retain psychomotor skills.

Watts et al developed an analogue comfort score for rural procedural GP anaesthetists\textsuperscript{206} and obstetricians\textsuperscript{207} and found increased comfort to perform a procedure correlated with the duration of procedural training and the number of procedures performed a year. In the second paper in this chapter the differences between confidence and competence are explored in further detail.

The evaluation of the effectiveness of teaching new skills is essential to monitoring the quality of education programs.\textsuperscript{208} The ultimate goal of medical education for trainers is for their trainees to competently use skills in the workplace.\textsuperscript{209} Evaluation methods conducted after educational sessions (impact indicators), are limited in their ability to assess long term learning outcomes. The evaluation methods presented in the third paper in this chapter are used to assess the effectiveness of teaching a procedure (in this case, shoulder joint injection). The paper outlines the present limitations of common evaluation tools to assess long term outcomes adequately.

The fourth published paper in this chapter, describes the planning, implementation and evaluation of a multidisciplinary, horizontally integrated medical education program designed to improve coordination in health care between members of the health care team. This project was used to upskill nurses, registrars, GPs and consultants in obstetrics training in the New
England. This project was externally evaluated and felt to “reflect targeted models of flexible delivery of training and support that can be delivered regionally and are capable of replication on a national basis.” Similar developments have been implemented in other settings (for example, Watts used a multidisciplinary approach to introduce a post operative pain service in a rural South Australian hospital\textsuperscript{126}). A survey of North American medical schools in 2004 found 21\% of respondents had adopted multidisciplinary approaches to obstetrics training.\textsuperscript{211}

Multidisciplinary learning has been promoted to students\textsuperscript{212} and health professionals\textsuperscript{213,214} to foster teamwork and improved health outcomes in the work environment. This educational approach has been well received by participants and facilitates improved understanding of each health professionals’ role. Chapter 1 emphasised the need for rural GPs to work with other members of the health team to optimise health outcomes.

The fifth published paper in this chapter, evaluates use of peer review in postgraduate education. In chapter 6, I discussed that interactive education methods such as peer review are considered to be an effective form of continuing medical education.\textsuperscript{172,178} Paradoxically, postgraduates have shown reluctance to be involved in peer review, particularly, if it is linked to summative assessment.\textsuperscript{215} This paper demonstrates the benefit of peer review in postgraduate training for registrars and as a means of monitoring quality of a medical education program. Peer review reports can be used as a
form of formative assessment tool to assess doctors’ behaviour in the workplace.\textsuperscript{209}

In 2005, I was awarded the General Practice Education and Training Medical Educator of the Year Award. This recognised my contribution to medical education development, research and delivery in the New England region of New South Wales.
Chapter 7 Publications

7.1. A guide to using role-plays in GP registrar teaching

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7.2. Teaching practical procedures in general practice: A primer for supervisors of medical students and registrars

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7.3. How to plan, deliver and evaluate a training session

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Fraser J. How to plan, deliver and evaluate a training session. Australian Family Physician 2004; 33:453-455.


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7.5. Evaluation of an interpractice visit program for rural Australian General Practice Registrars

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Fraser J, Evaluation of an interpractice visit program for rural Australian General Practice Registrars. Australian Family Physician 2006; 35: 143-146.
Implications of papers in chapter 7 to Thesis aims

This chapter discussed educational strategies to train competent GPs to provide clinical services to rural communities. This requires a variety of learning activities across the five domains of general practice. This chapter discusses differences between confidence and competence. Competence to perform a skill requires task skills to be complemented by higher order training including simulation and scenarios to enable skills to be applied in the workplace.

The importance of working in a multidisciplinary team to improve health care delivery (for example, obstetrics) is discussed in this chapter. Multidisciplinary training can increase the coordination of care between health professionals. This results in more time for GPs to deliver more clinical services. The synergy between clinical services, population health and public health practice for rural GPs was discussed in chapter 1 and 2. In chapter 5, we discussed population health and public health strategies to recruit a rural health workforce. In chapter 6, we discussed the importance of CME as a retention tool. In chapter 7, we discussed strategies to educate a rural GP workforce with a variety of communication and procedural skills. The acute life support in obstetrics project reflects the need for GPs to work in a multidisciplinary collaborative framework to improve health care delivery.

Increased retention and recruitment of an adequate Australian GP rural workforce increases the capacity of this workforce to meet the acute and
chronic clinical demands of rural areas. This allows GPs with a special
interest, to develop extended skills in population health and public health. This
complements the core skills in population health which are required by all
GPs as discussed in chapter 1 and reflected in the domains of the RACGP
curriculum.30

Chapter 8 demonstrates that training in population health and public health for
GP registrars is feasible. Furthermore, it can positively influence rural health
workforce recruitment and retention. Registrars who undertook special skills
training in population health and public health, as described in chapter 8,
report this type of work to be satisfying and challenging. The registrars
involved in special skill posts report gaining additional skills in managing a
project, working with key stakeholders and developing research skills.

Offering population health and public health training to GP registrars in rural
areas can facilitate networks to be formed between public health units and
divisions of general practice. Research undertaken by registrars added to the
rural health evidence base in smoking cessation, childhood obesity and the
needs of rural patients with hepatitis C.

Research capacity was further developed by the development of a research
support methods structure attached to the New England Research Ethics
Committee. This provides a multidisciplinary forum for increasing rural health
research in clinical, education and population health and public health.
Chapter 8: Training the next generation: Developing population health and public health training in rural areas

This chapter explores sustainable models of education, support and training which have been developed to increase training capacity for rural GPs in population health and public health. This model of training is supported by recommendations that promote increased links between general practice and population health and public health and increased general practice research with population health and public health perspectives.

In view of the multidisciplinary nature of rural health as discussed in chapter 1, an important complementary strategy developed in this chapter, is to develop models of support to increase rural research capacity and mentoring of health research by all rural health professionals.

In chapter 1, we defined a continuum of core skills in population health for all GPs to an extension of skills for those with a special interest in public health, ‘new’ public health and policy setting and leadership in this field. This Thesis expands on previous work looking at this interface. This Thesis considers how public health and population health differ with respect to their involvement with general practice. In chapter 2, models of population health and public health practice in rural general practice were demonstrated. Chapters 3-7 have focused on: differences in rural health research including the utility of the case study; the importance of ethical considerations in rural health research; and the need to develop a sustainable rural health multidisciplinary workforce with clinical skills to meet community demand.
All of these factors, facilitate an increased population health and public health focus in the role of the rural general practitioner.

**Significance of published paper in chapter 8**

This chapter describes pilot programs to expand public health training for rural GPs. Previous models of joint training between general practice and public health had been piloted internationally. This however, was the first post of its type to be offered in a rural area.

The first published paper in this chapter, describes the preliminary pilot for an academic registrar post in public health. This was funded under the Rural Health Support Education and Training Scheme as a project of national significance.

Population health and public health were defined as synonymous by the stakeholder reference group appointed to advise on this pilot. As discussed in Chapter 1, acknowledging differences between population health and public health is important to promote an increased integration between these disciplines and general practice. This blurring of definitions may have contributed to some of the “unease about coexistent clinical and population/(public) health roles” and “ownership” of the project as described in this paper.

Since this time, I have changed my viewpoint on the interface between general practice, population health and public health. A continuum of skills as presented in chapter 1 is the preferred model as it can accommodate a variety
of interests and skills. This continuum of skills is supported by the recommendations of the Public Health Working Group (which I chaired) who assisted in the development of the revised Royal Australian College of General Practitioners’ Curriculum in 2005-2006. 32

Despite these differences and blurring of definitions between population health and public health, the pilot as reported in the first paper of this chapter demonstrated mutually beneficial outcomes for the involved division of general practice, public health unit, the Royal Australian College of General Practitioners and the Australasian Faculty of Public Health Medicine. Ongoing interest from registrars and sustainable funding has been obtained for this type of training.

This type of post is cited as a model of best practice in a report to the Commonwealth to promote a dual training pathway between general practice and public health. 24 Due to this experience, Hunter New England Area Rural Training Unit has been invited to be a member of a dual training pathway advisory group. A dual training pathway for general practice and public health is being developed in 2005-2006 by General Practice Education and Training (GPET). Morgan and Kelly 218 cite the first paper in this chapter in their development of a similar public health post for GP registrars in the Northern Territory. They report positive learning outcomes for registrars involved. 218

The second published paper describes a long term evaluation of this type of training which has been offered in the New England from 2001 to present.
This project entitled “General practice training in public health: Two parallels converging.” was nominated as a finalist in the NSW Health Baxter Awards 2004 for quality in education and training.

Wall and Kelly \(^{23}\) evaluated a program called “Public health registrars in general practice” in 2005. This program consisted of Commonwealth funding for six advanced training posts from 2003-2006 for GPs to undertake Australasian Faculty of Public Health speciality training. The review team externally reviewed the New England population health post for GP registrars and cited this project as part of this review. They propose a joint training pathway between Fellowship of the Royal Australian College of General Practice and Fellowship of the Australasian Faculty of Public Health Medicine training to be advanced in Australia.\(^{23}\)

Their external views of the population health training post developed for GP registrars in the New England are cited below.

“One relevant model for the model (of) training discussed above, is the work of Professor John Fraser in New England. Following an initial pilot program he has continued to recruit and train rural practice registrars in population health using GPET (General Practice Education and Training) academic post funding. The Centre bids for this and undertakes the training in collaboration with the local Public Health Unit. The post lasts from six to 12 months depending on the registrar. There is typically only six months funding but this may be supplemented/extended by undertaking part
time clinical work during the training. The trainees have usually elected to undertake 60% population health and 40% clinical work.

Three trainees have completed the program in New England, and one in Sydney. Another is about to start. Ex-trainees have continued to stay in clinical practice in rural NSW and one has joined the training unit as a medical educator. Professor Fraser is looking to extend this model into drug and alcohol practice training.

It is significant that this training, which is a quite similar model to that being developed by the JTC (Joint Training Committee), has been implemented with relatively little fuss and significant success. None of the trainees have sought recognition from the Faculty for the training that they have undertaken. However they would have been prevented from doing so because of the GPET rule about not being enrolled in two training courses. As noted above, this rule has recently been changed. One other barrier is the requirement for an MPH. This may change with the Faculty's Part One entrance arrangement, which has the potential provide a greater level of flexibility in recruitment of suitable trainees.”

Later in their report, Wall and Kelly recommend an expansion of population health and public health training opportunities as offered in the New England.

“……a much greater number of general practice trainees (should obtain) the opportunity to undertake six or twelve months training in public health. The one informant felt that if a choice had to be made, the
shorter training would be a better model than the full Faculty training.

The dual-qualified graduates will be highly sought after ……They will make a strategic difference to the delivery of primary health care, including general practice. The long term benefits are likely to be considerable.

As indicated, we feel this training is necessary but is not sufficient to achieve the aim of promoting public health approaches in general practice. The six months to one year training that is envisaged by the JTC and which Fraser is undertaking utilising grant funding is also necessary. Furthermore, the number of trainees in both schemes needs to be significant to make a difference nationally.”

The third, fourth published papers in this chapter, demonstrate published major works of registrars involved in the academic post in population health. These focus on smoking cessation and childhood obesity. None of the registrars involved in these posts have published prior to being involved in this form of training. Significantly, Dr Wong’s experience in this post has fostered an interest in academic general practice. Dr Wong has become a medical educator for the region since his training. Fostering this interest is useful to build medical education capacity in rural areas to train the future rural workforce.

At the time of submission of this Thesis, another two registrars are involved in different stages of their research projects. One registrar, Dr Gunasekera has
undertook the first quantitative quality of life survey of patients with hepatitis C in rural areas of Australia. Dr Gunasekera has also collected data on hepatitis C patient’s access to treatment services in rural areas. She is in the stage of writing drafts of her manuscript for publication. This paper has complemented previous research presented in chapter 6 on GP workload and educational needs concerning hepatitis C.

Another registrar, Dr Druon is in the data collection phases of a qualitative research study of rural parental knowledge, beliefs and attitudes towards childhood obesity. She wishes to explore gender differences in this population of parents. The work of Dr Louise Fisher in paper four of this chapter, found parents tended to under estimate their child’s weight with this being more marked for boys than girls.

The fifth published paper in this chapter, describes a research methods support structure which has been implemented in the New England to support researchers from all health professions to undertake more rural health research. In chapter 3, we discussed the limited amount of rural health research being undertaken limits the evidence base of rural health. Differences conducting research in a small rural community were discussed in chapter 4.

The development of the research methods support structure has increased the number of local research applications receiving ethical clearance significantly in the New England region. Significantly, an increase in population health and public health research projects coincided with the
development of this group. There is great potential to expand this support structure to increase rural health research capacity in other areas of Australia.
Chapter 8 Publications

8.1. Evaluation of a general practice registrar training post in public health in rural New South Wales

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8.2. General practice training in public health: Two parallels converging.

Reproduced with permission of NSW Health from its publication Baxter 2004 Health Awards: Winners and finalists

8.3. The use of bupropion for smoking cessation in rural New South Wales


8.5. Evaluation of the impact of a Research Methods Support Group to increase research capacity in the New England Regions of rural New South Wales

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Implications of papers in chapter 8 to Thesis aims

This chapter describes and evaluates projects which can increase population and public health capacity amongst our future rural general practice workforce. The GP registrar in population health/public health training model has been sustained in the New England region for four years, with ongoing demand for this type of training from GP registrars. There has been recognition of the suitability of this training to be expanded to other regions of Australia. Registrars note increased job satisfaction in developing population health and public health skills. This will assist in recruitment and retention of GPs to rural areas.

The research support methods structure project has increased rural research capacity for health professionals from many different disciplines in the New England area. Significantly, an increase in population health and public health research was associated with the development with the research support structure.

Results and observations presented in previous chapters are necessary to the development of outcomes in chapter 8. This Thesis demonstrates rural Australian case studies which explore the interface of population health and public health with general practice in chapter 2, explores differences in rural health research in chapters 3-4 and describes and evaluates projects which can increase recruitment and retention to our rural health workforce in
chapters 5-7. In the long term, there is scope to increase the population and public health capacity of this workforce.

A case for a continuum of required population health and public health skills for GPs is supported by this Thesis. Core population health skills are required by all GPs. Based on GP interest and community health needs there is scope to expand skills in public health and ‘new’ public health. There is scope and need for some GPs to develop leadership in the interface between general practice, population health and public health to assist in policy development in the 21st century to improve health service delivery and health outcomes in general practice. This is particularly true, in rural Australia where the high morbidity and mortality of the population emphasise the importance of this approach.
Chapter 9: Conclusions and future directions

The GP of the future needs clinical, population health and public health skills to manage a multidisciplinary team. This combination of skills is consistent with recommendations of the World Health Organization for training health professionals into the 21st century. Health professionals require five core competencies including: patient-centred care; partnering (working with patients, health professionals and communities); quality improvement; information and communication technology and public health perspective. The public health perspective includes population health based care to define the needs of a population and expansion to a public health perspective. This uses systems thinking to optimise care across a continuum of society with change implemented via primary health care led teams.

There is vast scope for future directions of research in this field. Systems approaches to workforce planning and health care delivery were discussed in chapter 1,2 and 5. Utilisation of population health and public health skills in general practice requires a range of structural reforms to the way GPs work, relate to other health professionals and receive remuneration.

This Thesis has provided examples of case studies to substantiate the feasibility of integration of general practice with population health and public health in Australia and educational models to improve training in population health and public health in general practice. Promotion of this career pathway to GP registrars requires educational pathways to be developed. This Thesis
has discussed the problems in translating evidence into population health, public health and clinical practice. The differences between clinical, population health and public health based evidence and decision making need to be considered in implementing any change.

Organisational change models, barrier and promoters of change and the benefits of these types of structural reforms need to be researched and debated. Many of these questions are raised in the first chapter’s paper on systems approaches to organisational change in general practice.

This thesis presents several models which worked in the remote and rural areas of Australia where I have worked. More research and resources are needed to develop a series of sustainable models of expanding public health and population health capacity of health professionals in rural Australia. This is due to the diversity of rural Australia and the fact systems theory supports the benefits of variation in models as an efficient means of solving health problems.

In the first chapter of this Thesis reference was made to Cumpston who was one of the fathers of public health in Australia. It is surprising that the initial public health focus of the many programs lead by this man focused on remote northern Australia. Quarantine and the Australian Hookworm Program are examples of this concern. The reason for this priority were concerns about invasion and epidemic disease spreading to the metropolitan southern areas of Australia.
Perhaps it is time to return to this priority setting, however, this time based on health needs of the rural and remote Australian population and a desire to offer equity of access to health care to all Australians. More general practitioners trained in population health and public health could offer improved access to treatment and preventative programs.

As discussed in chapter 1, difficulties in translating tertiary based research to the community, the need to use resources efficiently and the many changes to the general practice environment such as workforce shortages, ageing population, new emerging diseases and poor public health infrastructure can represent opportunities for general practice in Australia.

Two opposing views of the future of general practice in Australia were presented in chapter 1. The GP of the future could become an evidence based protocol driven automaton as described in the second paper of chapter 1.

This Thesis supports the latter role presented in chapter 1 with GPs experiencing greater empowerment by an expansion of the GP’s role. This includes an expanded population health and public health function with links to a multidisciplinary team.

For this vision to become reality, enough health professionals need to be recruited and trained to ensure the work of the rural GP is sustainable.
Systems based research into organisational change in general practice is required. This needs to be complemented by adequate resourcing of educational programs and career structures for GPs to train in population health and public health.
Appendices

1 Frances Hardey Faulding Memorial Fellowship Award

2 New England Area Health Service Quality Award for Consumer Participation 2003

3 National Rural and Remote Quality Improvement Award Australian Council on Healthcare Standards 2003

4 Finalist, education and training section, Baxter 2004 NSW Health Awards

5 General Practice Education and Training Medical Educator of the Year Award, 2005.

6 Acknowledgement of Public Health Working Group Contribution

7 Media report: Thai medicos visit region Reproduced with permission Northern Daily Leader.

8 Media report: Thai health academics visit UNE Reproduced with permission University of New England.
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