# REMOTE X-RAY OPERATOR RADIOGRAPHY: A CASE STUDY IN INTERPROFESSIONAL RURAL CLINICAL PRACTICE

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# **DECLARATION**

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.


Signed _____     Date _____

Anthony Smith

# ACKNOWLEDGEMENTS AND DEDICATION

The completion of a PhD research project requires a great deal of personal commitment and dedication on the part of the candidate, but without the surrounding support network it would be an insurmountable task. Therefore, thanks go firstly to my supervisors for their assistance and guidance. In the early stages of the study Doctor Jon Adams demonstrated a great deal of expertise in helping to define the research topic and design the study. He later provided valued input into the data analysis process. With his assistance I have developed my understanding of qualitative research methods, particularly the application of those methods in my own discipline without the need to become a health social scientist as well as a radiographer. Although Professor Peter Jones was not involved in the earliest stages of the study, his input towards the end of the project was invaluable in helping me to maintain my focus and avoid despair when things were not going to plan. I acknowledge his optimism and open friendliness as excellent qualities in a research supervisor, not to mention in a human being.

Without the contribution of the study participants, this project could not have existed. I thank them for their time and patience in making themselves available, in spite of their work commitments. I also offer them my admiration for their dedication to the care of the rural and remote communities they serve, often in isolated and challenging circumstances.

Research higher degree study has its own rewards in the sense of achievement and in the professional development that takes place along the way. However, it is also an often lonely and isolating road, requiring long hours in deep thought in front of a computer monitor. For me, this loneliness was relieved by knowing that my family were not far away and that it would soon be possible for me to edge my way back into their world, sharing the relief of having finished this study. I simply thank them for being there.

Seeing my own hands on the computer keyboard, I have been reminded many times of my father's hands. Therefore, I dedicate this work to my parents, Neil and Rita Smith. Both have passed from this life but I know that they would have taken great pride and joy from my completion of this study. My parents' hands have guided me here and continue to guide me.

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# ABBREVIATIONS AND ACRONYMS

Abbreviations and acronyms have been used sparingly in this thesis. Although in most cases they are defined at the point in the text where they appear, the following is a list of those most commonly used.

AIR                 Australian Institute of Radiography

ARIA                Accessibility/Remoteness Index of Australia

EPA                 Environment Protection Authority

GP(s)               General practitioner(s)

RN(s)               Registered (or rural) nurse(s)

RR(s)               Rural radiographer(s)

RRMA                Rural, Remote and Metropolitan Areas

RXO(s)              Remote x-ray operator(s)

It should also be noted that where an acronym has been used in a citation the meaning is to be found in the list of references.

# SYMBOLS

In Chapters 6, 7 and 8 in particular, as well as elsewhere in the thesis, extracts from the interview transcripts have been given. Symbols used in these extracts are as follows:

…               Indicates a pause by the speaker or
                that the extract has been truncated to exclude irrelevant material.

[     ]         Explanation of a term or
                replacement of an identifier with a generic term.

'       '       A direct quotation of less than two lines included within the text.

"       "       An indirect quotation.

# RELATED PUBLICATIONS AND PRESENTATIONS TO DATE

**Published Papers**

Adams, J. & Smith, T. 2003, 'Qualitative Methods in Radiography Research: A Proposed Framework', *Radiography*, 9(3):193-199.

**Oral Presentations**

Smith, T., Jones, P. & Adams, J. 2006, Remote x-ray operator radiography: Exploring the key concepts*,* presented to 3rd Annual Scientific Meeting of Medical Imaging and Radiation Therapy, Hobart, 27-30 April.

Smith, T. 2005, The relevance of remote x-ray operator practice to the future rural health workforce crisis: Preliminary findings, presented to 2nd NSW Rural Allied Health Conference, Sydney, 28-29 October.

**Poster Presentations**

Smith, T., Adams, J. & Jones, P. 2005 Investigating the role of NSW remote x-ray operators: Future practice implications, presented to 8th National Rural Health Conference, Alice Springs, 10-13 March.

Smith, T., Adams, J. & Jones, P. 2003 Investigating the role of remote x-ray operators in NSW: A work in progress, presented to 1st NSW Rural Allied Health Professionals Conference, Sydney, 5-6 December.

# ABSTRACT

In some rural and remote locations in New South Wales and elsewhere in Australia, a limited range of radiographic examinations may be performed by nurses and general practitioners if there is no radiographer available. These so called remote x-ray operators are licensed under the New South Wales Radiation Control Act 1990. This study aimed to investigate the experiences and perceptions of remote x-ray operator radiography and examine the role of remote operators in New South Wales from the perspective of a cohort of rural radiographers and nurse and GP remote x-ray operators involved in frontline delivery of rural radiographic services.

**Methodology**

Semi-structured in-depth interviews were performed with twenty rural radiographers, ten rural nurses and seven rural general practitioners from various rural communities in New South Wales. Interview questions explored the informants' knowledge, opinions and values, experience and behaviour, and attitudes and feelings in relation to remote x-ray operator radiography. Interviews were tape-recorded and transcribed. Data analysis was subsequently performed using an iterative process based on a modified grounded theory methodology. Data labelling and comparative analysis were carried out in parallel with data collection, allowing progressive modification of the interview theme list to ensure that theoretical saturation was achieved.

**Results**

Data analysis led to the emergence of three key concepts, together with their relevant themes and sub-themes. The primary key concept, 'Dimensions of Practice', was inclusive of the central precepts of remote x-ray operator radiography. It includes themes titled 'Licence Conditions and Limitations', 'Competency Requirements' and 'Image Quality and Practice Standards'. The key concept of 'Service Provision and Equity of Access', represents the realities of clinical practice in the rural and remote health care setting. It includes themes of 'Clinical Management and Decision Making', 'Access and Availability', 'Patient Expectations' and 'Commitment to Service'. The third key concept is 'Professional Roles and Relationships', which deals with the interactions that take place between individual practitioners and the factors that influence them. It encompasses the

themes of 'Boundary Delineation', 'Professional Status and Esteem' and
'Interprofessional Conflict and Collaboration'. Relationships between the key concepts,
via their themes and sub-themes were also explored.

**Conclusions**

Analysis of the data led to the development of a conceptual model and a single story line
that represent the perspectives of the study informants. Remote x-ray operator
radiography takes place at the intersection of the occupational worlds of rural
radiographers, nurses and general practitioners. Remote operators provide a valuable
service that prevents rural residents having to travel to access minor radiographic
examinations. However, the quality of the radiography they perform is below the standard
expected of radiographers. Improvements in collaborative teamwork could improve the
quality of service, although interprofessional communication is stifled by status and
hierarchical relationships. The remote x-ray operator experience may inform the
development of future models of health care.

# PREFACE

## An Insider's Perspective:
## The Author's Background and Position as
## a Researcher in this Project

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Rigour in qualitative research is inclusive of the concept of 'reflexivity', the ability of the researcher to acknowledge and account for their role in the research process (Rice & Ezzy 2000, pp.40-1), including any prior assumptions or experience in the field of study. It is reliant on the researcher making known any personal or intellectual biases at the outset of the research report. For this reason it is important to declare that I, Anthony Smith, the author of this thesis, am a radiographer of some thirty years experience and that I have had close involvement with the New South Wales remote x-ray operator licensing program for more than ten years. Therefore, my perspective is not that of a detached, independent investigator but rather that of a keenly interested insider who is familiar with and part of the rural health education system that spawns remote x-ray operators. Further, as a consequence of my background I knew some of the informants prior to undertaking the study and was known to some of them, in many cases because of my involvement in the licensing program.

Subsequent to qualifying as a radiographer in 1976, I worked at a variety of public hospitals and private practices, including some New South Wales rural hospitals. In 1989, I took up a full-time academic position at the University of Newcastle, although I have constantly remained clinically active on a part-time and casual basis, principally in accident and emergency radiography. My current position is as a Senior Lecturer in Medical Radiation Science (MRS) at the University of Newcastle's University Department of Rural Health, Northern New South Wales. This position brings me into frequent contact with rural radiographers, as well as rural doctors, nurses, other allied health professionals and undergraduates of various disciplines.

My principal academic interest is in rural radiographic practice. In 1994, while working part-time in a small, private casualty clinic in Newcastle, I was alerted to the desperate

need in New South Wales for a short course in basic radiography for rural GPs and nurses so that they could obtain a remote operator's licence. In the early stages of conducting that course I became aware of the lack of educational support that rural radiographers and remote x-ray operators received. In 1995, I successfully applied to the Rural Health Support Education and Training (RHSET) program of the Commonwealth Department of Health and Aged Care for a grant to establish the Centre for Remote and Rural Radiography at Dubbo. The Centre was funded for two years during which it supported a continuing education program for radiographers and remote x-ray operators, a rural-metropolitan radiographer exchange program, and worked towards the establishment of a rural radiography communication network. Although moderately successful, the long-term sustainability of the Centre was limited by a lack of ongoing funding. I remain the Coordinator of the New South Wales Remote X-ray Operators Licensing Course, a role that brings me into frequent contact with rural radiographers and remote x-ray operators.

My radiography and teaching experience has the potential to have both positive and negative influences on this study. On the one hand, I have the background to understand and interpret the issues that have arisen in the course of researching this topic. I have a sound understanding of radiographic imaging and informants could, therefore, freely use radiographic terminology that would be unfamiliar to a non-radiographer researcher and may have required long-winded explanations. Further, even before the interviews I was aware of some of the history of remote x-ray operators in New South Wales and took part in some of the more recent debates. On the other hand, I may have entered into the research process with some preconceptions that could have unconsciously influenced the way I approached the interviews and the style of questions asked. Informants who were aware of my background may have doubted my impartiality and perhaps even found my involvement in the licensing program intimidating and thus been reluctant to describe their true feelings and experiences.

The point of this declaration is to assure the reader that I was aware of my insider perspective throughout the course of this study, as were my supervisors, neither of whom are radiographers and were therefore able to monitor the objectivity of the research process. At the interview stage of the study I was conscious of the need to gain the trust of the informants, to state my position and to adhere to the approved ethical requirements, as described in this thesis.

# SECTION ONE – INTRODUCTION AND LITERATURE REVIEW

## Chapter 1

## Introduction to this Study

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This thesis is concerned with the demarcation of professional boundaries within the context of the provision of health care services in rural and remote parts of the State of New South Wales (NSW), Australia. The particular service that forms the core subject of the study is plain film medical imaging using x-rays, that is, diagnostic radiography. This service is usually provided by radiographers, allied health professionals specifically educated and trained to undertake this role. However, in some rural and remote locations, where the delivery of health care services is limited by geographic, economic and social constraints, general practitioners (GPs) and nurses who have completed a short course in basic radiography may provide a service when or where a radiographer is not available. In that role the GPs and nurses, who are licensed under the New South Wales Radiation Control Act 1990 (Government of New South Wales 2004) to perform a limited range of diagnostic x-ray examinations, are referred to as remote x-ray operators or simply remote operators. This study investigates and seeks to explain that role and their relationship with radiographers.

In this chapter the aim and objectives of the study are concisely defined first of all. The rationale for and significance of the research is then explained in the context of the study aim and objectives and, subsequently, a brief overview of the thesis is given.

### Aim and Objectives of this Study

The overarching aim of this study is to use qualitative research methodology to document and examine the experiences and perceptions of limited licence remote x-ray operator radiography and to explain the role of remote operators in New South Wales from the

perspective of a cohort of rural radiographers and nurse and GP remote x-ray operators involved in frontline delivery of rural radiography services. In doing so it is intended to:

- describe and hence develop a better understanding of the practice of radiography, particularly in rural and remote locations where there is no radiographer available;
- develop an appreciation of any similarities and differences between how health professionals from different backgrounds interpret and portray the practice of radiography;
- investigate and explain the interprofessional relationship between rural radiographers and remote x-ray operators;
- examine how the key health professional stakeholders construct interprofessional boundaries relevant to radiographic practice in the context of rural and remote health service provision; and
- explore the broader relevance of the remote x-ray operator radiography case study to the development of future models of rural health care where role or task substitution is a key component.

In order to achieve the study aim a representative sample of rural radiographers and nurse and GP remote x-ray operators were recruited and a separate in-depth interview carried out with each study participant. The interview transcripts were analysed in detail with reference to the relevant literature, using a modified grounded theory approach. Consequently, it was intended that a substantive conceptual model and theory would emerge that was relevant to the delineation of interprofessional boundaries in this field.

## The Significance of this Study

It is important to appreciate at the outset the uniqueness of this study. As explained in more detail later in this thesis, very little research of the practice of radiography has been undertaken previously. Further, there have been few previous investigations of rural and remote radiography and this is the first formal study that has ever been performed of the role of remote x-ray operators and their interprofessional relationship with radiographers. While it might be presumed that radiography is an important diagnostic service in the

delivery of high quality health care, the dearth of research explaining the role of radiography and radiographers suggests that it is a service that is poorly understood. This also reflects undervaluing of research in this field. In contrast, the role of general practitioners and nurses in rural and remote health service provision has been extensively investigated and reported in several studies. Hence, it can be argued that there is a need for formal research in this field in order to describe radiographic practice in the context of rural and remote health service provision, whether it is performed by radiographers or by remote x-ray operators.

The practice of remote x-ray operator radiography appears to be a unique example of collaboration and cooperation between health professionals from different occupations and workforce sectors in the rural health care system. As such it is of interest as a case study of interprofessional clinical practice. However, personal observation suggests that the relationship between rural radiographers and remote x-ray operators is characterised by interprofessional tension and conflict and that this is at least potentially problematic. This observation is central to the motivation for undertaking the research described in this thesis. This study promises to provide greater insight into the complexities of the relationship between rural radiographers and remote x-ray operators by examining the perceptions of some of the key stakeholders who are directly involved in the provision of rural and remote radiographic services.

It can be argued that part of the reason for the interprofessional tension and conflict that appears to exist between rural radiographers and remote x-ray operators maybe their fundamentally different perspectives on rural health care. It can be further argued that, consequently, rural radiographers, nurses and GPs will understand and interpret, and ultimately perform, describe and explain radiography from different perspectives. It is also conceivable, however, that significant commonalities may also be evident. As indicated above, this study is intended to explore similarities or differences that may exist between the perspectives of different health professionals who are performing the same or a similar role or task. This study, therefore, has broader relevance.

There is an increasing awareness of the impending and unavoidable global workforce crisis facing health care. According to Australian Bureau of Statistics (ABS) projections (2003) the median age of the Australian population will have increased by ten years by

2050 compared to 2000. This unprecedented aging of the population has implications for workforce participation (Schofield & Beard 2005). In 2003 people aged twenty-five to fifty-four years made up 69% of the workforce (ABS 2003) and in the future, as the population ages, this portion of the population will become the patients who will require health and disability services. The prevalence of age-related chronic disease is also expected to increase (Alexander, Ramsey & Thomson 2004; Duckett 2005a). Over the same period, even taking into account migration, projections indicate that the proportion of the population of working age will decline (ABS 2003; Garden, Moored & Jorm 2005). It is argued, therefore, that health professionals need to develop new ways to practice, particularly in rural areas where the health of the population is already relatively poor and it is apparent that the impact of the changing population profile will be felt most acutely (de la Rue & Coulson 2003; National Rural Health Alliance 2004b). Some authors have suggested remodelling and redefining of interprofessional boundaries, with the transfer of skills between health professionals (Duckett 2005a; 2005b).

The broader relevance of this research relates to changes that may take place to the health care workforce in the future. Firstly, it may illustrate the mechanisms used by different health professionals from different backgrounds to define their occupational jurisdiction and construct practice boundaries when, through necessity, they are required to share the same practice arena. Secondly, it has relevance in the context of proposed changes to models of practice in health service provision, which include such concepts as extended practice roles, multi-skilling, and role or task substitution. In developing new practice models, professional interests need to be considered, as well as ensuring access to high quality health care services. The insights of front-line practitioners should be taken into account in the process of change. Therefore, the perceptions and experiences of rural radiographers, general practitioners and registered nurses involved in the delivery of remote x-ray operator services may be of interest in informing the development of new practice models in other fields.

This raises a number of pertinent questions and issues that will be addressed in this thesis. For example, what are the critical issues that rural practitioners perceive as central when roles are shared across professional boundaries? How do practitioners identify and describe their jurisdiction and practice boundaries? Should rural nurses and GPs be allowed to adopt the competencies of other allied health professions? Is it feasible to

transfer the skills of allied health professionals across interprofessional boundaries in order to increase service access in rural and remote health facilities? Would the quality of services be maintained or improved under such potential new practice models?

## Synopsis of this Thesis

This thesis is divided into three sections. Following this introductory chapter, the remainder of Section One deals with the background and literature that is relevant to the study. Chapter 2 places the study in the context of the rural health care system in Australia, moving progressively from explaining various meanings of the terms 'rural' and 'remote' as opposed to 'metropolitan', and onto exploring the implications of the degree of 'rurality' for health status and health service access. Chapter 2 culminates in the exploration of the provision of rural and remote radiographic services, including the development of the remote x-ray operator program. Chapter 3 examines the historical influences and the contemporary understanding of the occupation of radiography, as evident from a variety of sources. Possible future changes in the practice of radiography and the role of radiographers that are relevant to the study are also considered, as is the question of whether radiography is a profession. Chapter 4 takes a more theoretical perspective, examining literature related to the concept of professionalisation, involving competing claims that take place for the same task or role, at times within the same clinical practice arena or jurisdiction. The evolution of professionalism is also discussed in the context of the development of the new health professions. Finally, in the first section of this thesis, relevant theories related to the establishment and maintenance of interprofessional boundaries and collaborative teamwork are examined. While chapter summaries are given at the end of Chapters 2 and 3, Chapter 4 ends with the description of a preliminary conceptual model of remote x-ray operator radiography.

The second section forms the body of the thesis. Chapter 5 explains the methodology used in this study, providing a justification for the choice of methods as well as a detailed explanation of the practical aspects of how the study was conducted. The subsequent three chapters, Chapter 6, 7 and 8, detail the results of the study, categorised and labeled according to the key concepts, themes and sub-themes that emerged during the data

collection and analysis. These chapters contain copious quotations that illustrate the perceptions of the informants together with a commentary describing, explaining, justifying and further illustrating the points made by the study informants.

The third and final section of this thesis is the 'Discussion and Conclusions', which is divided into two chapters. Chapter 9 contains an analysis of the results, emphasising the major findings in relation to the study aims. Where appropriate, comparisons are drawn by deductive analysis with the literature dealt with in Section One. The findings are thus discussed, condensed and integrated in this penultimate chapter. The final chapter provides an interpretation of the study findings, explaining the apparent relationships between the emergent key concepts, at the level of the themes and sub-themes described under each. This culminates in the description of the conceptual model that explains remote x-ray operator radiography from the perspectives of the key health professional stakeholders, before final conclusions are drawn about the relevance of this study in the broader context.

# Chapter 2

# Rural and Remote Health Care and Radiography in Context

This research project is set amidst the background of the rural and remote health care system in New South Wales. There would be no need for remote x-ray operator radiography if it was not for the need to provide medical imaging services to small, relatively isolated rural and remote communities. Under the New South Wales Radiation Control Act 1990, remote x-ray operators cannot use their licence in the cities where, other than for some dental and chiropractic examinations (Government of New South Wales 1993), only radiographers can be licensed to perform radiography. Clearly, there is a divide between metropolitan and non-metropolitan population centres and a general understanding that those citizens who choose to live outside of fully serviced urban localities will have different circumstances to those living in urban population centres. Access to radiographic services is only one of many aspects of rural existence that is different from the city.

Comparisons are often made between urban communities and relatively worse off rural and remote communities in terms of economic and social structure, access to services and the availability of infrastructure (Morris & Palmer 1994; Simmons & Hsu-Hage 2002; AIHW 2005a). Various strategies have been put in place by successive Federal and State governments to counteract the perceived negative influences that have created the apparent inequity in health status and service availability and access (National Rural Health Strategy 1994; Healthy Horizons 1999 & 2002; New South Wales Department of Health 2002a; Humphreys, Hegney et al. 2002; Jones, Humphreys & Adena 2004). Some of these strategies will be referred to in this chapter, however, it is necessary to first describe some of the negative influences that have led to the urban-rural polarisation and hence to the apparent need for remote x-ray operator radiography to exist. Therefore, in this chapter relevant aspects of the rural health care system in Australia will be considered before moving on to describe and discuss rural and remote radiographic services in New South Wales. Reference will also be made to the situation in other Australian States and in other countries.

## Defining 'Rurality'

There is a great deal of discussion evident in the literature with regard to defining the meaning of 'rural', 'regional' and 'remote' and differentiating these from 'metropolitan' (Humphreys & Rolley 1993; Humphreys 1998a; Humphreys 1998b; Wakerman & Lenthall 2002; Couper 2003), principally for the purposes of government policy making and resource allocation (Humphreys & Rolley 1993; Humphreys 1998b). It can be argued that the need to define the characteristics of urban, regional, rural and remote population centres and delineate the theoretical boundaries between them is itself is a recognition of the fact that inequality exists in terms of product availability and service accessibility.

The Shorter Oxford English Dictionary (1962) defines 'rural' as 'having the standing, qualities or manners of country-folk, hence being agricultural or pastoral', and 'urban' as 'pertaining to or characteristic of, situated or occurring in a city or town'. However, the difficulty is not so much in determining whether or not a locality is rural or urban but rather in determining the degree to which it can be classified as rural and consequently what this means for the population of that location. There are apparently degrees of 'rurality'. For example, Hugo (2002) says that there are significant regional variations in rural population growth with much of the growth being concentrated in the rural-urban fringe, along the fertile east coast in sought after holiday and retirement zones and along the transport arteries that join major population centres. Coastal communities, such as those that dot the eastern seaboard of New South Wales, are generally closer together, larger and less dependent on primary production than inland communities (Hugo 2002). However, the rapid growth of some coastal rural communities has placed significant stress on the environment, community resources and the ability to provide a reasonable standard of services (Simmons & Hsu-Hage 2002). Understandably, therefore, deciding on the degree of rurality is a complicated task that must take into account a variety of geographical, social, environmental and economic factors (Humphreys 1998). Using various combinations of these factors, several different classifications of rurality have been developed. An elementary knowledge of these classification systems is helpful in understanding the nature of small rural and remote communities in which remote x-ray operator services exist and in understanding some of the later content of this thesis.

In 1994 the Commonwealth Department of Primary Industries and Energy and the Department of Human Services and Health provided a somewhat simplistic classification system of rural, remote and metropolitan areas (the RRMA classification) based primarily on statistical local areas and population size (Rural Doctors Workforce Agency[1]). It places regions into seven categories: Capital City, Other Metropolitan, Large Rural Centre, Small Rural Centre, Other Rural, Remote and Other Remote, graded 1 to 7 respectively. This classification, however, does not take into account road distance or road condition, nor does it reflect socio-economic or environmental factors, and it has been criticised for grouping together dissimilar centres (Wakerman & Lenthall 2002). The Australian Standard Geographical Classification (ASGC) similarly differentiates areas on the basis of population size, as follows (Hugo 2002):

- Major Urban Areas, with a population of 100,000 or more;
- Other Urban Areas, with a population between 1,000 and 99,999;
- Bounded Rural Localities, which have a population between 200 and 999;
- Rural Balance Areas, comprised of the remaining mainland areas; and
- Migratory Areas, composed of offshore, shipping and migratory collection zones.

Taking into account the ASGC, a system of classification known as the Accessibility / Remoteness Index of Australia or ARIA (and the enhanced ARIA+ classification) was developed by the National Key Centre for Social Application of Geographical Information Systems (GISCA 2003, University of Adelaide[2]) (AIHW 2004a). This system, which has been used widely in health service delivery models (Bamford et al. 1999), is the classification used in this study to categorise the location of the radiographer and remote operator informants (see Chapter 6 and Appendix B). The ARIA+ classification divides the entire Australian land area into five categories (Wakerman & Lenthall 2002), as follows: 'Highly Accessible' (HA) locations have unrestricted accessibility to a wide range of goods and services and good opportunities for social interaction; 'Accessible' (A) locations have some restrictions on access to goods, services and social interaction; and so on through 'Moderately Accessible' (MA) and 'Remote' (R) to 'Very Remote' (VR) locations, which are disadvantaged in access to goods, services and where social interaction is rare (Hugo 2002).

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[1] A brief description of the RRMA classification is available at: http://www.ruraldoc.com.au/ (accessed 18/11/05).
[2] http://www.gisca.adelaide.edu.au/ (accessed 18/11/05) – See also Appendix B.

## Rurality and Health Status

Given the important contribution that rural communities have made to Australia's economic prosperity over the decades, it is not surprising that Australians have a nostalgic connection with 'the bush' (Larson, A 2002a; Smith 2004) and are generally concerned for the well-being of the people whose livelihood is based around primary production. In spite of this, a considerable body of recent research has shown that rural Australians generally have lower socio-economic status and poorer health than their metropolitan counterparts, influenced by physical, environmental, behavioural, psychosocial and socio-cultural factors (Williams 1991; Moller 1994; Fragar et al. 1998; Strong et al. 1998; Dixon & Welch 2000; Rolley 2000; Wakerman & Humphreys 2002; de la Quine et al. 2003; Rue & Coulsen 2003; Thursten & Meadows 2003; AIHW 2005b). Limited access to products or services, such as high quality medical imaging, is commonly considered a matter for tolerance and forbearance for the stereotypical independent and self-reliant rural resident rather than a cause for complaint (Humphreys, Mathews-Cowey & Rolley 1996; Smith 2004). However, the populations in Australia and in other developed countries have recently begun to decry the deprivation and locational disadvantage that apparently define many aspects of rural life and reportedly result in relatively poor health status (Jensen & Royeen 2002; Ricketts 2004; Worley 2004; Bishop 2005; Piper 2005).

In the Ottawa Charter the World Health Organisation (1986) identified peace, shelter, education, food, income, a stable ecosystem, sustainable resources, social justice and equity as the macro determinants of population health (Simmons & Hsu-Hage 2002). These factors lead to variations in risk profile amongst different sectors of the population as individuals make choices about how they live, work and play in an environment that exposes them to different levels of physical, chemical and biological hazards (Moller 1994; Fragar et al. 1998). It has been shown that, in general, many non-metropolitan Australians are worse off than those in the cities in terms of the above health determinants (Simmons & Hsu-Hage 2002) and that rural populations consequently have a higher incidence of death and ill health due to injuries and disease (AIHW 2004b, pp.208-212).

The Australian Institute of Health and Welfare's most recent report on 'Australia's Health' (2004b) states that the overall higher death rate in rural and remote areas

compared to metropolitan areas corresponds to over 3,000 more deaths outside 'Major Cities' than would be expected if 'Major City' death rates applied. According to Phillips (2002) overall mortality rates for the non-Indigenous male population are 3.5% higher in rural areas (RRMA 2 and 3) than in metropolitan zones. Death rates for the Indigenous population overall are more than twice that of the non-Indigenous population in most Australian states and, given that some 70% of Australia's Aboriginal population lives in non-metropolitan areas (Hugo 2002, pp.25-6), mortality is generally much higher in rural and remote zones. In New South Wales in the period 1996 to 2000 the rate of avoidable deaths (those that could potentially have been prevented by health care or related interventions) increased with increasing remoteness on the ARIA scale, being 3.0 times greater in 'Very Remote' locations compared to 'Highly Accessible' locations (New South Wales Health 2002b). People living in 'Remote' and 'Very Remote' areas of New South Wales can expect to live six years less if male and four years less if female compared to people in 'Highly Accessible' areas. Death of Australians from cardiovascular diseases is reportedly 6 - 9% lower in 'Capital Cities' than in other RRMA zones (Phillips 2002, p.50), the risk factors of smoking, being overweight and lack of exercise all being generally higher for the non-metropolitan population. Diseases of the respiratory system also account for a greater proportion of deaths in rural and remote zones, being at least 1.1 times than those in metropolitan zones for both men and women (Phillips 2002, p.51). Deaths from motor vehicle accidents and gun-related injuries are 3.0 times and 10.0 times higher respectively in 'Very Remote' compared to 'Highly Accessible' areas (New South Wales Health 2002b).

Australia-wide, the rates of hospitalisation are 10 - 20% higher in rural areas compared to metropolitan areas (Phillips 2002, p.53-4), although the reasons for hospital admission are not always apparent or as clear-cut as the figures might indicate. In rural areas, it is probable that some people are hospitalised because of the great distance they live from a source of adequate care. Nevertheless, it is reported by Phillips that hospital separations for residents of remote zones are 30% higher for males and 50% higher for females compared to metropolitan zones (p.54). In New South Wales, the rate of avoidable hospitalisations also increases with distance from a major urban centre, with 'Very Remote' locations having a rate almost seven times that in 'Highly Accessible' areas (New South Wales Health 2002b). Hospitalisation rates for Indigenous people are as much as two to three times higher than for non-Indigenous Australians.

## Access to Rural and Remote Health Care Services

Given the demonstrably poorer health status of those who choose to live in rural and remote areas of New South Wales and Australia generally (Glover & Tennant 1999), the logical argument that follows is that the need to provide access to health services, including medical imaging services, is greater in regional, rural and remote areas compared to the city. However, a major contributing factor to the poorer health status of rural populations is the lack of availability of health care services, which is compromised by great distances, relatively poor infrastructure and low population density (Humphreys, Mathews-Cowey & Rolley 1996; Lyle 2002). Other compounding factors include difficulty in attracting health professionals to live and work outside the metropolitan areas (Wolfenden, Blanchard & Probst 1996; Crandall, Dwyer & Duncan 1990; DEWRSB 2000; Humphreys, Jones et al. 2002; Causby 2003; Wilkinson 2003; Denham & Shaddock 2004; Jones, Humphreys & Adena 2004), lack of health care resources resulting from the challenge of distributing the health service dollar and a range of services over a vast land area and numerous small communities (Bourke et al. 2004; Piper 2005), and the negative 'mind-set' that exists in a system dominated and administered for the most part by urban residents (Humphreys 2000; Humphreys, Hegney et al. 2002).

The scarcity of doctors in rural and remote areas has long been considered a major factor influencing the lack of access to health care (Kamien & Butterfield 1990; Strasser 1992; Shepherd 1995; Cameron 1998; Young, Dobson & Byles 2000; Dunbabin & Levitt 2003; Jones, Humphreys & Adena 2004; Veitch & Grant 2004; Worley 2004). In Australia people who live in rural areas access a general practitioner less often than city residents (about 2.4 versus 6.5 times a year), while in New South Wales, because of the lack of general practitioners, people in 'Very Remote' areas are on average more than twice as likely to visit a hospital emergency department for treatment instead of seeing a general practitioner (Larson, A 2002b, p.60). In fact, the ratio of full-time equivalent general practitioners to population in 'Remote' and 'Other Remote' areas (RRMA 6 and 7) is less than half that in 'Capital City' areas (RRMA 1) (Larson, A 2002b, p.59).

Not only is it difficult to attract medical graduates to rural and remote areas but it is also difficult to get them to stay (Kamien 1998; Cameron 1998; Humphreys, Jones et al.

2002). For this reason the government and professional bodies have cooperated to introduce various programs aimed at both recruiting medical practitioners into rural practice and retaining them. Such schemes include the Rural Health Clubs, the Rural Training Pathway Scheme and the University Departments of Rural Health (Kamien 1996; Wilkinson et al. 1999; Humphreys et al. 2000; Lawson, Chew & Van Der Weyden 2000; Dunbabin & Levitt 2003). The Commonwealth Rural General Practice Incentives Program addresses reimbursement or payment mechanisms in order to increase financial rewards for rural practice (Shepherd 1993; Holub & Williams 1996). The establishment of the Australian College of Remote and Rural Medicine (ACRRM) has helped to address the need of rural general practitioners for continuing education and collegial relationships[3]. The Commonwealth Bonded Medical Places Scheme recruits new medical graduates to work in districts of workforce shortage for a period of six years in exchange for a greater chance of entry into medical school[4].

Doctors are not the only health professionals that provide health care services in rural areas, however, or in metropolitan areas. Nurses and allied health professionals also form an important part of the health care network. In metropolitan areas GPs would not be expected to practice in a system that is seriously undersupplied with other health professionals and it can be argued that one of the disincentives to doctors entering rural and remote practice is a lack of the same ancillary health services, like medical imaging, that are commonly available in the city. It can also be argued that without a broad range of health care services the doctors' job is more demanding and less rewarding. Nevertheless, the same sorts of incentive models that have been made available to medical students and rural general practitioners have not been made available to rural nurses and allied health professionals (NRHA 2004a).

Rural and remote areas are comparatively well served in terms of nursing staff numbers according to Larson (2002b), with generally higher ratios of nurses (including enrolled nurses (ENs)) to population in most RRMA categories between 3 and 7 ('Large Rural Centres' to 'Other Remote') compared to RRMA categories 1 and 2 ('Major Cities' and 'Other Metropolitan'), although a 1995 Queensland Ministerial Taskforce study reported that nursing staff turnover rates were higher in rural areas. Hegney and her colleagues

[3] http://www.acrrm.org.au/
[4] http://www.health.gov.au/internet/wcms/publishing.nsf/Content/health-workforce-bmp-what.htm

(2002) shed some light on the factors affecting higher rates of recruitment and retention amongst rural nurses. In that study rural nurses ranked teamwork and job satisfaction, related to the generalist role of the rural nurse, high among the reasons why they would choose to stay in rural practice. The opportunity to treat the whole patient is something that is not commonly encountered in metropolitan practice according to Larson (2002b). In the survey carried out by Hegney et al. (2002) 31% of the respondents nominated 'professional autonomy' high on the list of desirable characteristics of rural nursing, and 21% identified advanced practice roles as important. One of the respondents commented that 'there are always more courses open to ENs [i.e. enrolled nurses]' identifying 'radiology' as one of the potential advanced practice roles. These findings were in agreement with statements made in an earlier review paper by Hegney (1997) about extended practice roles. In order to help improve the health status of the community, 'filling the gaps due to the lack of medical and allied health professionals' was argued to be an attractive aspect of rural nursing. Again, in that paper 'performing x-rays' was cited as one of the potential extended roles.

Although the number of rural nurses does not seem to be a substantial problem at the moment, according to the figures quoted by Larson (2002b), it has been estimated by the Australian Health Workforce Advisory Committee (2004) that 37% of the 2002 aged-care nursing workforce in Australia would retire over the subsequent ten year period. It was further estimated that, in the same period 26% of the other nursing workforce would also retire. Therefore, particularly given the ageing population, the problem of recruitment and retention of highly skilled and experienced nursing staff in rural areas is of concern.

Problems of recruitment and retention and high staff turnover rates also afflict many of the allied health professions in rural areas (Gadiel & Riddout 1993; Millsteed 1995; Millsteed 2000; SARRAH 2000; Lannin & Lonland 2003; Lowe & O'Kane 2004; NRHA 2004a). For example, in 2000 radiographers, physiotherapists, speech pathologists and pharmacists were included on a list of nineteen health occupations that were experiencing national or state-based shortages (DEWRSB 2000). Rural allied health services like radiography are commonly only available on an irregular ad-hoc, sessional or part-time basis in smaller rural health facilities (Gadiel & Ridoutt 1993; Smith & Winslow 1998).

Like rural general practitioners and nurses, rural allied health practitioners fulfil a more generalist role than their metropolitan counterparts, often having greater autonomy and making more explicit decisions about their patients' needs (Lannin & Lonland 2003; Larson, A 2002b, p.68; Arthur, Sheppard & Dare 2005). However, there is a dearth of adequate information about the rural allied health workforce and their clinical practices (SARRAH 2000). Some professions, such as physiotherapy and occupational therapy, have carried out national surveys but the complete picture and the detail are currently unreported in the literature (Larson, A 2002). In 1998, a workforce study of physiotherapists undertaken by the Australian Institute of Health and Welfare reported that remote Australia had only thirty physiotherapists per one hundred thousand population, compared with forty-seven per one hundred thousand in rural areas and sixty per one hundred thousand in metropolitan centres (Arthur, Sheppard & Dare 2005). The National Allied Health Workforce Report (Lowe & O'Kane 2004) showed that, based on census data there were smaller numbers of medical imaging practitioners (including radiographers, sonographers and nuclear medicine technologists) per ten thousand population compared to physiotherapists in all ARIA zones, with an average of 4.39 compared to 5.41 respectively.

Other than the lack of availability of practitioners, the other important factors that negatively influence access to rural allied health services are a lack of awareness among both consumers and other health service providers of the types of services offered by allied health professionals and a lack of representation at senior managerial level of the health care system (NRHA 2004). Often multidisciplinary health care teams that employ allied health staff are managed by other health professionals (nurses being the most common) who may have little real understanding of the service needs of consumers relative to the individual contributions of the allied health disciplines (Larson, A 2002b). This complaint resulted in allied health professionals identifying the need for greater representation and consultation in decision making during a series of Allied Health Strategic Directions Workshops conducted by the New South Wales Department of Health in 2003 (unpub.).

Rural hospitals are generally smaller than metropolitan hospitals. In Australian 'Capital Cities' in 1996 the average size of public hospitals was two-hundred and five beds, whereas in small rural localities it was eighty-two beds, in 'Remote' centres forty-six

beds, and in 'Other Remote' centres only fifteen beds (Larson, A 2002b). Logically, because of a lack of a 'critical mass' of patients, small rural health facilities cannot provide the range of services provided by larger hospitals. Access to specialist medical and allied health services is affected by this fact and there is a strong negative correlation between increasing remoteness and availability of specialised care (Hodgson 1992; Sheppard 2001) until a point is reached where it is not economically sustainable to provide particular services. Residents of small communities either have to travel to the nearest service point, do without the service altogether, or make do with a lesser alternative. Various strategies have been used to try to compensate for the lack of specialised care, such as travel assistance schemes for patients, 'fly-in, fly-out' visits by specialist teams, mobile multidisciplinary services, and telemedicine consultations supported by local health professionals or health workers (Allen 1996; Bishop, Hodgson & Coman 1996; Bishop 1998; Battye & McTaggart 2003). The remote operator program described below is one such alternative service provision scheme or model.

## Rural and Remote Radiography Service Availability

The provision of medical imaging services to the potential patient population outside boundaries of major urban and regional localities may be regarded as a particular case of service access to what can be argued to be an essential requirement for high quality medical care. For example, while no similar observation is evident in the literature about the role of diagnostic imaging in rural and remote health care in developed countries, in the context of the developing world it has been observed that 'the concept of primary health care cannot be successfully implemented without the support of diagnostic services', which would usually include basic diagnostic radiography (Akpan 1984; Palmer 1984; Palmer et al. 1998). To address this need in some developing countries, the World Health Organisation introduced the basic radiology system (BRS) which was designed to be operated by non-radiographers in small rural hospitals (Akpan 1984; 'X Rays for the developing world' 1989; de Lacey 1990; Jordan 1990; Kitonyi 1993).

It may be observed that availability of diagnostic radiography is often a relatively minor consideration in the provision of primary health care to small rural and remote

communities, where service priorities are generally considered from the perspective of meeting the basic health care needs of the population. In Australia these needs are reflected in the priority areas of government funding (Australian Health Ministers' Conference 2002; New South Wales Health 2002c). In that sense, diagnostic radiography may be viewed as part of the secondary or tertiary referral health care network. In addition, the provision of a radiographic service is expensive, both because of the initial capital outlay for equipment and ongoing service costs, particularly if a radiographer is to be employed. Small communities, with limited health care budgets, may be inclined either to avoid such relatively expensive services, prioritorising other health care needs, or opt for the cheapest possible alternative. Consequently, small rural and remote communities have poorer access to health care services that metropolitan communities take for granted.

As suggested in the Productivity Commission's recent report (2005, p.206), and also under the previous heading in relation to accessing specialist allied health services, in some rural or remote communities where the population is small the number of patients that need to have a radiographic examination may be too few to justify employing a radiographer. Although no particular number of examinations is specified, this would be the case if, for example, there were only a few occasions each week when a radiographic service was required. In such situations a limited range of plain radiographic examinations may be performed by a remote x-ray operator, who, in New South Wales, may be either a general practitioner (GP) or registered nurse (RN) who has successfully completed the Remote X-ray Operators Licensing Course. The course is a non-award, short course offered through the University of Newcastle. Successful participants are eligible to obtain a limited x-ray licence (Type I.14R) from the New South Wales Environment Protection Authority (Government of New South Wales 1993).

In order to illustrate the various levels of radiographic service available in rural and remote communities in New South Wales, Table 1 lists a range of population centres found in one Area Health Service region. The towns have been de-identified to ensure anonymity of the practitioners and are listed with their ARIA+ score and population size. They are grouped according to whether they have a radiographer-staffed service available, a remote x-ray operator service, or no radiographic service at all. Clearly, as suggested above, larger population centres, generally those with lower ARIA+ scores, have health services that employ radiographers. In Towns A, B and C there are multiple

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radiographers and each of these towns has both a public hospital and a private radiology practice that employ radiographers. These communities have access to computed tomography and ultrasound services as well as plain film radiography and the largest town, Town A, also has magnetic resonance imaging available. It is apparent that as the population size decreases, the number of radiographers and types of medical imaging services available also diminishes, with Towns C and D being sole radiographer

**Table 1:** Examples of radiography service levels in some towns in one Area Health Service region in New South Wales.

| Localities with a Radiographer-Staffed Service | | | |
|---|---|---|---|
| Populated locality | ARIA+ category * | Population † | Number of radiographers |
| Town A | 1.66 (HA) | 31,865 | 20 |
| Town B | 2.13 (A) | 25,000 | 10 |
| Town C | 4.23 (MA) | 9,270 | 3 |
| Town D | 2.42 (A) | 8,315 | 1 |
| Town E | 3.75 (MA) | 6,419 | 1 |
| **Localities with a Remote X-ray Operator Service** | | | |
| Populated locality | ARIA+ category * | Population † | Approx. distance to a radiographer-staffed service ‡ |
| Town F | 3.93 (MA) | 1,267 | 90 km |
| Town G | 2.76 (A) | 2,500 | 40 km |
| Town H | 2.85 (A) | 1,623 | 60 km |
| Town I | 4.20 (MA) | 1,290 | 80 km |
| Town J | 4.65 (MA) | 1,900 | 40 km |
| **Localities with no Radiography Service** | | | |
| Populated locality | ARIA+ category * | Population † | Approx. distance to a radiographer-staffed service ‡ |
| Town K | 4.90 (MA) | 540 | 60 km |
| Town L | 3.28 (A) | 270 | 60 km |
| Town M | 3.79 (MA) | 825 | 30 km |

* GISCA, available @ www.gisca.adelaide.edu.au/web_aria/aria/aria.html

† Northern New South Wales Regional Internet Site, available @ http://www.nnsw.com.au/

‡ Readers Digest Motoring Guide to Australia, 1983.

communities. As the population falls below five thousand, the smaller demand for radiographic examinations does not justify employment of a radiographer and in these communities remote x-ray operators provide a limited service. Patients requiring more complex examination types must, therefore, travel to the nearest radiographer-staffed health facility, although Towns F, G and J are also serviced once a week on a sessional basis by a radiographer. In this particular region, towns with less than one thousand residents have no radiography service, although each of these small communities has a small, primary health care facility.

The conditions and limitations for the use of the Type I.14R limited x-ray licence are shown in Table 2. Primarily, the licence can only be used when a diagnostic radiographer is unavailable, as defined in Clause 1(b). The principal purpose is apparently to prevent patients having to travel long distances over poorly surfaced roads for relatively minor x-ray examinations that may turn out to be normal. The geographical limitation on the use of a limited x-ray licence assumes that a radiographer is available at all times in metropolitan areas and major rural centres, that is, those with regional referral hospitals or large district hospitals (Smith & Winslow 1998, p.46). It is only in centres where small district hospitals and community health facilities exist that remote x-ray operators are required regularly. In some large district hospitals where a radiographer is employed as a sole practitioner, or in small district hospitals where they are only available on a sessional basis, remote x-ray operators may exist alongside rural radiographers so that the radiographer does not have to be available all the time (Smith & Winslow 1998). The question of whether a rural radiographer or a remote x-ray operator performs a plain radiographic examination in those circumstances depends on the type of examination required and the availability of the radiographer, as defined by the licence conditions.

Figure 1 shows the alternative clinical pathways that are generally followed, depending on whether a radiographer or a remote operator performs the x-ray examination. On the left-hand side of the flowchart the patient is referred to a radiographer, while on the right-hand side a remote x-ray operator performs the examination. If the radiographer performs the examination the images can be made immediately available to the referring doctor (the rural GP), who proceeds to make a diagnosis, often in consultation with the radiographer, and then immediately treats the patient. Subsequently, or indeed

**Table 2:** Remote x-ray operator licence conditions (Government of New South Wales 1993, *Radiation Control Act 1990 No.13*).

**Licence Conditions - Type I.14R**

1. (a) Subject to condition 4, the licensee shall use radiation apparatus only when a diagnostic radiographer licensed under the Radiation Control Act 1990 is unavailable.

   (b) For the purposes of this condition, but subject to paragraph (d), a diagnostic radiographer is taken to be unavailable:

       (i) where a radiographer is not in attendance at or on-call for the radiology facility; and
       (ii) a registered medical practitioner (Medical Practitioners Act 1938) certifies that in the circumstances a radiological examination should be undertaken before arrangements could reasonably be made for the examination to be performed by a radiographer.

   (c) In the event that the licensee is a registered medical practitioner, the licensee shall not make any certification for the purposes of paragraph (b)(ii) unless the licensee first makes reasonable inquiries and those inquiries indicate that arrangements cannot reasonably be made for the examination to be undertaken by a diagnostic radiographer.

   (d) For the purposes of this condition, a diagnostic radiographer is taken to be available at all times in the locations described in the Schedule[*].

2. Subject to condition 4, the licensee shall use radiation apparatus only for the following radiological examinations: digits or phalanges, hand, wrist, forearm, elbow or arm (elbow to shoulder), foot, ankle, lower leg, upper leg, knee or thigh (femur), shoulder or scapula (frontal view), pelvic girdle (frontal view), chest (frontal view).

3. The licensee shall use radiation apparatus in accordance with the National Health and Medical Research Council's "Recommendations for limiting exposure to ionising radiation (1995)" and "National standard for limiting occupational exposure to ionising radiation (1995)".

4. The licensee may use any radiation apparatus at any time for any examination (not being limited to those set out in condition 2) if requested to do so by a medical practitioner who:

   (a) reasonably considers that the life or well-being of the patient could be seriously threatened if the examination is not undertaken immediately; and

   (b) certifies this on the request form.

5. (a) The EPA may, whenever it sees fit to do so, serve written notice to the licensee, requiring the licensee to satisfy the EPA that he/she is competent to enable him/her to properly carry out the activities able to be carried out under this licence.

   (b) If the EPA serves notice under paragraph (a), the licensee must satisfy the EPA of his/her competence by undertaking the steps specified in the notice to the satisfaction of the EPA within the time specified in the notice.

[*] The schedule lists cities and local government areas within the Sydney, Newcastle and Wollongong metropolitan areas.

**FLOWCHART OF THE PROCESS OF PROVIDING A RADIOGRAPHIC/RADIOLOGIC SERVICE IN RURAL AND REMOTE AREAS**
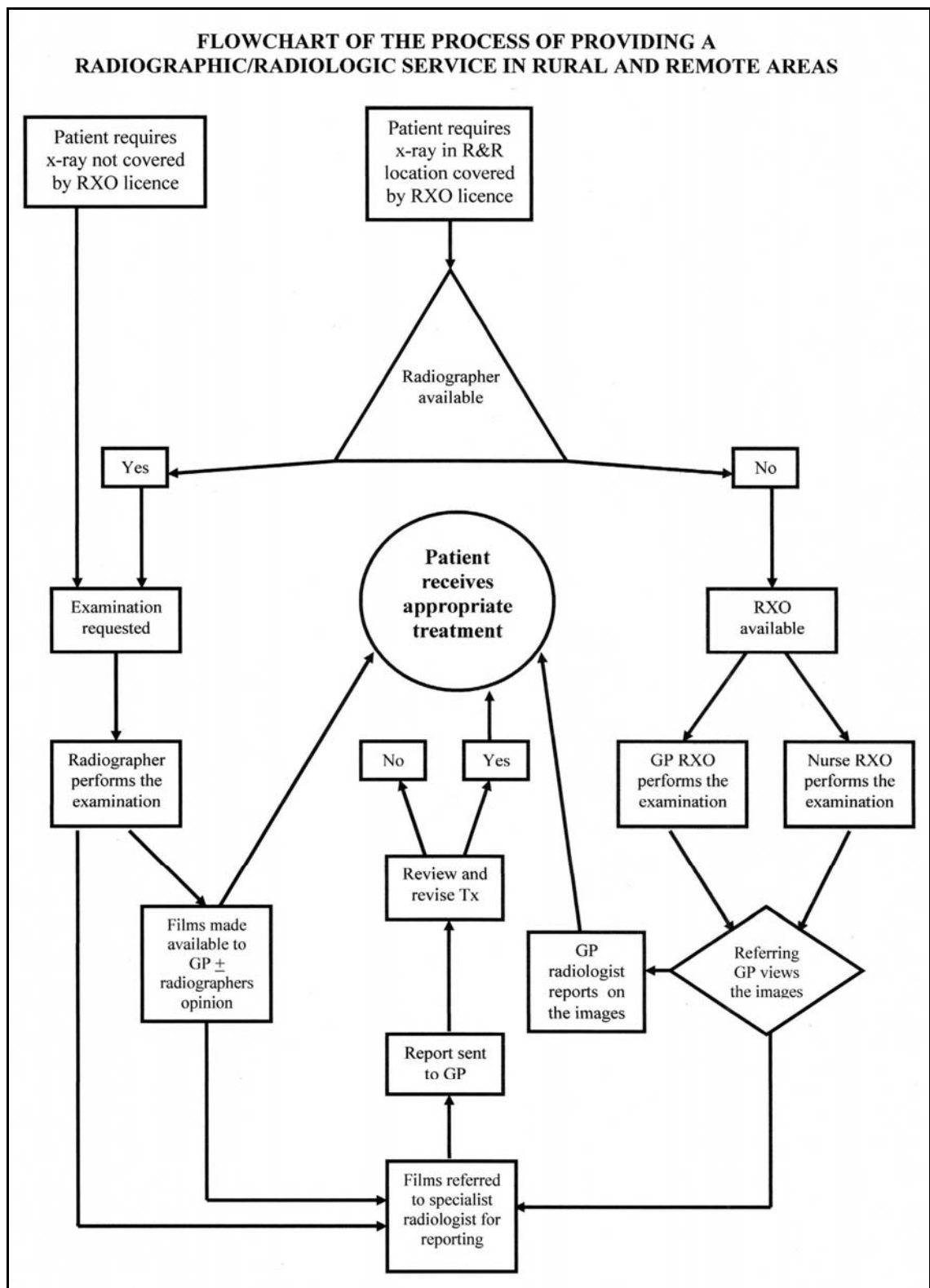
**Figure 1:** The alternative clinical pathways followed when patients need an x-ray examination in a rural and remote (R&R) location, depending on whether a radiographer or a remote x-ray operator performs the examination.

alternatively in some circumstances, depending on the provisional diagnosis, the films will be sent to a radiologist, who reports on the examination and provides a radiological report to the referring GP. The GP may then either continue with or alter the patient's treatment based on the radiologist's opinion.

If the examination is performed by a GP or nurse remote x-ray operator, the images may again be viewed immediately by the referring GP who then treats the patient based on the combination of their clinical diagnosis and interpretation of the radiographic appearances. The decision as to whether the films are subsequently sent to a radiologist for reporting usually falls to the GP. Some rural and remote GPs, however, can obtain a 'remote area exemption' under the Health Insurance Act and can charge Medicare for seventy-five percent of the schedule fee for the examination (Parliament of Australia 1999). In that situation the GP cannot subsequently get a report from a radiologist, as the radiologist could also bill Medicare for the same examination.

No matter who performs the examination or reports on the images, the result in all cases should be that the patient receives the best possible treatment for their condition. However, it is suggested that this may not always be the case and that part of the reason for this is that the diagnosis is compromised by less than optimum quality radiographic services. Returning briefly to the situation in the developing world, in 1979 Dr W Seelentaag, who was then the World Health Organisation's Chief Medical Officer in the Radiation Unit, made the following statement:

> An x-ray examination undertaken without appropriate clinical indication will usually contribute no more than vaguely to the diagnosis. Conversely, a potentially efficacious x-ray examination may be nullified by technical inefficiency on the part of the radiographer or the reader. In order to have the potential for improving the patient's health, a radiological examination must be competently performed and interpreted, and able to influence the management and treatment of the patient.

In many ways this statement summarises the central problem investigated in this research project. Primarily, in order for a radiographic examination to appropriately influence a patient's management, it must be indicated by the patient's clinical condition. If not, then it is unlikely that the examination will alter the patient's treatment or health outcome. Seelentaag goes on to argue that, if the examination is clinically indicated, it must be both

competently performed and interpreted in order to maximise the potential benefit to the patient. As will be seen from the following history of remote x-ray operator radiography, issues of service quality, as well as access, have been at the centre of the debate about limited x-ray licensing.

## History of the NSW Remote X-ray Operators Program

As noted in Chapter 1 in relation to the significance of this study, no previous formal investigation has ever been undertaken of the role of remote x-ray operators and their interprofessional relationship with radiographers. Hence, it is necessary in this thesis to describe the historical background of the remote x-ray operator program in New South Wales in some detail.

The history of the licensing of GP and nurse remote x-ray operators is poorly documented and the document trail that does exist is incomplete. As a result, this brief history of remote x-ray operator licensing has been assembled from a limited range of sources. In February 2000 the New South Wales Department of Health, Performance Management Division, produced an internal discussion paper (unpub.) that explained some of the relevant history. To complement this, an interview was conducted with a retired radiographer (McInnes, D. 2003, pers. comm., 27 April) who was the Chairman of the New South Wales Branch of the Australian Institute of Radiography (AIR) in the 1980s, the period in which remote x-ray operator radiography was formalised. In addition to an oral history, this retired radiographer was also able to supply copies of a variety of documents that include correspondence between the stakeholders and reports that had been circulated at that time.

It seems that in the decade or so following World War II there was no radiation licensing at all and that some decommissioned military personnel took up posts in civilian hospitals as 'radiographers', often with no formal education or training in the field. Licensing to use irradiating apparatus in New South Wales appears to have come into existence under the Radioactive Substances Act 1957, which was administered by the then Health Commission of New South Wales (later to become the New South Wales Department of

Health). However, in the early years following implementation of the Act the licensing process was loose and poorly controlled with the result that various unlicensed personnel who had developed a 'proficiency' in taking radiographs continued to do so without being prosecuted, particularly in rural and remote areas. In some cases these people were not health professionals and apparently included orderlies, hospital handymen and ambulance officers.

Under Section 10(1) of the 1957 Act, a licence could be granted to senior nursing staff in a country hospital on the basis of a recommendation from a radiologist or a senior radiographer. No education or training was necessary in order to be granted a licence in this way, although some informal, unregulated training was apparently organised locally by some health services (Regional Advisor in Radiology, Health Commission of New South Wales 1982, corres., 17 February & 17 March). General practitioners who had been taking radiographs for some time were able to obtain a licence apparently without having to have a recommendation. In 1982 the New South Wales Branch of the AIR officially expressed its concerns to the Director of the New England Regional Office of the Health Commission about the limited training that non-radiographer remote operators received and the resultant risk posed to the public (Secretary, New South Wales Branch, AIR 1982, corres. 12 May). The situation was described as 'reprehensible and misleading to the public' and called for cessation of the 'farcical situation' of issuing licences to 'persons not having any formal qualifications in the administration of radiation'.

A circular from the New South Wales Department of Health, dated December 1983, sheds further light on the growing concern over the lack of control of the licensing process. It states: '[there is concern] that the use of irradiating apparatus by non-licensed, untrained personnel could present a serious health hazard'. The circular goes on to specify guidelines for who should take radiographs in country hospitals. In the first instance if a radiographer was available 'such a person should be called upon to take the radiograph'. It is stated that 'a staff medical practitioner' will be issued with a licence in preference to a member of the nursing staff and that in the absence of a radiographer 'a licensed medical practitioner may take the radiograph'. If neither is available the 'director of nursing' or a 'senior sister', who holds an x-ray licence under the Act could take the radiograph but 'only in emergency situations'. Finally, it is stated that 'non-licensed

persons shall not use irradiating apparatus'. The retired radiographer who was interviewed said that, to his knowledge, those guidelines were never strictly adhered to. Apparently the practice of non-radiographers operating diagnostic x-ray equipment was also to be found in metropolitan areas where doctors who had their own x-ray equipment self-referred for radiography examinations. However, they didn't necessarily perform the examinations themselves, many preferring to employ a nurse to do the radiography. In spite of the fact that they practiced in metropolitan Sydney, and did not take the radiograph themselves, these doctors were apparently granted a licence under the same Section of the 1957 Act as the rural and remote practitioners (McInnes, D. 2003, pers. comm., 27 April).

In the early 1980s there was growing concern in the radiography community about the quality of the diagnostic radiographs taken by non-radiographer x-ray operators. The retired radiographer remembered an occasion when a poor quality chest x-ray was shown at a meeting of one of the AIR rural Sub-Branches and it being said that this radiograph was the end result of seven attempts to get a diagnostic image. Furthermore, radiographers in health facilities where the number of radiographic examinations performed annually was small were concerned that they would be replaced by nursing staff who had obtained a limited x-ray licence (McInnes, D. 2003, pers. comm., 27 April). However, in 1985 in a letter to the Regional Director of the Orana and Far West Health Region (Secretary, New South Wales Branch, AIR 1985, corres., 20 May), the AIR State Branch acknowledged the difficulty of 'placing radiographers in such small communities'. It was said that 'although the taking of radiographs in an emergency by the matron of the local hospital or health centre is an acceptable alternative, it is felt that there must be set up a training course for these people (sic.)'.

An AIR State Branch sub-committee comprising nine rural and metropolitan radiographers was organised and the sub-committee prepared a report to the Federal Council of the AIR. At the time there were apparently similar developments and concerns in other states. 'The Dubbo Report' (July 1985), which was criticised by some for reaching a 'pre-conceived' conclusion (Irwin, T. 1985, corres., 8 August), recommended that a training program be established and that it be delivered by rural radiographers and overseen by the AIR State Branch Committee. The Dubbo Report was eventually ratified by the Federal Council in about October 1985. One of several commentaries produced at

the time stated that implementation of the proposed training program would lead to 'marked improvement in patient care and cost effectiveness in remote Area Health Services' (Innes, B. 1985, corres. 25 October).

The retired radiographer, who was one of the AIR sub-committee members that had prepared the Dubbo Report, remembered this as a turbulent time when heated discussion took place at some meetings. He said that some radiographers, particular those in sole positions, found the whole idea of remote x-ray operators 'threatening'. There was a view that the New South Wales Radiological Advisory Council, the body that was convened under the Radioactive Substances Act 1957 to administer radiation licensing, had little control over what was happening in the field and some radiographers felt unsupported. It took two years of negotiation to get most radiographers to agree to a course being conducted. Even then some remained adamantly opposed, believing that assisting with their training gave remote x-ray operators unjustified legitimacy and that this would lead to a proliferation of the non-radiographer radiographic practice, especially in rural areas. However, the argument that prevailed was that someone had to do the job in locations where there was no radiographer available and it was better for these people to have had some training than none at all (McInnes, D. 2003, pers. comm., 27 April). It was apparently estimated at the time that there were seventy health facilities in New South Wales with radiographic equipment but with no radiographer permanently available.

A training program for rural and remote nurses was developed under the auspices of the New South Wales Branch of the AIR and in 1987 five courses of five days duration were conducted at Dubbo and Orange. Records show that eighty-six participants attended. The New South Wales Department of Health discussion paper that was referred to earlier described this as a response to the need for 'improved access to more specialist medical services in rural New South Wales', the prime purpose of remote operators being to 'provide support to radiographers and to existing radiography services'. From that time on limited x-ray licences would only be issued to those who had completed a recognised course and the regulations related to the Act were amended accordingly.

General practitioners were not included in the AIR training program, apparently because it was assumed that doctors already knew enough to take x-rays (McInnes, D. 2003, pers. comm., 27 April). However, they were thus excluded from obtaining a limited x-ray

licence under the revised regulations. Therefore, at about the same time as the AIR-sponsored courses got underway, the New South Wales Faculty of the Royal Australian College of General Practitioners organised a licensing course specifically for GPs. That course was apparently to be conducted once a year and GPs wishing to gain a licence were required to subsequently pass an examination conducted by the Radiological Advisory Council to be eligible to apply for an x-ray licence.

In the late 1980s and early 1990s courses for both nurses and GPs were held only intermittently. Disruptions apparently occurred because of alleged breaches of the licence conditions, specifically non-licensed personnel taking x-rays and those with licences performing examinations not specified on their licence (Secretary, Radiological Advisory Council 1989, corres., 10 January). The dissent and the ferocity of the debate at AIR State Branch level was such that the training initiative was suspended, although support was never formally withdrawn. In a letter dated 24 January 1989 the Director of Health for the Central West Region of New South Wales referred to 'industrial problems' with the AIR as the reason for cancellation of some courses. As further evidence of the discontent at the time, a letter written by one sole rural radiographer (Dunn, A., 1989, corres., 31 January) expresses 'total disagreeance (sic.) with the concept of any person other than a radiographer performing radiography'. Another letter from the Officer in Charge of Radiation Health to the Secretary of the New South Wales Branch of the AIR refers to ongoing Department of Health investigations of 'cases where persons have been working outside of the [licence] conditions' (Officer in Charge, Radiation Health Services 1989, corres., 26 April). It appears that such licence breaches were not isolated incidents.

In a letter dated April 1989, addressed to the General Secretary of the AIR, the New South Wales Department of Health requested that the Institute re-establishes the remote x-ray operator courses in New South Wales (Rosser, M. 1989, corres. 27 April). In this letter assurances were given that licence breaches would be investigated by the Radiological Advisory Council and that Directors of the Regional Health Services would be instructed to 'maintain closer supervision of radiography practice in remote areas'. In regard to the latter, a memorandum was circulated almost a year later by the Department (Executive Director, Service Development, memo., 12 March 1990) advising Regional Directors that a radiographer should be 'nominated to provide professional supervision to the operators', that records of examinations must be kept, and that they, the Directors,

will be responsible for 'ensuring that all remote operators adhere strictly to the guidelines' that had been agreed to by the Department of Health. It is uncertain precisely what guidelines this refers to, however, an undated draft circular from the New South Wales Director General of Health lists a series of 'new guidelines' arising 'due to alleged irregularities in the use of radiation apparatus by persons licensed under the Remote Operator Program'. These guidelines are very concise, stating the Department's position that no person shall operate irradiating apparatus in a public health facility unless they hold a licence issued by the Radiological Advisory Council after completion of an approved course. The draft circular goes on to state that the licence holder 'shall strictly adhere to all the written conditions', that anyone who uses irradiating apparatus without a licence 'will be in breach of the radiation control laws and liable for prosecution', and that the employing authority may be held equally responsible for the breach of the Act committed by an employee. A further guideline stated in this document restricts the use of the licence issued to a particular person and to a specified health facility. However, it seems that this latter recommendation was never implemented, correspondence from the Officer in Charge of Radiation Health Services (26 April 1989) stating that 'legal advice was that we cannot make the licence site specific' and that this matter will be further investigated. The current remote x-ray operator licence conditions do not restrict the use of the licence to a particular site (see Table 2).

The delivery of the remote x-ray operator course for which the AIR was responsible apparently resumed, reports having been obtained for courses conducted in July 1989, June 1990 and August 1992, with a total of forty-seven nurse participants. The report on the 1989 course makes reference to concern expressed by some of the participants that they had at times been instructed, 'and in some cases ordered' to perform x-ray examinations that were not included on the licence conditions and were outside of their 'capabilities'. This suggests that some participants had been performing radiography prior to undertaking the course. Further, the report goes on to recommend that such acts of coercion should be reported and that action must be taken to eliminate 'verbally coercive behaviour' that may result in the licence conditions being breached. Interestingly, this same recommendation is repeated in the reports of the 1990 and 1992 courses, suggesting that coercion continued to be an issue raised by participants in subsequent courses. While the source of this coercion is not stated in the reports, it is probable that it came from the

referring general practitioners, given that doctors were still excluded from attending the AIR's limited x-ray licence radiography course.

The Radioactive Substances Act 1957 was repealed in September 1993 and replaced with the Radiation Control Act 1990, under the administration of the Environment Protection Authority, although the Radiological Advisory Council remained in place to oversee the licensing process. During this period of transition debate about who should be eligible to obtain a limited x-ray licence escalated. In August 1992 the then Regional Director of the South West Health Region wrote to the then President of the New South Wales Branch of the AIR outlining the problem that some doctors were taking x-rays without a licence and that they had been told that they could not participate in the course because 'they were not "classified as remote operators"'. He requested that a special, abridged version of the course be conducted for those doctors in the South West Health Region who already had proficiency in taking x-rays. This letter appears to openly draw attention to the problem of unlicensed rural general practitioners using public health facilities to perform radiography illegally, thus risking prosecution. Indeed, in his letter the Regional Director makes reference to the matter having been raised with the Minister following an incident in a small rural hospital, the details of which he did not elaborate on.

A little over a month after the letter dated August 1992 the Regional Director of the South West Health Region wrote again to the President of the New South Wales Branch of the AIR in an agitated tone, saying that 'there is growing concern from the Rural Doctors' Association that doctors in remote areas are not serving the best interests of patients requiring x-rays when radiographers are not available'. This is presumably a reference to the fact that patients were being forced to travel to have minor x-ray examinations performed because no radiographer was available and doctors were not being given access to the training program. He complained that he had received no reply from the Environment Protection Authority and suggested that if 'an early solution' to the problem was not found he expected to be confronted by the media on the issue.

The final course conducted under the auspices of the AIR was held in late 1992. With the new Radiation Control Act 1990 on the horizon and a realignment of the Area Health Service boundaries imminent, the time was right for change to take place. Throughout 1993 and early 1994 no courses were held, although the demand continued to grow. In

mid-1994 two competing proposals for a revised licensing course were put forward to both the AIR New South Wales State Branch Committee and the Radiological Advisory Council. One proposal came from an individual radiographer who had been involved in the course delivery since 1987. The other came from the University of Newcastle's Discipline of Medical Radiation Science. The AIR State Branch Committee rejected the former proposal in favour of the latter on the grounds that there should be only one AIR endorsed course and it was better for that course to be delivered by 'a university currently offering undergraduate education in diagnostic radiography' (Honorary Secretary, NSW Branch, AIR 1994, corres., 30 June). Similarly, the Radiological Advisory Council's rationale for accepting the University of Newcastle's proposal was that under the Radiation Control Act 1990 the Council is only to recommend the licensing of a person if they are regarded as 'a fit and proper person to hold the licence' and if 'the applicant has the appropriate knowledge of the principles and practices of radiation hygiene and protection' (Secretary, Radiation Advisory Council 1994, corres., 17 October). The Council was not satisfied that under the alternative proposal successful participants would meet the latter criterion.

In late 1994, the University of Newcastle conducted five courses of five days duration at Dubbo (twice), Tamworth, Wagga Wagga and Broken Hill. Since then at least one course has been conducted every year, except in 2003 when the course was redeveloped into a seven week distance education program, incorporating a two day weekend workshop (Smith & McKiernan 2004). The course content consists of modules covering basic physics and instrumentation (including exposure selection and film processing), radiobiology and radiation protection, radiographic positioning techniques, and radiographic anatomy and pathology for those anatomical regions and examination types included under the licence conditions. Prospective licensee participants in the course, who may be either nurses or doctors, must be nominated by their Area Health Service with written approval from a radiographer (preferably the Area Advisor on Radiographic Services) and must establish face-to-face contact with a local radiographer as a course requirement. Although the atmosphere has markedly improved since the late 1980s and 1990s, to this day licence breaches are still reported or rumoured to occur and feelings still run high at times in some locations.

## Professional Policy on Limited X-ray Licensing

The Australian Institute of Radiography has formulated a national policy statement on remote x-ray operator radiography. It gives qualified support to remote x-ray operators and recommends a number of guidelines and criteria for the content of limited x-ray licensing courses and for the appropriate use of remote x-ray operator radiography. This policy statement reads as follows:

> The Australian Institute of Radiography recognizes that, because of geographical constraints, health professionals other than radiographers are at times required to perform limited diagnostic radiography examinations in remote health facilities where a diagnostic radiographer is unavailable. It is considered essential that such personnel have met the minimum training requirements and hold a limited radiographic licence under the relevant State's radiation control legislation.
>
> (Australian Institute of Radiography, last revised July 1999)

In the guidelines that accompany the above policy, it is further stated that it is the preferred position of the AIR that radiography is performed by diagnostic radiographers who hold accreditation issued by the Institute. The guidelines also define what is meant by 'remote health facilities' in this context as one that does not have ready access to a diagnostic radiographer at the time that the examination is required, while specifically excluding metropolitan areas or principal towns where the services of a radiographer 'may otherwise be available'. Specific mention is made of the expectation that ongoing 'technical and clinical support' and 'guidance and supervision' should be provided by a radiographer with whom the remote operator has 'a good working relationship'. It is also stated that a radiographer should periodically attend the facility to provide advice and assistance. Some general criteria are also stipulated as to the type of examination that may on occasions be carried out by remote x-ray operators, as follows:

- that the licence is for acute or traumatic presentations;
- that the examination is initiated by the medical practitioner responsible for the patient's management and who is able to interpret the resultant radiograph, and;
- that the remote x-ray operator is competent to perform the requested examination.

Each Australian State has its own version of the Radiation Control Act making it difficult to consider remote operator limited x-ray licensing and education on a national basis. As

can be seen in Table 3 below, licence conditions are not uniform between States except that in all states GPs can obtain a licence and in all states remote operators can perform a range of extremity examinations and chest x-rays. South Australia and Queensland have more then one type of limited x-ray licence, basic and extended, and in Queensland it is still possible for some non-health professionals, such as hospital orderlies and ambulance officers, to obtain an x-ray licence. South Australia is the only State with which New South Wales has an agreement for mutual recognition of limited x-ray licensing.

**Table 3:** Remote operator licence conditions by State (Smith & Winslow 1998, pp.15-17)

| State* | Eligible Candidates | Examination Types | Course Structure |
|---|---|---|---|
| NSW | ▪ Registered nurses<br>▪ General practitioners<br>▪ Other health professionals | ▪ Extremities<br>▪ AP shoulder & pelvis<br>▪ Chest | ▪ Uni of Newcastle<br>▪ 7 week distance education course + a 2 day workshop |
| Vic | ▪ General practitioners | ▪ Extremities<br>▪ Chest<br>▪ Abdomen<br>▪ Lateral cervical spine | ▪ Monash Uni<br>▪ Up to 14 weeks of distance learning + a 2 day workshop |
| SA | ▪ Registered nurses<br>▪ General practitioners | ▪ Extremities<br>▪ Chest<br>▪ Extended licence includes all regions | ▪ Dept of Health<br>▪ 3½ day basic<br>▪ 5 day extended |
| WA | ▪ Registered nurses<br>▪ General practitioners | ▪ Extremities<br>▪ Chest | ▪ Dept of Health<br>▪ 5 days |
| Qld | ▪ Registered nurses<br>▪ General practitioners<br>▪ Non-health professionals at remote locations | ▪ Extremities<br>▪ Chest<br>▪ Extended licence can include all regions | ▪ Qld Uni of Tech. |
| Tas | ▪ General practitioners | ▪ Extremities below elbow & below knee<br>▪ Chest | ▪ Currently N/A<br>▪ 1½ day for extremities only<br>▪ Extended for chest |

* Neither the Australian Capital Territory nor the Northern Territory has limited x-ray licensing.

The AIR's policy statement on limited licence remote x-ray operator radiography sets out those conditions under which the radiography profession as a whole might accept the role of remote x-ray operators as legitimate. However, it does not necessarily follow that

individual rural radiographers will accept the Institute's position, nor that they will, as independent practitioners, accept the existence of remote x-ray operators within or close to the health facility where they practice. Membership of the AIR is not mandatory and is thus not universal. It is conceivable, therefore, that a considerable number of rural radiographers may be so isolated from their representative professional body that they may be unaware of the existence of the policy statement. Even members of the Institute may be unaware of the statement if they have not kept up to date with AIR policies.

**The international perspective**

On the basis of anecdotal evidence (as discussion of the role of limited x-ray licensees is rare in the literature) it seems that non-radiographer radiographic practice also takes place in countries other than Australia. The attitude of representative professional bodies in other countries is difficult to ascertain. Akpan (1984), writing on behalf of the International Society of Radiographers and Radiologic Technologists (ISRRT), called attention to the fact that while in some countries radiographers are regarded as health professionals, in other countries they are 'grouped with the lowest cadre of workers in the hospital' and that according to the World Health Organisation some 80 – 90% of radiography is performed by untrained personnel (Akpan 1984). This, he suggests, is an unfortunate outcome of the implementation of the basic radiology system in developing countries. He warns that it is 'very dangerous and misleading' to believe that good radiographic practice can be judged only on the basis of a 'good quality' radiograph and that this 'end product' is often achieved through 'radiation abuse and mishandling of patients' (Akpan 1984).

Limited x-ray licensing also exists in some parts of the United States (US), where Federal legislation delegates authority to the States (Hansen 1988a). The American Registry of Radiologic Technologists (ARRT) initially opposed state licensing, believing that it would lead to the lower qualifications for radiologic technologists (the US equivalent of radiographers). However, in 1979 the ARRT altered its stance and took responsibility for conducting the state licensing examinations in most States. Some technologists apparently consider that this tacit endorsement of the concept of 'limited scope licensing' (Hanson 1988) demeans the radiography profession, contributing to a public perception that a person with limited training can perform what appears to be the role of a certified

practitioner, making 'the profession seem less demanding than it is' (Hanson 1988b). It has also been suggested that their lack of knowledge of radiation safety and limited ability to evaluate their performance means that limited licensees place 'the patient doubly at risk' (Hanson 1988a). In spite of these objections, however, the ARRT acknowledges the existence of the limited scope operators, believing that untrained operators will not be eliminated simply by ignoring them. It has been argued that it is in the best interest of the public and the profession to establish adequate training programs and competency assessment with the hope of maintaining an acceptable standard of limited licence radiography (Hanson 1988b).

## Chapter Summary

Remote x-ray operator radiography is practiced in the context of the rural and remote health care system, which is characterised by poorer health status of the population and limited service access and availability compared to metropolitan areas. The provision of radiographic services is limited because of the smaller population size of rural and remote communities, the cost of providing a radiography service compared to other health care needs of the population, and the distance of these communities from a radiographer-staffed health facility. Even though it is apparent that some non-radiographer operators, particularly doctors, have performed radiographic examinations in rural areas for decades, it has only come under legislative control relatively recently, with differing licence conditions in each Australian State. The formalisation of limited licence radiography has apparently been the cause of some intra-professional tension and conflict in some other countries as well as in Australia, although the Australian Institute of Radiography has a policy on the issue that gives conditional support to remote x-ray operators. Issues that appear to be of concern to radiographers relate to the nature of training remote operators receive, radiation protection of patients, image quality and the standard of service and the overall legitimisation of non-radiographer operators. While the remote x-ray operator program meets a perceived need, it is apparent that its development has posed some challenges for the radiography profession as a whole as well as for individual rural radiographers.

# Chapter 3
## Explanation of Radiographic Practice

As commented in Chapter 1 in relation to the significance of this study, research performed by radiographers examining radiography remains a fairly new phenomenon (Nixon 2001; Scutter 2002; Williams 2002; Lombardo 2005). Consequently, there is a lack of systematic evidence explaining the practice of radiography. Furthermore, it can be argued that, while it would be expected that most of the population, even in the most remote parts of New South Wales, would have some knowledge of what the role of a doctor or a nurse involves, a radiographer's role in the health care system would not be so well known or understood by so many. For both of these reasons it is necessary in this thesis to examine the practice of radiography and, hence, to develop an understanding of how the boundaries of the occupational jurisdiction of radiographers are portrayed, firstly in the literature, and subsequently by the study participants. In this chapter various perceptions of the occupation of radiography and the role of radiographers will be discussed drawing on the limited range of published literature available, as well as other sources. The origins and early evolution of radiography, including the relationship with radiology, will firstly be examined before describing different perceptions of the occupational role of radiographers in the health care workforce.

## The Development of Radiography

The origins of medical imaging can be traced back to the discovery of x-rays in November 1895 by Wilhelm Conrad Röentgen (*Salute to the X-ray Pioneers of Australia* 1946), a physicist who was awarded a Nobel Prize for his discovery. Also of importance was the discovery of 'uranium rays' by Henri Becquerel in 1896 and the later, sacrificial work of Marie Curie (another Nobel laureate) and her husband Pierre, leading to the discovery of radioactivity (American Institute of Physics 2005). The medical use of radiation is, therefore, a relatively new occupational domain, compared with medicine or nursing for example, and one that owes its existence to a particular scientific discovery

and rapidly advancing technological innovation. It has evolved into highly specialised diagnostic and therapeutic disciplines including plain film radiography and fluoroscopy, ultrasonography, computed tomography, magnetic resonance imaging, nuclear medicine and radiation therapy, most of which are represented as subgroups of the medical radiation profession.

Subsequent to Röentgen's discovery and the publication of his first paper, the scientific and technological world of the time responded very rapidly, emulating his experiments, which seems to illustrate the user friendly nature of basic radiographic imaging, even in those very early years. Scientific and technically minded people around the world who possessed a Crookes tube and an induction coil tried to produce x-rays, many successfully (Eisenberg 1992). Indeed, it was only a few months after the first announcement of the discovery of x-rays in Germany that a physics teacher at St Stanislaus' College at Bathurst in rural New South Wales, Father Joseph Slattery, produced what is claimed to be the first medical radiograph taken in Australia (Irvin 1995). Only a year after Röentgen's momentous discovery the London Röentgen Society was founded, composed of interested members of the medical profession, physicists and others (Larkin 1983). In 1917 a purely medical society was formed from the medical membership of the British Röentgen Society and the electrotherapeutic section of the Royal Society of Medicine. Later, in 1921, the Society of Radiographers was founded, having both medical and non-medical members, with the aim of enhancing the status and improving the education of radiographic technicians (Moodie 1970, in Larkin 1983).

Initially, therefore, the medical imaging fraternity was a hybrid group of scientists, electricians, curious amateurs and technically minded doctors who might collectively have been called 'electro-medical practitioners'. It wasn't until the 1920's that the balance began to shift, when boundary disputes that had been simmering for some time over the sensitive matter of reporting on radiographic images boiled-over (Price & Paterson 1996). This was an issue of great importance to the doctors who feared loss of control over information that had become vital for diagnosis. The medical profession laid claim to interpretation of radiographic images with the assertion that only a person educated in the practice of medicine could reliably interpret radiographs (Desjardins 1931). The apparently less onerous task of the technical production of the images was left to the non-medical practitioners of radiography (Larkin 1983). These 'lay practitioners' were at a

cross-road of professional development. Decisions that were made at this time ultimately crystallised into the divide between radiologists, the medical specialists in this field, and radiographers, the paramedical workers who serve the needs of the medical profession.

In 1925, when the Society of Radiographers sought incorporation in order to gain legal status as a corporate body, their application was passed on to other interested parties (Larkin 1983). The General Medical Council (GMC), being one of those parties, responded that incorporation should be conditional on inclusion of the following article:

> No non-medical member … shall accept patients for radiographic, radioscopic or therapeutic work except under the direction and supervision of a qualified medical practitioner, and any breach of this regulation shall be deemed conduct unfitting the member guilty thereof to remain a member of the society.
>
> (GMC 1925, quoted in Larkin 1983)

The use of the words 'direction and supervision' effectively stifled any attempt by radiographers to practice autonomously by directly sub-contracting their services to referring doctors. The threat was that non-medical members would be expelled from the Society of Radiographers for reporting on radiographs (Larkin 1978), thus ultimately giving radiologists control over and responsibility for radiographic interpretation. The role of the radiographer, therefore, became that of performing the technical aspects of medical imaging, which was regarded as analogous to photography. Increasingly they came to work under the direction and supervision of radiologists who not only owned the equipment the radiographers operated but also directed their study curriculum and, in effect, dominated every aspect of radiographic practice. This is well demonstrated in the following quotation from a high profile radiologist of the time, which exemplifies the opinion held by many radiologists even today:

> We should welcome lay assistance, and seek to organise and guide it. It is too late in the day to make a mystery of taking plates but the interpretation of them is ours forever.
>
> (Hernaman-Johnson 1919, quoted in Larkin 1983)

### Radiographers and medical dominance

Although the origins of radiography as an occupation are inextricably linked with the medical speciality of radiology (Price 2001; Reeves 2002; Decker & Iphofen 2005), and

in a sense preceded the beginnings of radiology as a unique branch of medicine, the development of radiography has been overshadowed by the relationship with the medical profession (Willis 1994; Price & Paterson 1996). Radiologists share many elements of clinical practice in common with their physician colleagues and wear the title of 'doctor'. The role of physicians is well recognised and highly regarded by other health professionals and by the general public, but the role of the radiographer in the health care team is less well understood and is often undervalued and unappreciated (Smith & Lewis 2002). Because they are often nameless members of the health care team and frequently stereotyped by patients as either doctors, if they are male, or nurses, if female, radiographers are often seen as somewhat superfluous and disregarded in favour of radiologists by the public, other health professionals and by health care administrators when it comes to decision making.

It has been suggested that the history of the development of the occupations of radiology and radiography is a good example of medical dominance (Bucher & Strauss 1960; Larkin 1978; Willis 1989; Willis 1994). Willis (1989) argues that although the invention of the x-ray machine created the necessity for development of a new occupation of operators, it was a series of social interactions, particularly the dominance of the medical profession, that resulted in a system where radiographers are 'disproportionately women who work under the direction of doctors and at much lower pay rates' (Willis 1989, p.34). One of the 'modes of domination' that, according to Willis, is evident in the radiographer-radiologist relationship is 'subordination', where an apparently less valuable occupation works under the direct control of another more powerful one (Willis 1989, p.6). Further, one of the processes of subordination is what Willis terms 'vertical specialisation' involving the phenomenon he calls 'pass-the-task', where less pleasant, more routine and mundane tasks are delegated to the subordinate occupational group (Willis 1989, pp.32-33). The occupation that is concerned with the design or planning of a task and which has control of the delegation process is likely to be seen as the one possessing the professional expertise (Daly & Willis 1994, p.81). Recently, the same process was described euphemistically by Duckett (2005a) as 'skills transfer', which he advocates in relation to the development of future models of health care practice.

Willis (1989) also refers to 'limitation' as another of the modes of domination, which he describes as being implemented by administrative processes, such as representation on

registration and licensing boards, legislative control and the oversight of educational curricula. Such mechanisms of control have also been evident in the radiologist-radiographer relationship in Australia, exemplified by the fact that until the mid-1980's completion of a radiographer education program was marked by the award of a Diploma of Qualification from the Conjoint Board of the Australian Institute of Radiography and the Royal Australian College of Radiologists, which was a requirement for future employment. In 1985 the Conjoint Board was disbanded and the Australian Institute of Radiography set up its own Professional Accreditation and Education Board with no radiologist representation (Baird 1992; Cowell 1997; Lewis 2004). This was followed soon after by movement of education programs from the higher education into the university sector. However, it may be argued that the dissolution of the Conjoint Board had symbolic rather than any practical significance, the subordination of radiographers to radiologists and limitation of their practice role having been institutionalised for about sixty years at that time.

Indeed, radiologists have so successfully dominated the medical imaging field in Australia that the amount of influence they exert over decision making and the dispersal of new medical imaging technologies has at times been called into question. Concern about the 'uncompetitively high' incomes of radiologists in private practice (Daly & Willis 1994, p.78) motivated the Victorian State Government to launch a Parliamentary Enquiry into radiological services in 1986. Interestingly, one of the recommendations of that enquiry was that radiographers be entitled to provide a wider range of diagnostic services, including the interpretation of some routine plain film radiographic examinations. The College of Radiologists responded with a simple and familiar argument: 'You wouldn't want someone without medical training reading the results of your x-ray, would you?' (Daly & Willis 1994, p.94). In another more recent instance the relationship between the Commonwealth Government's Minister for Health and the radiological fraternity was called into question in Federal Parliament (House of Representatives, 11 May 2000) over what became known as the 'Scan Scam' (*The Australian*, 24 Nov. 1999, p.1). This related to events which allegedly resulted in advanced notice being given to radiologists of impending changes to the laws governing the funding of Commonwealth Government rebates for magnetic resonance imaging examinations.

In summary, the clinical role of most radiographers is apparently a subservient one in that they work under the direction of radiologists, as well as the referring physicians. It has been suggested that this has created a perception that radiographers only 'take pictures' and do not make clinical decisions that affect the health outcomes of patients (Smith 1995; Smith & Lewis 2002). However, it has also been argued that the radiographer-patient relationship is 'complex', 'dynamic' and 'vital' and that radiographers often interact with patients at critical stages in their patients' lives (Bowman 1993).

## Contemporary Views of Radiography

### Standard Definitions

Diagnostic radiographers are tertiary qualified allied health professionals. About fifteen years ago the minimum entry level qualification moved to a three-year bachelor degree (Baird 1992), with courses now available at eight Australian universities. Prior to that, the base level qualification had been a three-year diploma and as recently as the early 1970s, Certificate and Associate Diploma graduates were admitted to clinical practice (Baird 1992; Cowell 1997). Professional accreditation with the Australian Institute of Radiography requires graduates to complete a professional development year (PDY) before being eligible for admission to full membership of the Institute (Baird, Power & Bergen 1996). Thus, the Australian Institute of Radiography defines diagnostic radiographers as 'health care professionals' who hold a certificate of professional accreditation issued by the Institute and '… who provide and interpret a range of medical imaging examinations for diagnosis and management of medical conditions' and, further, that they are '… responsible for optimising diagnostic quality whilst maintaining radiation safety' (AIR 2005).

According to the AIR Competency Based Standards quoted above, the role of the accredited diagnostic radiographer, subsequent to the completion of the PDY, is further broken down into a list of tasks as follows:

- patient and clinical assessment;
- application of the science of medical imaging to include;
  - general radiography, incorporating plain film and digital radiography,

- fluoroscopy,
- operating theatre imaging,
- emergency imaging, and
- computed tomography.

- image processing and data recording;

- quality management and diagnostic efficacy;

- image interpretation; and

- mentoring, clinical reasoning and research.

The Australian Standard Classification of Occupations (ASCO) describes a Medical Diagnostic Radiographer as someone who '… operates x-ray and other medical imaging equipment to produce images for medical diagnostic purposes in conjunction with radiologists and other medical specialists' (ABS 1997). Accordingly, tasks include:

- medical imaging on patients according to referral from medical practitioners;

- calculating details of procedures such as length and intensity of exposure to radiation and settings of recording equipment;

- explaining procedures to patients;

- positioning patients and equipment to carry out procedures;

- producing electronic or medical images performed by equipment such as x-ray machines, scanners, fluoroscopes and ultrasound machines for use by medical practitioners in the diagnosis of disease or injury; and

- assisting surgeons by using radiographic equipment in operating theatres.

It can be argued that both the AIR and ASCO definitions of radiography are similar in their strong emphasis on the use of equipment and technology in the process of image production. The most notable difference, however, is that the AIR standard definition excludes any reference to the collaboration with medical practitioners, suggesting greater clinical autonomy in both image production and interpretation. This is further evident in language used in Table 4, which details the desired attributes of an accredited radiographer, again according to the AIR Competency Based Standards (2005). These 'five core standards' are described as a framework for 'professional and community expectations', which integrates the skills, knowledge and understanding that underpin professional practice with the unique attributes of the role. They reflect not only the

**Table 4:** Competency Based Standards for radiographer accreditation (AIR 2005).

| Standard | Descriptor | Definition |
| --- | --- | --- |
| **Knowledge and Understanding** | Key knowledge concepts | Demonstrate a broad & thorough understanding of theoretical concepts underpinning radiography |
| | Critical skills and practice | Demonstrate a broad & thorough knowledge of the scope of practice underpinning radiography |
| **Critical Thinking and Evaluation** | Formulation and delivery | Assesses clinical situations, determines the key issues and delivers a timely and quality outcome |
| | Clinical skills | Analyse and respond to problems related to patient treatment and care |
| | Analyse, synthesise, prioritise | Analyse and respond to problems of operation and management |
| | Research and innovation | Initiate & evaluate research outcomes & incorporate into evidenced based practice where relevant |
| | Evaluation & quality assurance | Evaluate and implement processes and procedures for ensuring quality outcomes |
| **Professional and Ethical Practice** | Autonomy and accountability | Operate effectively as an autonomous and responsible practitioner |
| | Scope of practice | Guided in action by their own and others scope of practice |
| | Professional relationships | Establish & maintain appropriate collaborative relationships with colleagues & all team members |
| | Patient advocacy | Act to ensure that patient welfare and rights are appropriately respected |
| | Legal framework | Act to preserve the safety of individuals and groups at all times |
| | Quality management | Management of quality issues relating to effective practice |
| **Care and Clinical Management** | Patient welfare | Fulfil the duty of care in clinical practice |
| | Empathy | Establish and maintain effective interpersonal relationships with patients and colleagues |
| | Cultural sensitivity | Respond appropriately in culturally sensitive situations |
| | Clinical management | Demonstrate effective clinical management of individuals |
| **Lifelong Learning** | Professional development | Demonstrate a commitment to ongoing professional development |
| | Mentoring and teaching | Play an active role in guiding the learning of others |
| | Research | Participation in research |

essential knowledge and skills to perform tasks competently and safely but also the characteristics necessary for radiographers to function as independent, analytical and reflective practitioners (Schön 1983; Hall & Davis 1999) and lifelong learners (Sim, Zadnik & Radloff 2002).

**Perceptions of radiographic practice**

In 1994 a radiographer named Brendan Corr gave the 43rd Welch Memorial Lecture at the 52nd Annual Conference of the Canadian Association of Medical Radiation Technology in which he described the knowledge, skills and attitudes of a 'diagnostic medical radiation practitioner'. In that lecture he laid claim to 'superior knowledge of gross anatomy, physiology, pathology, radiographic anatomy and pathology, physics, chemistry, radiobiology and radiation protection'. He also identified interpersonal communication as important in dealing with 'individual patients in a context of obscure and intimidating technology', being conscious of maintaining the individuals 'dignity and esteem'. The ability to manage multiple daily patient contacts within a constrained time frame while demonstrating 'peerless artistic and scientific abilities' was also seen by Corr as part of radiographers' essential competencies. Finally, he acknowledged the importance of performing these duties without 'consideration for the practitioner's personal needs, biases, emotional state, ethnic or religious background, or personal aversion for specific human conditions'.

While the order and emphasis of the various elements of Corr's description may be contested, it is inclusive of a wide range of characteristics that may be associated with radiographers and radiography and is useful as a basis for critical analysis. In particular, it brings into focus two somewhat dichotomous aspects of radiographic clinical practice which, according to Castle (2000) span both 'hard' and 'soft' knowledge domains, as might be expected of 'a discipline that combines the use of technology with patient contact' (Castle 2000). On the one hand is the role that radiographers play in operating technologically advanced equipment and the knowledge of the basic sciences that they need to do this in such a way as to competently produce high quality diagnostic images. Accompanying this scientific aspect is an element of artistic ability in producing images that are not only diagnostic but are also 'pleasing to the eye', an expectation also identified by other authors (Carlton & Adler 1992; Dowd 1992). This blend of basic

science and aesthetics is perhaps peculiar to the occupation of radiography and is what is referred to below as the 'technographic' aspects of radiographic practice.

The other side of the radiographers' role that Corr placed emphasis on is what may be called the 'humanitarian' aspects of the occupation, which may be regarded as being opposite to the technographic aspects. Radiographers work at the interface between patients, most of who are not at their physical, psychological or emotional best, and the high end of health care technology. It can be claimed that radiographers, therefore, need to have good interpersonal communication skills in order to manage the anxiety and apprehension patients may feel when undergoing potentially threatening radiological examinations and procedures using 'high-tech' instrumentation (Kabler 1986; Brealey 1997; O'Connor & Cotter 1998; Murphy 2003).

There is evidence in the literature to suggest some tension between these two different aspects of radiographic practice. While some authors appear to have held to the view that technology is the mainstay of radiographic practice, there is also evidence of an increasing recognition of the importance of the humanitarian over the technographic aspects of the radiographers' role (McKenna-Adler 1990).

- *The 'technographic' aspects of radiographic practice*

The origin of radiography lies in one of the most momentous technological discoveries to ever influence the development of medical science. Therefore, it is not surprising that to many, even within the radiographic fraternity, the role of radiographers is predominantly linked to the technological aspects of health care (Dowd 1993). Technology plays an important part in what radiographers do, as is apparent from the standard definitions, as radiographers operate a wide variety of expensive and technologically advanced medical imaging equipment in hospital x-ray departments and private radiology practices. However, a purely technographic perspective of the radiographers' role creates some challenges for their recognition as health professionals. Reference was made earlier in this chapter to the perception that conventional plain film radiography may be regarded by some as analogous to photography (see p.37). Frances Campeau in *'Radiography: Technology, Environment and Professionalism'* (1999, p.5) also makes reference to this perception, pointing out that radiography and photography share common terms such as

darkroom, filters, film, processing, exposure and so on. As Campeau suggests almost everyone has at sometime used a camera to take a 'snap-shot' with acceptable results and it is conceivable that a member of the public or another member of the health care team may presume that it must be equally as easy to take a radiograph.

This perception is further encouraged by the popular media and entertainment. For example, in the American situational comedy 'Becker' the receptionist, who is cast as naïve, self-centred and unintelligent, was directed in one episode to 'take an x-ray'. It may be argued that such portrayal of radiography reflects a public perception that it is no more difficult to take a radiograph of a patients injured limb than it is to take a photograph of that person. Few casual photographers, however, would be expected to have a detailed knowledge of the anatomy of their subject and be able to manipulate them into an anatomically correct position, as well as understanding the complexities and nuances of the equipment they are using, while being responsive to the subject's physical, psychological and emotional needs. The casual photographer would not anticipate that the image they produce could be used to influence the treatment of their subject's illness or injury, perhaps be used as evidence in a court case, be discussed in a scientific meeting or published in a journal.

In 1985 Cockburn (cited in Daly & Willis 1994, p.78) referred to the latest version of computed tomography scanners as 'idiot proof' and while this opinion is debatable, it suggests another potential risk of the technographic paradigm. Radiographic instrumentation has evolved even further since Cockburn's observation was first reported and it is becoming less operator-dependent with the introduction of menu-driven exposure selection and computed radiography systems that allow the images to be manipulated after they have been digitally recorded (Pongnapong 2005). Some authors have argued that as the technographic aspects of radiography become more automated it becomes more dubious for radiographers to claim exclusive expertise in the operation of radiographic equipment, with the resultant risk that radiographers will be 'replaced by technicians and non-R.T.s' (i.e. non-radiologic technologists) (Tilson & Dowd 1997). Other authors, however, have argued that computerisation of the imaging process simply changes the skill-set of radiographers, potentially extending their role (Cesar 1997; Pongnapong 2005).

In his analysis of the sociological influences that determine the boundaries of scientific and technological endeavours, Andrew Abbott (1988) made the observation that excessive 'formalisation' and 'codification' of expert knowledge makes tasks vulnerable to 'routinisation'. The greater the ease with which a task can be performed the greater the likelihood of it being taken over by other occupations or delegated to less expensive subordinates. Daly and Willis (1994) made reference to this same phenomenon in suggesting that all occupations contain a mixture of 'indeterminate' and 'technical' skill elements. Atkinson et al. (1977, cited in Daly and Willis 1994, p.82) suggested that medicine has a high indeterminate element, the so called 'medical mystique', which includes 'interpersonal communication' and 'clinical judgement'. Atkinson suggested that maintaining a high ratio of indeterminate to technical skills in effect buffers an occupation against the risk of their role being usurped by another, neighbouring occupational group.

It can be argued that a traditional means by which radiographers have defended their expert knowledge base has been the maintenance of the image production mystique, particularly through the teaching of physics and other basic sciences (Lorimer 1994). Andrew Abbott (1988, p.67) identified this as a common method that professions use to defend their jurisdictional boundaries and emphasise differences from other groups. However, the threat of a breakdown in the defence that has been afforded by the technographic monopoly that has traditionally been used to mark their occupational jurisdiction has coincided with the opportunity for radiographers to adopt skills and tasks that might augment their current range of clinical knowledge and expertise (Paterson, undated; Price, Miller & Mellor 2002). This process, called 'role development' or 'role extension' (Craven & Barber 1995; Smith & Lewis 2002), is discussed in more detail later in this chapter in relation to radiography, although the same process may also be observed in other health care occupations, such as in rural and remote nursing (Keyzer 1994; Roberts 1996; Hegney 1997; Ross 1999).

A scientific reality of radiographic practice that is commonly either disregarded or perceived as of only minor relevance, is that exposure to ionising radiation is potentially harmful, although the magnitude of the risk compared to the benefit of medical exposure is debatable (Roebuck 1996; Smart 1997). It was only a matter of about two years after the discovery of x-rays that it became evident that exposure to this form of radiation can be lethal (Daly & Willis 1994, p.86). However, notwithstanding the untimely death of

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some of the early pioneers of x-ray technology (*Salute to the X-ray Pioneers of Australia* 1946) its applications expanded rapidly, such was its value as a means of diagnosis. At low radiation doses, such as those delivered by modern diagnostic imaging equipment, the concern is about the long-term, stochastic effects, the principal ones being the production of cancer and birth defects (ICRP 1990). It is because of this potential danger that the use of x-rays is strictly limited and controlled by international, national and local laws. It is also the reason why in New South Wales diagnostic x-ray equipment can only be operated by a person licensed under the Radiation Control Act 1990. Radiographers, as well as those health professionals performing radiography under limited radiation licences, have a responsibility to ensure that they do not unjustifiably expose members of the public or themselves to x-radiation and to limit exposure to that necessary to obtain an accurate diagnosis (Akpan 1984; ICRP 1990; Smith 2000). In some Australian states, rather than being licensed under radiation control legislation, radiographers are required to be both licensed and registered (Government of Western Australia 2005, p.4), thus acknowledging radiographers' responsibility to the general public as well as to individual patients in relation to the use of this potentially harmful technology.

On occasions, radiographers have used the responsibility for protection of the public from the dangers of radiation exposure as a means of defending their occupational jurisdiction. In Victoria in 1979 radiographers claimed that general practitioners took poor quality radiographs and performed unnecessary examinations for reasons of financial gain (Daly & Willis 1994, p.90). Indeed, it has been shown in the United States that radiographers do use x-rays more responsibly than doctors (Wochos et al. 1979, cited in Daly & Willis 1994). It is argued that patients have the right to expect the person performing their x-ray examination to have the expertise to protect them from unnecessary exposure (Akpan 1984) and perform the examination efficiently, accurately and in a timely manner (Renner 1994). Renner goes on to argue that the public should not be subjected to examinations performed by 'some inexpensive, inadequate substitute' (Renner 1994), reflecting dissatisfaction with limited x-ray licensing in some American States (Hanson 1988).

Technological innovations in medical imaging have occurred rapidly over the past several decades (Howard 1989) and it has been suggested that this has challenged radiographers' ability to assimilate the new technologies into their daily clinical practice and into educational curricula (Quick 1993). The rapid pace of change may explain the apparent

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historical dominance of the technographic perception of radiographic practice, as any suggestion that radiographers should be more patient-focussed was overridden by the imperative of adapting to technological innovations. Consequently, as evident in the ASCO definition of medical radiography cited earlier, the role of radiographers is commonly defined in terms of providing technological support to the health care team. It has been suggested that this is radiographers' core role, while the seemingly 'lower level skill' of looking after the patient is delegated to other team members (Cherryman 1994).

- *The humanitarian perception of radiographic practice*

There has been considerable discussion in radiography literature about the broader role that radiographers play in the health care system through their close relationship with patients (Whyke 1982; Akpan 1984; Kabler 1986; Dowd 1992; Bowman 1993; Dowd 1993; Dwane 1993; Pack 1994; ASRT 1995; Hammick 1996; Sim 1999). In 1996 David Kennedy published an overview of the literature related to the topic of 'patient-radiographer interactions', making particular reference to terminally ill patients, the elderly, and patients undergoing interventional procedures or examinations involving the use of advanced technologies. He concluded that radiographers should be better prepared at undergraduate level for dealing with the complexities of patient interactions. According to Steven Dowd (1993) radiographers are expected to be skilled both in the application of technology and in meeting the needs of patients. In 1992 Dowd also made the observation that radiography offers a unique opportunity to work in a technical discipline but with a 'human perspective'. Similarly, Marilyn Hammick (1996) argued that radiographers have the dual role of performing 'high quality procedures' and providing assurance that 'patients, their families and friends are supported from reception into the department, throughout all treatment or imaging procedures and in the follow-up period'.

In 1986 Candace Kabler emphasised the importance of communication skills in a paper titled 'Can a Radiographer Survive on Technology Alone?', making the observation that radiographers spend too little time with their patients to establish a supportive relationship. Brendan Corr (1994) also made reference to this when he said that part of the radiographic duty is to manage multiple daily patient contacts within a constrained time frame (see p.43). Kabler suggested that the limited patient contact time makes it even more important that radiographers have high level communication skills so that they

can 'immediately go to work' on establishing meaningful personal interactions. The technographic imperative of image production and the limited contact time often results in behaviour suggesting that radiographers do not regard their patients as people but as examination types or workload. For example, in a study of the way that radiographers interpreted ethical issues in clinical practice, Lewis (2002) found that they generally had a poorly developed understanding of ethical concepts and were often influenced in their decision making by personal issues and workplace culture and traditions rather than by the needs of the patients. It can be argued, therefore, that a shift towards a more humanitarian practice regime requires increased patient awareness, which may result in better patient care (Whyke 1982).

Perhaps part of the reason why radiographers generally have sought to ground their perceived role in the technographic aspects of practice and distance themselves from the humanitarian perspective, is that the latter is seen as being the realm of nurses (Pearson, Vaughan & Fitzgerald 1996; Hall 2002; Hood & Leddy 2003; Brilowski & Wendler 2005). As Cherryman (1994) suggested looking after the patient apparently requires lower level skills than the seemingly more intellectually demanding tasks that are associated with the application of medical imaging technology. However, the nursing profession has used the patient advocacy role to considerable advantage and this, together with their sheer weight of numbers, has afforded them considerable social and political influence in the health care system (Branch & Marra 1999; Queensland Nurses Union 1999; Malone 2004). It appears that radiographers have not used similar tactics to increase their power, influence and prestige as a professional group. Indeed, it has been suggested that their limited use of power in their own work place and apparent lack of assertiveness has contributed to radiographers 'impaired self-esteem' and 'poor self-image as a profession' (Johnson 1990).

In 1993, Dowd reported the results of a survey of sixty-one directors of accredited radiography education programs in the mid-western United States. The program directors were asked to rank a series of assumptions, which were drawn from a review of the literature about the profile of the radiographer of the future. The statement that ' "soft", "caring" or "customer satisfaction" issues' will increase in importance was ranked second out the seven assumptions presented (with 97% agreement), the only higher ranked assumption being related to the future manpower (sic.) shortage. The statement that

'radiographers will be expected to be skilled in the application of technology' was ranked third and a statement related to the importance of computing skills ranked fourth. Dowd (1993) concluded that although the 'application of technology has been seen for many years as the primary role of the radiographer', the survey results suggested a perceived need on the part of education program directors to balance the 'technological role' with the 'caring role' in order to overcome the image of radiographers as 'individuals interested only in the technical aspects of healthcare'. A similar argument was put forward by Whyke in 1982 who suggested that, while radiographers are taught technical skills, communication skills are underemphasised in radiography curricula. Therefore, while the core technographic role of acquiring high quality diagnostic images is important, the humanitarian obligation is of equal, or perhaps greater importance in performing some examinations (Whyke 1982).

The concepts of 'multi-skilling', 'skill mix' and 'holistic' care have been discussed in some radiography papers (Whyke 1982; Spiers 1991; CAMRT 1995; Kletzenbauer 1996; Egan 2002), particularly with regard to adopting greater responsibility for patient care. Multi-skilling has been variously described as the concept of 'redesigning job classifications to broaden the scope of responsibility' (Marshall 1995) or 'the need for the professions to diversify their skill base to ensure a range of career options' (Smith & Crowley 1995). In general, however, it appears that radiographers often consider attempts to trade or share skill-sets between occupations are cost cutting exercises that will result in them loosing occupational territory in favour of those who have greater industrial and political strength and power, such as the nurses, resulting in dilution of the quality of health care (CAMRT 1995; Holzemer 1996; Oliver 2002). There is also a perception that the blurring of occupation boundaries by skill mixing could lead to a loss of professional identity among health care personnel in general (Pack 1994; Egan 2002). For example, in one study reported in the United Kingdom, the attitude towards skill mix of the one hundred and fifty-four radiographers surveyed was found to be decidedly negative because they were suspicious of managerial motives and because many of the survey respondents appeared to be defensive of their occupational territory (Kletzenbauer 1996).

Multi-skilling was a strong theme of the Educational Consensus Conference of The American Society of Radiologic Technologists (ASRT) in 1995 (ASRT 1995), the overriding perception being that there was a need for radiographers to become more

multi-skilled in order to provide improved patient care services and move beyond their traditional technographic role. It was reported that 29% of the four hundred and one conference delegates perceived multi-skilling as the greatest future change in the education of radiographers and that the majority believed that having the skills to provide basic patient care, such as making and recording clinical observations, usually a nursing duty, will become part of the radiographers skill-set.

In the United States, reform of the health care system based on the model of 'patient-focussed care' involves groups of multi-skilled health professionals operating in small, decentralised clinics with the aim of curbing escalating costs and improving patient satisfaction (Pack 1994). In this model the patient is seen as the central point, receiving services as needed from a team of practitioners who have been cross-trained in a range of skills, as opposed to the patient being referred from one specialist provider to another, each having a limited skill set. The team members would ideally be able to manage the whole patient and their problems, and would have greater clinical decision-making authority than under the traditional model of health care. While acknowledging that the risk may be a loss of professional identity, Pack (1994) suggested that if radiographers embrace this health care model they could further their education in a broad range of disciplines and demonstrate that they have the knowledge and ability to perform patient care tasks. Whyke (1982) also suggested that the change towards a more holistic model of health care availed radiographers of the opportunity to develop their knowledge of 'psychology, social work, diet, etc.' as part of the health care team. According to Carney (1995) provided staff time is deployed effectively and a sensitive approach to cross-boundary training is adopted, multi-skilling has the potential to enhance job satisfaction and rejuvenate the 'ailing radiography workforce'.

It has also been argued that a unique form of patient care has always been a central aspect of radiographic practice. Culmer (1997) makes the point that managing relatively well, ambulant, co-operative, adult patients is comparatively easy, but performing a more complex examination on an immobile, severely injured patient, perhaps even a child who is in pain, requires the personal interactional skills and knowledge of an experienced practitioner. Culmer criticised the simple linear model of radiographic practice and proposed an alternative, holistic model in which the patient is the central reference point, dictating the radiographers approach to the examination at all stages (Culmer 1997). In

the Culmer model, the radiographer goes through a series of process-oriented steps but at the same time constantly observes the patient's condition and evaluates their limitations, making decisions about how best to manage the examination in order to achieve the best possible images with the least possible pain and discomfort for the patient. Consequently, analysis of the resultant images takes into account the condition of the patient and, for example, their capacity to comply with the routine positioning requirements of the examination. The latter may be compromised because of age, disability, body habitus, illness, injury, pain, or emotional and psychological status, resulting in the radiographer accepting less than optimum quality images. The image evaluation process, which seemingly takes into account a range of variables, was described by Bowman (1997) as an 'extremely complex' task that radiographers perform 'in an intuitive manner'.

In summary, evidence in the literature appears to support the assertions of Corr (1994), Castle (2000) and others that the occupational role of radiographers in the health care workforce spans both technographic and humanitarian aspects, although the former has apparently dominated the discourse (Whyke 1982; Dowd 1993). It is argued, therefore, that the occupational jurisdiction of radiographers is partly defined by their sound knowledge of a branch of physics, having responsibility for the control of advanced and potential harmful medical technology, as well as a detailed knowledge of human anatomy and physiology. Using their knowledge and accompanying skills, radiographers attempt to produce images that are not only technically accurate but are also aesthetically pleasing and easy for the radiologist to interpret. At the same time, however, radiographers apparently need high level communication skills making it possible for them to quickly establish a professionally meaningful and effective relationship with patients who are often vulnerable and in need of support and reassurance (Whyke 1982; Kabler 1986).

## Changing Radiographic Practice

Much has been written in recent times about the changing role of radiographers in relation the interpretation and reporting of the images they produce (Price 2001; Price, Miller & Mellor 2002; Brealey & Scuffham 2005; Brealey et al. 2005), although other extended roles have also been described (Fernando 1999; Suter et al. 2000; Murphy et al. 2002;

Price, Miller & Mellor 2002; Smith & Lewis 2002). As discussed earlier in this chapter, in the early part of the twentieth century anyone who worked with x-rays in medical diagnosis was entitled to interpret the images they produced and to share their opinion with the physicians treating the patients (Larkin 1983). However, arguments about the safety of allowing non-medical 'radiographers' to report on images soon emerged (Price 2001) with the end result that by the 1930s a clear demarcation had evolved between radiologists, who reported on radiographs, and radiographers, who produced the images. By the 1980s the pendulum had begun to swing back the other way and radiographers started to assume more responsibility for identifying abnormal appearances on radiographs (Renwick, Butt & Steele 1991; Renwick 1991; Rose & Gallivan 1991; Loughran 1994; Edwards & Bowman 1995; Robinson, Culpan & Wiggins 1999; Brayley N 2000; Price 2001). This began with the 'red-dot' system at Ealing Hospital in England (Cheyne et al. 1987; Field Boden 1997) but quickly spread to other parts of the United Kingdom and overseas, including Australia (Orames 1997; Hall, Jane & Egan 1999; Smith & Younger 2002; Cook, Oliver & Ramsey 2004).

By the mid-1990s a substantial body of evidence had begun to emerge that, because of their experience in looking at radiographs, radiographers were at least as accurate as some doctors in identifying radiographic pathology compared to the 'gold standard' of radiologists (Price 2001; Brealey et al. 2005). Most of the investigations of radiographer reporting took place in the United Kingdom, usually with the assistance of radiologists and sometimes under their direction. It was seen as beneficial to radiographers, as an opportunity to develop and demonstrate their professionalism (College of Radiographers 1997), and also for radiologists, as a means of delegating some of their more mundane duties in the National Health System where they were faced with the insurmountable task of reporting every radiograph performed (Saxton 1992; Field-Boden & Piper 1996). A Special Interest Group in Radiographer Reporting was established in the United Kingdom (Price 1997) and several universities began offering postgraduate education programs in radiographer reporting of musculoskeletal, chest and abdominal radiographs (Carter & Manning 1999; Prime, Paterson & Henderson 1999). This movement has continued and the reporting role of some postgraduate trained radiographers has become an accepted part of the National Health System (Price, Miller & Mellor 2002).

Some research into the accuracy of radiographers in interpreting plain film radiographs has been performed in Australia, revealing similar results to the studies performed in the United Kingdom (Smith & Lewis 2002). However, the radiology system is significantly different in Australia in two important ways (Smith 2002). Firstly, Australia does not have a shortage of radiologists to the same extent experienced in the United Kingdom where the number of radiologists per million population is about one-third lower than in Australia (O'Donnell & Stuckey 1995; O'Donnell, Jones & Stuckey 1997). Nevertheless, Australia is still considered to be undersupplied with radiologists, with maldistribution favouring metropolitan localities (Jones 2002). Secondly, in the United Kingdom the vast majority of radiology is performed in the National Health System, funded at public expense, while in Australia about 70% of radiologists work in the private practice sector (RANZCR 2004). Even in the public hospital system private practice radiologists are contracted to provide services in some cases (Collyer & White 2001). The Commonwealth health insurance legislation prohibits radiographers from charging directly for the provision of a radiographic service and reimbursement for a service generally requires that a radiologist's report is produced (Commonwealth of Australia, MBS 2002). Under the Medical Benefits Schedule in its current form, therefore, it is unlikely that radiographer reporting will develop to the same extent that it has in the United Kingdom in the last two decades (Smith 2002).

Nevertheless, anecdotal evidence suggests that the radiographic interpretation role is part of what radiographers do in clinical practice, not only in terms of image quality and positioning technique criteria, but also in terms of the identification of significant abnormalities (Smith 1995; AIR 2003). It can be argued that to a large extent it is an unacknowledged role, although not unappreciated in rural and remote areas in the absence of a radiologist. In some small rural hospitals, a radiologist's report may not be available to the referring doctor until several days after the radiographic examination has been performed (see Figure 1). In the meantime, the patient must be treated on the basis of the referring doctor's interim radiological interpretation, which is often performed in consultation with the radiographer. No research of this collaborative role of rural radiographers and general practitioners has been performed but it is probable, given the results of the studies of radiographer interpretation and reporting discussed above, that the combined accuracy of the radiographer and GP in the interpretation of accident and emergency radiographs would approach that of radiologists.

The interpretation and reporting of accident and emergency radiographs is not the only role development opportunity open to radiographers. Other extended roles, such as the reporting of ultrasound examinations and performing barium enemas (Price, Miller & Mellor 2002; McKenzie et al. 1998), performing angiography (Andrews et al. 2001), and health promotion and information giving (Hogg 1993; Caseldine 1994; Castle & Reeves 1998; Smith & Lewis 2002) have been reported elsewhere in the literature. However, the plain film reporting role is perhaps relevant in the context of this study for several reasons. Firstly, it has been a means by which radiographers have expanded the professional boundaries which they have traditionally shared and continue to share with radiologists. In this sense it is a demonstration of the changes that can take place in occupational jurisdiction in response to a perceived need, in spite of traditional boundary demarcation. In addition, the skills that radiographers possess in image interpretation have the potential to impact on their relationship with other neighbouring occupational groups, such as the referring doctors. Further, as was noted by Hegney (1997), role development in a profession has the potential to increase job satisfaction and thus improve recruitment and retention, which is of particular importance in rural and remote areas where reported rates of recruitment and retention are low (see Chapter 2, pp.12-16). Finally, the interpretation and reporting of abnormalities on radiographs extends the responsibility of radiographers to their clients (both patients and referring doctors), which is one of the factors influencing professionalism, as discussed in the next chapter.

## Radiography as a Profession (Blane's Conditions)

Akpan (1984) suggested that radiography is a developing profession, although there is substantial variation in the status of radiographers between developed and developing countries. However, the question of whether the occupation radiography could legitimately be called a profession was examined by Price and Paterson in 1996, specifically in relation to the United Kingdom. They concluded that radiography was in the best position it had ever been in to claim professional status, although they perceived a need for restructuring of the professional body to ensure that radiography could maintain its status and uphold its obligations to the public in the future. Carr and Fell (1997) drew similar conclusions, stating that although 'radiographers are more than

adequately prepared for a rapidly changing future', there is a need to 'adopt an appropriate vision, formulate an achievable strategy and promote a culture of professional practice' (Carr & Fell 1997).

Price and Paterson (1996) drew upon the work of Blane (1991, cited in Price and Paterson 1996, p.6) who distilled professionalism down to four characteristic conditions. Blane's first condition described professionals as existing in the highly skilled sector of the labour market, possessing a body of knowledge, to which they add by research, and undertaking their education under the control of the profession, usually in a university. Price and Paterson (1996) argued that radiography meets this first condition, although it has been acknowledged elsewhere that the development of radiography and its knowledge base have been strongly influenced by disciplines such as radiology, physics, sociology and nursing (Decker & Iphofen 2005). It was also recognised by Price and Paterson (1996), as well as by others, that the development of a unique body of knowledge about radiographic practice through conducting research is in the early stages (Akpan 1984; Challen, Kaminiski & Harris 1996; Nixon, 2001; Scutter 2002; Smith & Lewis 2002; Williams 2002; Lombardo 2005).

The second of Blane's conditions is that professions have a monopoly in their field that is sanctioned by the state. Although the use of irradiating apparatus is subject to state legislation in Australia, as it is in the United Kingdom (Price & Paterson 1996; Decker & Iphofen 2005), it does not necessarily give a monopoly to radiographers in performing diagnostic imaging examinations. Radiologists, some other medical specialists, chiropractors, and some physiotherapists, as well as rural and remote nurses and GPs, are also legally able to perform radiography on human subjects, often under the same legislation as radiographers (Government of New South Wales 1993). Price and Paterson (1996) warn that this 'impinges on the practice of radiography', preventing radiographers from having a monopoly in their perceived field of expertise.

Blane's third condition is that professionals have considerable autonomy, only another member of the same profession being competent to assess their work. Price and Paterson (1996) conceded that radiography falls short of condition three, largely because radiographers have always worked under the direction of radiologists and other medical staff, often following protocols that are dictated to them. The extent to which radiography

fits this condition is therefore questionable, although probably no more so than for a number of the other allied health professions. Further, it can be argued that, as discussed above, radiographic practice is changing, along with other aspects of the health care system and the roles of other providers. It has been suggested that the modern, restructured health service deliberately aims to moderate those values which professions traditionally held in high regard, such as power and autonomy (Kenny 2004), in favour of a system that standardises professional practice and opens it up to greater scrutiny in the interests of the consumers (Colyer 2004).

Finally, therefore, this brings into focus the fourth of Blane's conditions, that professions espouse a code ethics that in part regulates intra-professional relations and relations with their clients. Both the Australian Institute of Radiography and the College of Radiographers have a code of conduct (AIR 2005; College of Radiographers 2004) which are similar (Bowman et al. 2001). However, in a small scale study of the understanding of ethics and ethical behaviour by radiographers in New South Wales, Lewis (2002) found that a lack of professionalism contributed to the survey respondents insensitivity to ethical issues, including demonstration of a 'lack of respect' for the patients' conditions, cultural insensitivity and an overall 'poor "personal attitude" towards ethics'. It was concluded that this was in part the result of medical dominance and radiographers' subservience to radiologists (Lewis 2002). Others have also raised the question of radiographers' responsibility and accountability to their patients, particularly in relation to maintenance of competency and ensuring best practice through continuing professional education (Hall & Davis 1999; White & McKay 2004). Brady (1995) emphasised the importance of the concept of accountability in relation to extended radiographic practice, observing that, in the context of their respective definitions of professional practice, the perspective of the profession of radiography was potentially inadequate compared that of nursing.

## Chapter Summary

The occupation of radiography owes its origins and much of its development to the evolution of medical imaging equipment. Consequently, definitions of radiography place strong emphasis on the technographic aspects of radiographic practice as opposed to the

role that radiographers have in providing care for patients. This is potentially problematic in that it diminishes the extent of radiographers' power and prestige and contributes to the impression that it is a technological-based occupation that requires little in the way of 'indeterminate' knowledge and skills, as opposed to medicine which retains its mystique. The role of radiographers in the health care system has been overshadowed by the dominant societal role of doctors, radiologists in particular, and they are often portrayed as subservient to doctors. The lack of independent practice is the principal reason why radiography struggles for professional recognition. However, it is evident from much of the literature that radiographers perceive their role as having both technographic and humanitarian aspects. The Australian Institute of Radiography's competency based standards framework reflects both, and much of the recent discourse about radiographic practice emphasises the radiographer-patient relationship. There is also considerable evidence in the literature of changing models of radiographic practice, particularly in relation to the extended role of radiographic image interpretation and reporting.

# Chapter 4
# Relevant Theoretical Concepts

This chapter begins with a brief exploration of the classical definition of professionalism and the emergence of a new type of professionalism in health care, associated with which is the expectation of greater interprofessional collaboration. While health professions, new and old, apparently share some characteristics in common, it is also the case that there are definable differences between occupational groups or professions. These differences potentially result in differing perceptions of health care and the role that the various occupations fulfil. It is one of the objectives of this study to investigate similarities and differences in the way that each of the occupations involved constructs and gives meaning to the shared role of rural radiographic practice. Therefore, before going on to describe and discuss the perceptions of rural radiographers and nurse and GP remote x-ray operators, it is necessary to explore the theoretical concepts that underlie this objective. Relevant theories that have been used to describe social interactions, the construction of occupational jurisdiction and interprofessional boundaries are explained. In addition, more recent theories related to collaborative models of health care are examined, with examples of some of the mechanisms used by health professionals to maintain interprofessional boundaries. The chapter concludes with the description of a preliminary conceptual model of remote x-ray operator radiography, bringing to a conclusion the first section of this thesis.

## Professionalism in Health Care

Carr-Saunders and Wilson (1933, cited in Abbott 1988) refer to professions as having ownership of a body 'esoteric knowledge' unique to that particular occupational group. In analysing the boundaries of science, Gieryn (1995) also defined professions as occupations that are grounded upon a body of knowledge skilfully applied in altruistic service to the paramount problems of human existence - death, disease, injustice and sin. The practitioner becomes the trustee and defender of the clients' interests and welfare,

and through altruistic service earns recognition and respect from the wider community. Pellegrino (1983) similarly stated that true professions deal with people in vulnerable situations, when they lack the knowledge to make their own decisions or take independent actions. He suggests that law, medicine and theology are the only occupations that truly fit this definition.

In return for service to the population, professions are permitted to develop organisational features that help to maintain ownership of the knowledge and skills they possess and to enlarge their status, prestige, wealth, security and power (Larson, M. 1977). They use various mechanisms to guide and control individual practitioners. These include licensing and registration laws, national associations, professional schools, codes of legal, moral and ethical conduct, and specialised journals. Professions also set minimum standards of entry, possess academic property and form national and international organisations that exclude illegitimate practitioners and expel those whose conduct is unbecoming membership (Larson, M. 1977). Hence, professions are not wholly without self-interest, dominance and autonomy arguably being traditional hallmarks of true professions (Freidson 1977, cited in Abbott 1988).

**Emergence of a new professionalism**

In contemporary society many of the occupations that were once regarded as trades, arts, crafts or commerce have claimed the title of 'a profession' with the objective of gaining greater status, power, prestige and higher rates of financial remuneration for their work (MacDonald 1995, pp.29-30). These new professions are what Etzioni (1969) called the 'semi-professions' and include school teaching, librarianship and business management, as well as several health professions, such as pharmacy, social work, nursing and so on (Brown 1973). It can be argued that radiography is amongst this group of semi-professions (Nixon 2001).

For an occupation to portray itself as a profession a process of professionalisation must occur whereby an occupational group and its members are perceived to demonstrate the qualities that are characteristic of a profession or a professional person (Frank et al. 1996; Bossers et al. 1999; Swick 2000; Bruhn 2001). One example of a framework that defines these qualities was described in a report produced by the Royal Canadian College of

Physicians and Surgeons titled 'Skills for the New Millennium' (Frank et al. 1996). It identifies seven essential roles that a postgraduate medical practitioner should aspire to, linking each role to key competencies. These are listed in Table 5 and it can be seen that the roles and competencies, which embrace concepts such as communication and collaboration, resource management and continuing education, are not uniquely medical. With only slight modification they can be generalised to contemporary health professions, with comparable frameworks having been derived for other occupations (Behrend et al. 1986; Breines et al. 1988; Miller, Adams & Beck; 1993; Parkin 1995; Bossers et al. 1999). For example, comparison between the roles and competencies listed in Table 5 and the desired attributes of an accredited radiographer shown in Table 4 reveals strong similarities.

Professionalisation is considered a dynamic, evolutionary process, often involving competition and conflict over occupational jurisdiction (Abbott 1988). The process may come about through technological changes and the specialisation of tasks, for which the evolving profession claims expertise (Hofoss 1986), or else through subordination of mundane, routine work by an occupation that has more jurisdiction than it can provide for (Abbott 1988). Radiography, like other new health professions or semi-professions, seems to have evolved under a combination of these processes. Goode (in Etzioni 1969, p.270) suggests that in return for awarding this higher status to the semi-professions, society gains through higher levels of productivity and competency, stronger ethical values, better quality control and the development of improved techniques.

Increasing specialisation and the rise of 'expert professionalism' has paralleled a decline in the older sense of 'social-trustee professionalism' (Swick 2000). Health care has gradually shifted away from the traditional model, dependent on the services of the profoundly knowledgeable physician, towards dependence on a team of service providers with specific but often overlapping fields of clinical knowledge and skills (Engel 1994; Pack 1994; Chapman, Hugman & Williams 1995; Lambrew & Otto 1998; McCallin 2001; Colyer 2004). The new models of interprofessional practice, such as patient-focused care and multi-skilling, are aimed at controlling the spiralling cost of health care, making health professionals more accountable for their actions and providing greater patient satisfaction by sharing the care of the patient across a range of service providers (Colyer 2004; Kenny 2004). This suggests the need for a common commitment to caring

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for the patient, sharing of knowledge and responsibility across professional boundaries with greater interprofessional interaction, communication and collaboration than in the traditional practice model in which one discipline dominated over all others (Hilton, Morris & Wright 1995; McNair et al. 2001; McCallin 2001).

**Table 5:**  Essential roles and key competencies adapted from the Royal Canadian College of Physicians and Surgeons, CanMEDS 2000 Project (Frank et al. 1996).

| Essential Roles | Key Competencies |
|---|---|
| **(Medical)\* Expert** | ▪ Demonstrate necessary skills for ethical and effective patient care<br>▪ Access and apply relevant information to clinical practice<br>▪ Demonstrate effective consultation for patient care, education & legal opinion |
| **Communicator** | ▪ Establish relationship with patients/families<br>▪ Obtain & synthesise relevant history from patients/families/communities<br>▪ Listen effectively<br>▪ Discuss appropriate information with patients/families & health care team |
| **Collaborator** | ▪ Consult effectively with other health care professionals<br>▪ Contribute effectively to other interdisciplinary team activities |
| **Manager** | ▪ Utilise resources effectively to balance patient care, learning needs & outside activities<br>▪ Allocate finite health care resources wisely<br>▪ Work effectively & efficiently in a health care organisation<br>▪ Utilise information technology to optimise patient care, life-long learning & other activities |
| **Health Advocate** | ▪ Identify the important determinants that affect patients' health<br>▪ Contribute effectively to improved health of patients & communities<br>▪ Recognise & respond to those issues where advocacy is appropriate |
| **Scholar** | ▪ Develop, implement & monitor a personal continuing education strategy<br>▪ Critically appraise sources of medical information<br>▪ Facilitate learning of patients, students & other health professionals<br>▪ Contribute to development of new knowledge |
| **Professional** | ▪ Deliver highest quality care with integrity, honesty & compassion<br>▪ Exhibit appropriate personal & interpersonal behaviours<br>▪ Ethical practice consistent with obligations of the profession |

\* While the term medical appears in the original document it may be dispensed with in the broader context of health professional practice.

Although they aspire to have the same level of community recognition and social status, Goode (in Etzioni 1969, p.267) suggests that the semi-professions are identifiably different from the original humane professions in traits such as their cohesion,

commitment to service, the proportion of practitioners who make it a life-long career, and in their control over professional violations. They may be regarded as professions without a vocational component that requires a life-long commitment to the service of human-kind, as is traditionally the case for medicine (Verghese 2005). In the case of nursing, for example, clinical practice has been described as an integration of the art of caring with the application of scientific knowledge (Keyzer 1997; Yam 2004) with nurses providing a multi-skilled service that incorporates the roles of care-giver, patient advocate, educator, coordinator, manager, counsellor and ethicist (Yam 2004). However, it has also been argued that because it is a predominantly female occupation, with generally lower levels of education and training (Warelow 1995) and lower rates of pay, nurses do not easily fit the traditional, masculine-oriented definition of a true profession and have traditionally lacked autonomy and been subservient to medical practitioners (Parkin 1995; Warlowe 1996; Yam 2004). With changing models of practice, nursing has developed greater clinical autonomy based upon caring for patients, as opposed to the medical paradigm of providing treatment and cure (Pearson, Vaughan & Fitzgerald 1996).

The response of the medical fraternity to new interprofessional models of care has generally been to decry the loss of professionalism (Pellegrino 2002). Sullivan (2000), for example, stated that 'managed care' in the United States has transformed the traditional 'doctor-patient relationship' into 'questions of cost and benefit', under the guise of 'consumer sovereignty'. Swick (2000) called for the renewal of medical professionalism along traditional lines of 'commitment to service, advocacy and altruism' (Swick 2000). Bruhn (2001) claimed that 'being good and doing good' have suffered in the face of 'distrust, cynicism, and decreasing integrity and commitment' under the new regimes, while Edmund Pellegrino (2002) pleaded the case for the restoration of virtue-based ethics amongst physicians. Others have argued that if medicine is to maintain its occupational monopoly, with the accompanying prestige, autonomy and financial rewards, then its members must 'guarantee competence, provide altruistic service, and conduct their affairs with morality and integrity' (Cruess, Johnston & Cruess 2002). Beauchamp (2004) suggests that the 'renewed post-modern professionalism' demands greater accountability of the medical profession both in providing treatment and in the management of the health care system.

## Theories of Interprofessional Interaction

Andrew Abbott (1988) described the development of professions in terms of the contests between occupations for control over tasks and focused his attention on interprofessional competitions, when one occupation lays a claim of legitimacy over another in the provision of certain services. By its very nature, rural and remote health care places clinicians in an environment where there is a scarcity of specialist services, often in isolation from the main, metropolitan-based body of their profession (Welch, McKenna & Bock 1992; Bent 1999). It has been suggested that this necessitates greater professional autonomy and the performance of tasks that are beyond the health professionals' traditional practice roles (Welch, McKenna & Bock 1992; Hegney 1997; Alexander & Fraser 2001; Blue & Fitzgerald 2002; Bagg 2004; Kenny 2004; Mungall & Kenkre 2004). Hence, it may be argued that interprofessional competition over the control of tasks is characteristic of the rural health care system. Further, the shift towards interprofessional models of health care appears to have added impetus to the competitiveness between rural health professionals (Keyzer 1997).

While it is important to appreciate that this thesis does not aim to report the results of a sociological investigation, it does exemplify some concepts of sociological theory on a practical level. In order to interpret and ultimately understand the interactions that take place between rural radiographers and remote x-ray operators in the rural health care setting it is necessary to have an elementary knowledge of the theory of social interactions. Therefore, relevant aspects of Social Worlds Theory and Boundary Work are described briefly below. The former relates to how individual practitioners and professions as a whole perceive and construct their occupational jurisdiction, while the latter relates to how they establish and maintain interprofessional boundaries. It is apparent from the discussion below that these two theoretical concepts are related.

### Social Worlds Theory

Social Worlds Theory has its foundations in symbolic interactionism, which places emphasis on the meaning and interpretation that people give to their 'lived experiences' and thus how they 'construct and create their environment through a process of self-reflexive interaction' (Hardy & Conway 1988). It is based on the premise that people

create 'shared meanings' as a result of their interactions and that those meanings are integrated to become their reality, their social world. Blumer (1969, in Patton 2002, p.112) distilled symbolic interaction down to three major premises: that people act on the basis of the meaning that the things they encounter have for them; that the meaning is derived from the social interaction people have with others; and, that meanings are translated or modified through the interpretative processes of each individual. Thus, it follows that different people or groups may observe the same situation or experience from divergent perspectives and respond or react in different, perhaps conflicting ways (Polgar & Thomas 2000).

Based on this perspective, Strauss (1978) suggested that social worlds are not as tightly bounded nor clearly defined as might be expected and that they are dependent on a continuous and unlimited discourse, in addition to the more palpable aspects that are commonly recognised as defining the extent of social worlds such as memberships, activities, locality, technologies and organisations. Hence, there are four aspects of social worlds: 'mutual response' as a form of social interaction; an 'arena' in which a kind of organisation exists; a 'cultural area', which has boundaries; and, the limits of 'effective communication', which serve to set those boundaries (Shibutani 1955, in Strauss 1978). Theoretically social worlds are not static in either time or space and are constructed perhaps as much by mutual response and communication as by the arena and cultural area in which they exist. They are flexible and ever changing in response to the dynamic social forces acting on them both internally and externally and there is an endless array of social worlds in coexistence with one another (Strauss 1978). Thus, while the more palpable aspects may be common, individuals perceive and construct social worlds in response to their own knowledge, experiences, symbolism, emotions, attitudes and so forth.

The relevance of this theory to the case study reported in this thesis is that because of differences in their professional roles, their experiences and their interpretation of those experiences, radiographers and nurse and GP remote x-ray operators may give quite different meaning to 'rural radiographic practice', in the context of their social world. Bucher and Strauss (1960) further theorised that social worlds intersect and segment into social sub-worlds. Strauss (1978) suggested that where services are needed but are unavailable 'technology is borrowed and technical skills are taught and learned' at these intersections. This concept is relevant to the case study presented in this thesis as it

appears to involve the intersection of the social worlds of the rural general practitioner and the rural nurse with the social world of the rural radiographer. Strauss (1982) points out that it is a major analytical task to discover and examine such intersections and to investigate the 'associated processes, strategies and consequences'.

Within intersecting social worlds or sub-worlds Strauss observed that some may be, or may think themselves to be, more authentically belonging to that world than others, a judgement that relates to both the quality of the activity performed and whether or not the act is regarded as more or less essential (Strauss 1982). Strauss suggested that disputes often arise from this question of authenticity and decisions have to made, criteria established and mechanisms put in place to more clearly define the legitimacy of one claimant over another. These mechanisms, of which legislation and licensing are examples, are often enacted and overseen by organisations and commonly result in the allocation of power, resources and responsibility. Nevertheless, the territorial conflict and disputes related to authenticity do not necessarily dissipate as a result, because one or other of the opponents may perceive that they are somehow disadvantaged (Strauss 1982). So it is that intersecting social worlds often contain conflict, tension and dissatisfaction amongst the stake-holders and 'internal and external social movements' develop as a response. Clarke (1990) suggests that the 'truth' only lies at the intersection of multiple perspectives. Ideologies are created by the various participants within a social world about how their own activities or roles should be carried out and debates occur about how the activities of others may affect them (Clarke 1990). Personal interests and values are also at stake and key sociological and ideological differences may emerge in the exploration of a social world and related sub-worlds.

**Boundary Work**

Gieryn (1995) described Boundary Work as the processes by which people or groups compete for the 'credibility, prestige, power and material resources' offered by a particular societal role. This usually occurs through one group challenging 'the cognitive authority' of another and attempting to legitimate a role as rightfully theirs. According to Abbott (1988) there are three arenas in which boundaries are contested: the legal world of the legislature and courtrooms; the public world of popular knowledge and perceptions; and, in practice in the workplace. The boundaries between occupations are clearest in the

legal arena, where laws establish a defined structure of professional jurisdiction (Abbott 1988). Such is the case with remote x-ray operator licensing, where jurisdiction is defined in terms of stated licence conditions, as shown in Table 2 (p. 20). Boundaries are often least well defined in the workplace when legal jurisdiction is subjected to the pressures of providing 'heterogeneous services to heterogeneous clients' (Abbott 1988). In practice, decision making is rarely as straight forward as it may appear in the cloistered world of the legislature or courtroom. Practitioners must consider all the variables that may influence the outcome for a specific client on a specific occasion of service. Abbott (1988) suggested that these complexities can become the source of disputes between professions at the shifting boundaries of professional practice and can be used as justification for one profession infringing on the 'turf' of another. Gieryn (1995), however, commented that Abbott manages to avoid the implication that such boundary disputes may be the 'intrumentalist games of greedy professions wanting to extend control' or coopt the tasks of another.

Professions use identifiable mechanisms or strategies to establish and defend interprofessional boundaries. These include 'subordination', where the dominant profession in the field controls and delegates tasks to an alternative, subordinate occupation (Willis 1989; Gieryn 1995), and 'limitation', by which the dominant profession dictates the administrative, educational or other processes of a less powerful group (Willis 1989). Both of these mechanisms were described previously in relation to the historical dominance of radiologists over radiographers (pp.37-40). However, another of the strategies apparently used to justify a claim over performing a particular task is 'clientele differentiation', where professions competing for jurisdictional claims can perform the same task but for a different type of client or market (Abbott 1988; Gieryn 1995). In addition, Gieryn makes reference to 'boundary objects' as defined by Star and Greismer in 1989 (cited in Gieryn 1995). Ideas, things, people or processes can inhabit more than one social world and satisfy requirements within each thus linking the interests of separate groups across boundaries. While a boundary object may be a potential source of conflict, it may also form a bond between the occupants of separate social worlds.

In summary, therefore, it is apparent that, like social worlds, boundaries are neither stable nor permanent, although there may be elements that are both stable and permanent. The most important aspect of these theories, however, is that interaction, interpretation,

negotiation and renegotiation, competition and conflict as well as technological or systems changes cause boundaries to shift, thus expanding or contracting social worlds and creating the need for professions to interact.

## Theoretical Basis of Collaborative Teamwork

Colyer (2004) suggested that one of the consequences of the emergence of the semi-professions has been the development of the concept of interprofessional collaboration and a growing emphasis on interdisciplinary team work (Milne 1980; WHO 1988; Carpenter 1995; Zwarenstein et al. 2005). The impetus for greater collaboration in health care has come from social as well as economic and resource considerations (Colyer 2004). Much of this change originated in the United Kingdom where nurses, for example, have taken increased responsibility for patient care (Cartlidge, Bond & Gregson 1987; Coombs & Ersser 2004), the driving forces being the nursing profession itself combined with the need to reduce the workload of junior doctors (Colyer 2004; Coombs & Ersser 2004). The development of collaborative practice models has been viewed as a means of addressing a number of perceived problems in health service delivery: meeting consumer demands for better quality care at lower cost; addressing fragmentation and disorganisation associated with impersonalised and inaccessible care; satisfying credentialing bodies demands for greater multidisciplinary practice; and, decreasing inefficiency and service duplication, thus increasing cost-effectiveness and reducing instances of clinical error (Milne 1980; Norsen, Opalden & Quinn 1995). The overall aim of such initiatives is to pull the attention away from the maintenance of professional boundaries and refocus on the needs of the patient (Zarwenstein & Bryant 2000; Zwarenstein et al. 2005).

The role of 'collaborator' has been proposed as one of the essential characteristics of health professionals (Frank et al. 1996), as shown in Table 5. Lindeke and Block (1998) described collaboration as a partnership in which there is sharing of common goals, responsibility and authority, where partners recognise each others roles and defend each others interests. Norsen, Opalden & Quinn (1995) explained successful collaborative practice as having six key elements. The first of these is *cooperation*, referring to the

development of collegial relations based on equality, where shared decision making replaces hierarchical authority. The second is *assertiveness*, where team members can express their views with confidence but without the need for aggression, which may demean others and destroy the collaboration. Sharing of *responsibility* is the third element, where team members are accountable for their viewpoint and also support decisions made by consensus. The fourth key element is *communication*, requiring that members of the team are accessible for the exchange of ideas and discussion, while the fifth, *autonomy*, embodies the expectation that individuals are bestowed with the trust of other team members to act independently and competently. The sixth and final key element of collaboration according to Norsen, Opalden & Quinn (1995) is *coordination*, the requirement that individuals make efficient use of resources and organise the 'components of care' appropriately. Norsen, Opalden & Quinn also stated that these elements are bound together by *trust* between team members.

Interprofessional collaboration is a complex phenomenon (Fagin 1992; Henneman, Lee & Cohen 1995; Lindeke & Block 1998; McCallin 2001; Rushmer 2005) with several impediments to success, including status and prestige, knowledge, language, orientation and time perspectives (Manthorpe & Iliffe 2003). Hall (2005) makes reference to the fact that, in the struggle to define their identity, sphere of practice and role, professions develop differing cultures based on particular values, beliefs, attitudes and behaviours. Consequently, they develop a unique 'world-view' and intuitively construct barriers to exclude other professions, labelling them as 'frauds, amateurs or incompetents' (Hall 2005). McCallin (2001) states that professions have different primary values, citing the difference between physicians, who seem to value authoritarian team interactions, and nurses, who characteristically value collegiality with their physician colleagues, an observation supported by the earlier findings of Fagin (1992). Manthorpe and Iliffe (2003) noted the contrast between social workers and general practitioners, the social workers apparently being committed to collaborative teamwork and the doctors valuing 'individualised professionalism', the resulting tensions contributing to defensive behaviours according to the work of June Huntington (1981, cited in Manthorpe & Iliffe 2003). Abramson and Mizrahi (1996) also investigated the collaborative relationship between physicians and social workers, similarly finding that variations in personal and professional perspectives resulted in role competition, role confusion and turf issues. In another study in a special care nursery unit in Victoria, Wilson (2005) found that the team

members, including registered nurses, consultant physicians, registrars, junior doctors and social workers, displayed differing values and beliefs. Wilson noted that judgemental attitudes about roles were destructive and destabilising to the team, sometimes precipitating personal attacks on team members. Lindeke and Block (1998) also made reference to disparate underlying professional values and different practice regimes as contributing to failed collaboration and identified a number of constraints to successful collaboration, the primary one being poor communication.

The challenge, according to Manthorpe and Iliffe (2003), is to incorporate differing professional cultures within a single organisational structure, with increased interaction and communication enabling greater understanding of each others roles, scope and limitations and therefore greater trust between team members. Effective communication is commonly seen as a key component of supportive teamwork as it builds trust (Abramson & Mizrahi 1996; Jensen & Royeen 2002; Parsons, Cornett, & Burns 2005), with the nature and quality of communication also being an important consideration (Rosenstein 2002; Rushmer 2005). Poor communication contributes to 'tribalism' (Rushmer 2005) causing team members to retreat to the safety of their own professional world where role definition is clear and they can practice with autonomy and respect (Hall 2005). Poor quality, 'disruptive' physician to nurse communication has been shown to decrease job satisfaction and staff retention rates amongst nurses (Rosenstein 2002). Hall (2005) noted that, while interprofessional collaboration is seen as increasingly important, communication skills are generally taught in professional groupings with the emphasis placed on patient interactional skills as opposed to interprofessional interaction.

One important aspect of interprofessional communication, particularly in relation to extended practice, is the capacity to negotiate role boundaries (Norsen, Opalden & Quinn 1995; McCallin 2001; Blue & Fitzgerald 2002; Fairman 2004; Rushmer 2005). Norsen, Opalden & Quinn (1995) suggested that, while the team mission may reflect a common commitment to the patient, there may be disagreement between team members about how that goal is best achieved. Hence, there is a need to define the scope of practice through negotiation and the development of succinct standards, guidelines and protocols, thus establishing the 'boundaries of authority' (Norsen, Opalden & Quinn 1995). Such negotiations, however, may be obstructed or limited by societal issues of power, status, authority, education and socialisation (Lindeke & Block 1998), as well as by structural

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impediments such as different lines of management (McCallin 2001) and a lack of shared space and time (Lindeke & Block 1998). Fairman (2004) suggested that such negotiations between doctors and nurses have been tainted with the use of language suggestive of 'victims and victimisation' but that in spite of this 'schismatic dichotomy' there is evidence of an increasing capacity for negotiating the 'borderlands' and for the sharing of skills, knowledge and authority (Fairman 2004).

In their study of practice nurses in rural South Australia, Willis, Condon and Litz (2000) reported that remodelling of professional boundaries was based on traditional relationships and that the practice nurses generally lacked autonomy and were subservient to the general practitioners. Although shared care apparently did not exist, the nurses were content with their position and played the 'doctor-nurse game' (Willis, Condon and Litz 2000), as described elsewhere (Stein 1967; Warelow 1995). Blue and Fitzgerald (2002) found that, although medical dominance was still an issue in their collaboration with rural general practitioners, rural nurses exercised greater professional autonomy than ever before and appeared increasingly able to communicate their clinical knowledge and experience, and doctors were increasingly inclined to listen. The importance of the nurses gaining the trust of the doctors for their experience and ability was also noted. The collaboration involved the nurses undertaking an extended clinical assessment role, sanctioned and supported by the doctors who developed trust in the expertise of individual nurses, while the nurses apparently protected the doctors from excessive workload (Blue and Fitzgerald 2002).

## Mechanisms of Boundary Maintenance in Health Care

There are several studies of interprofessional collaboration reported in the literature that examine teamwork between doctors and nurses (Griffiths & Luker 1994; Willis, Condon & Litz 1999; McCallin 2001; Blue and Fitzgerald 2002; Parsons, Cornett & Burns 2005). No such studies have previously been reported related to collaborative clinical practice between radiographers and other health professionals. Therefore, for the purpose of illustrating how health professionals in general use various mechanisms to differentiate themselves from a perceived rival professional group, the following three examples,

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which involve health professions other than radiography, have been selected from the literature.

**Ownership and trade**

A Canadian study of an intensive care unit team found that 'the team', which consisted of medical specialists, nurses, technical staff and resident medical officers, was not a 'unified entity' but a collection of 'individuals with distinct professional identities … based in distinct models of care, different skill sets, diverse economic circumstances and competitive political agendas' (Lingard et al. 2004). The investigators identified two dominant mechanisms that were used by participants to distinguish their role from the role of other team members. The first was ownership of 'valued constructs or commodities', which were identified as expert knowledge and clinical territory, technical skills, equipment, physical space, and even the patients and their families. The recognition of ownership sometimes facilitated smooth operation of the team but at other times it was a source of conflict, for example, when resident medical officers sought information from the nurses and then later portrayed it as their own knowledge during morning rounds (Lingard et al. 2004).

The second mechanism identified by Lingard et al. (2004) was the 'process of trade'. It was found that team members often negotiated over the use of equipment and resources, as well as over 'abstract, social commodities, including respect, goodwill and knowledge' (Lingard et al. 2004). For example, for the nurses failure by a team member to treat them with respect resulted in a refusal to share knowledge. In their discussion, the authors reflected on the 'theory of social structuration', which similarly to social worlds theory, recognises that professional groups construct their own social system based on their position relative to other professions and their access to certain tradable commodities. The authors concluded that in the multi-professional team environment maintaining the delicate balance between the tensions that exist is integral to the success of the team.

**Atrocity stories**

Certain rhetorical mechanisms are also often used to delineate professional boundaries. In this next study the use of 'atrocity stories' was examined as a means of defining boundaries within a multi-professional team working in a general hospital in Wales

(Allen 2001). At the time, in line with government policy, team members' roles were being expanded so that the registered nurses were taking on tasks usually performed by junior doctors. At the same time, lesser trained health care assistants were introduced into the team to perform certain technical roles usually performed by the nurses. A series of interviews, complemented by observations, were carried out to assess the resultant blurring of professional boundaries that was taking place on the wards.

Stories, the telling of atrocity stories in particular, reportedly both 'hold people together and pull them apart' and thus make up an important part of the fabric of society that emerges through interaction (Plummer 1995, cited in Allen 2001). Allen (2001) calls attention to the use of rhetorical mechanisms used by the story-tellers to align the story-recipient with a particular, preferred perspective. In Allen's study, the nurses' stories often served to juxtapose a medical and nursing perspective, portraying the doctor as having a 'narrow biological focus' in contrast to the nursing perspective, which was represented as much more caring for the overall well-being of the patient and their family. The nurses generally portrayed themselves as having better communication skills and better knowledge about the patient through daily contact. In conclusion, Allen states that the nurses' atrocity stories served the dual role of reinforcing the difference between nursing and other occupations and uniting the nurses as a group. The junior doctors' stories, on the other hand, often portrayed the nurses as inappropriately challenging 'medical decision making in relation to patient treatment' (Allen 2001), in effect overstepping the boundary.

**Us and them**

In another study of the various health professionals involved in the treatment of musculo-skeletal disorders, story-telling was again used as a mechanism to differentiate one occupational group from another through stereotyping (Norris 2001). Participants told stories about themselves and others from an 'us and them perspective'. This New Zealand study was aimed at investigating micro-level, rhetorical strategies used by practitioners to maintain professional boundaries. The group studied included medical specialists, general practitioners, physiotherapists, chiropractors, osteopaths, and a number of providers of complementary and adjunctive medicine (CAM) techniques. It was found that in many cases the more mainstream providers were critical of the CAM providers. In some cases

they told stories of having to fix problems caused by members of another occupation where a patient had found that the previous treatment had failed (Norris 2001).

Norris (2001) found that the occupations used mechanisms she described as 'limitation', 'holism' and 'prevention' to justify their own treatments and criticise the treatments used by others. Limitation was where study participants referred to a particular knowledge, skill, quality or ability that another group lacked in comparison to their own. The concept of holism was where one practitioner described themselves as being in possession of a more rounded understanding of the patient's problem and were thus in a better position to treat the whole person. The concept of prevention was described by some practitioners as the ability to counsel the patient on how to avoid recurrence of the same problem and discourage treatment-dependency. Opposing providers reportedly did not criticise each other on the basis of a lack of scientific evidence for their techniques. Norris suggested that this was either because they shared some techniques in common or because of a lack of reliable, positive evidence for the efficacy of the techniques they used.

The above examples illustrate some of the mechanisms used to delineate interprofessional boundaries. It is apparent that, in spite of the efforts of professional groups and individuals to differentiate their role from that of others, the overlap of the occupational worlds of members of the multi-professional health care team is a significant issue.

## A Preliminary Conceptual Model

Prior to moving on to explain the methodology and results of this study a preliminary conceptual model has been proposed, as shown in Figure 2 below. It appears reasonable to describe remote x-ray operator radiography as taking place at the intersection of the occupational worlds of rural radiographers, general practitioners and nurses. This is represented using 'connate theory', creating a visual metaphor to make relationships between people and groups transparent and open to analysis (Rushmer 2005).

The members of the three professions function within different occupational worlds defined according to their roles in the health care system and the competencies that they

demonstrate in carrying out those roles. This is represented in Figure 2 by three
overlapping triangles labelled RR (rural radiographers), GP (general practitioners) and
RN (registered nurses). As well as profession specific characteristics, roles and
responsibilities, health professionals have some common characteristics and also share
some roles and responsibilities. The profession specific aspects are represented in the
diagram by the non-overlapping portions of each of the triangles. These areas may extend
beyond the borders of the diagram (as suggested by the dashed lines and arrows) and
include only those roles, responsibilities and characteristics that are *not shared* with other
professions. Rushmer (2005) suggested that each occupational group is respectful of and
does not attempt to invade or control these areas of unique expertise. These profession
specific jurisdictions may segment into various sub-worlds or intersect with the
jurisdictions of other professional groups, as suggested by Bucher and Strauss (1960).
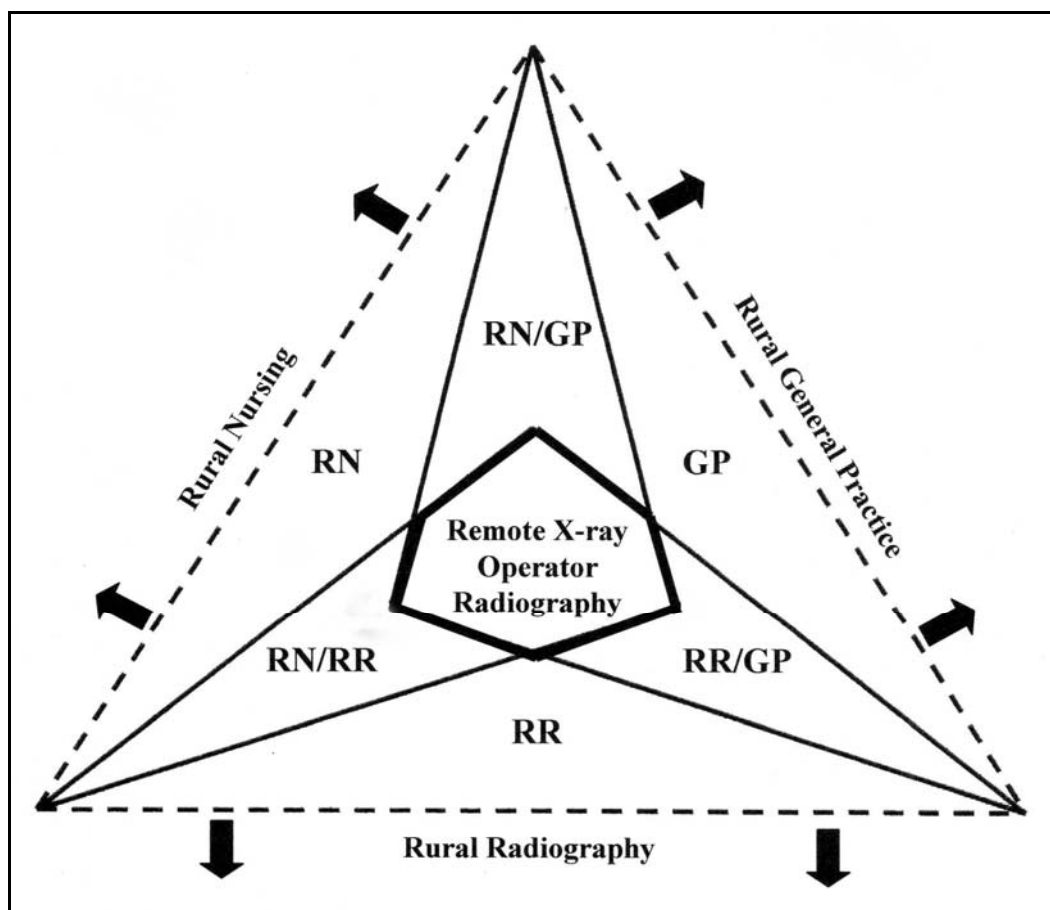


**Figure 2:** Preliminary conceptual model - Remote x-ray operator (RXO) radiography
exists at the intersection of the occupational worlds of the rural radiographer
(RR), the registered nurse (RN) and the general practitioner (GP).

Each of the three triangles overlaps with the other two, giving rise to regions that are labelled RN/RR, RR/GP and RN/GP. These areas of the diagram represent those practice roles, responsibilities and characteristics that are shared between health professions. Although practice roles may overlap the practice boundaries still exist, representing that discussion, negotiation and agreement takes place about shared roles and responsibilities (Rushmer 2005). The RN/RR portion of the diagram represents those roles which are shared between rural radiographers and nurses, such as information giving and overall patient care. The portion where the roles and responsibilities of the GP and the radiographer overlap (RR/GP) may include image interpretation, for example, and the overlapping roles of the nurses and GPs (RN/GP) may encompass the treatment of some minor conditions. These areas of the diagram are not the principal areas of interest in this study, although they may be of some significance as they too may be contested or referred to by some informants.

The section of the preliminary conceptual model that is the subject of this thesis is the irregular hexagonal-shaped region bounded by heavy lines at the centre of the diagram where the three triangles, representing the three occupational worlds, all overlap with one another. It is in this region that GP and nurse remote x-ray operators share the common task with rural radiographers of performing some types of plain radiographic examination. While they all share a common interest in this region of the diagram, the remote operators do not occupy the region on a permanent basis, unlike the radiographers for whom it represents part of their core role and responsibilities.

The nature of the interests and responsibilities shared by the three professional groups, the extent to which they overlap, and the mechanisms each uses to define the boundaries are unexplained at this stage. Given the dynamic and potentially unstable forces that operate on either side of the perceived boundaries, and accepting that the theories discussed earlier in this chapter suggest the individualisation of reality, it is argued that only those who are actively engaged in rural radiographic practice can accurately describe its dimensions. With this in mind, the next section of this thesis contains the description of the study that has been performed.

# SECTION TWO – METHODOLOGY AND RESULTS

## Chapter 5

## Background to and Application of the Chosen Methodology

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What follows in this chapter is a description of the qualitative research process used in this study, including sample selection, data collection and data analysis, together with theoretical justification for the choice of the components of the methodology. According to Miles and Huberman (1994, p.6), data collection in qualitative research is carried out through intense and often prolonged contact with the participants with the intention of capturing a holistic view from the perspective of those under study. Interpretation of the data is also intense with the most compelling of the various alternative interpretations being supported on both theoretical grounds as well as internal consistency within the data (Miles & Huberman 1994). It is recommended, therefore, that because of this reliance on detail and the need to ensure a high standard of theoretical rigour it is important that qualitative research reports provide a comprehensive and detailed explanation of the research methodology used (Rice & Ezzy 2000).

### Rationale for the Choice of Methodology

One of the characteristics that distinguish qualitative research from quantitative research is depth as opposed to breadth of investigation (Patton 2003). Quantitative studies generally use tools and methods that make it possible to collect specific, measurable responses or outcomes from a large number of study subjects with the intention of performing statistical analysis to make generalisations. These quantitative methodologies belong to the 'empirico-analytical' paradigm that is the foundation of medical research (Higgs 1997, p.6) and commonly forms the basis of health professional research (Burns 1994, p.3; McMurray 1994). They are said to predominate in the observation of the physical world and are rooted in the 'positivist belief' that there are 'simple universal truths which can be discovered with objective methods' (Herbert & Higgs 2004).

Qualitative studies, on the other hand, aim to produce detailed data about relative few study subjects or cases with the aim of attaining a deep understanding of particular phenomena. Qualitative methods provide a means of gaining an understanding of the way that individuals experience their social worlds and give an insight into their knowledge, their opinions and values, and their attitudes and feelings (Burns 1994; Patton 2003; Herbert and Higgs 2004).

While it could be argued that any research has the potential to manipulate reality, the value of qualitative studies is that they aim to elicit findings that reflect the nature of the actions and experiences of the research subjects (Rice & Ezzy 2000, p.1), without any attempt to manipulate, modify or control the phenomenon being studied (Patton 2002), as is commonly the case in quantitative methodologies. The researcher sets out to document and ultimately to interpret and understand the reality of the study subjects in relation to the particular phenomenon being investigated (Greenhalgh 1997; Polgar & Thomas 2000; Patton 2002; Meadows 2003). In doing so the researcher must accept the complexity of reality, be open to whatever emerges and, unlike quantitative research, must facilitate but not control the course of the investigation.

Medical radiation research has traditionally been dominated by the positivist paradigm (Hammick 1995; Challen, Kamiski & Harris 1996), because of the attention given to clinical research by radiologists and to technological investigations performed mostly by medical physicists. Some medical radiation research questions, such as how much radiation dose is delivered to patients in an examination type, or how accurate a new technique is in diagnosing a particular condition, lend themselves to quantitative methods. However, in contemplating the research question to be investigated in this study it was necessary to find a method of investigation that allowed a degree of openness and flexibility not generally found in quantitative methodologies. It has been argued that qualitative methodology lends itself well to the potential areas of research that radiographers could and should explore (Hammick 1995; Adams & Smith 2003; Ng & White 2005). Some radiographers have previously used qualitative methods to examine aspects of radiographic practice, demonstrating its successful application in diagnostic radiography (Culmer 1997; Coombs et al. 2003; Lewis 2004; Davies & Reeves 2005).

The method of data collection used in this study was semi-structured, in-depth interviews. Taylor & Bogdan (1984, cited in Minichello et al. 1995, p.68) described in-depth interviews as 'face-to-face encounters between the researcher and informants' where the purpose is to understand the informants' perspectives on their lives, experiences or situations as expressed in their own words'. It is intended that the researcher and informant meet on equal terms to explore the informant's construction of their own reality expressed in the language and the format that they are familiar with (Minichello et al. 1995, p.68). In-depth interviews value the informant's role in the research process, rather than merely as a source of data and also offer potential to be flexible and responsive to the changing conditions encountered 'in the field' when moving from one site to another with a range of informants (Meadows 2003).

## Concept Sensitisation

While ideally qualitative researchers should enter the field to collect data with an open mind, in reality this is rarely feasible because of the need to collect detailed data in a limited time frame (McCallin 2003; Patton 2003). Further, the interviewer must be prepared to ask meaningful questions and try to appreciate interactions from the perspective of the informant, but at the same time be willing to put aside or critically examine any preconceived notions or biases (McCallin 2003). Therefore, it is recommended that the researcher is guided by a set of 'sensitising concepts', defined as ideas that might potentially be fruitful to investigate and which define an 'emerging meaningful language' (Blumer 1969, cited in Clarke 1990).

As declared in the preface to this thesis, the researcher in this study was aware of many of the sensitising concepts, as they had arisen over years of interaction with potential informants in the field and indirect involvement through working with professional bodies and government agencies on matters related to remote x-ray operator radiography. This, however, raises the challenge of doing 'insider research' (Smyth & Holian 1999) and the influence that professional roles may have on qualitative investigations (Richards & Emslie 2000). In discussing research carried out within organisations, Smyth and Holian (1999) suggested that insider researchers face issues of credibility and need to be cautious

of bias and subjectivity, as well as ethical issues such as anonymity and coercion. They go on to argue that, provided appropriate measures are taken to safe-guard against such influences, research of this sort has the potential to deliver enormous benefits in terms of insight and knowledge and subsequently in learning and process improvement. In reporting the differences between qualitative interview data collected by GPs and sociologists, Richards and Emslie (2000) suggested that professional background, as well as gender, age, ethnicity and social class, influences informants' responses. They recommend that researchers reflect on their own 'professional background and personal characteristics' in both collecting and analysing the data (Richards & Emslie 2000).

The relevant discourse about remote x-ray operators and the role they play in the rural radiographic workforce is confined to a few New South Wales Government internal documents, correspondence made available by a retired radiographer, some informal publications of the Australian Institute of Radiography, and a handful of relevant journal articles. The literature search was thus broadened to include the growth and development of professionalism, the role of various health professionals in providing rural health care, role extension in the health professions generally, and interprofessional boundaries in clinical practice. At the outset of the project, several lists were made of sensitising concepts that would be likely to be relevant to the topic under investigation. An example of some of the concepts, divided into three broad categories, is shown in Table 6 below. These were used as the principal keywords in searches of databases (Medline, Embase & Cinahl) and the world-wide web and later in developing the initial interview theme list.

**Table 6:** List of some sensitising concepts identified before entering the field.

| Theoretical Concepts | Structural Concepts | Personal Concepts |
|---|---|---|
| Professional roles | Rurality & remoteness | Tension & conflict |
| Professionalism | Rural health care | Competency |
| Interprofessional boundaries | Service delivery & access | Supervision |
| Interprofessional practice | Workforce | Competitiveness |
| Role development / extension | Training & continuing education | Communication & support |
| Hierarchy of professions | Clinical pathways | Professional isolation |
| Power relationships | Teamwork | Collaboration |

## Ethics Approval

The research protocol used in this study was approved in June 2002 for a period of three years by both the University of Newcastle Human Research Ethics Committee (Approval No. H-365-0602) and the Hunter Area Research Ethics Committee (Approval No. 02/05/08/3.22). An extension of the approval was granted until May 2006 to ensure full coverage of the data analysis period. A summary of the ethical considerations, according to the original ethics application is given in Appendix A, together with details of the content of the Information Sheet and Consent Form. Where relevant, further information as to how these ethical requirements were met is contained in the following description of the methodology.

## Recruiting a Sample of Informants

Several authors have described techniques of developing and evaluating rigorous qualitative research (Mays & Pope 2000; Rize & Ezzy 2000; Barbour 2001; Horsburgh 2003) and many of these techniques are influenced by the sampling process. Rice & Ezzy (2000, pp.41-48) explained that sampling in qualitative studies is different from that used in quantitative research in that randomisation and representativeness are not important considerations. Rather, the aim is to recruit a sample of study participants with the intention of ensuring that as many variables or concepts as possible are accounted for (Mays & Pope 2000; Rice & Ezzy 2000, pp.47-48), thus optimising theoretical rigour. It is most desirable to sample purposively, which Rice and Ezzy (2000, p.43) describe as sampling with the intention of selecting 'information-rich cases for in-depth study to examine meanings, interpretations, processes and theory'. It is least desirable, although constraints may exist, to sample purely on the basis of convenience. If convenience sampling is used as the sole sampling technique it has the potential to produce a systematic bias (Rice & Ezzy 2000, p.46), although it may be used effectively in conjunction with purposive sampling. In this study the combination of sampling techniques used included volunteer sampling, where the participants were recruited from a larger group who volunteered to participate, purposive sampling (stratified by health profession), and finally, convenience sampling.

Again, unlike quantitative research it is not possible in qualitative studies to predict the sample size based on particular characteristics of the population being studied. Rather, the qualitative research sample should be unrestricted in the early stages of the study, as qualitative methodology demands that the researcher continues to sample until 'the point of redundancy' or 'theoretical saturation' is reached (Rice & Ezzy 2000, p.47). At that point it is apparent that the properties of each category are fully developed and no additional evidence is likely to be forthcoming from further data collection and analysis.

In investigating the role of remote x-ray operators, data were collected from three potentially different perspectives of the frontline health professionals involved in rural and remote radiography in New South Wales – rural radiographers, nurse remote x-ray operators and GP remote x-ray operators. This 'data source triangulation' is another sampling method used to increase study validity (Rice & Ezzy 2000, p.38; Barbour 2001). It involves making observations and comparing results from a number of different sources and is seen as a way of ensuring that the study is more comprehensive than if only one data source was used. Sampling from essentially three different professional groups potentially gives a better understanding of remote x-ray operator radiography than might be possible if, for example, only the opinions of rural radiographers were sampled.

Figure 3 below shows all of the potential participant groups that could have been included in this study, with the sampled groups highlighted by bolding. Identifying other potential participant groups gives a broader appreciation of the reference frame of the sampled population (Rice & Ezzy 2000, p.43). They include metropolitan radiographers, rural health service administrators, nurses and GPs who do not hold a remote x-ray operators licence, and the patient consumers of rural radiographic services. While they may have an opinion about remote x-ray operator radiography they are not involved in the frontline delivery of rural and remote radiographic services.

The New South Wales Environment Protection Authority holds a database of all those licensed to operate irradiating apparatus in the State. With approval of the Ethics Committee and the cooperation of the Radiation Control Section of the Environment Protection Authority, access was obtained to a de-identified version of the database. The Environment Protection Authority edited the database to include only the name of the town and postcode of all Type I.14 (diagnostic radiographer) and Type I.14R (remote x-

ray operator) licence holders outside the Sydney, Newcastle, Wollongong and Central Coast metropolitan areas. A list of postcodes was also obtained from the Australia Post website and the database was checked to ensure there were no unnecessary inclusions.
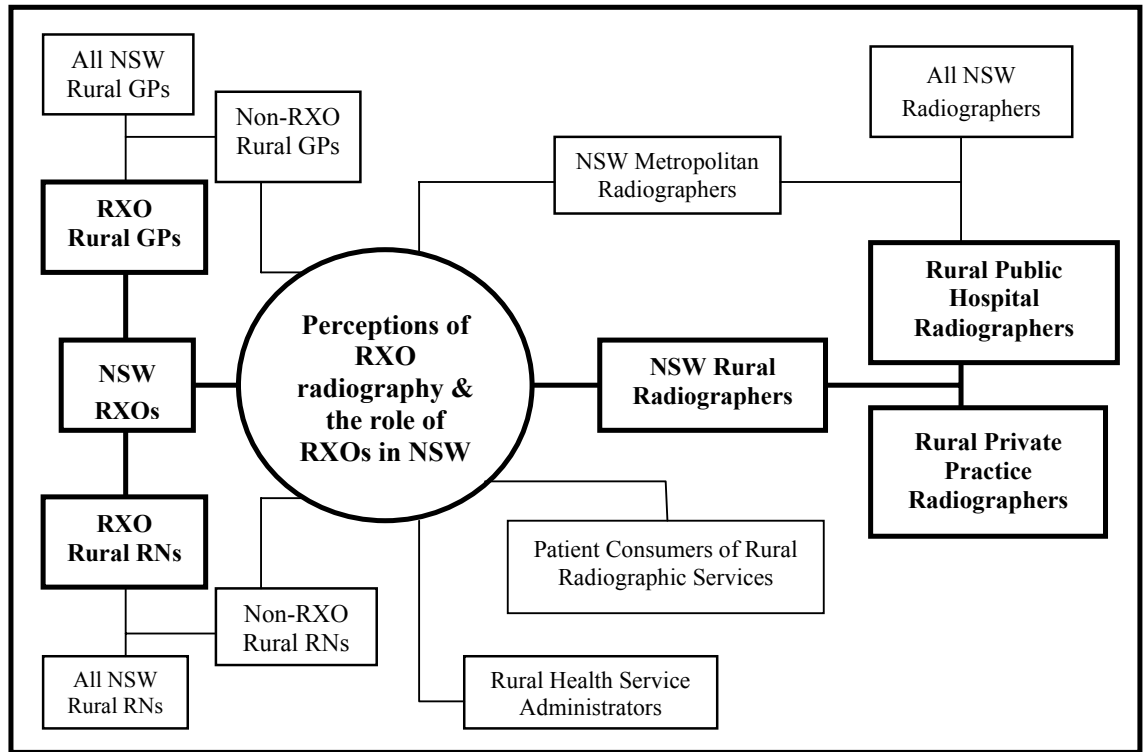


**Figure 3:** Diagram showing the reference frame for the sampled population in this project. The bolded groups were targeted for sampling.

The sampling frame or total number of licence holders identified in this way (Burns 1994, p.69) was one thousand and twenty-four (1024), including eight hundred and forty-two (842) rural radiographers and one hundred and eighty-two (182) remote x-ray operators (see Figure 4). It is not known how many of the one hundred and eighty-two remote operators were general practitioners and how many were registered nurses as this information was not provided by the Environment Protection Authority for reasons of confidentiality. However, from past experience (Smith 1997; Smith & Winslow 1998) it is suggested that between twenty and twenty-five percent of New South Wales remote x-ray operators are general practitioners and the remainder nurses, with the exception of one physiotherapist.

The Information Sheet and a letter of invitation to participate in the research project were sent to all one thousand and twenty-four licence holders. In order to meet with the requirement of anonymity imposed by the Ethics Committees and the Environment Protection Authority, the envelopes were filled and then couriered to the Authority's office in Sydney from where they were posted after an address label was applied to the front of each envelope. Eighteen envelopes were returned unopened marked 'return to sender' (six addressed to radiographers and twelve to remote operators). In addition to the Information Sheet and letter of invitation, each envelope contained a Consent Form and a Contact Details Form. If the licensee wished to volunteer to participate in the study they had to sign the Consent Form and complete the Contact Details Form with their name, postal address, telephone number, fax number and their e-mail address (if they had one). They were also asked to indicate approximately how long they had held their x-ray licence, how long they had worked in a rural area, and the name of the town where they performed radiography most often. Both forms were returned to the University in a reply-paid envelope.

A breakdown of the potential respondents from the sampling frame to the final sample is shown in the flow chart in Figure 4. Of the one thousand and six licensees who presumably received an invitation only one hundred and thirty-three (thirteen percent) replied. Of these forty-four were remote x-ray operators, twenty-six percent of the potential remote x-ray operator respondents, and eighty-nine were radiographers, only eleven percent of the potential radiographer respondents. These response rates were remarkably low and the reason for this is unknown. Non-respondents were not pursued as the aim was simply to get enough positive responses to constitute a reasonable size pool of volunteers, covering a reasonably wide geographical area of rural and remote New South Wales, from which to draw a stratified, purposive sample.

The details of all respondents were entered into a Microsoft Excel® spreadsheet and a process of culling the volunteer sample down to a pool of potential informants was undertaken. This was done using the exclusion criteria that the volunteer did not perform radiography in a truly rural location (generally having an ARIA+ value placing them in the 'Major Cities' category) or they had only limited experience in either radiography or in rural health care. A radiographer-academic colleague was also asked to cull the volunteer sample using the same exclusion criteria. A comparison was made of the

outcomes and agreement reached about which of the volunteers would be culled to create a list of potential informants.
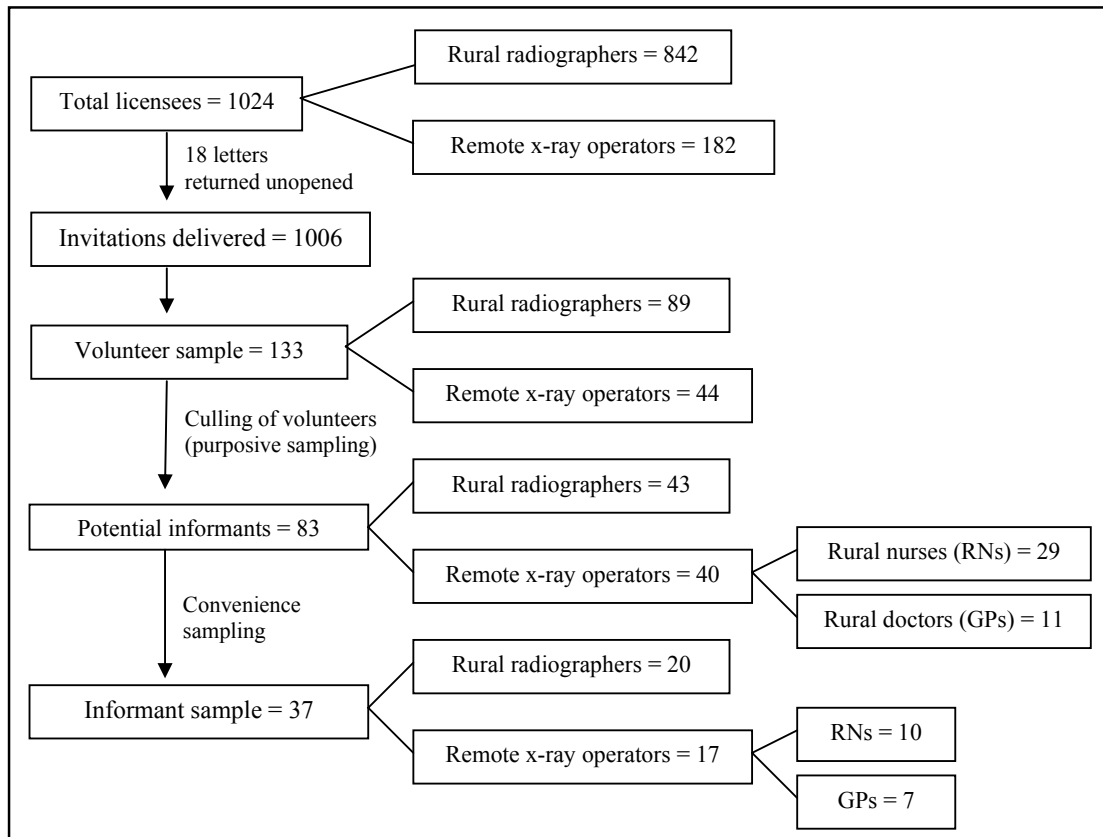


**Figure 4:** Flow chart showing the sample selection process from the sampling frame.

Therefore, the volunteer sample was purposively sampled on the basis of radiographic experience, or the length of time they had held a radiation licence, and the length of time they had worked in rural clinical practice at the time they accepted the invitation to participate in the study. The aim was to choose informants with a range of experience who could perhaps give a variety of different perspectives, thus enriching the data and minimising the risk of a selection bias (Polgar & Thomas 2000, p.38). Those who had volunteered to participate but who had subsequently been culled were sent a letter of thanks, informing them that they would not be required for an interview. Those who were included in the sample of potential informants were sent a letter telling them that they may be contacted to organise a mutually convenient time and place for an interview, but that if they heard nothing within twelve months they would not be contacted again about this study.

The pool of potential informants had been reduced to forty-three rural radiographers and forty remote x-ray operators, the latter including twenty-nine rural nurses and eleven rural doctors, as shown in Figure 4. Although at that stage it was considered most unlikely that it would be necessary to interview all of the radiographers and nurses to reach theoretical saturation, it was assumed that all eleven doctors would probably be interviewed given the relatively small pool of potential GP informants. From the pool of potential informants the sample of actual informants was drawn by convenience sampling, as follows. Because the geographical area to be travelled was very large, the final sample was selected on the basis of availability of potential informants at a time when interviews were being carried out in their region. The final sample of informants, at which point it was decided that theoretical saturation had been reached, was twenty rural radiographers (RRs), ten registered nurse remote x-ray operators (RNs) and seven general practitioner remote x-ray operators (GPs). Many issues were common across the informant groups, although the GP informants expressed a narrower range of issues.

Appendix B shows a comparison between the potential pool of informants and the actual sample of informants in terms of rurality and remoteness, number of years licensed and the number of years in rural practice. These three variables are also tabulated for each of the informants in Table 7. The degree of rurality and remoteness shown in the table is based on the ARIA+ score and structural category. The maximum and minimum values for each category are also given in Appendix B.

Examination of the ARIA+ categories in Table 7 shows that the majority of the rural radiographer informants worked in population centres categorised as 'Highly Accessible' (HA) or 'Accessible' (A), while only two of them worked in 'Very Remote' (VR) locations and the remainder in 'Moderately Accessible (MA) centres. More of the remote x-ray operators, on the other hand, worked in centres categorised as 'Remote' (R) or 'Very Remote', with only one of them working in a 'Highly Accessible' locations. It is apparent, therefore, that the remote x-ray operator informants were generally working in more remote population centres than the radiographer informants at the time of the interview. This is verified by the fact that the average ARIA+ score for the remote operators listed in Table 7 is 5.12 compared to 2.97 for the radiographers. However, the GP remote operator informants were generally located in less remote centres than the nurse remote operators, their mean ARIA+ scores being 3.08 and 6.55 respectively.

**Table 7:** List of the sample of informants with descriptors for each.

| ID Code | ARIA+ Classification | | Years Licensed | Years Rural |
| | Score | Category | | |
|---|---|---|---|---|
| **Rural Radiographers** | | | | |
| RR.1 | 3.75 | MA | 35 | 25 |
| RR.2 | 2.22 | A | 20 | 20 |
| RR.3 | 2.06 | A | 19 | 16 |
| RR.4 | 0.78 | HA | 26 | 20 |
| RR.5 | 0.66 | HA | 16 | 16 |
| RR.6 | 1.62 | HA | 30 | 4 |
| RR.7 | 3.65 | MA | 10 | 8 |
| RR.8 | 9.32 | VR | 13 | 11 |
| RR.9 | 0.55 | HA | 25 | 25 |
| RR.10 | 10.44 | VR | 25 | 15 |
| RR.11 | 0.72 | HA | 25 | 20 |
| RR.12 | 4.88 | MA | 34 | 15 |
| RR.13 | 2.56 | A | 18 | 18 |
| RR.14 | 4.57 | MA | 11 | 4 |
| RR.15 | 2.25 | A | 6 | 2 |
| RR.16 | 3.27 | A | 26 | 22 |
| RR.17 | 1.33 | HA | 30 | 28 |
| RR.18 | 1.20 | HA | 22 | 22 |
| RR.19 | 2.25 | A | 18 | 14 |
| RR.20 | 1.33 | HA | 10 | 6 |
| **Nurse Remote X-ray Operators** | | | | |
| RN.1 | 4.65 | MA | 8 | 15 |
| RN.2 | 3.93 | MA | 8 | 14 |
| RN.3 | 5.49 | MA | 8 | 10 |
| RN.4 | 5.93 | R | 4 | 10 |
| RN.5 | 6.4 | R | 3 | 12 |
| RN.6 | 7.28 | R | 1 | 26 |
| RN.7 | 10.44 | VR | 2 | 12 |
| RN.8 | 4.88 | MA | 16 | 16 |
| RN.9 | 6.07 | R | 8 | 16 |
| RN.10 | 10.44 | VR | 6 | 25 |
| **GP Remote X-ray Operators** | | | | |
| GP.1 | 4.30 | MA | 1 | 2 |
| GP.2 | 2.76 | A | 7 | 10 |
| GP.3 | 5.93 | R | 2.5 | 4 |
| GP.4 | 1.31 | HA | 5 | 6 |
| GP.5 | 3.06 | A | 4 | 4 |
| GP.6 | 1.93 | A | 31 | 31 |
| GP.7 | 2.25 | A | 30 | 30 |

It is also apparent from Table 7 that all but one of the rural radiographer informants had held an x-ray licence for ten years or longer, in contrast to the remote x-ray operators, the majority of whom had held their licence for less than ten years. Only three of the remote operator informants had held an x-ray licence for more than ten years, including two of the GPs who had been licensed since entering rural practice some thirty years earlier. Furthermore, on average the rural radiographer informants had worked in a rural area longer than the remote operator informants (15.6 years compared to 14.2 years), the majority having been in rural practice for fifteen years or more. Again, this contrasts with the remote operator informants, a minority of whom had fifteen years or more experience in a rural position.

A map of the location of the informants is shown in Figure 5. It can be seen there are variations in the distribution of the different types of licence holders. There were very few potential informants from the far west of the State, a reflection of the population distribution, and some of those with whom contact was attempted had either moved or were unavailable for other reasons. While the distribution of radiographer informants was fairly even across the rest of rural New South Wales, the nurse informants were located in the mid-west, north-west slopes and far west regions. This area was purposively sampled because it was known that there had been tension and conflict between radiographers and nurse remote x-ray operators at some sites in that area in the past. It is also generally considered to be the heartland of remote x-ray operator practice, the early formal education programs run by the New South Wales Branch of the Australian Institute of Radiography having been held at regional referral hospitals in the central west region.

No nurses could conveniently be interviewed in the south of the State, however, some rural GPs in the southern region were available to be interviewed. This variation in distribution is perhaps a reflection of the true mix of nurse and GP remote x-ray operators in that region. Because only rural GPs may obtain a limited x-ray licence in Victoria (see Table 2) it is possible that this influence infiltrates across the border into southern New South Wales and so there is a preponderance of GP limited licence holders over nurse remote x-ray operators in that part of the State. In some locations interviews were conducted with more than one informant and in several locations radiographers and remote operators were within two hours travelling time of each other and so had at least some awareness of each other. In some cases the radiographer interviewed at one hospital

**Location of Informants**

New South Wales

Sydney

N

● Rural Radiographers (RRs)
● Rural Nurses (RNs)
○ Rural Doctors (GPs)
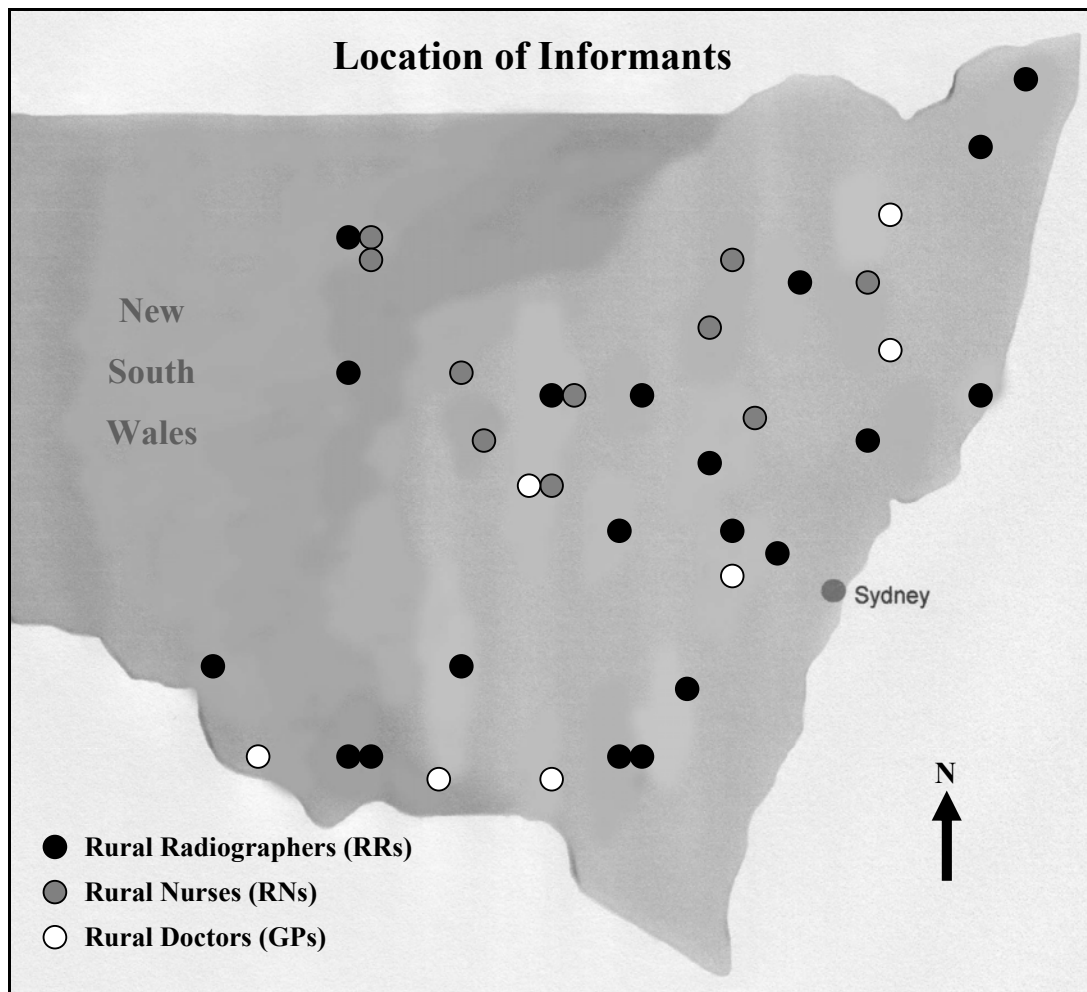
**Figure 5:** Distribution of interviewees shown by the approximate location of towns.

provided a sessional service to other hospitals in the local area, some of which had remote x-ray operators to provide a service during those periods when the radiographer was not in attendance.

## Developing the Interview Theme List

Interviews are the most popular method of qualitative inquiry used in health social science (Chew-Graham, May & Perry 2002; Shmerling, Schattner & Piterman 1993), their purpose being to allow the investigator to enter the perspective of the study participants (Patton 2002 p.342). The flexibility of the interview as a research tool allows

the interviewer to address the issues that are of most immediate importance to the study and of particular importance to the interviewee or informant. The interview assumes that other people's experiences and the way that they interpret these experiences are able to be articulated and that they are meaningful and knowable to others, particularly the interviewer (Fielding 2003; Denzin & Lincoln 2003). The informants give an insight into their reality through the responses, the stories they tell, and their use of language.

Although relatively open-ended and exploratory compared to structured interviews, in semi-structured interviews it is recommended that the interviewer has a schedule of topics that are to be covered, a 'theme list' (Minichello et al. 1995, p.65; Rice & Ezzy 2000, p.59; Patton 2002, p.343). A theme list was used in this study, not as a prescriptive guide to the interview but as a means of ensuring that all relevant aspects of the research topic were covered during each interview, while allowing the freedom to participate in the conversation with a sense of continuous engagement with the informant. The interviews were largely informant driven, particularly after the interviewee relaxed and became less conscious of the research process. The theme list was useful in getting the informant beyond the initial discomfort of being interviewed and as a guide if the interview seemed to be drifting away from the aim or was not flowing smoothly.

The theme list evolved over the duration of the data collection period, as more interviews were completed and analysed. The earliest versions of the theme list were derived directly from the aim of the project, as well as from analysis of the literature and awareness of the sensitising concepts (as listed in Table 6). In addition, pilot interviews were conducted, as described below, in part to inform the development of the theme list. Topics covered included the perception that informants had a unique professional role in the delivery of rural health care, how they described their role in relation to other health professionals, how they perceived the role of remote x-ray operators, and how, if at all, the remote operator role impacted on their perception of their own professional role through interprofessional interaction. Later versions of the theme list were informed by the ongoing data collection and analysis so that the nature of the questions developed, although the relationship of topics to the aim of the study was maintained.

**Pilot interviews**

Using a preliminary, draft theme list three pilot interviews were conducted: one with a rural radiographer, one with a nurse remote x-ray operator and one with a GP remote operator, all of whom had volunteered to participate in the study. The aims of the pilot interviews were to gain experience in interview technique, including the use of the recording equipment, and to test the style of questioning and range of topics that were relevant to the informants, as well as to gain an appreciation of the different themes covered by the three different types of health professional.

The three pilot interviews were transcribed and analysed for common and divergent themes, although the pilot interview data were not included in later analysis of the data collected in the main body of the study. The pilot interviews were analysed independently by two reviewers, who subsequently compared their interpretations for convergence and divergence. A sample of some of the pilot interview data and analysis are shown in Appendix C and a summary of the themes and sub-themes that were identified in the pilot interviews is given in Table 8.

Using the data from the pilot interviews it was possible to develop a more sophisticated version of the theme list with which to begin the formal data collection. While the theme list continued to evolve as more data came to hand, an example of the interview theme list used in this study is shown in Table 9 with sample interview questions categorised according to the scheme described by Patton (2004, pp.348-351). Other authors have also suggested similar categories of questions (Minichiello et al. 1995; Silverman 2001).

## Data Collection: Doing the Interviews

The interviews were carried out over a twenty month period in 2003 and 2004. Each prospective interviewee was contacted by telephone and asked if they would be available to be interviewed on a particular date, the time and location being left to their choosing in order to fit in with their personal and work commitments. All interviews were carried out either in the interviewee's workplace or at their home. Where interviews took place in the workplace a quiet location where interruptions would be minimal was chosen by mutual

**Table 8:** Summary of the themes and sub-themes identified from the pilot interviews.

| Rural Radiographer (RR.P) | Nurse Remote X-Ray Operator (RN.P) | GP Remote X-ray Operator (GP.P) |
|---|---|---|
| **Licence breaches**<br>■ Abuse of power (coercion)<br>■ Loss of call<br>■ Cost cutting by the health service<br>■ Unnecessary paranoia<br>■ Responsibility – Duty of care<br><br>**Need to support RXOs**<br>■ 'Necessary evil'<br>■ Better communication<br>■ Better information about the laws<br>■ Continuation education<br><br>**Professional hierarchy**<br>■ Doctors superior attitude<br>■ GPs being 'pig-headed'<br>■ Nurses are easier to deal with<br><br>**Need for clearer clinical pathways**<br>■ More structure<br>■ Improved training<br><br>**Need for radiographer role extension**<br>■ Reporting<br>■ Relationship with radiologists<br><br>**Recruitment and retention**<br>■ Workload issues for RXOs<br><br>**Priorities**<br>■ Conflicting demands<br>■ GPs are more clinically focussed | **Medical dominance**<br>■ Negative interaction with the GP<br>■ Role suppression<br>■ Conflict<br>■ Lack of clinical autonomy<br><br>**Complimentary roles**<br>■ RXO role improves nursing<br>■ Teamwork with other RXO<br><br>**Patient & community consciousness**<br>■ Reduces patient transfers<br>■ Saves money<br>■ Better patient management<br><br>**Extended role**<br>■ Better diagnostic skills<br>■ Future nurse practitioner role<br><br>**Feedback about radiographs**<br>■ Aims for good quality images<br>■ Seeks honest feedback<br><br>**Equipment & Safety issues**<br>■ Radiation protection<br>■ Processor maintenance<br><br>**Continuing education**<br>■ Need for more continuing education | **Recruitment and retention**<br>■ Demand of rural general practice<br>■ Lifestyle issues<br><br>**Making clinical decisions**<br>■ Earlier diagnosis & management<br>■ Excluding fractures<br>■ Treatment<br>■ Clinical examples<br><br>**The patients' perspective**<br>■ Better access to services<br>■ Less waiting & delays<br>■ Transport & travel<br><br>**Interaction with visiting radiographer**<br>■ Positive experiences<br>■ Depends on personality<br><br>**Continuing education**<br>■ Unavailability because of time<br>■ Need for on site training |

agreement. Locations included private offices and consulting rooms, x-ray rooms, staff tea-rooms (outside normal working hours) and emergency department treatment rooms. The atmosphere was as relaxed and informal as possible under the circumstances. While interruptions did occur during some interviews these were not so disruptive as to cause long pauses or cessation of the interview.

Interviews were tape recorded using a Sanyo TRC-960C compact cassette recorder (Sanyo Electric Co Ltd, Milan, Italy) and a remote microphone that was sensitive enough to allow both the interviewee and interviewer to speak in a normal conversational tone. The interview always began with the interviewee being reminded of the Information Sheet that had been posted to them and the Consent Form they had signed and returned to the University (see Appendix A). Copies of both were given to them to re-read if they wished to refresh their memory. A formal introduction ensured that the informant clearly understood the aim of the project, their right to withdraw at any stage or to retract and erase parts of the interview, the confidentiality of everything that was said, and that the names of people or places would not be reported in any way. None of the informants refused to proceed, nor did anyone withdraw consent once the interview had begun.

While the interview was taking place the theme list lay on the table in front of the interviewer, although the sequence of questioning was not followed rigidly. The background and demographic questions were always asked first as a way of allowing the informants to relax while talking about themselves. The remainder of the interview, however, was informant-driven, with questions ranging freely between categories.

The background and demographic questions (see Table 9) were designed to elicit information about the personal and employment history of the informant. Some of this information, such as how long they had held an x-ray licence and how long they had been in rural practice, was already known from the Contact Details Form, however, asking these questions in an open, conversational style allowed them the freedom to elaborate. Some informants told interesting stories about their past employment, which in some cases gave context to later responses about their experience or knowledge.

Knowledge questions aimed to inquire into the informants' awareness of the remote x-ray operator licensing program in terms of accurate factual information. These questions were

**Table 9:** Sample interview questions categorise according to the type of question.

| Background and demographic questions: |
|---|
| Approximately how many years have you held an x-ray licence? |
| Approximately how many years have you worked in a rural area? |
| In what rural areas have you practiced? |
| How many RXOs are there locally? |
| **Knowledge questions:** |
| What do you know about limited x-ray licensing in NSW? |
| What do you understand to be the licence limitations placed on remote x-ray operators in NSW? |
| How do you explain the role of the EPA and other authorities in limited x-ray licensing? |
| What do you know about the training that RXOs undertake? |
| **Opinion and values questions:** |
| Do you think limited x-ray licensing is necessary? (Why?/Why not?) |
| What sort of training do you think remote x-ray operators should have? |
| How many RXO licences do you think there should be in a country town? |
| How do you define your role in the health care system relative to other health professionals? |
| What do you know about the radiologists' role and their opinions of remote operator radiography? |
| In your opinion should the radiologist who reports on the films have any role in the RXO process? |
| Do you think that the existence of remote x-ray operators is better or worse for patients? |
| Do you think that the existence of remote operators improves access to radiographic services? |
| What do you think about patient radiation exposure and risk in relation to RXO radiography? |
| What sort of expectations do you think patients have of rural and remote radiographic services? |
| What do you think that RXOs should have to do to maintain their licence? |
| **Experience and behaviour questions:** |
| What experience have you had of limited licence remote x-ray operator radiography? |
| Describe some of your experiences of limited licence radiography. |
| What interactions do you have with other health professionals in relation to limited licence radiography? |
| How does dealing with remote x-ray operators affect your own professionalism? |
| What sorts of difficulties do RXOs experience in performing radiography? |
| Are you ever put in a position where you had to, or were tempted to, perform examinations that are outside your licence conditions? |
| Are you aware of any instances of RXOs breaching their licence conditions? |
| Does performing limited licence radiography conflict or complement your role as a nurse/GP? |
| **Attitude and feelings questions:** |
| How do you feel knowing that some nurses and GPs can do some radiographic examinations? |
| How do you feel about the experiences you have had of remote x-ray operator radiography? |
| Do you feel valued as a member of the health care team? If so, why? If not, why not? |
| How do you feel other members of the health care team respond to the role of remote operators? |
| How do you feel if you do a poor quality radiograph? |
| How do you feel when you see poor quality radiographs performed by RXOs? |
| Do you think that the attitude of nurse remote operators about radiography differs from that of GP remote operators? |

useful in soliciting the informants' perceptions about the perceived boundaries within which remote x-ray operator radiography is performed. Opinion and values questions were used to investigate the way informants perceived and interpreted their experiences and those of others around them. Patton (2004) explains these questions as being about the 'head stuff' and they are designed to get below the surface of the informants' knowledge, behaviour and experiences. Typically these sorts of questions were framed in terms of 'when that happens, what do you think about it?'. In response to opinion and values questions the informants were able to express their preferences and expectations, as well as giving their opinion of the status quo.

The informants' responses to the experience and behaviour questions were to describe their own actions and those of others whose actions they had observed. It was common for these descriptions to take the form of quite lengthy stories about a particular event or incident, often a clinical scenario. On occasions, informants recounted second or third-hand accounts of an incident. Having explored an informant's experiences, behaviour, values or opinions, they were usually next asked something like 'how did that make you feel?', thus opening the way to investigate their attitudes and feelings. These were often difficult questions to get a satisfactory answer to because the informants often appeared to confuse how they felt (angry, frustrated, happy) with their thoughts or opinions and the consequent actions that took place following an experience, event or incident. Therefore, in reply to questions aimed an eliciting a response about a feeling, it was common to receive a reply that justified an opinion – 'well, I thought that was just wrong'. This is not a unique problem as even experienced interviewers have similar difficulties getting appropriate responses to attitude and feelings questions (Patton 2004, p.350). People are often reluctant or unable to recall their true feelings about a past incident, particularly if the feelings they experienced were an irrational response to the situation at the time. However, not all of the informants were reserved about expressing their feelings, some giving frank and open responses.

To supplement the primary line of questioning, it was frequently necessary to use probing questions to elicit information in greater depth (Minichello et al. 1995, pp.89-92). These questions were used if the informant's answer to a primary question seemed incomplete or vague. As suggested by Minichello et al. (1995, p.90) probing questions can be used tactically to 'provoke the informant into elaborating on previous comments, either to

provide the interviewer with more detailed information or to test the validity of the interviewer's interpretation of the informant's position on a particular issue'. Examples of the type of probing questions used are as follows: 'Can you explain that again for me?'; 'What do you mean by 'context'?'; 'In what regard?'; 'So what's inferior about it?'. Positive 'verbal nudging' was also used as a means of encouraging informants to expand on what they were saying (Minichello et al. 1995, p.91; Meadows 2003). Examples include: 'Okay, yeah.'; 'Oh, right.'; 'Wow!'; or simply, 'Mmmm'. By indicating that the interviewer is listening to the informant, and perhaps even agreeing or empathising with their position, they are encouraged to say more (Minichello et al. 1995, p.91).

In addition to the tape recorded interviews, hand-written commentary notes were also kept, as recommended by Patton (2002, pp.383-384). Rather than writing notes during the interview, which would have been distracting to both the interviewer and informant, the notes were written immediately after each interview. The notes recorded an overall impression of the content, as well as physical, technical and environmental aspects. Parts of the interview that were of particular interest or may have added new perspectives to the emerging themes were also noted. Commentary notes were referred to during the analysis of the transcribed data to refresh the memory of the interview and to clarify key issues.

## Modified Grounded Theory and Data Analysis

After each interview the recording was given a code, labelled and handed to a transcriber. The clerical assistant who transcribed the data was recruited externally on a casual basis and was not a health professional or employed by an Area Health Service. This was important in order to ensure the confidentiality of the content and the transcriber was made aware of this. Both printed and electronic versions (in Microsoft Word® format) of the transcribed data were made available for analysis.

The method of data analysis used may be described as 'modified' grounded theory, meaning that the process used may depart somewhat from formal grounded theory methodology with the emphasis instead on the development of a substantive theory that is grounded in the data. Grounded theory, which has its roots in symbolic interaction

(Llewellyn 1998, p.28), is a method of analysing qualitative research data that was originally proposed by Glaser and Strauss (Strauss & Corbin 1990, p.24). Since then it has been used so extensively that there are now a variety of methods that purport to be grounded theory but are perhaps better described as modified grounded theory (Llewellyn 1998, p.32). McCallin (2003) defines grounded theory as 'an interpretative research methodology that is useful to generate research-based knowledge about behavioural patterns (Glaser 1978, cited in Strauss & Corbin 1994) that shape social processes as people interact together'. It is a way of gradually building up conceptually dense categories and their relationships from a body of raw data by an iterative process of inductive analysis such that the theory ultimately developed is 'grounded' in the data (Strauss & Corbin 1994). Classical grounded theory is based upon a step-by-step process that was summarised by Llewellyn (1998) as the recording of experiences, generating key concepts, developing a theoretical formulation, and exploring and interpreting this formulation in the context of the literature. However, it does not require a sequential approach but rather the analytical procedures are employed in constant interplay and repetitively (Silverman 2001). Coding, indexing or labelling of data are regarded as the most fundamental aspect of a grounded theory approach and Strauss and Corbin (1990) described three different types of coding, all of which were used in this study in an iterative analytical process.

**Familiarisation and data labelling**

The reading and re-reading of transcripts took place from the very earliest stages of data collection and continued throughout. Data were collected and analysed in phases that coincided with excursions into the field, each phase of analysis being used to inform subsequent phases of data collection. As many as four or five interviews were conducted between data analysis phases. Analysis involved reading the transcripts closely while listening to the tape recorded interview, which allowed the intonation or inflexion in the informant's voice to be detected and noted in the margin of the transcript. The principal purpose of this stage of analysis was to identify significant passages of the transcripts. These were highlighted and labelled in the margin adjacent to the passage so that they could be retrieved at a later stage of analysis. Reference notes describing the content of each passage were also entered into a separate Word document, each note being linked to the original passage by the informant's code and transcript page number.

As data collection and analysis proceeded, labelling and categorisation of the transcript passages became more refined, with labels recurring throughout the transcripts where there was significant overlap of the content. It gradually became possible to group passages and the accompanying reference notes into distinct data categories, cutting and pasting direct quotations from the electronic versions of the transcripts into a separate document, again referenced to the original transcript. Transcripts analysed early in the study were reanalysed and relabelled where necessary.

Throughout this stage of analysis the aims and objectives of the study were constantly revisited to verify the relevance of the extracted and categorised data. Literature related to the study was also referred to, adding a deductive element to the analysis and ensuring external validity, so that interpretations of the raw data would be found relevant by 'people other than the primary analyst' (Pope, Ziebland & Mays 1996, p.86). In addition, the three pilot interviews, as well as some of the early interview transcripts that formed the body of the data, were analysed independently by an experienced qualitative researcher, who was not a health professional but a social scientist who was familiar with the aims and objectives of the study. Comparison was made between the categories derived by each analyst and agreement was reached about the data categories to be used. Where necessary, new categories were created or categories were collapsed into one another. Data were thus analysed from a number of different perspectives, a form of triangulation aimed at increasing study validity (Pope, Ziebland & Mays 1996, p.83; Barbour 2001).

Some authors refer to the above process as 'open coding', a term coined by Strauss and Corbin (1990) in the context of true grounded theory (Llewellyn 1998). The principle is to identify, name, categorise and describe 'phenomena' or 'instances' in the data into broad provisional categories that can later be collated by comparative analysis. According to Pope, Ziebland & Mays (1996, p.86) the end product should be a 'detailed index' of labels that allow the data to be categorised into 'manageable chunks for later retrieval and exploration'. In this study the above process led to between fourteen and twenty-four labelled categories at various stages of analysis, some of which initially had up to five sub-categories. Perry (cited in Pope, Ziebland & Mays 1996, p.79) described these as 'fuzzy categories' and Pope, Ziebland & Mays (1996) suggested that there will be a considerable degree of 'overlap and repetition' from one category to another.

**Comparative analysis of the data**

Concurrently with data labelling, comparative analysis took place with the purpose being to merge the categories into a smaller number of logical themes and sub-themes derived from the data. These themes were subsequently grouped under an even smaller number of key concepts. This was achieved using two interlinked parts of the analysis process. A summary descriptor was written for each of the data categories and to accompany each descriptor a set of theoretical questions and statements that were relevant to each category was produced. The latter part of the process involved recourse to the data and to the relevant literature, requiring switching between inductive and deductive reasoning (Llewellyn 1998; Patton 2002), which is characteristic of grounded theory methodology (Strauss and Corbin 1990). Categorised quotations and reference notes related to each labelled passage of data were 'interrogated' in order to answer the questions or statements under each data category. Examples of the questions and statements used at this stage of analysis are shown in Table 10 for three of the fourteen emergent categories. Using this method, deviant or negative instances were identified and scrutinised, thus testing the independent validity of each category and sub-category (Llewellyn 1998). Strauss and Corbin (1990) referred to processes similar to this as 'axial coding', a means of further developing the conceptual categories (Llewellyn 1998, p.34). The aim is to reduce them to a smaller number of independent but related categories that can be traced back to the raw data where they are represented by specific instances. The number of data categories was thus reduced to ten 'themes', most with 'sub-themes', which could be logically grouped under three 'key concepts'.

**Interpretation and mapping**

The final stage of data analysis has been referred to as 'selective coding', the purpose of which is to link the data categories, now themes and key concepts, by 'relationships derived from the empirical data' (Llewellyn 1998, p.34). A series of charts was used to show how each key concept could be broken down into the various themes and sub-themes. The chart for each key concept is shown in the introduction to each of the results chapters (Chapters 6, 7 & 8). Subsequently each of the ten themes was systematically related to other themes and sub-themes, linking key concepts where a relationship could be explained by interpretation of the data and reference to the literature. This is representative of the fact that, while separate key concepts have emerged from the data, in

**Table 10:** Examples of questions and statements used in comparative analysis.

| Image Quality and Standards |
| --- |
| 1.  Radiographers equate patient care with radiographic image quality.<br>2.  Is 'image quality' central to the identity of radiographers?<br>3.  Doctors are not concerned about image quality.<br>4.  Do radiographers and RXOs evaluate radiographs according to the same criteria? |
| **Professional Status and Esteem** |
| 1.  Rural doctors generally have an over inflated perception of their importance, which can be problematic.<br>2.  Do radiographers display low professional esteem?<br>3.  Do radiographers see themselves as valued members of the health care team and the community?<br>4.  There is a common perception that radiography is easy. |
| **Patient Satisfaction** |
| 1.  Patients don't really care who takes the radiograph so long as they find out what's wrong with them.<br>2.  Patients are more concerned about being able to stay close to home than about whether a radiographer or a remote operator takes their x-ray.<br>3.  Does being a radiographer in a small country town give them a positive community profile? |

reality they have a common origin and, therefore, they do not exist in isolation from one another. Pope, Ziebland & Mays (1996, p.86) emphasised the importance of ensuring that mapping and interpretation converges in the original aims of the research. Strauss and Corbin (1990, p.14) suggest that all data categories should be unified around a single core category, although other authors reject this in favour of representation of the 'complexity and multiplicity' of data interpretation (Rice and Ezzy 2000, p.197).

The goal is to create a single 'story line' based on the interpreted relationships between the concepts, themes and sub-themes that can be traced back to the raw data (Rice and Ezzy 2000, p.197). Using diagrams that represent the 'relationships within and between the categories at the broader conceptual level', it is then possible to lay out a theory based on the validated relationships (Llewellyn 1998, p.34). In the following three chapters, the results of the data labelling and comparative analysis stages are shown, as described

above. The conceptual mapping and final interpretation of the results is described and discussed in the final section of this thesis.

## Limitations of this Study

As is the case in any research investigation, this study has certain limitations. It may be considered by some that the sample size is small. However, as explained earlier, sample size is not an important consideration in qualitative research. The initial call for participants was met with a low response rate, the reason for this being unknown. Although a larger volunteer sample was expected, it was considered unnecessary to seek further responses given that the pool of potential informants was large enough to meet the study objectives. Further, comparison between certain characteristics of the volunteer sample (potential informants) and the final sample of informants (actual informants), shown in Appendix B, revealed that there was no significance difference. It may be argued that the characteristics of the population cannot be reliably matched to those of the actual informants because of the limited response to the call for volunteers. This limits the generalisability of the results. Some maldistribution of the geographical location of the informants has also been noted, especially of the nurse informants. This was partly the result of convenience sampling, although it was noted earlier that the location of the nurse informants was also influenced by purposive sampling, with the intention of obtaining information-rich data.

It may also be commented that the inclusion of other informant categories, such as health service administrators, patients, metropolitan radiographers and unlicensed GPs and nurses, may have enhanced the richness of the data. While this may be true, it is argued that this is outside the aim of this study, which is to explore the experiences and perceptions of those health professionals involved in frontline delivery of rural radiographic services. The opinions of other potential informant groups may the subject of a future investigation.

In addition, it will be noted that a substantial body of data relates to differences in radiographic image quality between radiographs performed by rural radiographers and

those performed by remote x-ray operators. This data are presented in the next chapter. No objective verification of this perceived difference by evaluation of the radiographs has been performed to date. Again, this falls beyond the aims of the study and would be an appropriate topic for a further research project in this field.

Finally, this study has not been performed with the aim of applying grounded theory methodology in its formal sense. Rather, it uses techniques that have been developed and described by grounded theorists as a vehicle to achieve the study aim. It is thus described at the bottom of page 96 as 'modified' grounded theory. The term 'substantive' grounded theory is similarly used in the literature to describe similar studies where the intention has been to formulate a theory that is applicable to a particular area of sociological enquiry (Llewellyn 1998). It is not intended in this study to develop a theory that has broader social implications outside the arena from which the theory is derived.

# Chapter 6
# Dimensions of Practice

Analysis of the data using the techniques described in the previous chapter resulted in the emergence of three key concepts. In this chapter the data related to the first of these concepts, 'Dimensions of Practice', is presented and described. Under this key concept a number of themes and sub-themes emerged and each is explained in detail with relevant sample quotations. The common characteristic that ties these three emergent themes together is that they all relate, directly or indirectly, to specified practice requirements or to expected standards of clinical practice. The themes and sub-themes and their relationships are shown diagrammatically in Figure 6.
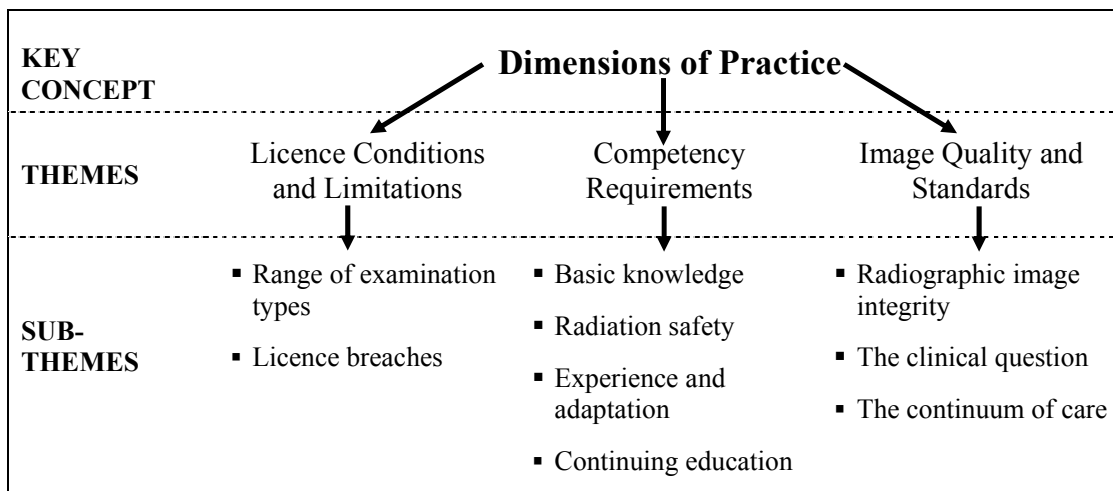


**Figure 6:** 'Dimensions of Practice' cascading into themes and sub-themes.

As this investigation is about professional boundaries and the sharing of the role of performing plain film radiography across those boundaries, it is important to examine the structural parameters and criteria that apparently define the practice boundaries. Some aspects of clinical practice are prescribed, perhaps by legal requirements or by the traditions embodied in an educational program dictated by the accreditation requirements of a professional body or other agency. However, there is also a degree of flexibility in

the way that individual practitioners or occupational groups interpret the structural parameters and construct the occupational territory in which they work.

Although they have some core health professional characteristics in common, doctors, nurses and radiographers display certain characteristics that are unique to their profession. Many of these characteristics are acquired through education and practice regimes that serve to mould the individual practitioner into a bona fide member of their profession. The challenge for remote x-ray operators is that, having been educated and trained to practice in one discipline, they are expected on occasions to practice in another that may have quite different characteristics to their own. Underlying this challenge are the regulations that are intended to direct practitioners and assist them in interpreting their practice boundaries. Further, the personal traits of individual practitioners also influence how they interpret the structural parameters and criteria and how they respond to specific clinical circumstances. In this chapter the aim is to investigate the key structural elements and gain a better appreciation of how each professional group interprets radiographic practice within that framework, given their different characteristics and traits.

## Licence Conditions and Limitations

The New South Wales Radiation Control Act 1990 and the Type I.14R radiation licence conditions serve as the principal regulatory instruments that guide the practice of remote x-ray operator radiography (Government of New South Wales 1993). The licence conditions are listed and discussed in the introduction to the thesis (pp.19-22 and Table 2). Knowledge of the conditions is essential to understanding this theme, which encompasses interview data related to those sections of the Act pertaining to limited x-ray licensing, to the administration of the Act, and to the organisation and management of the remote x-ray operator program. Data has been categorised under three sub-themes, as shown in Figure 6, and it should be noted that some of these sub-themes have links to other themes and sub-themes described in this and subsequent chapters.

### Range of examination types

The limitations placed on remote x-ray operators include the specification of the types of the radiographic examinations they can legally perform. A list of the examinations is

given in Condition 2 of the licence conditions (Table 2, p.20), which appear on the back of the radiation licence. It should also be noted that radiation control falls under the jurisdiction of each State Government and so the examination types included on the limited x-ray licence vary from State to State (see Table 3, p.32). This disparity influenced the opinions expressed by some informants in relation to the range of examination types included on the licence. For example, one of the GPs, who originally obtained his licence in South Australia, made the following observations about the New South Wales licensing system:

> GP.2: I don't know there seems to be a bit of turf wars here between the radiologists and, I don't know. There seems to be more of a, there's a bureaucracy within the accreditation, whereas the rationale in South Australia is access of services and trying to promote more people having services, and that may be due to the lack of country radiologists in South Australia compared to New South Wales, I don't know.

With these comments GP.2 implies that bureaucrats in New South Wales are ignorant of the health needs of rural and remote communities. This same GP also complained that in South Australia, 'only two hours from Adelaide', he was allowed to '… do all the films, skulls and everything' and he had difficulty understanding '… why you can't do that in New South Wales'.

The exception to Condition 2 is that, under Condition 4 of the licence, a remote x-ray operator may perform other examination types if a registered medical practitioner 'considers that the life or well-being of the patient could be seriously threatened if the examination is not undertaken immediately' (see Table 2, p.20) and they are willing to certify this opinion. The inclusion of this latter condition has been the cause of some concern to radiographers. As one radiographer informant (RR.12) said in reference to this condition, 'It troubles a lot of radiographers. I would say, I wouldn't go a month without a radiographer from somewhere making a comment.'

At some point during the interview the informants were generally asked whether they felt that the examination types included on the licence were appropriate. They were specifically questioned about whether, in their opinion, the lateral cervical spine view should be included, as that projection is included on the limited x-ray licence in other States and, from personal experience, it has also frequently been a subject of discussion at

training workshops in New South Wales. Although most of the informants expressed satisfaction with the examination types currently included on the Type I.14R licence, the other two examination types that were raised by informants as possible future inclusions were the lateral chest view and the plain, supine abdominal view.

There was agreement that the lateral cervical spine examination (or c' spine) should not be included on the licence (RR.13, 14, 15; GP.1, 4, 5). Only one GP argued for its inclusion, which is discussed below under licence breaches (pp.108-117). Some of the radiographers' comments about the cervical spine examination were as follows:

> RR.13: Only recently they've asked, "Why can't we learn to do a cervical spine?" I said, "You've got to get good at what you do to start with."

> I[5]: What about cervical spines?
> RR.14: They don't do any. If somebody comes in and they've got a spinal injury I'd say they'd probably hardly ever hit the table here. They go straight away.
> I: Right. So, you'd just treat them like they've got a fracture and get them out of here?
> RR.14: Yes. Yes, moved straight out. No, there's, there's been no incidences of any cervical spines or any spinal x-rays taken at all.
> I: Right. And, they've never argued with you that they should be able to do some?
> RR.14: No. No. No. I don't think they'd want to either. We don't have the facilities here to treat patients like that so…

> RR.15: I'd feel really awful if they did try and do a c' spine for a trauma or something because, a) they wouldn't know how to do it properly, and b) I don't know if they'd know how to read it that well.

Generally, the radiographers were opposed to the suggestion of including the lateral cervical spine view on the licence. As suggested in all of the above quotations, their principal concern was that a false negative diagnosis could be made, leading to serious consequences for the patient. This is in line with current best practice in the management of potential cervical spine injuries, the false negative rate having been reported to be as high as sixty to eighty percent (Mace 1985; Stiell et al. 2003; Cross 2004).

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[5] Where the symbol 'I' appears in quotations it indicates the interviewer speaking during the interview.

None of the nurses commented on including the lateral cervical spine view on the licence, while the GPs generally agreed with the radiographers. For example:

> GP.1: Oh, God no. I don't want to do a cervical spine, not in the least.
> I: For what reasons, why?
> GP.1: Because c' spine films if you miss it, it's absolutely tragic and if you're not seeing enough of them you're not going to have your skills up. I'd rather that someone with a lot of trauma experience is having a good look at the c' spine film, keep them in a collar and transport them out.
> I: So you treat them like they have a fracture.
> GP.1: Definitely. It's again, it's the old thing that if you don't see it often enough you're going to miss it.

> GP.4: I wouldn't be all that happy taking a picture and looking at it myself and saying well there's no fracture so don't worry. I prefer to have somebody else take the pictures and interpret them. So, I mean basically I don't really do them. I can't remember, I think I've done, I've done one …

> GP.5: But certainly spinal fractures. If I see a fracture we're in big trouble and if I don't see a fracture they're still going to CT [Computed Tomography] the person as soon as they hit a trauma centre anyway. So, all I'm doing is wasting time.

These GPs also rejected the idea for the same reasons as the radiographers, although their concern is apparently focussed more on their ability to interpret the radiograph rather than to perform the examination. GP.5 suggested, in a case where he suspects a cervical spine injury, whether or not he was able to demonstrate a fracture or dislocation, the patient is still going to be transferred to a higher order hospital, where they can undergo a CT scan of their neck. Again, this approach seems to comply with current best practice guidelines (Goergen 2004).

In regard to the inclusion of the plain abdominal view, again most informants appeared to be comfortable with the fact that it is not currently included on the licence, considering it unnecessary to make any changes at all to Condition 2. However, some of the informants did express an opinion regarding this issue, as in the following quotation from one of the radiographers who, prior to this, had told the story of a man who was found to have a leaking abdominal aortic aneurysm and whose life, she says, was saved by the timely action of the staff at the hospital:

RR.14: I actually feel that they should be able to take an abdomen x-ray or something like that. That man was saved because of a quick response.
I: Even if it means breeching the license conditions of the remote x-ray operator licence?
RR.14: Well, is it going to hurt anyone? Look I don't know. Look, I shouldn't probably say what I feel but I think they should be able to do an abdomen x-ray.
I: I want to know what you feel.
RR.14: But you know, in an emergency situation, when you've got somebody that's going to die, or live, for the sake of an abdomen x-ray, you know maybe they do chest x-rays and it's just a little bit low.

The argument put forward is that, if the decision as to whether or not to transfer a patient with a provisional diagnosis of a potentially life threatening condition is dependent on doing a plain abdominal x-ray, then the remote x-ray operator should do the examination. In fact, under the existing licence conditions a remote operator can legally perform a plain abdominal examination in such circumstances under Condition 4. RR.14, however, goes on to suggest that the remote operator might get around the perceived licence limitation by doing an improperly positioned chest x-ray that's 'just a little bit low'. This practice was also mentioned by other informants. One of the nurse remote operators spoke in favour of doing abdominal (abdo') radiographs to decide if the patient needed to be transferred to a higher order hospital, although, she said that it is rarely necessary.

RN.1: It would be very useful to do abdo' x-rays for diagnostic and transfer purposes whether you will need to send someone to [place name 1], have they got fluid levels or do they, are they safe to keep in [place name 2] but it's an extremely rare issue.

The same nurse recounted a scenario about doing a 'low chest' and a 'high hip' x-ray on a child to locate an ingested two dollar coin. It could be argued, however, that this is an unnecessary examination on an initial presentation if the child was not distressed, as often a child who has swallowed a coin will pass it within a few days without complications (Connors 2005). Further, one of the GP informants suggested that in his opinion plain abdominal radiography is often unhelpful for a variety of abdominal pathologies, although this may be disputed (ACR 2004).

GP.4: I mean some people raise the issue of abdominal x-rays. Again, I don't really think it's all that, I don't think that's a very helpful test in many situations now. I don't think it really alters the, you know, whatever the abdo' x-ray shows is not going to alter my management of somebody in the short term.

Nevertheless, RN.3 described the same technique as RN.1 of deliberate inaccurate centring and poor collimation in order to include a neighbouring anatomical region on the radiograph and in doing so commented that 'So there's a lot of cheating goes on in our licence' suggesting that this is regarded, at least by some remote x-ray operators, as a means of circumventing the restriction of not being able to legally perform abdominal radiographs.

The lateral chest x-ray projection, which is not currently included on the licence, was the examination that was most frequently identified by informants as needing to be included (RR.14; RN.2, 3; GP.1, 5). It is the only additional view for which there is perhaps an argument for it to be included in the future, for selected patients (Ely, et al. 1996), although recent evidence suggests that chest x-rays are generally low yield examinations in the primary care setting (Tigges, et al. 2004; Wilkins & Wilkins 2005). Some remote operators indicated that they already perform the lateral chest view on occasions: 'If he's concerned that the person's got pneumonia I'll do a lateral for him. Not as a routine thing' (RN.2). In this case it is clear that the nurse remote operator is acting under the doctor's request. RN.3 also commented briefly that 'the lateral chest x-ray' should probably be included on the licence and RR.14 acknowledged that lateral chest views are sometimes performed by the remote operators, conceding that this is not a problem '… if the lateral chest x-ray could mean the difference between having to evacuate a patient, you know, and taking up an air ambulance that's not really needed'. Nevertheless, in terms of the current licence conditions, for a remote x-ray operator to perform a lateral chest radiograph constitutes a breach of the licence conditions.

**Licence breaches**

The other sub-theme under the theme of 'Licence Conditions and Limitations' deals with the matter of remote x-ray operators reportedly breaching the licence conditions. A deliberate breach of the conditions is illegal under the Radiation Control Act 1990, the objective of the Act being:

> … to secure the protection of persons and the environment from exposure to harmful ionising and non-ionising radiation to the maximum extent that is reasonably practicable, taking into account social and economic factors and recognising the need for the use of radiation for beneficial purposes.

Under Section 6(2) of the Act it states that:

> A person must not possess, use, sell or give away anything to which this
> section applies unless the person is the holder of a licence under this section
> and does so in compliance with any conditions to which the licence is subject.

Further, under Section 22(1) it states:

> If an employee contravenes any provision of this Act or the regulations, the
> employer is to be taken to have contravened the same provision (whether or
> not the employee contravened the provision without the employer's authority
> or contrary to the employer's orders or instructions).

Contravention of Section 6(2) carries a maximum penalty of $1,500 for a corporation and $750 for an individual, according to the Radiation Control Regulation 2003.

In an historical context, some of the informants recounted stories about the gardener, the wardsman, the filing clerk, and several nurses and GPs who had performed radiography without a licence in the past (RR.1, 2, 4, 8; RN.7, 8, 10). Most described poor standards of radiographic practice in such cases but occasionally the standard of the work was described in glowing terms: 'Excellent, excellent radiographer. She used to do incredible stuff before she got her limited license' (RN.8). It seems, however, that the operation of diagnostic x-ray equipment by unlicensed personnel is now rare, although rumours are still sometimes heard. For example, RN.7 said that she had seen '… doctors who have not been through, through the remote radiography course, walk into an x-ray room and want to take an x-ray'. No direct evidence was found of this illegal activity occurring currently, however.

It seems that from the data collected in this study recent licence breaches fall into two categories – 'fringe practice' and 'illegal substitution'. 'Fringe practice' is where a remote operator, usually a GP, chooses to perform an examination that is not permitted according to the conditions of their licence. A good example of this is the GP who argued in favour of performing cervical spine examinations.

> I: Are you not inclined to send them anyway if they're a suspected cervical
> spine injury?
> GP.6: Yes. If there was, you know road accidents, most of the time I have to
> send them. But isolated injury, whiplash injury or something like that. If the
> patient was brought, usually by the ambulance, with a stiff collar. So, instead

of sending some of the patients you know, I mean, if I'm confident enough, clinically it was not indicated, I try to do but most of the time they have to go to [place name], yes.

He maintained that if a patient appears to have no other injuries and arrives by ambulance in a cervical collar he may choose to do the examination rather than refer the patient to a hospital where a radiographer is available. This appears contrary to best practice in the light of the currently available evidence cited earlier and the GP may be in a dubious legal position if he was to miss a significant cervical spine injury. This same GP also said:

> GP.6: Abdomens, yeah. Abdomen occasionally, I do them. In case of bloated tummy and all, I occasionally, lately only. But I got advice from the radiographer how to do that and, you know, yeah, occasionally.
> I: So do you feel that that really should be something that's included on the licence?
> GP.6: Yeah. That would be, that would be useful, yes, the abdomen, yeah. Only the AP [Antero-Posterior] view.

Again, this appears to be a deliberate breach of the licence conditions and two aspects of GP.6's honest admissions are remarkable. Firstly, neither the cervical spine injury or abdominal distension patients appear to have been in a condition where their life or well-being was 'seriously threatened' and, therefore, if called to account for his actions the GP could probably not claim to have been performing the examinations under licence Condition 4. The second remarkable aspect is that apparently a radiographer was complicit in these licence breaches by advising the GP on how to perform abdominal radiographs, assuming the radiographer knew that the doctor intended using the technique on patients that were not seriously ill at the time the examinations were performed.

Other instances of deliberate licence breaches included accounts of occasional lateral chest projections and abdominal radiographs being performed, which were seen by the perpetrators as bending rather than breaking the licensing laws. For example, the nurse who x-rayed the child's abdomen for the ingested two dollar coin said in her defence:

> RN.1: So I did bend them on that occasion because to me one x-ray of a child was a whole lot better than doing three looking for the one thing.

Otherwise, there was a considerable amount of unsubstantiated rumour about licence breaches, usually presented by the radiographer informants, for example:

RR.3: Now a lot of radiographers, the information I get about remote operators comes from radiographers that have dealings with remote operators and sometimes that's a successful sort of interaction between the two and but more often than not it tends to be some negative aspects of what happens. … perhaps sometimes they overstep their mark a little bit about the examinations they can do.

RR.17: Well, I've heard doctors, a doctor who's a remote x-ray operator, he does virtually the works. He does spines, and ….
I: In New South Wales?
RR.17: Well I've heard he's in the [same Area Health Service].
I: And do you know whether anybody has attempted to stop him?
RR.17: Not that I know of, no. I'm not even sure if he's still in the town, but he was. … But I'd only heard that, that he was fairly comprehensive for his determinations and what he'd attempted.

RR.3 also claimed to have heard rumours that some nurse remote operators are '…forced to do it by the medico that's asked them to do something', which raises the issue of 'coercion', a more subtle form of fringe practice that was noted in Chapter 2 (p.28). This, however, goes beyond rumour, several of the nurse and radiographer informants (RN.2, 3, 8, 9; RR.4, 8, 18) giving accounts of doctors applying pressure to nurse remote operators to perform examinations that are not included on their licence in order to avoid having to transfer a patient. Some examples of this are as follows:

RN.2: I've had the medical officer put the pressure on me once to do an abdo' and the person was quite sick and I felt concerned about it and I rang and spoke to [the Area Chief Radiographer] about it and he said really he thought that if the person was that sick they should be going to [the regional referral hospital] anyway.

RR.4: Well, I got on well with the staff there so I started talking to the DON [Director of Nursing] that was doing a fair few of them and I said, "look I really don't think you should be doing them, these images aren't good", and she said "no, no I know, it's just that I get pressured by the doctors".

RN.3: He's alright but he's always saying that we, I mean we were actually only taught to do PAs or APs [postero-anterior or antero-posterior projections]. He's always wanting laterals because you can't take a proper x-ray without a lateral of the chest.

In the above quotation RN.2 says that she was prompted to ring a senior radiographer, who supported her refusal to do the examination. Some radiographers also spoke about offering similar support to nurses when coercion was attempted. One of the radiographers

(RR.8) remarked that '… the pressure from the doctors was just intense' and that 'she was actually doing as she was told by the doctor at the time who was probably giving her a hard time about it'. In this case, the nurse was advised by the radiographer as follows:

> RR.8: If it's something that you've been asked to do that you don't feel comfortable with then it's something that you don't want to be doing. It's something you don't need to be doing. And, you just get them [i.e. the doctors] to ring me. I don't care if it's four o'clock in the morning. That's the rules. If it's outside those rules that are there you don't do it. We can print them up and laminate them and put them everywhere if you want. We can write letters to the doctors every three months just to remind them if you want. But if you're having an issue with any of the GPs you get them to ring me.

Another of the radiographers (RR.18) suggested that the positive outcome of coercion was an improved relationship with the nurse remote operators, saying that '… the nurses have been brought into some of the conflict with the doctors, which in a way has put them on my side'. There is apparently a sense of collegiality that comes from joining together to oppose attempts at coercion by the doctor. Further, in some cases the nurse remote operator involved displayed a better understanding of radiography than the doctor involved, as described below.

> RR.18: I've actually heard in one instance, "The doctor wanted me to do that". He said "Oh, just put the film down. Point it there and take it", and "One, I'm not supposed to do that, and I don't want to do it, 'cause it's wrong. And, secondly, I know enough to know it's not going to work".
> I: The doctor thinks it's simple?
> RR.18: The doctor has an over simplified understanding, exactly. Which is I think probably part of the conflict.

Other nurses, like RN.2 above, reported that they had at times refused to comply with a doctor's request to perform an illegal examination without the need to involve a radiographer, such in the following two examples:

> RN.8: … we used to be always pressured to do things which we used to have to stand on our dig and say no I'm not, and that was from doctors. Yeah, and Dr [surname] was renowned for it.

> RN.9: I've said "Nuh. That is a job that you either call the radiographer out here or that patient must be transferred. I'm not qualified to take that x-ray. It might be dangerous if I did. I might miss something."

RN.8 suggested that the doctor that she named in the above quotation has 'behaviour problems', describing him as 'obsessive compulsive'. RN.2 also suggested that the doctor that she had problems with was '... one of these people '"if you can get away with it well why not" - [the doctor] works the system a bit'. Both apparently felt that the doctors concerned were behaving inappropriately at the time of the attempted coercion and that they, therefore, felt confident in their refusal to take part in the licence breach.

The second of the two types of licence breaches that emerged from the data, as mentioned earlier, is 'illegal substitution'. This is where a health service manager (who may in some cases also be a nurse remote x-ray operator) chooses to allow a remote operator to provide a service instead of the radiographer in order to make a financial saving for the health service. This is spoken of in quite strong terms by several of the radiographer informants (RR.3, 4, 12, 13, 17, 18). It was suggested by some informants that it is the cause of tension and conflict between rural radiographers on the one hand, and remote x-ray operators and health service managers on the other, and so it is considered again under the key concept of 'Professional Roles and Relationships', in the context of the theme of 'Interprofessional Conflict and Collaboration' (Chapter 8, p.239-241). In some cases illegal substitution apparently occurs when the radiographer is on-call for the hospital, as described below by one of the radiographer informants, which is a clear breach of licence Condition 1.

> RR.4: Well he'd go off duty at five and at half past five or ten past five a patient would come in so the remote operator would do it because she was still on duty and the only reason she did it was to save money and that was always an issue with me with a lot of remote operators in a lot of these areas, especially in single manned places that the only reason they give the remote operators a licence is to save money, and I've said I've never been against remote operators if it's not just put there to save money because that's why the majority of them are there.

The issue of using remote x-ray operators as an apparent cost saving measure is also discussed under the sub-theme of 'Money, power and isolation' in Chapter 9. However, inappropriate, if not illegal, substitution for other reasons was also described, such as in the following examples:

> RR.4: Well what used to happen there that used to annoy me, we used to go out there I think twice a week I can't remember to [place name 1] from [place name 2], and we'd get there and half an hour before we got there one of the

remote operators had done an examination and the reason given is because the doctor told them, he couldn't wait, and that's a poor excuse, that should never happen. And, another thing that would happen, while we were out at [place name 1] we'd come back to [place name 2] and the remote operator had done something because we were in [place name 1] which was non-urgent and she said, the excuse she used to use was "I like to keep the service going".

RR.12: I've now got four [i.e. remote operators], and I've just been away for a week and they said, "oh, we don't need to get a radiographer in", right, and this happened, for this is the third time at [place name] where the girl has gone on pregnant leave, maternity leave, and, oh, "we don't need to get a radiographer in, we'll get a remote operator in", and now I'll tell you what you're doing, I don't know if you're aware of this one, it's a doozy, oh yeah, the radiographer's available but no we'll use remote operators. Wrong call! And this is exactly what I was saying right back, where they are slowly taking over.

These two examples are at best at the borderline of compliance and certainly not in the spirit of the Radiation Control Act 1990 and the licence conditions. The breach is perhaps not a direct contravention of the conditions, although it is questionable whether 'reasonable inquiries' had been made as to the availability of a radiographer, as specified under Condition 1(c) (Table 2, p.20). Furthermore, it seems to give RR.12 grounds to believe that remote x-ray operators are 'slowly taking over' his territory by stealth.

Of all the sites where remote x-ray operators are employed, it appears that there are only three, or perhaps four, where this type of illegal substitution has taken place in recent times. Interestingly, these sites are clustered in one geographical region where the relationship between the radiographers and health service administrators is apparently often strained. Other radiographers, however, are aware of the problems experienced at these sites and rumours are widespread. For example, one radiographer said:

RR.13: Only at our sub-branch meetings for our radiography in this area, have I met people from the [Area Health Service name] area that seem to have a lot of issues with their remote operators. You know, things like calling remote operators instead of radiographers to save money, and things like that.

And, later in the same interview:

RR.13: Oh, training up as many remote operators as they can and then calling the remote operators to do the work of an on-call radiographer. To save the hospital calling the radiographer in and to save, and these radiographers are locally available. And, I've heard that the management in places, it's usually

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Nurse Manager, has been utilising the remote operators to save calling in a qualified radiographer.

RR.12 made reference to the fact that at the chief radiographers meeting in the particular region where disquiet about remote x-ray operators seems most common '… something about remote operators will be brought up at that meeting' regularly, which probably adds impetus to the rumours. It appears that if a problem occurs with a remote operator service at one location news spreads very quickly across the rural radiography community.

In spite of this, the majority of radiographer informants (RR.4, 5, 10, 11, 13, 14, 15, 16, 17, 18, 20), even some of those who were aware of licence breaches, expressed qualified support for remote x-ray operators at some point in the interview, so long as they stay within the boundaries specified in the licence conditions and did not impinge on what they perceived as the occupational domain of radiographers. Some typical examples of their comments in this regard are given below:

> RR.14: … the experience I've had with these remote operators is, they don't do more than what they should, they do what they think they should. Does that make sense?
> I: So, they do what they think they should in light of the patient's presentation rather than within the licence conditions?
> RR.14: You know and I don't think they take advantage. I never see anything that's un-called for, that was additional.

> RR.17: I feel very strongly on the point that if a radiographer is available and can take the x-ray, he's the one that should do it. That's the proviso, but if he's not available, or if he or she is not available I'm not particularly against or adverse to someone who's got some training to give, provide a reasonable radiograph in a remote situation.

> RR.18: I think in its place it's a good idea. It's all misuse of the, of the concept that bothers me. Like here, and I've heard of other radiographers with similar problems where they have operators with the idea that they're not going to use the radiographer anymore.

While licence breaches do apparently occur at some sites, the majority of remote x-ray operators seem to work within the licence limitations. As one nurse remote operator said:

> RN.8: None of the girls [i.e. nurse remote x-ray operators] who do remote, as a remote operator here, have any, any intention of becoming, of doing anything outside their licence.

Nevertheless, some radiographers remained concerned that licence breaches take place and that their complaints are ignored. Indeed, the principal complaint that radiographers made about the role of the Environment Protection Authority was the lack of action taken against remote operators who had apparently breached their licence conditions (RR.1, 4, 9, 12, 17). Such concerns about perceived licence breaches are expressed in the following two quotations:

> RR.4: So I don't have much respect for the system because there are a lot of people that have been dobbed in. They know about a lot of people who operate without licences or a lot of people are doing things negligently. … But how many have actually had their licences taken away? Now I don't know if that's because the radiographer hasn't reported them but I would hazard a guess there's been a fair few that's been reported. But you see unfortunately then you get the clash where they start saying "well it's a jealousy thing, they're stepping on our toes". Well that might well be true, I don't know.

> RR.12: If we'd done as we said in the first place and controlled it as we said in the first place we would not have a problem. However, once they are released out onto the public there's no real control of them. You can report incidents to the EPA until you're blue in the face and nothing happens and unless we get off our bums and go and teach them how to do our job better, um, it just gets worse.

It may be noted that these are the same two radiographers who were outspoken about illegal substitution and their complaints to the Environment Protection Authority were about the issues described in earlier quotations. RR.4 has apparently had the experience of being told that his concerns were invalid because they were only about 'a jealousy thing', apparently meaning that it was only a professional boundary issue and therefore not a real problem. He appeared to see this as an insurmountable counter argument and so he disowns that position. RR.12 is the same radiographer who sees the remote x-ray operators as 'taking over', and so he apparently sees the situation as out of control, his complaints having been ignored by the Authority. Despairingly he suggests that the only way around the problem is to 'teach them how to do our job better'. This is an interesting observation in light of the fact that one of the means of professional domination is limitation by control of the educational curriculum of a potentially threatening occupational group (Willis 1989). Another radiographer made the observation that:

> RR.17: … I don't feel threatened by that person providing they don't have open slather and that they are still accountable to medical imaging. It's the

way that I feel about it. So, that possibly is a positive spin-off because we are then the educators and we have the control.

He goes on to suggest that there needs to be '… some vigilant controls on them to make sure they are answerable to radiographers'. Similarly, several of the radiographers who express concern that the Environment Protection Authority does not have enough control over remote operator licensing suggest various aspects that could be managed better. These include: greater supervision by radiographers, including provision of continuing education (RR.1, 9, 10, 17); knowing more about the equipment they are using, including maintenance, quality control and safety aspects (RR.3, 4, 9); and, making licences 'site-specific' and non-transferable while limiting the number of licences available at each eligible hospital (RR.4, 9, 12). In the following quotation, one of these radiographers explained his vision of how remote x-ray operators might be better controlled through a better organised system of supervision and skills maintenance:

> RR.9: I think they've got to be licensed and they've got to be supervised some how. Doesn't have to be by, by their nearest radiographer. It could be, I mean I'm not uncomfortable about them having a centre of, you know, I'd be quite happy if, you know, if they wanted to split the state into two halves and say "We're going to base the supervising of remote operator person at Tamworth and one at Dubbo and these people slowly travel around and give, do some tutoring and some guidance and that kind of stuff.

## Competency Requirements

The next theme under this key concept of 'Dimensions of Practice' relates to the criteria that define the educational requirements and the competency of remote x-ray operators to perform radiography. In general terms the competency of an individual to perform a role or task can be defined in terms of whether they posses the requisite knowledge, skills and abilities according to a prescribed standard. In this theme the competency of remote x-ray operators is compared to that of radiographers to perform the same or a similar role. There are no published standards describing the expected level of competency of remote x-ray operators, however, the Australian Institute of Radiography has competency-based standards for accredited practitioners of diagnostic radiography (AIR 2005, see Table 4, p.42). Many of these standards broadly reflect the common or core characteristics of

health professionals, however, it is particularly within the standard titled 'Knowledge and Understanding' that remote operators may perhaps fall short of the level of competency of accredited radiographers. Nevertheless, it could reasonably be expected that they would possess the requisite knowledge, skills and abilities to perform plain film radiography in the examination types for which they are licensed.

It should be noted that there is considerable overlap between this theme and the theme of 'Image Quality and Standards', although the latter is concerned more with outcomes and evaluation, while this theme is about the process by which those outcomes are achieved. It is described under four sub-themes: 'Basic knowledge'; 'Radiation safety'; 'Experience and adaptation'; and, 'Continuing education'.

**Basic knowledge**

There is a perception expressed by several of the radiographer informants that remote x-ray operators do not posses the requisite knowledge to perform radiography in the same way that radiographers do. Although some aspects of their basic knowledge, such as the GPs' knowledge of anatomy and mechanisms of injury, or the nurses' knowledge of patient care, are considered adequate, their understanding of the principles of radiographic image production was considered to be below an acceptable standard. Mention was specifically made of knowledge about the operation of the equipment, manipulation of exposure factors and of the 'photographic' process. For example, in comparing his own level of knowledge with that of remote operators, one radiographer (RR.6) said, 'you can have ions, lights and the rest of it but that means you've got to know why they work and how they work to be able to use them effectively …'. The same radiographer later made the observation that:

> RR.6: The main elements, well you've got, I hate to say it and I couldn't understand why we did it at the time, but we got basic physics, you got basic equipment, you got basic positioning and then of course the basic exposure practice, I suppose all jump to mind. Obviously included in the physics is the safety aspect. Patient care, you know pregnancy, gonad protection.

While this radiographer was reflecting on what he perhaps perceived as some similar gaps in his own knowledge, it seems from the data that commonly perceived flaws in the remote operators understanding of radiography are what radiographers might regard as

the elementary, technographic aspects of radiography (RR.1, 4, 6, 8, 13, 15, 20). Positioning was also seen as wanting but perhaps not to the same extent as basic knowledge of the application of radiographic technology, in which it was perceived that remote operators' education was lacking. This opinion is reflected in the following sample quotations from two of the radiographer informants:

> RR.4: And of course what nursing staff member learns photography? They don't learn the ins and outs, they don't learn the physics. They really don't know their anatomy and physiology that well.

> RR.13: I perceived at the time that most candidates were good on anatomy, needed some demonstration of positioning on that anatomy, but they knew nothing of the photography process. Darkroom, simple things as fogging film with light, you know, and they had to be explained, how the individual chemicals worked, the small processing units.

In both of these quotations, as well as others, a distinction is made between the remote operators understanding of the fundamental principles of image production and their appreciation of anatomy and positioning. However, it was also implied by RR.4 that their knowledge of anatomy is also not as good as it should be. RR.13 felt that the remote x-ray operators know the anatomy but their understanding is not such that they can visualise it well enough to position patients appropriately to produce anatomically correct radiographs. He explained by giving the example that they become confused about the positioning for 'an ankle as opposed to a foot'. He then goes on to complain that, as a result, they do 'a different lateral for every shot' and that 'the ankles were looking more like feet', suggesting that the remote operators' positioning technique is fundamentally incorrect, as well as being inconsistent. The result, in the example he used, is that what is supposed to be a lateral view of the ankle looks more like a view of the foot.

Problem solving in relation to exposure selection was identified as another area of weakness. This is perceived as important because of the effect on image quality and, as discussed below under the sub-theme of 'Radiation safety', because of the need to repeat incorrectly exposed radiographs. For example, in response to a question about what remote operators seem to find most difficult, one of the radiographers said:

> RR.15: Exposure charts and I can't, I can't get through to either of these two doctors that one book cannot have an exposure chart for Australia. Every

machine's different and I've got my exposure chart on my little, my file. But they don't want to use them …'

RR.13 also makes reference to this problem, saying that the remote operators sometimes call him when they have made a mistake seeking advice about exposure selection:

> RR.13: And they say, "Oh, no, the lungs are okay, but they're, it's just too dark." And you have to estimate what exposures do you think, because that was the initial thing. I didn't think some of the staff appreciated what the difference 5 or 10 kV [kilovolts] could make to a picture.

Some of the remote operators freely acknowledge that manual exposure selection is difficult for them to grasp (RN.2, 3, 4, 8; GP.1, 5), particularly for chest x-rays, where there is a wide variation in tissue type and thickness. In addition, the acquisition of a new x-ray unit presents them with the challenge of transposing exposure factors from one x-ray unit to another, as mentioned by GP.1 in one of the quotations below:

> RN.3: In fact sometimes I've had to use the lateral exposure to get a decent x-ray. I've done one three times and thought I won't do any more I'll give too much radiation stuff and it's just still pale, really pale and so I've found I nearly always go up about ten than what it actually says to get a good x-ray, chest x-ray. It's, bones and everything seems fine, it's just chest x-rays.

> RN.8: For instance we had a lady here who was chronic emphysema, she's recently died. I took an x-ray of her chest doing exactly the same as what [the radiographer] had done and there was these black patches where her lungs were supposed to be and I, you know, I came out and I took the doctor aside and said "Look, am I doing something wrong here", I said, "but there are very little lungs showing up here." And he said, "Pat that is the patient's lung."

> GP.1: We've got a new machine and learning a new machine has been a bit interesting, but then …..
> I: Interesting in what way?
> GP.1: Getting a feel for the settings with it.

The above quotation from RN.8 also suggests that she doesn't understand the effect that emphysema has on the density of lung tissue. This is a concern because it is elementary knowledge for a radiographer. Lack of basic knowledge such as this means that remote x-ray operators often appear to have difficulty when they have to deal with more difficult patients or extraordinary situations that extend them beyond the limits of their understanding, as discussed later under the sub-theme of 'Experience and adaptation'.

The inadequacy of remote operators' basic knowledge was considered by several radiographers to be in part a consequence of a lack of training in radiography (RR.1, 3, 4, 12, 14, 15). As one of the radiographers (RR.4) said, remote operators should not be expected to '… learn four years work in a week'. Another said:

> RR.3: There's a lot of things that are involved in a radiographers' training that perhaps is not in an ROs' [remote operators] and I just think that they think with a number of days training that, you know, you come out the other side knowing everything you need to know and I do have some reservations about whether that's correct.

There is apparently a perception that remote operators are trained to do the same job as radiographers and, further, that the only requirement to achieve that standard is to complete the course itself. However, the stated aim of the course is to:

> … provide non-radiographer health professionals with the basic knowledge and skills upon which to develop a deeper understanding of remote x-ray operator radiography so that they can provide a limited radiographic service in health facilities where and when there is no radiographer available.
> [Course Information Booklet, NSW Remote X-ray Operators Licensing Course, 2005]

There is an assumption inherent in this aim that the remote operators' development will continue after the course has been completed, ideally under the guidance of a local radiographer. Furthermore, the course targets GPs and nurses, health professionals who have already completed a bachelor degree at university, thus having developed core health professional characteristics and competencies. Radiographer undergraduate education programs have much broader aims and objectives, encompassing not only core health professional knowledge, skills and abilities but also an extensive depth of knowledge of a wide range of medical imaging modalities, incorporating clinical practice components. The graduate outcomes of the two programs are greatly different in terms of the expected level of competency. In spite of the obvious differences in the educational aims and objectives of the programs, however, it is not surprising that some radiographers, who may have a limited understanding of pedagogical theory, are critical of the suggestion of equivalency. This may be seen as a mechanism that they use to defend the integrity of their own professional education regime and accreditation system.

At the same time as some radiographers are critical of the perception that remote x-ray operators are qualified to do their job, some of the same radiographers refer to them as

having skills about equivalent to those of a first year radiography student (RR.4, 10, 13).
For example:

> RR.4: I have students that come through here that have to work under my
> licence that can't operate on their own, and I would rather have a first year
> student radiographer x-ray me than a remote operator, and a lot of the students
> get quite upset with the fact that a nurse can go out, or a doctor can go out
> after doing a week's course, and start x-raying people willy-nilly unattended
> and yet students can't.

Thus, when RR.14 observed that 'you can't sort of get those things in five days of training, compared to, you know, a three-year degree and a year as an intern. You can't pick up those things', it appears that she may, in fact, be quite correct, when considered in the light of the stated aim of the Remote X-ray Operators Licensing Course.

**Radiation safety**

Radiation safety is such an important component of knowledge for both radiographers and remote operators that it stands alone as a sub-theme under the theme of 'Competency Requirements'. It is the fact that radiographers and remote x-ray operators are using a technology that is potentially harmful that creates the need for its use to be regulated and controlled. As one of the radiographer informants pointed out:

> RR.9: So because it's fundamentally dangerous we've always had this
> responsible view of it. … part of that is so that there's an accountability back
> so that people aren't running around everywhere taking x-rays.

Furthermore, together with image quality, radiation safety forms an essential component of the radiographers' expert role, the two concepts being inextricably linked (ICRP 1991; Smith 2000). Again, as one of the radiographer informants said:

> RR.3: I don't' know what the course that ROs [remote operators] do involves
> but no doubt there would be a component of radiation safety in that it
> certainly is quite a substantial part to what radiographers do …, and I think
> probably that's what it comes down to a lot of times is that, is that experience
> and knowledge and even to the point of not having to redo something, having
> a good idea of exposure factors, absorption coefficients and you know using
> maybe a high kV [kilovoltage] doing a pregnant abdo' [abdomen].

There are conflicting views expressed about whether or not remote x-ray operators possess sufficient knowledge about the danger of x-rays and the safety issues involved.

Some radiographers felt that the remote operators lack basic knowledge in this area and thus represent a risk 'of overexposing the population' (RR.16). For example:

> RR.8: It frightens me a little bit, with someone with three weeks worth of training can actually take over an x-ray machine and produce radiation. It's the radiation side of the field that I worry about.

Others suggested that remote x-ray operators are generally aware of the dangers and are perhaps even more diligent about radiation safety than some radiographers, the latter having become complacent after years of performing radiography. One radiographer (RR.13) said that he had met most of the remote operators in the region and that as a whole they are '… very conscientious and they're very aware of radiation safety', while another radiographer commented as follows:

> I: What about radiation protection issues?
> RR.14: They're actually probably better than I am.
> I: Right? Okay.
> RR.14: In all honesty!
> I: How does that make you feel?
> RR.14: I'm quite happy with, you know, look if I've got a mother or a father in with a child, they're definitely covered, you know. Well, it's one of those things, it's one of those things we all know we should do but very few do.

One of the greatest concerns expressed by radiographers about remote x-ray operator radiographic practice is that it apparently results in examinations having to be repeated unnecessarily (RR.1, 4, 10, 13) with the most common reason for the concern being the increased radiation dose to the patient (RR.1, 3, 12, 13, 14). For example:

> I: So you find that as the most troubling aspect of these limited licences is that they could be getting diagnosis wrong?
> RR.3: I suppose yes, and ending up that the patient may be transferred away from wherever they are remotely and perhaps needing that whole examination done again anyway because perhaps something's not sufficient, whether that be an exposure or positioning or something that requires the examination to be repeated somewhere else. So, again that's sort of doubling up.

> RR.12: But if they're really bad why bother having remote operators taking examinations when they're going to get sent up to [the nearest regional referral hospital] anyway? So why do we have that, that um, nurse doing the radiation? What's the ratio according to the survey in England? You have a one million chance of dying from each time we push the button!

RR.13: I don't know how many images, that's the trouble, I don't know how many images it's taken to get the images I've seen, which worries me.
I: Yeah. So, it worries you from the radiation dose basis?
RR.13: Yes, that's right.

In the latter quotation the radiographer is making the same point as was made by the retired radiographer who was interviewed to gain background information about remote x-ray operator program (Chapter 2, p.25). It is not possible to tell how many radiographs have been rejected by the remote operator before they finally get one that they find acceptable. However, apparently at least some remote operators are aware of their limitations and restrain themselves from needlessly repeating exposures (RN.1, 2, 4, 7, 9; GP.2, 4). Again, some sample quotations are given below:

RN.1: I don't think I'd be mortified to find that I didn't have good enough x-rays to suit the orthopaedic surgeon. I'm quite the opposite. I'm usually rather chuffed to find that he was happy with what he got and that the patient didn't need to go for further x-rays.

RN.2: I'm content because I don't take a lot of pictures. If I get a picture, a picture that's good enough to see what they need to go on and they'll need more films then I don't take any more, I don't overexpose them here and then send them on to be exposed.

GP.4: So in that situation if I can get enough to make a decision I don't worry about repeating views or whatever, I mean that can be done somewhere else or here by [the radiographer] at a different time.

In these quotations there appears to be a presumption that most patients will have to be re-x-rayed. This is substantiated by a sole radiographer at a remote location where the remote x-ray operators provide a back-up service when the radiographer is absent. It was said that '… the patient's nearly always going to have another film as soon as I get back' (RR.10). However, further accounts of remote x-ray operators deciding not to repeat exposures unnecessarily are given below under the next sub-theme.

**Experience and adaptation**
Competency was commonly referred to by informants in the context of experience. It is apparent from the results and analysis above that there is perceived to be a difference between the radiographers' knowledge about radiography and that of remote x-ray operators, however, perhaps the more important difference is experience with a variety of

patients with various clinical presentations. The observation was frequently made by both radiographer and remote x-ray operator informants that without considerable experience remote operators have difficulty problem solving and adapting techniques for the more challenging examinations and patient limitations. As one radiographer (RR.11) said, '… they aren't qualified, or have very little qualifications, and what I do is fairly complex'. Other radiographer informants made similar observations about the ability of the remote x-ray operators to adjust to the patients' limitations, such as in the following quotations:

> RR.7: They know the basics and they know the positions in the books, which every time you can tell when they've done them 'cause the book's out, and they've got to get it like that, now the fact that it's a fracture is irrelevant, the book says I must get it like this, so I will get it like this.

> RR.20: I don't think they've got the expertise to know how to fix it when it's not a good x-ray. So yes, they do critique their own films, "Yeah that's okay, that's not", but they don't know how to get it from 'not' to 'okay'.

RR.7 made the point that not all examinations can be performed as they are described in the textbooks, especially if the patient has a fracture, while RR.20 expressed the belief that there is considerable knowledge and skill involved making technique corrections when a radiograph doesn't look like it should. In addition, because they apparently have limited radiographic problem solving ability and lack the versatility of radiographers, in some cases remote x-ray operators fail to do a full and comprehensive examination, as suggested by one of the radiographer informants below:

> RR.20: We do, we use it to show the bones, you know, all the angles. Not just to show the fracture, whereas a lot of the times you'll see the fracture but that doesn't give you a lot of information. You need to know from the other views what sort of displacement or what sort of angulation and all that sort of stuff. So, they will stop before they get to that stage.

The consequence of doing a less than complete examination by doing a limited series of views is that fractures are sometimes missed, as in the case described below, which was one of several 'atrocity stories' recounted by radiographers about poor quality remote operator radiography.

> RR.2: An example was a fractured patella and the doctor had only taken a lateral and an AP and it hadn't shown up and the guy came down a week later and had a fracture. A lot of things hide. You do a couple of views and you can see a very subtle change but…. That was one example but there's probably a

few more because they don't take, they just take the basic views and they don't sort of see the subtle changes when you need to get a few more views.

Several of the informants, both radiographers and remote x-ray operators (RR.9, 10, 13, 16, 20; RN.4, 8; GP.5), commented that remote operators do not do enough radiography to acquire and maintain a broad range of radiographic competencies and they apparently struggle just to maintain a basic set of skills. One of the radiographers, who was working part-time, made the following comparison between herself and a local GP remote x-ray operator:

> RR.20: [The doctor] might do, he may do between one and five x-rays in a week, but I mean we're doing between ten and thirteen each day and if you're working two to three days a week you're doing thirty to fifty a week. So, you know, huge difference in skills anyway, plus our three years of training to get there anyway.

Although there is no published data available, a full-time sole practitioner radiographer would generally be expected to see between fifty and one hundred patients per week. The point, however, is that because the GP lacks experience, as well as lacking the understanding of radiography that comes from 'three years of training', he doesn't have the same skills as a radiographer. Another of the radiographer informants explained this lack of experience by drawing a useful analogy with what might be regarded as a simple and familiar competency, that of driving a car.

> RR.9: … you know, when you accelerate, clutch in, move gear stick, clutch out, accelerator in. They do it like that, 'cause they don't do it often enough to smooth out steps so it becomes a harmonious curve.

One of the other radiographer informants suggested that '… a lot of radiography is just familiarity' (RR.10) and because remote operators are relatively unfamiliar with radiography '… they haven't got a routine'. Others also suggested that familiarity and routine are important in the practice of radiography, the best illustration of this perception coming again from the interview with RR.9, as follows:

> RR.9: I have a theory about radiography. It's that there is no one brick, big brick, on how to take a good x-ray. Right? There is no thing that gets you a seven out of ten for your x-ray.
> I: Yeah.
> RR.9: It's a whole lot of little steps. Just to start at the bottom, get the right patient in the room. Do the right test on them. You know? …

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[at this point he described the radiographic process with a stepwise approach] So there's a whole bunch of things that you can do, some of which are automated, you see and radiographers automate a whole bunch of those steps. In a way that people who work with them don't really see.

Another radiographer (RR.14) provided further support for this automated approach to radiographic practice, in suggesting that remote x-ray operators don't appreciate the complexity of what radiographers do because radiographers make it look easier than it is: '… they don't understand all the little things that we do, that we don't even think about because we've been doing it for such a long time' (RR.14). It is apparent that there is an element of radiographic practice that is intuitive for experienced radiographers and, because remote operators do not practice radiography frequently enough in a variety of circumstances, they are unlikely to acquire the same level of proficiency. This perception is further supported by the comments of some of the remote operators, who often portrayed themselves as much less adept at radiography compared to the radiographers they have contact with. Some examples of this perception are evident in the following quotations:

GP.4: No, it's not easy, yeah, and it's something that's taught but still sometimes it's very difficult, tricks that you would have learnt over, or you learn when you're doing it nine to five, five days a week there's no way in the world I'll ever know.

RN.7: So I'd say whilst you might get reasonably similar pictures in the end the approach would be a lot longer, probably not as easy for the patient, especially if the patient has a fracture.

RN.10: You guys [i.e. radiographers in general] can get in, move your patient, get it positioned, do the x-ray, and get them comfortable again. It'll take me five or ten minutes to do what'll take you a minute to do. You know, so you're forever conscious of that, and where it takes you a little while to get used to moving the table and not the plate and the film and things. It's different for remote radiographers [i.e. remote x-ray operators].

While both are performing a task that is outside their traditional roles, it was argued by some informants that nurses and GPs approach radiography from different perspectives. RR.9, for example, suggested that nurses, more so than doctors, are used to working in the stepwise fashion referred to in the above quotation and are more used to following instructions, protocols and guidelines. He suggested that this may be advantageous when it comes to performing radiography and that the nurses may, therefore, adapt more easily

to radiography, the basics of which he considers to be a matter of following a series of steps in a linear fashion. RR.8 said that he believes that '… sometimes a little too much understanding is a bad thing as a remote operator …' and that consequently doctors are more likely to step outside the defined 'margins' compared to nurses. RR.9 said about nurses that 'they do what we teach them', meaning that if they are given a set of stepwise instructions and clear criteria to meet they will attempt to match their performance with the standards. RR.9 also said that he believed that GPs practice more autonomously and because they've 'got it by the throat' they are more likely to 'take short cuts'. This argument was support by RR.11, who said, again with reference to the linear practice model:

> RR.11: I would think that the nurse would be probably more diligent in following the, the steps and procedures. The nurse would be more likely to follow a flow chart and ensure that step 1, 2, 3, 4, 5, 6 have been done, whereas the GP may well just do step 5 and carry on.

Some of the comments made by the nurses give further grounds to the argument that nurse remote x-ray operators perform radiography according to the instructions they have been given and tend not to deviate from that. One of the nurses said that 'I'm doing what I've been taught to do and doing it more or less by rote…' (RN.4), and another said that '… I would have to go by the book exactly …' (RN.7). The question of GP compliance with guidelines is raised again later and discussed in more detail in relation to image quality evaluation, with strong supporting evidence that they are more inclined to take short-cuts, as suggested above.

It appears that, through the combination of a more extensive radiographic education and experience, radiographers have attained levels of radiographic competency that cannot be paralleled by GP or nurse remote x-ray operators. As another radiographer said:

> RR.18: … the radiographer can still manage to get the films in the difficult circumstances where they couldn't and that's when they recognize, you know, the radiographer does have quite a bit of skill in that area.

Some of the GP remote operators (GP.3, 6, 7) acknowledged the higher level of radiographic competency of the radiographers, with comments such as those in the following quotations. Both of the GPs quoted below acknowledged that on occasions

when they are unable to make a diagnosis they refer the patient to a radiographer for further investigation.

> GP.6: Yes, you know, yes sometimes if I am not happy with my exposures, if I couldn't see the thing, then I do particularly you know if, say a hairline fracture and things like that, when I do the, when I need the second exposure I send it to the radiographer. Because it's not an emergency one, so I send it back to the radiographer.

> GP.7: Of course a radiographer's skills are different to just taking limb x-rays, you know. There's a difference between a radiographer and a GP taking x-rays. Radiographers are trained to take skilled x-rays to difficult projections, or difficult diagnoses and images …

Possibly the most common limitation encountered in radiography is the inability of patients, because of their physical condition at the time of the examination, to achieve the required position and then maintain that position while the exposure is made. This is supported by evidence that positioning errors and patient movement have been shown to be the cause of reject/repeat rates of the order of thirty to fifty percent (Eastman 1996; Dunn & Rogers 1998; Lau et al. 2004). In this study, the observation is made that nurses apparently find it very difficult to position patients who are in pain as a result of their injury or condition. It is suggested that this is because their basic training and instinctive response to a patient who is in pain is to relieve their suffering, while radiographic positioning may increase the patients' pain and discomfort momentarily. For example, the following quotations from some of the nurse remote operators illustrate this:

> RN.1: Somebody who's in a lot of pain trying to get the correct position is the hardest thing for me because sometimes I've got pain relief I can give them, and sometimes I've got to x-ray them before they've had too much pain relief or before it works or it's not adequate.

> RN.2: That's the only thing that threatened me about it. You know when you get people in that are really traumatised and in really difficult circumstances to come in and try and get a film on them …

> RN.9: One thing I do find that is very awkward for a nurse to do is sometimes to be firm enough in the x-ray department because radiographers are known to be reasonably cruel people to get people into the positions they want to get the views they want, where nurses we tend not to want to hurt a patient, not even briefly. It's the instinct not to.

RN.10: I struggle with the positioning. Just that side of it, because I don't want to inflict pain. My job is to alleviate pain and I know when I do an x-ray I'm going to cause some grief because I have to reposition an ankle or something like that and I get really like this [grimacing] when I have to do that.

The nurses' more gentle and caring manner was described by RN.7 as a more 'nursey approach', or having 'somebody who's a little bit more empathetic about their pain …'. Further, RN.7 perceived radiographers to be less caring, saying that '… they may not be as "touchy", asking the appropriate questions and giving the appropriate reassurance to a vulnerable, sick person'. Interestingly, in one of the above quotations RN.9 described radiographers as 'reasonably cruel people' in her experience of years working in intensive care and coronary care, adding that she has wondered whether it's the sort of career that '… attracts somebody with that impatient, often brilliant, mentality or whether it's something about the job that's aggravating'. This is a relatively isolated opinion in the context of this study, although it perhaps reflects a stigma that the radiography profession in general carries in being regarded as more technographically competent than being regarded as a humanitarian, caring profession.

It may be argued that one of the challenges of radiography is to adapt to the patients' limitations and find techniques to perform the necessary radiographic projections correctly in spite of the temporary pain and discomfort that might result from moving an injured body part. Radiographers apparently do this with a combination of knowledge and experience, becoming competent in what RR.10 described as ways of:

RR.10: … how to move a patient and how to do it in a way that's going to cause the least pain. And, how to get the patient to trust you enough in thirty seconds, that what you're going to do is not going to make it worse.

This radiographer seems to suggest that an important part of radiographic competency is gaining the patient's confidence in order to adapt the technique to the patient's limitations. A similar observation was made by Candice Kabler (1986) when she referred to the need for radiographers to have high level communication skills so that they can quickly establish a meaningful professional relationship with their patients, given the limited time they spend with them (see p.48). There is a perception evident in some of the data that nurse remote x-ray operators do not have the skills and experience to do this and

so they approach radiography too tentatively. RR.1 makes this point very clearly in the following quotation:

> RR.1: One of the things that I have always said to remote operators, particularly to the nurses, "You've got to change caps, you've got to get rid of your clinical nursing caps of being caring, giving, nurturing sort of people, put on your radiographer's cap of wanting to get a really good clinical film. You don't want to hurt your patient, but you've got to push them." You get patients holding their hand, can't stand up, "I really can't do this, I'm too sore." You sort of talk to them, you talk them through it and you help them and it's amazing how people will push themselves that little bit further so they can straighten out their elbows.

Thus, RR.1 suggested that for nurses to do radiography well they have to put aside their 'caring, giving, nurturing' ways and become more like radiographers in being able to encourage the patient to do what they need to do to get a 'good clinical film'.

Doctors, it seems, do not generally suffer from the same inhibitions as the nurses in this regard, prompting RR.17 to observe that the GPs do a better job because '… they understand the anatomy of it. They understand the trauma side of it'. This suggests that it is not only a matter of experience and communication skills, but that there is also a knowledge component to dealing with injured or seriously ill patients. This is perhaps knowledge that radiographers share in common with their medical colleagues. It has been suggested that interpreting the probable type of injury and the extent of that injury from the patients' clinical history is an important aspect of the radiographer's role (Egan & Baird 2003; Lam, Egan & Baird 2004). By interviewing the patients the radiographer is not only able to predict the nature of an injury but also understand the patients' limitations (Batten 1996). This was referred to by one of the radiographer informants in the following quotation:

> RR.12: … it's a very big part of our job, finding out the mechanics of what's happened and reading the request form, i.e. the history, and reading from that history what you have to do.

It seemed that several of the nurse remote x-ray operators interviewed in this study had limited knowledge of mechanisms of injury and resultant injury types. Although this was not specifically investigated, they appeared inclined to overestimate the patients' limitations and some nurses (RN.1, 2, 5, 8) said that they were inclined to truncate the

examination by doing only one view if the patient was difficult to x-ray. This is justified by RN.1, for example, with the assumption that '… mentally I expect them to be x-rayed again', a point that was raised earlier in relation to radiation safety (p.119 & pp.122-124). In another instance RN.5 said:

> RN.5: I'll take one picture and if it's you know an obvious fracture I'm not going to put that child through any more trauma, they can do it in [place name] if they want to, but I'm sure as hell not going to you know, alright, you know, you've got a fracture you can get him out. It's not our problem.

Radiographers apparently have particular expertise in the field of medical imaging and appear to have the capacity to integrate the essential knowledge, skills and abilities to perform radiographic examinations even on the most difficult of patients. According to the Culmer model of radiographic practice (Culmer 1997), which is a patient centric model, they do this by constant reference to the changing needs and limitations of the patient. Thus, while radiography may be regarded as a linear stepwise process, as suggested by some of the radiographer informants, in the reality of everyday practice any of those steps may be altered at any time because of a range of variables, often beyond the control of the radiographer or remote operator. It appears that, because of their limited knowledge and experience, remote x-ray operators cannot adapt to the changes as readily as radiographers do, only being able to perform a limited range of views, provided they can follow a formula or recipe and the patients' needs do not stray too far from the textbook descriptions.

**Continuing education**

The final sub-theme under the theme of 'Competency Requirements' relates to the fact that, other than performing radiography regularly, the other way of maintaining radiographic competency is to undertake some form of continuing education. As one of the nurse informants said, if she was in the position of having to give up radiography for a time and then take it up again, 'I'm unlikely to forget the basics' and she'd 'certainly need a refresher' (RN.1). Similarly, one of the radiographer informants (RR.3) referred to one of the local nurses who had completed the training sometime ago '…but had never done any practical. Well, if I said to her today "we need you to work this week as a remote operator" then she wouldn't know where to start'.

As suggested under the previous sub-theme, apparently remote x-ray operators generally perform too few examinations to maintain a reasonable level of competency and yet there is no mandatory requirement for them to undertake any form of continuing education or quality assurance program to maintain their licence. As long as they pay their annual licence fee the Environment Protection Authority continues to licence them to perform radiography. The consequence is that the responsibility falls upon the remote operators themselves, often in collaboration with the local radiographers, to organise a program of continuing education. With no extrinsic motivation to do so, however, such programs are rare, as they require a considerable amount of personal commitment, and they are prone to collapse. For example, in the following quotation one of the radiographers explained how difficult it is to maintain a program, particularly when the effort seems unappreciated and other radiographers are apparently reluctant to help.

> RR.1: I've only ever given talks to nurse remote operators because they're the only ones that ever come to any of these courses that we've ever put on. Doctors have never come. Doctors claim to be too busy or they know everything.
> I: So is that your experience through the whole area?
> RR.1: Yes, through the whole area.
> I: Do you talk to any of the other radiographers about remote operators, like area radiographers?
> RR.1: No, not really. Not any more. We used to. It's just I was giving these, I did these courses for a year and they were going really, really well and there was a lot of interest and doing a lot of talks with other radiographers, blah, blah, blah, and then I sort of felt that, you know, when things get stale? I sort of felt that if another radiographer took it on they could have another sort of input. Take it from a different direction and then just keep it all bubbling really nicely. But no-one's interested in doing it. No-one's interested in helping out and things like this so it's all fallen into a bloody big hole.

In this quotation, RR.1 is critical of GPs for not attending the refresher courses she had organised, apparently because they were either too busy or were complacent, in her opinion. Indeed, none of the GP informants in this study saw a necessity for doing any continuing education in radiography. The one possible exception was GP.1 who conceded that perhaps there was a necessity for '… a day here where we all get together and, say, have a chat about our films and our technical requirements'. Most GPs, however, said that they were happy enough with the radiography they were doing and they did not have the time for continuing education, as in the following quotation from GP.5:

GP.5: Now, I think the person that takes lots of x-rays and is fairly happy with the majority of the quality. You are not missing too many diagnoses. You're not killing too many people. That's a fair start. Now, does going up to [place name] to do a refresher course, such as I did, or do six weeks of join-the-dots on the computer and then have a weekend hob-nob in [place name], or whatever. Is that going to improve my medicine? The answer's probably no.

This same GP was quite outspoken about continuing education generally and also said:

GP.5: The other thing too is that a lot of the CPD [continuing professional development] that's floating around is too damn hard. Not technically hard, but it is physically hard to get to. I can't be spending a day going to [place name] to chat with the radiologists over there, doing CME [continuing medical education] for radiology! I just haven't physically got the time or the inclination, to be quite honest.

These quotations reflect the commonly held perception of the GP informants about continuing education in radiography, which are: that it is unnecessary; that it takes them away from their work to places that are hard to get to; and, that it is too time consuming. In support of this perception GP.4 said that, 'It's a matter of time and priorities … I think there are things I'm worse at than the x-rays I do at the moment and I'd get more benefit from other courses'.

Several of the nurse remote x-ray operators (RN.1, 2, 3, 4, 7, 9) apparently felt that continuing education is, or could be, beneficial if it was available, making comments such as those in the following examples:

RN.2: I find the in-services that have been run every twelve months I find those really valuable and I actually feel I could go to those every six months. I do find those useful, even if I suppose you guys must think "oh, we go over the same thing all the time', but I find it useful just to be repetitive about it.

RN.3: Some of the things with positioning arms, hands with children and people who have got really bad fractures and can't get into a lateral or oblique properly, some hints. You know, some more handy hints.

RN.9: I pushed a bit periodically about more education but it doesn't seem to be happening. I would like it every now and again. Say a day in 12 months. Just to stir up everything you don't use very often and all that sort of thing.

In the above quotation RN.3 suggested some topics that she would like to know more about, specifically some 'handy hints' for dealing with the difficult cases such as those

referred to under the previous sub-theme. Both RN.2 and RN.9 suggested that some form of continuing education would be desirable at regular intervals. This suggestion was also put forward by some of the radiographers, with RR.10, for example, suggesting that it needs to be as often as once a month or at least 'a certain number of times a year' and RR.14 suggesting that '…every 12 months they should have a quick refresher. Just on the basic things: positioning; the way you put the film in the holder; and, where you place the names.'

One of the nurses (RN.7) suggested that it would be useful to spend some time in the x-ray department with the local radiographer, saying that, '… if I haven't done one [i.e. an x-ray examination] for so long that maybe she could let me do her next routine one or something like that', meaning that she would gain benefit from doing some examinations under the supervision of the radiographer. Another nurse (RN.4) suggested something similar: 'Maybe once a year we need to go and spend a day in a fairly, you know, full on x-ray department and just do it with somebody there giving you advice'. However, like the doctors, the nurses find that the greatest obstacle to continuing education is time, the common perception being that there is a need for '… a set apart time that you're going to have that time explicitly to talk about radiography' (RN.2), without the interruptions of the routine work.

## Image Quality and Practice Standards

The third and final theme under the key concept of 'Dimensions of Practice' is about the differing ways that the different health professionals involved in the provision of rural and remote radiographic services explained radiographic image quality. There is an apparent difference between the way that rural radiographers perceive image quality compared to remote x-ray operators, which one of the radiographer informants described in terms of how each interprets their role and consequently gained different perspectives:

> RR.8: They're probably not looking at it as closely as we do, and then probably not as objective as what we are, because they have other roles and they're sitting outside that role, so I think they feel that if they're presenting anything that's a bonus because there's no radiographer there.

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In this section the theme of 'Image Quality and Practice Standards' will be described under three sub-themes, representing the perceived interpretation of rural radiographers, doctors and nurses separately (see Figure 6). Each sub-theme is an amalgam of the opinions expressed by a range of informants from each professional group about how their own interpretations are similar or are different to the others.

The quality of a radiographic image is evaluated against a set of prescribed 'radiographic evaluation criteria' that have been developed over decades of radiography education and practice and are presented in radiographic textbooks (McQuillen-Martensen 1996; Ballinger 1999; Bontrager 2005) and reflected in course curricula, including in the Remote X-ray Operators Licensing Course (Smith & McKiernan, unpub.). These criteria are a standard against which each radiographic projection can be assessed and they are well known to radiographers. While radiographers aim to achieve this standard, they do not always produce an optimum quality radiograph because of various reasons, most commonly because the condition of the patient does not permit (Culmer 1997). Hence, there is a range of latitude within which a radiographer may consider a radiograph to be of an acceptable standard under the circumstances, even though it may fall short of optimum quality. This qualitative assessment is often represented in course notes by means of a visual analogue scale (Cox & Davison 2005), as shown in Figure 7. A radiograph that falls within the 'range of acceptable image quality' satisfactorily meets the evaluation criteria for positioning and technical factors.
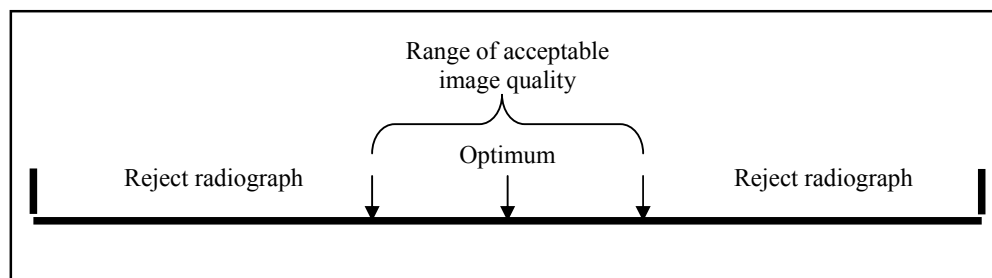


**Figure 7:** Image quality evaluation represented on a visual analogue scale.

While prescribed, objective and measurable standards of radiographic image quality exist (Hanley 1989; Manning, Bunting & Leach 1999), radiographic evaluation is largely based upon the subjective judgement of the observer. Each radiographer, radiologist and remote

operator must decide whether they will accept or reject a radiographic image under the circumstances of the particular patient's condition and the diagnosis they are attempting to make. Furthermore, the amount of error that individual observers will tolerate may also vary from one observer to another. As a result, although the optimum standard remains fixed according to the evaluation criteria, the quality of the radiographic image may vary from one examination to the next and from one practitioner to another. For this reason the resultant standard of image quality may potentially vary according to each professional group's collective interpretation of 'optimum' and perception of the 'range of acceptable image quality'.

**Radiographic image integrity**

The data suggested that, for radiographers, producing high quality diagnostic images is an essential component of their professional identity. It appears to be a core element of their practice domain and so might be regarded as a key competency within the 'Expert' role of the CanMEDS 2000 professional framework (see Table 3). This perception was evident in the comments of a number of the radiographer informants. For example:

> RR.6: Basically the films that I put in front of the radiologist are of the highest quality I can achieve under those circumstances, so that they can get the best report out for that patient.

> RR.8: … radiographers are presenting basically a craft. It's their craft, it's their chosen field. They should be presenting a decent film every time, which we should be. We're paid a gazillion dollars to do that.

> RR.17: It's all about image quality, and understanding, physics and the …, I mean that's what our profession's about, isn't it? Producing good images, thinking not only with the diagnostic side of it, the producing of it, the development side of it.

As suggested in the above quotation from RR.6, image quality is so important for radiographers that they relate it directly to patient care and quality of service. It was stated by another radiographer informant that the aim is to get 'it right the first time to the highest standard that you personally can achieve in that set situation' (RR.19). Consequently, it appears that the standard of patient care can be seen and evaluated in the terms of the quality of the image and, furthermore, image quality can be assessed

according to a set of extrinsic, prescribed radiographic evaluation criteria or a visual standard, as expressed in the following quotation:

> RR.6: Radiography is probably one of the few professions that has an end result that goes out and can be viewed and assessed as to quality and success. Plastic surgeons are the only ones that I can think of otherwise.
> I: It's quite visual then?
> RR.6: It's very much a visual thing. None of the other professions really have anything that there are standards, where they get good results or they get average results or they get poor results. They can write papers up about it but there's nothing actually there that is there for the next twenty years.

The permanency of the radiographic image was referred to by several radiographer informants (RR.6, 7, 11, 12, 13, 19), a point which was made by some by likening the image to a piece of art or craft. For example, in referring to image production RR.11 says that 'I'm conscious of the art in radiography as well as the technique'. Similarly, RR.7 likens the sense of ownership of the image to that of a craftsperson for his work, saying that 'it's a pride in your work, it's a pride in your craftsmanship I suppose'. Indeed, like a piece of art or craft the image bears the radiographer's signature in the form of their personally identified radiographic side-markers, as referred to in the following quotation:

> RR.7: You've got to get a feel for it and you've got to have a respect for it otherwise you can't learn it. It's like appreciating art I suppose, everyone has their own way of doing it. To me that is my work, that is my piece of art, you know, it's got my markers on forever. I've got my signature on the form, I want to be proud. If that goes to the Children's Hospital or, you know, Prince of Wales, somewhere I want it to be nice.

Another of the radiographer informants said that he had been told by his radiography tutor that the artistic or aesthetic aspect of image production is paramount, a lesson he had apparently not forgotten:

> RR.12: … one of the things he told us [referring to a radiography teacher from the past] was that it's treated as an art not a science. You've got aesthetics, you've got the tonings, you've got the positioning, layout, etcetera, etcetera. on your films and I've always approached it that way and found that even though to some general radiography is boring I find it can be quite interesting. You can do thirty chest x-rays and they're all going to be different.

This artistic side of the radiographers' role was referred to earlier, in Chapter 3 of this thesis. There is a perception that radiographs should have an aesthetic quality as well as

conveying accurate diagnostic information. While the radiographers may appreciate the role of the image in making a diagnosis, they also apparently aim to produce an image that is easy to look at and pleasing to the eye. Another of the radiographer informants commented that for some radiographers the aim of producing an aesthetically appealing radiograph may even become the central challenge, overriding the aim of making an accurate diagnosis:

> RR.13: … it's something the radiographers learn too, they initially try to get that decent shot but they're not having a good look at, for pathology once they've done it. They just want to get the pretty picture, I guess.

Some radiographers apparently expect that when performing radiography, remote x-ray operators should aspire to achieve this same visual standard, as suggested in the following quotation from a nurse remote operator:

> RN.9: He likes our x-rays to be aesthetically pleasing. Limbs to be exactly straight up and down on the film and all this sort of thing. Centring and all the collimation and things. We usually do reasonably well I think …

It can be argued that the reason for this high expectation is that radiographers are always producing a radiograph that is to be viewed by another person, the referring doctor and a radiologist. Unlike the referring doctor and the radiographer, the radiologist will usually not have seen the patient or had the opportunity to perform a clinical assessment, yet must describe any abnormal appearances and, if possible, make a diagnosis. Therefore, the radiographers apparently feel a sense of duty to ensure that the maximum amount of information is available to the radiologist on the images. They apparently see this as part of their core role and responsibilities and it implies correct positioning, accurate centring and collimation, correct exposures and consequent image density and contrast, and additional projections if necessary. This interpretation of the radiographers' role was most succinctly expressed by one of the GP informants who, in referring to radiographers in general, made the observation that:

> GP.3: … they're acting as a middle man, or a middle person, to make the job as easy as they possibly can for the radiologist to make the diagnosis and, um, unless they can give the radiologist every piece of information and as well as they can do it, um, first of all he might be, they might feel that there's a chance they may lose their job, there's a chance that they may get criticised and criticism might become part of their social … they're regarded as not good at their job. Um, so I think a radiographer has a lot more at stake when,

um, when they're doing the, taking the film because they're doing it for someone else. They're not doing it for themselves.

According to this GP, radiographers may not only be motivated to obtain optimum image quality for the sake of the patient but they may also have a considerable self-interest. The argument that radiographers might feel that their job is at stake if they don't produce high quality images is not evident elsewhere in the interviews, however, it does support the perception, even from this GP's perspective, that image quality is central to the radiographers' professional identity. What is evident, however, repeatedly throughout the radiographers' interviews is that they are conscious of the radiologists' opinions of their work and that they do not want the radiologist to mistakenly think that radiographs produced by the remote x-ray operators have been produced by them. This anxiety is illustrated in the following quotations from some of the radiographers:

> RR.13: Oh, I don't like their horrible images going through our reporting services.
> I: Does that insult your professionalism, or … ?
> RR.13: Well it's clear to the reporting radiologist that we didn't do those images. I've had the stationery made up stating on the printer cards "So-and-So Hospital". And, the request forms, I used to actually put the name of the hospital, "[name of a hospital]", so they're clear where they come from, and they're clear they're remote operators' films.
> I: And that's important to you?
> RR.13: They interpret them as such. They will say "Repeat examination required. Films were over-penetrated", for example, they will … But does it take away from yourself, professionally? I guess as a radiographer, but I don't interpret them as radiographers. It's a totally different service.
> I: Okay, so you define, I guess, professionalism in terms of the product that these people are seeing? That the radiologists are seeing?
> RR.13: Yeah, the quality of the image. The picture quality and the amount of views they produce as well as picture quality. Overall, the quality, diagnostic quality, that's imaging and it's the whole deal.

> RR.15: I do good x-rays, okay. I don't do crap and send away crap and expect radiologists to report on that. But his, there's the few that he wants sent away, I don't reckon I've ever sent one that I would be happy to say I'd done, do you know what I mean?

> RR.16: I don't want a slanderous or slur on my work. I take great pride. At times I'm told I'm a perfectionist. I don't think I am, but I do like to produce …, I don't want the radiologist compromised in that he can't interpret and make a good diagnosis on what is produced, so I do find it important to produce a reasonably high standard.

> RR.20: I always write on them [i.e. the radiographs] "Remote Operator".
> I: Why?
> RR.20: So that, I mean that's just professional. Personally, you don't want them to think they're your films. So, it doesn't change my professionalism in my own work, but the perceived professionalism of your work, definitely it can change, if they're not aware of who's done the films.

These radiographers apparently regard it as very important to distinguish the images that they produce from those that the remote x-ray operators produce. The quality of the radiographs sent to the radiologist for reporting is a reflection of their professionalism and, as RR.13 suggests, it is a 'totally different service', implying no sense of ownership or responsibility for the quality of the remote operators' radiographs.

Radiographers working in larger radiology departments have the opportunity to benchmark the quality of the images they produce, not only against the textbook prescribed evaluation criteria, but also with their radiographer peers and under the external gaze of radiologists. In support of this view one of the radiographers said that:

> RR.6: … in my situation where I'm within a group, I've got peers around me, I'm going for further education, I've got radiologists on my back if I'm not producing the quality keeps me up, makes sure that I'm maintaining quality.

It seems, therefore, that radiographers not only have a well developed appreciation of the image quality that they consider acceptable, but that they also expect that others will view and judge their work, drawing conclusions about the standard of their professionalism based on the quality of their radiographs. In this sense the reputation of a radiographer is perhaps related directly to the quality of the images they produce, as suggested in the above quotation from GP.3.

From the radiographers' perspective there is apparently a discernable difference between the radiographs produced by radiographers and those produced by remote operators. Radiographers describe these differences not only in terms of the aesthetic quality of the radiographs but also in terms of the radiographic evaluation criteria, which it seems the remote x-ray operators apparently fail to meet. According to the radiographers, the remote x-ray operators are producing sub-standard radiographs. Radiographer informants identifed some of the differences in the following quotations:

RR.2: Mainly just positioning, exposures, probably not overly anatomical views.

RR.10: One report says "I am unable to comment on this film due to it's poor quality. I would suggest a repeat", and that was the report. He actually wouldn't report on the film at all. When I looked at it, it was very pale. I think it was meant to be an ankle.

RR.15: They've always been, the position's wrong, the exposure's wrong, the collimation's wrong, something dodgy about it. There's no markers on there, there's no name, it's hand written name or stuff, and that's why I just mark it.

RR.16: Probably the density of the film. The coning isn't as sharp. Perhaps the size of the cassette that was used. What else? Perhaps that the views performed aren't true AP's [antero-posterior projections] or true laterals. And, probably the fact that, being a radiographer I've probably been performing additional views other than just the AP and lateral, or just a simple AP. I would perhaps, you know, there will be additional views.

RR.20: They put a film up, "Oh, okay the films are sub-standard. Why are they sub-standard?". Now are they, are they just too light or are they too dark, are they not including the areas of interest? Are they not quite lateral? Are they, you know …?

Some of the remote x-ray operators also recognised that their own radiography is sub-standard, although for them it does not appear to have the same implications as it does for the radiographers. It appears that they are concerned about the standard of their radiography because it is not central to their professional identity in the same way that it is for the radiographers. For example:

RN.2: I've never done a film yet that I've looked and thought this is a perfect picture.

RN.4: I guess particularly with chest x-rays, and there seem to be more of them, but particularly with chest x-rays, if you're underexposed or you're overexposed how much am I going to alter it by, you know, trying to, because we just don't do enough to be able to say, you know, this person's a lot more solid or whatever, this person's frail or whatever and, therefore, you're going to have to up the kVp [peak kilovoltage] or down the kVp and sometimes I know I do two x-rays on a person that should need only one.

GP.5: They tend to take smaller films and things than I do. They'd be able to get sixteen wrist views on the one cassette and I'd only get three or four. But yeah, but that's all technical stuff I guess. And, they're, so they're going to be

better and they've got twenty-eight different scaphoid views and I've only got three or four.

Some of the radiographers (RR.1, 4, 13, 14, 20) seem to be intolerant of the poorer quality images produced by remote operators. Apparently, in the radiographers' opinion, poor image quality equates with poor patient care because of the risk of missed diagnoses, as explained by the following quotations:

> RR.1: Yes, the fact that I get so pissed off and angry and want to jam some of these films down the local toilet that I get here, that's not professional. I should be bigger than that. I should sort of say "Well these people have got a problem I've got to tentatively and calmly go out and sort this out." But I get so heated and so angry about some of the films that I get here …

> RR.13: Chest images are probably the most common procedure performed by remote operators and they worry me if the exposures, the chest, comes back black. They're missing pneumonias. They might not miss heart size, enlargements and things like that but your pneumonias that are being not treated because the exposure's inadequate.

In the above quotation RR.1 voiced her anger and frustration at the poor quality of the remote operator films she sees, later saying that in spite of all the support she gives them 'we still get horrific looking films', which she says makes her 'really, really angry' because she believes that 'they're just not listening'. Like RR.13 above, RR.4 in the quotation below expressed concern about the quality of chest x-rays and made the point that if a patient needs to have a chest x-ray it should meet the same standard criteria no matter who performs the examination. On this basis, he was critical of radiologists who report on poor quality remote x-ray operator radiographs without reservation and without commenting on the poor image quality.

> RR.4: …a lot of radiologists will report films that are sub-standard because they say it was done by a remote operator. Well, to me that's no excuse. If you're having a chest x-ray you want a diagnostic chest x-ray and they should not make allowances because it's a remote operator.

It seems that the radiologists concerned apply a different standard to the remote operators' radiographs compared to those produced by radiographers.

There was also a tendency on the part of some radiographer informants to make concessions for poor quality images produced by remote operators. Several of the rural

radiographers interviewed expressed similar opinions about this (RR.4, 6, 7, 13, 14, 20) including RR.13, who expressed concern in one of the above quotations that pathology could be missed on poor quality images. Later in the interview he conceded:

> RR.13: It's hard to describe my opinion on what is being an acceptable quality for me and what's the same thing for a remote operator. I've got to appreciate the limited knowledge, experience that remote operators have.
> I: So you're happy to tolerate a little bit of a gap between …?
> RR.13: There's definitely latitude. Some of the procedures come out as good as we could do!

Here the radiographer acknowledged that remote x-ray operators have a different level of basic knowledge and experience, as explained under the previous theme of 'Competency Requirements'. However, he later went on to comment that, on occasions, remote operators do in fact produce images as good as those produced by radiographers, an observation also made by some other informants (RR.4, 9, 10; RN.3) but not an opinion that was widely or strongly expressed by those interviewed. Rather, it was almost universally considered that the images produced by remote x-ray operators do not meet the same standard of image quality as those produced by radiographers. For example, several of the informants made reference to the fact that remote operators do not produce 'a radiographer film' (RR.7), one nurse remote operator (RN.5) commenting that 'I'm not a radiographer. They can do all the fine tuning' and further explaining 'That's not my job'. Another nurse said 'I'm not trying to offer them a film of the quality that an experienced radiographer would' (RN.2). Other remote operators made the distinction between the radiography that they performed and 'proper x-rays' performed by radiographers, as in the quotations below, one from a nurse remote x-ray operator and the other from a GP:

> RN.3: … you've got a proper radiographer over there. Just don't worry about an x-ray here. We can decide to send them over there and they can have a proper x-ray or if you want me to do it here and send it because they're busy.

> GP.7: In your suspicious lesion, or if you are not sure, we follow it up. It's an acute emergency care, when there is doubt, if it is still there, we follow it up with further x-rays. Not ourselves, but get some proper x-rays.

It appears, therefore, that remote x-ray operators do not use the same criteria to accept or reject their radiographs as rural radiographers do. As one radiographer commented, 'they

obviously do have different priorities because they're not a radiographer' (RR.6). In terms
of the visual analogue scale in Figure 7, it is perhaps the case that remote operators
evaluate the radiographs they produce according to a broader 'range of acceptable image
quality' than radiographers and that they are not as conscious of the prescribed
radiographic evaluation criteria commonly used by radiographers. This raises the question
of what criteria remote operators use and how they apply them, which is discussed in
detail below under separate sub-themes for the doctors and the nurses.

Related to the high radiographic standard that radiographers often expect of themselves
and of others is the fact that some described themselves as pedantic or fastidious about
their work (RR.2, 7, 11, 14, 16, 18). For many of them it seemed that the radiographic
process extends beyond the production of satisfactory radiographs to include the
recording of information about the patient and examination, maintaining an accurate
filing system, keeping the work environment tidy, and maintaining the equipment. Such
things were described by some radiographers as essential to maintaining a high standard
of service and professionalism. Some examples are as follows:

> RR.1: …if they take on an extra arm to their profession, like doing remote
> operators, they should do it properly. Why do jobs and not do it properly and
> part of that is taking good x-rays, processing the bloody things properly,
> maintaining the equipment properly, that's just part and parcel of life. If
> you're going to do a job you do it properly.

> RR.7: I'm probably, I suppose it depends who taught you, but we were failed
> if we had the markers sideways or not straight or, yeah, bit pedantic probably,
> and I expect things to be, which is unfair because they haven't done much
> training, they haven't had much practice.

After complaining that the remote x-ray operators often fail to do the paperwork
associated with the examination and 'leave it for me to fix up on the Tuesday',
RR.14 asserted that there is a difference between the way the remote operators
approach their radiography role and the way a radiographer approaches it:

> RR.14: …even just doing something as simple as completing your paperwork,
> it is a real professional courtesy. It's like, if one radiographer to another
> radiographer, would never leave an exposed film cassette somewhere where it
> could be picked up. That's the 'professionality' of being a radiographer, and
> making sure that what you're leaving it right for the next person. And, I'd say

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that, you know, 99.9% of radiographers are like that. They're very considerate of their fellow workmates.

In this quotation the radiographer implies that the vast majority of radiographers are attentive to what may seem minor considerations, while remote x-ray operators are not. Because of what some radiographers see as this lack of caring about their work colleagues, remote operators are apparently considered by some radiographers to lack professionalism in this regard. Further, some remote operators are considered by some of the radiographers to be notoriously bad at the ancillary duties and there was a common perception expressed that doctors are less attentive than nurses to such apparently minor duties. The following extract from one of the radiographer interviews displays this perception.

> RR.16: … there have been a couple of occasions where [the doctor], you know he's been in 'cause he usually leaves the room in an absolute mess. I don't know how he manages. But there's chemical spills and there's dirty sheets still on the bed …
> I: Okay, now that's, that's interesting. Now why, why do you think [the doctor] does that?
> RR.16: Probably expects everybody else to run after him and clean up.
> I: Do you think that he …, do you think he maybe doesn't regard that as terribly important?
> RR.16: Probably. Probably in the scheme of things it's probably not important and probably it really isn't.

Another radiographer informant, RR.20, said that 'the remote operator doesn't take responsibility for the equipment …' and that this is true '… particularly in the case of doctors'. While above RR.16 suggests that one possible explanation for this casual attitude is that the doctor expects somebody else to do it, the reasons for this perceived difference are discussed below in more detail under the following sub-theme.

**The clinical question**

As mentioned earlier, remote x-ray operators appear to use different criteria from rural radiographers when deciding whether or not to accept or reject a radiograph. For the GP remote operators, the standard of image quality of the radiographs they produce is simply measured by whether or not they can accept or reject a clinical hypothesis. The doctors only wish to make a diagnosis, such as whether or not the patient has a fracture. For example, GP.1 said, '… I'm doing it clearly with a purpose in mind I think I've only once

not been able to get a film to be able to show me what it was that I needed to know at that time'. The clear purpose is to get an immediate answer to a clinical question.

The data suggest that where a radiographer may repeat an examination if the image does not meet the standard radiographic evaluation criteria a GP will perhaps not, as long as they are satisfied that they can see the anatomical region they are interested in. Therefore, the doctors are meeting a visual standard but not the same one that radiographers use and it seems that they consider it unnecessary to repeat a radiograph simply because of inaccurate positioning or inappropriate radiographic density or contrast. This perspective was common to all of the GP informants interviewed, with examples as follows:

> GP.3: If I can see what I'm trying to look for, then there's no need to go any further than that I don't think.
> I: Right, how important do you find a quality issue?
> GP.3: I suppose it gives you a sense of achievement to get a really good quality x-ray but as far as determining the management of whatever the particular problem is, as long as the quality is good enough to make a diagnosis I don't really get fussed about it.

> GP.5: In some cases I'm trying to achieve a diagnosis. A little old lady in the nursing home, you know, she falls out of bed and lands on the floor and we really need to establish if she has a fractured hip, for example. … So certainly you might have an over- or under-penetrated pelvic x-ray but you can see the pertrochanteric fracture and that's all I'm interested in.

> GP.4: But it is difficult, yeah, certainly like kids with supracondylar fractures, elbows and things could be hard to get views, but again I mean so long as you can get a reasonable view that you can make a decision on.

> GP.7: I've got enough experience to take good x-rays.
> I: Yeah?
> GP.7: Thirty years experience.
> I: Yeah, and she's [i.e. the visiting radiographer] pretty satisfied with what you are doing?
> GP.7: I think so, yes. Oh, satisfied in the sense, I'm not sure, you know, except saying, "Oh, the quality may not be as good", you know. But from the GP point of view, we are interested in a broken arm, a broken bone, you know, a broken bone. If it's suspicious or something, well of course we follow it up. Our interest is only diagnosing fractures, dislocations, pneumonia.

As apparent in some of the above quotations, when attempts were made during the interviews to encourage the GPs to talk about radiographic image evaluation, the conversation often turned to the sorts of diagnoses they were attempting to make – 'I

mainly do them for fractures and if there's any effusion, joint effusion for trauma' (GP.6). This seems to be fundamentally different to radiographers who, when engaged in similar sorts of conversation, spoke about technical issues, such as overexposure, underexposure, collimation or positioning criteria, sometimes at great length.

Another notable difference between the rural radiographer and the GP informants is that, while the radiographers are producing the images to be viewed by someone else, as discussed earlier, the GPs are producing the radiographs for themselves to make an immediate diagnosis. This is evident from the above quotations from the GPs themselves, however, it is also supported by the following quotations from both radiographer and nurse informants.

> RR.1: [The doctor]'s hopeless. [The doctor], and I've spoken to [the doctor] about this and he's slammed down the phone on me and won't talk to me and refuses to talk to me. [The doctor]'s attitude is "As long as I can see what's going on I don't care what anybody else thinks". Yes, I've had films up here black, black as black and I've said, "But you can't see anything on this [doctor], how am I supposed to do a report on this?" He says, "I don't care, I know what's going on."

Here the radiographer suggests that a particular radiograph was so overexposed that it was uninterpretable but the GP was satisfied because he could apparently see what he wanted. In the quotations below, one of nurses (RN.1) similarly suggested that image quality is not a great concern for the doctor, so long as he can make a decision about how to manage the patient. In another case below RR.11 made a comparison between the nurse and GP remote operators, arguing that, while nurses tend to be diligent about such things as correctly identifying the radiograph, the doctors are only concerned with getting a quick answer to a clinical question.

> RN.1: I don't think [the doctor] lies awake at night thinking about the quality of his x-rays. I'm pretty sure he just takes what he wants.
> I: What makes you say that?
> RN.1: Well, he knows what he's looking for and he's making his decisions based on his pictures, so I don't think he loses any sleep.

> RR.11: There's often times when a GP doesn't write the name on the request form, so I can't imagine that they would take the time to want to write the name on the film.
> I: Right. Yeah.

RR.11: I imagine that the nurse would be concerned that, to identify the film fully and properly, whereas the doctor would say "I've looked, I've taken a quick picture. I've looked at it. I can see what I need to see…".

RR.15: I think, what that comes back to is that he's only doing it for his own reassurance of what's wrong with the patient. I don't think he really cares what a radiologist thinks.

It appears from the data, therefore, that the doctors are not producing radiographs with the thought in mind that the image will be viewed and interpreted by someone else, as they feel capable of making their own interpretation. Even if they do send the film away for reporting by a radiologist, the opinion that the radiologist might form of their radiographic skills is of little consequence, as suggested above by RR.15. Firstly, it is not the GPs' primary role and, secondly, it will make little difference, if any, to the way that they have managed the patient. Excellence in image quality is apparently not essential to the GPs' professional identity, but diagnosis is. As one GP explained:

GP.3: I know radiographers do always because they want to make sure they've got really good quality, for the person that's reading them and it's part of a radiographer's brief to do that. But if it's part of my brief to make a diagnosis and if it's not going anywhere and I can make it on my own then all I'm interested in is the best quality x-ray that meets the requirements to make the diagnosis.

Another concern expressed by the radiographers is that doctors in general, and some GPs in particular, take a casual approach to their limited-licence radiography. The radiographers seemed to perceive that GPs do not appreciate the finer points of radiographic imaging and are inclined to take 'short cuts' in order to get a 'quick picture', as commented above by RR.11. This concern is expressed by a number of the rural radiographers (RR.9, 10, 11, 14, 15, 17, 20) and supported by the comments of some of the nurse remote operators (RN.1, 4, 10), such as in these examples:

RR.9: So they're [doctors in general] willing to skip a few steps … [They] don't take the views we teach them to take. Doctors just want to take, "Oh, it'll do. I'll sort it out in my own head." And then the views don't look like normal views…

RN.10: I've found doctors' approach, and this is a generalisation, I haven't had that much to do with GP's taking x-rays, gung-ho approach and, they think that they don't have to through the accreditation process.

RR.17: I think it's probably best for the GP to be the remote operator, but I think they're so consumed by their workload in the bush that they probably don't take enough time to develop the skills necessary.

The doctors' 'gung-ho' approach was commonly explained by the perception that they regard radiography as easy and relatively unimportant, the words 'dabbling', 'play' and 'puddling' being used by different informants to describe the perceived approach of some GPs. This perception was expressed as follows by some of the radiographer informants:

RR.10: What GPs do is, they think they can take better x-rays than nurses can and they think they can do more because they're GPs. Like, I've come across GPs doing, um, shoot-thru lateral hips because they're a GP. "Well, I'm a doctor I can do anything", is their attitude.

RR.11: I would imagine that a GP would see the taking of an x-ray picture as not a particularly big deal because the …, in their point of view, the viewing of an x-ray is not a particularly big deal.

I: The local doctor here doesn't have a licence?
RR.14: No, the one at the moment doesn't. The one before, when I went on maternity leave, he had a licence. He was a little bit gung-ho I think. He said to me before he went off and trained, he said, "Oh yeah, I'll just do this and …", and I don't think he realised how hard it is.

In all of the above quotations, the radiographers expressed their perception that doctors are complacent about doing radiography and apparently underestimate the difficulty of performing high quality, accurate radiographic examinations. The opinion that some GPs think that they should be able to do anything, as expressed by RR.10 above, supports and is supported by some of the data presented later in Chapter 8 under the theme of 'Professional Status and Esteem'. Other radiographer informants thought that the doctors are too busy to be concerned about image quality and standards, as in some of the previous quotations as well as those below:

RR.9: But the other thing is the doctor normally has, when he's at the hospital, a whole range of people who he wants to see and think about. So, to teach him the fine points … X-raying people's a step by step thing and often they just want the answer and they don't want to do the step by step, they just want the answer!

RR.11: … I would think that the doctor would probably be doing three investigations at once - listening to the chest, listening to the patient, looking at the patient, examining the patient, taking an x-ray picture.

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RR.9 considered that the problem was that doctors have too many demands on their time to bother with the stepwise approach apparently required to produce high quality radiographs, while RR.11 suggested because radiography is only one of several diagnostic tests the doctors might be performing it does have the same level of importance as it does to a radiographer. Indeed, some doctors expressed views that appear to support the radiographers' perceptions that image quality is not of central importance to GPs, as in the following instances:

> GP.2: I guess the view is that this is probably one hundredth of what you do in a day and so you do a whole lot of other stuff and you do enough to get by, or enough to provide the services that were needed.

> GP.7: The GPs in remote areas, or in rural areas, should have a licence to do a simple x-rays, like limb x-rays and a chest x-ray, which doesn't take a lot of skill and you know they're easy to do.

**The continuum of care**

Under this sub-theme the way the nurse remote x-ray operators appear to construct the concept of radiographic image quality and standards is examined from the point of view of each of the three professional groups represented in the study. The nurses' core health professional role of providing patient care is not generally measured in the same objective, quantitative terms as the physically and visually manifest radiographic image. Since the mid-1980s the nursing profession has generally identified with the intuitive, psycho-social, humanising aspects of health care rather than the positivist, scientific, medical-based model (Darbyshire 1994; Paley 1996; Pearson, Vaughan & Fitzgerald 1996; Pearson 2003). While some nurses may be more technically-minded than others, it is suggested that they do not generally have either a scientific or technical background or a deep understanding of anatomy, which have been argued to be two of the central knowledge domains of radiography (Corr 1994). The nurses, however, do have some practice characteristics in common with radiographers, possibly the most important of which is that they are not producing the radiograph for their own interpretation but are acting under the direction of the referring local GP, who is responsible for making the immediate diagnosis. As one radiographer (RR.11) commented 'the nurses would be producing the pictures for someone else …' as opposed to the GPs who would be '… producing the picture for themselves'. Another radiographer informant gave a more

detailed and succinct explanation of the apparent difference between the doctors' and the nurses' approach to their radiography (using gender stereotypes).

> RR.9: Nurses are assiduous because of the way, they don't really quite understand what's going on here but they know it's important …
> I: Yeah, Okay. I mean that's not an unreasonable sort of conclusion, I think.
> RR.9: And she doesn't have to prove or disprove the fracture. She just takes the x-ray. When you teach a doctor he always makes some comment, always has some assumed position. Either it's broken or not broken. So, he does two views and if it agrees with what he thinks then that's the end of it. Whereas for the nurse, she is like we are. Just doing the …, just doing the films.

The perception portrayed by RR.9 is that nurses, because they are not in the position of having to make a diagnosis from the radiograph, are more likely to be attentive to the finer points of image production. They will 'do what we teach them' - a point that was made earlier in reference to competency (p.128). In contrast, the doctor understands the clinical question and sets out simply to get an answer. In this respect RR.9 suggested that nurse remote x-ray operators are more like radiographers in that they don't carry the responsibly of having to make the diagnosis as well as producing the image, the argument being that they will, therefore, assiduously attempt to provide a maximum amount of information on the radiograph. The doctor on the other hand '… doesn't care that it doesn't look formal'.

Some of the nurses acknowledged that they do radiography with the idea in mind that their radiographs will be viewed and evaluated for image quality by someone, as evident in the following quotations:

> RN.1: If I've got doubt about what I've taken I go and wave it under doctor's nose and say, "Is that good enough or do you want me to do it again?". I haven't been sent back to do it again, although he has asked for a different view occasionally but I've never had to repeat an x-ray.

> RN.4: When we do an x-ray either the local medical officer's going to look at what …, he mostly is going to look at it but even if he doesn't look at it it's going to go off for reporting to be looked at by the radiologists. So, does it change my attitude, I think, gosh, if they weren't looking at them I think I'd feel a lot more… [Laughter], without thinking I was going to be judged, but no, they've got to be able to read it, so yes.

> RN.6: …he [the GP] did have a bit of a niggle at me and I did feel a bit of pressure there at one stage thinking, oh, God I don't know, you know, can I

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do better. Then I had a good look, I read back and I had a look through the book and had a look at the chest x-rays that had been done and the ones I was doing and I could see absolutely nothing different from the other girl and I thought well, you know he's probably just feeling a bit pushed and I was feeling a bit pushed and, probably the x-ray's coming back from the radiographer with no comments on them to improve.

RN.9: Anything a bit technical I've always enjoyed, or mechanical, and I find that … I suppose I've looked at thousands of x-rays working in Intensive Care at [place name]. So, usually there's that interest to see how good you can get the result for the doctor that's trying to treat the patient.

In each of these quotations it is clear that the nurses believe that they are producing the radiographs for the doctor, to whom they are apparently subservient in this situation. It appears to be important that they gain the approval of the doctor for their radiography and they are conscious of being 'judged', as explained by RN.4. RN.6 also indicated that she felt inadequate and pressured when the GP disapproved of her radiography, to the point where she recalibrated her performance against that of her fellow remote x-ray operators. As explained earlier, radiographers are also conscious of being judged, but apparently more so by the radiologists than by the local GP.

In spite of what might be considered this positive aspect of nurse remote x-ray operator practice, the perception remains that some nurses are less knowledgeable about radiography than would be ideal. For example, one GP informant (GP.2) commented that he used to get the nurses at the hospital to x-ray his patients but the results were so 'crappy' that he had to do it himself. Another of the GPs commented on the quality of the nurse remote operator's radiographs as follows, comparing them to his own radiographic work and suggesting that the nurses positioning was often not anatomically correct:

GP.1: [The nurse]'s films generally tend to be better for penetration but they're not always as good for anatomy. So, sometimes her positioning is not good enough and you get a lot of rotation in the film and "what's going on" sort of thing.

The difficulty that nurses have with positioning and what was described as a more 'nursey' approach to radiography (RN.7), has been dealt with earlier under the theme of 'Competency Requirements'. This, together with a generally lower level of understanding of anatomy and diagnosis, is a limiting factor in their capacity to perform high quality radiographs. However, as was noted on p.144, some of the nurses emphasised that they

were not radiographers and did not aim to produce the same quality images as a radiographer would. Rather it appears that the nurse remote x-ray operators see their radiography role as part of the continuum of care in triaging and reassuring the patient, helping the doctor to make a diagnosis, organising and administering the treatment and, if necessary, having the patient transferred elsewhere. One of the nurse informants described this as follows:

> RN.6: … the GP, he'll send them over for an x-ray. I'll ring him and say, "I've got the x-ray ready, would you like to come and see it". He'll come over and often, if the other staff are busy, I'll stay and assist him with the removal of that [speaking of a subcutaneous foreign body] because he might want another x-ray. So, I can actually see like a holistic approach, rather than like a radiographer would just take a picture and that's the end of the story.

In this respect, therefore, it is not the nurse remote operators' professional responsibility to produce excellence in image quality, nor is it central to their professional identity. Rather, it is considered to be part of the holistic patient management and decision making process, a perspective that is similar to that of the GPs. The radiograph itself has no intrinsic value unless seen as part of a patient's management regime. This matter of diagnosis and decision making, particularly in regard to transfer and retrieval of patients, is covered in the next chapter and forms a link between the concept of 'Dimensions of Practice' and that of 'Service Provision and Equity of Access'.


## Chapter Summary

The key concept of 'Dimensions of Practice' relates to those elements of remote x-ray operator radiography that are in some way defined or definable. Therefore, the theme of 'Licence Conditions and Limitations' refers to the legal restrictions that are placed on remote x-ray operators under the Radiation Control Act. 'Competency Requirements' refers to the range of knowledge, skills and abilities remote operators apparently acquire and how they are maintained, while 'Image Quality and Practice Standards' is about the informants' perceptions of how the standard radiographic evaluation criteria are interpreted by the different health professionals involved in the provision of rural radiographic services.

It is evident from the data presented in this chapter that remote x-ray operators do breach their limited licence conditions on occasions and that they do commonly produce images that are of poorer quality then those produced by radiographers. Although they share the common role of performing some radiographic examinations, radiographers, doctors and nurses appear to view radiography from different perspectives. The differences can seemingly be traced back to their core health professional roles, values and beliefs. For radiographers performing radiography is their core role. Therefore, they perceive the optimisation of image quality and limitation of radiation exposure as central aspects of health care. The core role of doctors is diagnosis and treatment. Radiography represents a relatively small part of that, therefore, they perceive issues of image quality and radiation dose as minor concerns, so long as they can make a diagnosis and initiate treatment. Nurses represent their core role as patient care. In a similar way to the doctors, for the nurses radiography is just part of a process of deciding how to manage the patient.

# Chapter 7

# Service Provision and Equity of Access

As explained in Chapter 2, there are distinct and very significant differences between living in metropolitan areas compared to living in rural and remote Australia. One of these differences is that rural and remote Australians have generally poorer health and yet have poorer access to health care services. In spite of this deprivation people still live outside of the comparatively well serviced metropolitan areas, either by choice or because their income depends on it. In doing so they apparently accept that they have to make some compromises, one of those being that secondary and tertiary medical care may be several hundreds of kilometres from where they live.

Ready access to high quality medical imaging services is one of the compromises that rural and remote Australians make, be it perhaps without full knowledge of the service limitations until they need them. When that time comes the compromise sometimes manifests itself in the form that the clinical staff (including doctors, nurses and allied health professionals) have to work quite differently to their metropolitan counterparts because they do not have the resources that are available in the city. Part of this difference is that professional boundaries are less pronounced and staff may have to perform extraordinary, extended roles, or perhaps work longer hours and in isolation of a professional support network of their own colleagues. Commonly they are forced by circumstances to rely heavily on their own skills and knowledge in making clinical decisions that affect the lives of their patients in ways other than just their health. The decision, for example, that a patient needs to have an x-ray examination may mean that they have to travel long distances, perhaps stay away from their family or carers overnight or even loose a day's income when they may be already struggling financially. The decision making process becomes much more complex when such factors have to be taken into account.

The alternative, of course, in the case of a simple radiography examination, is that the patient can stay where they are, closer to home, and have the examination performed by a remote x-ray operator. This can be an adequate, though perhaps not ideal solution to the

dilemma. This means that the nurse or GP remote x-ray operator has to step outside their usual clinical role, crossing a professional boundary, to provide a service in which their knowledge, skills and confidence are often below the standard that the patient would have access to in a larger population centre. At times this may substantially increase the work pressures on the health care provider by taking them away from their core responsibilities. This compromise, therefore, requires both a considerable commitment on the part of the health professional providing the service and a lot of trust on the part of the patient receiving the service. The question is, whether this service is satisfactory?

In this chapter the informants' perceptions of how the key components in this aspect of health service provision come together and how they deal with the issues involved are examined. Figure 8 below illustrates the various themes and sub-themes that became evident from the data under this second key concept.
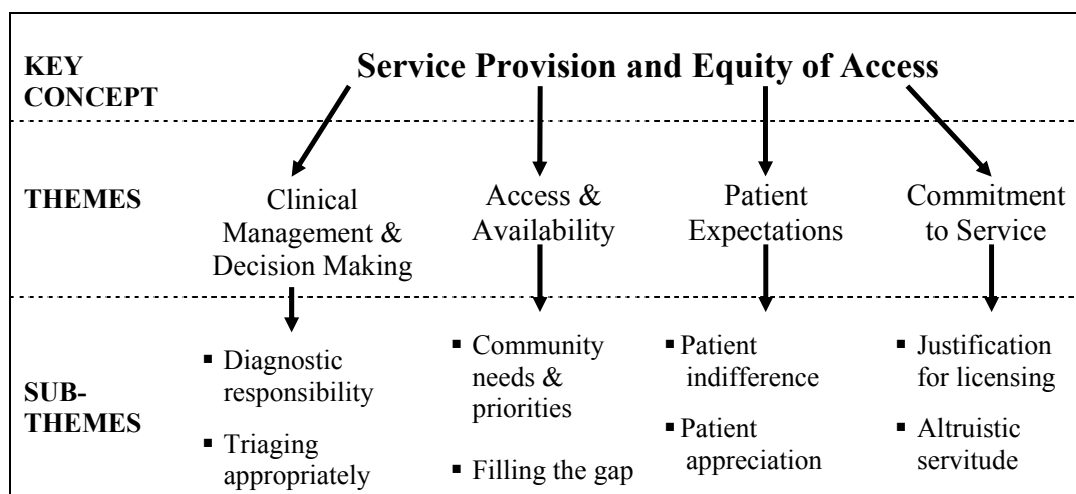


**Figure 8:** 'Service Provision & Equity of Access' cascading into themes and sub-themes.

## Clinical Management and Decision Making

As mentioned in Chapter 3 (p.35) the discovery of x-ray radiation counts among the most influential landmark events in medical history. It changed the diagnostic capacity of the medical profession and lead rapidly to the evolution of new professional roles. However, as Dr W Seelentaag warned in 1979 (see p.22) 'a radiological examination must be

competently performed and interpreted …' in order for it to appropriately '… influence the management and treatment of the patient'. This statement concisely summarises the link between this theme and the theme of 'Image Quality and Standards' in the previous chapter. The ultimate responsibility for making a diagnosis rests with the doctor in whom the patient has placed their trust. While the doctor may use a variety of knowledge and skills to help make a diagnosis, the radiographic image can in many cases provide the definitive piece of information the doctor requires. As one of the radiographer informants commented:

> RR.16: … it's a bit like a jigsaw puzzle, gaining all these bits of information. Clinically you might have evidence of something or other, maybe a pneumonia, however having done the chest x-ray, it's clear perhaps, you know, you should be looking at maybe pulmonary embolism or something.

However, as implied by Dr Seelentaag's statement above, in the same way that a good quality radiographic image can accurately inform the clinician's diagnostic decision, there is also the potential for an incorrect diagnosis and clinical decision to result from a poorly performed or poorly interpreted radiograph.

This theme, therefore, explores questions about the nature of the clinical decisions that are made on the basis of a radiographic examination and how those decisions can influence the management of the patient. In doing so it also seeks to explain the purpose of radiography under the circumstances of rural and remote health care, particularly the influence it can have on the choice of whether or not a patient's condition can be managed locally or whether they should be transferred to a higher order hospital.

**Diagnostic responsibility**

Diagnosis and clinical decision making is part of the role of the doctor on site at the time that the patient presents. Although at times the radiographic examination may be a critical component of the diagnostic algorithm, they also have a lot more information available to them, such as the clinical history and physical examination, as well as their experience and intuition to complement their radiographic interpretation skills. RR.9 suggests that rural doctors may be more reliant on their clinical diagnostic skills than metropolitan doctors, who rely more heavily on the information provided by radiography and other tests that they have ready access to:

RR.9: Doctors in big centres now tend to be protocol driven. If you've fallen three feet and you've done this or you've done that, you've hit this thing then we do these tests. Doctors in remote areas can't afford themselves that luxury. They treat people clinically. So, the x-ray that they're doing is a confirmatory one.

Some of the other informants, however, including some of the GPs, argued that under some circumstances radiography is a very important, if not essential diagnostic tool, perhaps even more so in rural and remote locations (RR.11, 14, 15, 16; GP.1, 4, 5, 7; RN.1). For example:

GP.1: We have an elderly population and there are times where the x-ray really does swing you one way or the other, and things like being able to exclude a pneumothorax in a young person with odd chest pain.

GP.5: Certainly in a remote area it can make the decision, it can be the difference between a retrieval or not at great expense.

RR.11: But, by the same token x-ray examinations are very basic and viable. I mean, you can't beat an x-ray picture to see whether someone's got a broken wrist.

Others, again including some of the same GP informants, also suggested that it's not so much an essential tool but 'it's handy to be able to do' in some circumstances (GP.2), while in other cases it's superfluous. For example, in relation to dealing with major trauma cases one of the doctors said:

GP.5: … after all I regard my job here with the real sick patients, my job is not always to know exactly what is going on with them but to get them out of here alive into definitive care in as good a condition as when you get them in. The management of many conditions doesn't change, you know, it's airway, breathing, circulation, etcetera.

In this quotation GP.5 suggested that in those cases when he knows that the patient is going to be transferred there may be no benefit in him doing an x-ray examination. Another of the GP informants agreed, as follows:

GP.4: … if there's a, you know, a gross open fracture and often when I've talked to the referring people I say "I can do an x-ray if you want but, you know, you'll probably want to do more" and so on, and so I don't necessarily if somebody's definitely going to go another place and their diagnosis is obvious, I don't always x-ray.

GP.4 suggested that even if he did some radiographs the doctors at the tertiary referral hospital would 'probably want to do more' anyway. This implies that he doesn't have a great deal of confidence in his ability to produce radiographs of the quality that would be acceptable to a medical specialist and so he is content to manage a patient's condition on the basis of his clinical judgement. This relates RR.9's opinion above, that perhaps doctors in remote areas need to be more self-reliant and must have highly developed clinical expertise in order to manage patients without the ancillary services available in larger health care facilities in the major towns and cities.

In the opinion of Dr Seelentaag (1979, quoted on p.22 and again above), under any circumstances the decision to do a radiographic examination should be influenced by the ability to interpret the resultant image. While it may be possible in rural and remote sites that someone other than the doctor will perform the examination, the doctor must be able to interpret the radiographs. If a radiographer is available and performs the examination their role may extend to image interpretation in consultation with the GP, in the absence of a radiologist (see pp.52-55). However, if a remote x-ray operator produces a radiograph of sub-optimal quality this may compromise the doctor's ability to see a radiological sign of an abnormality. Further, if the doctor lacks experience in interpreting radiographs they could misinterpret a significant abnormality as a normal variant or incorrectly diagnose a normal variant as pathological. Any of these possibilities is potentially deleterious, possibly even harmful, for the patient in terms of their health outcome or financially or both. A number of the informants commented on the ability of GPs to interpret radiographs in the light of them making a decision that an x-ray examination should be performed (RR.1, 8, 13, 16; RN.3, 4; GP.3, 4). For example, GP.4 commented that he didn't see his decision as to whether or not to perform an x-ray examination as an area of great concern:

> GP.4: I wouldn't see it as being a high risk area so to speak. I mean, I think you take a picture, you know whether it's adequate or not. You use common sense, it's more whether you x-ray, you know, you're not x-raying the sore wrist because, you know, there's a scaphoid fracture there or something. I mean if you actually take a picture, um, you ought to know really whether it's an adequate view or not and, um, the films are also sent away for a report.

Although he was imprecise in his language, he was apparently attempting to explain that he made a choice whether or not to x-ray the patient on the basis of whether he felt

competent to interpret the radiograph for a particular pathology he might suspect, a fractured scaphoid being the example he used. A similar confidence in their decisions was expressed from a slightly different perspective by other GPs. GP.3 simply said, 'If I can see what I'm trying to look for, then there's no need to go any further than that, I don't think', and GP.2 said, 'just the fact the positioning or whatever's wrong you're not going to redo that if you've got the answer from that film', agreeing that if they can confirm or exclude a particular diagnosis then image quality is not all that important. The other rationale for GP.4's lack of concern expressed above is that as a back-up he sends his films away to be reported on by a radiologist, a back-up which some other GPs apparently choose not to avail themselves of (RR.15, 17; RN.4).

In the quotation below, one of the radiographer informants also expressed confidence that in some cases GPs make a sound decision not to perform an x-ray examination on the basis of the potential for poor radiographic image quality inhibiting their ability to make a correct diagnosis. He said:

> RR.13: This is a good example. This site that the doctor or nurse started to ring me, say "Look we've got this patient. We think this is the problem but we'd rather you get the better shot." They seem to have it down pat. They've got a good understanding of the remote operator service. I think they do what they can. They didn't even take an image of this patient. They said, "We're worried about this patient. I think they can get to town, but we'd rather you do the images." They appreciate the difference in quality.

Other radiographers have apparently had similar positive experiences, one commenting that 'the doctors out there are quite adept at determining whether it is an urgent one that would need a more urgent response' (RR.16). In other cases, however, radiographers said they believed that on occasions some doctors make inappropriate clinical decisions:

> RR.15: Yeah, and sort of like, well what's the point? What's the point of doing that x-ray? Because it's not showing, it's so bad, it's so wrong that it's not diagnostic, you know?
> I: Do you feel angry about that?
> RR.15: No, I don't feel angry. I just sort of think, "Oh God, what are you doing?". It doesn't make my angry. I mean, he's the doctor, that's what he decided to do. That's the way he's decided to do his patients.

Clearly, this radiographer is of the opinion that the doctor is providing less than optimum care for his patient by accepting a radiograph that is of less than optimum quality. RR.13,

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the radiographer who is quoted positively above about decision making at one site, was less complimentary about his experiences with the doctor at another site, where he said:

> RR.13: The medical officer should have some input at these sites, if he or she is not performing the image, he should have the remote operator perform an adequate image as well. He's the one that looks at these images at the time of the exposure.

He goes on to talk in terms of medical negligence:

> RR.13: … if they're an inpatient at these remote sites and they've just done one exposure of the chest, and it's a terrible exposure, and not repeated it, that's negligent. That's when I worry about these patients and the care they're getting.
> I: Okay, so negligence is a fairly substantial accusation.
> RR.13: Yeah. They have got to be aware that they've got to produce a certain quality. They're not producing that quality.

RR.13 raises the question of liability for accepting poor quality radiographs in circumstances where a remote x-ray operator has performed the examination rather than a radiographer. For example, if a GP requested a chest x-ray to be performed by a remote operator, who then produced a poor quality radiograph on which a life threatening condition was not visible because of under or over exposure, and the GP accepted the radiograph and interpreted it as normal without seeking a radiologist's opinion, the GP could possibly be liable. RR.13, who also told an atrocity story about multiple fractures missed on an underexposed radiograph of a foot, said that 'if a GP looks at the image and it's not an acceptable quality, they should have the nurse practitioner [i.e. nurse remote operator] repeat it'. This argument about potential false negative diagnoses and the consequent risk is similar to the argument for not including the lateral cervical spine projection on the limited x-ray licence, which was considered to be an appropriate omission by the majority of the GP informants (p.106).

It was observed in the previous chapter that there is common perception that some nurses lack the requisite knowledge to perform anatomically correct radiographs (p.119) and that they apparently have a limited understanding of injury types, which limits their ability to position patients who are in pain (p.129-131). Some of the nurse informants also confessed to a limited understanding of radiographic interpretation, which they saw as falling outside their role, as in the following quotations:

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RN.3: …you'd need to be able to see that there's a half collapsed lung or something or something really important. It's all very well saying get the radiographer [i.e. the radiologist] to read it but we have to be able to pick a few things, at least the doctor does …

RN.4: … I mean it's not a nursing thing to be able to see an x-ray, it's really for a medical officer. I mean, we certainly do look at them and make a judgement, we can't help that, but no, no I guess it's too, it's up to the medical officer to complete the diagnosis.

RN.7: I still can't read an x-ray to save my life. I can tell a chest is a chest and a knee is a knee but I've made it very clear to them that unless a dagger is sticking out of a film I'm hopeless. Poor old [the radiographer] tries to point things out to me but I seem to have a block there.

Nevertheless, in some cases nurses do have a significant input into the decision whether or not to perform a radiographic examination on a patient and they do exercise clinical judgement based on their experience. For example, RN.3 said that because the doctor is not usually at the hospital it is often up to the nurse to 'make a judgement of whether or not to call the doctor even to start with'. Later in the interview this nurse said:

RN.3: So, a lot of things they say, "I've hurt my wrist and or my arm, I just fell and it's alright", but you think I'd better x-ray it because they're elderly and you find there is a fracture or something like that, and sometimes it's the nurse's decision. Like, if the doctor's away and you think now, … we just take it and then tell them.

Later she recounted the story of a ten or eleven year old child who she suspected had a fractured forearm. The doctor had a look and suspecting only a minor, greenstick fracture said, "… I don't think that we'll do an x-ray, just put it in a sling". The nurse was not content with the doctor's diagnosis and said, "well, I still think that he might need an x-ray", to which the doctor replied, "fine, fine you're experienced at this". She performed the x-ray examination and found what she described as 'quite a fracture … you could actually see half way through the radius crack and down toward nearly the wrist'.

Other nurses also described how they are often in the position of having to use their clinical judgement and perhaps influence the doctor's decision:

RN.5: …you're pretty sure that the doctor's going to need an x-ray anyway before he makes a diagnosis, um, I might go and turn the machine on and give him a ring and say do you want a pickie [i.e. a radiograph].

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RN.7: In a place like [place name] where the doctors aren't on at the time, you know, in-the-middle-of-the-night stuff, they really do use us to a large degree to make the call as to whether they need to see somebody.

Therefore, while the doctor may be ultimately responsible for diagnosis and clinical decision making, nurses play a significant role in the rural health care setting when the doctor is not present and, at times, play the doctor-nurse game at times (Stein 1967). This extended role is discussed in greater depth in Chapter 8.

**Triaging appropriately**

It may be argued that under the circumstances in which remote operator radiography is performed the purpose is to allow for an informed decision to be made about what to do with a patient – whether to transfer them or treat them locally. Radiography is a way for the doctors to increase their confidence in their clinical decision. It appears to be simply a means of knowing what they are dealing with, a perception that one of the GPs put forward in the following quotation:

GP.4: … you can take a reasonable x-ray, look at it, get the information you're looking for and start your clinical management along, you know, because of on the basis of what you've found on the x-ray. That side of it is always, gives you a sense of satisfaction because a lot of what you do, you're dealing with uncertainties. You really haven't got a clue where, you know, you've only got some idea of what's actually wrong with somebody, you know, is this serious or isn't it and it's good to have a break and just do something that's a bit, um, you know, I guess more concrete.

In the field of diagnosis, where uncertainty is common, radiography provides reassurance in the form of sound evidence, particularly if the radiographic evidence supports the clinical diagnosis. This is supported by GP.1 who said:

GP.1: For me it means that if I'm unsure of what is going on with a patient. There are situations where you might keep someone or you might send them, depending on what the x-ray says, and I'm particularly thinking about cardiac patients, if there's major chest pain and you're worried that the mediastinum is widened and dissection, if there's something odd about the chest pains…

This medical interpretation of radiographic imaging as simply a means of answering a clinical question was referred to in the previous chapter as the reason why doctors do not place great emphasis on image quality criteria. It also further explains the confidence

expressed by GP.2 and GP.3 in their image interpretation skills, saying that if they 'have the answer' they have no need to 'go any further' (p.147).

Nurses also expressed the same sense of confidence gained from knowing what's wrong with their patient, although they frequently reflected the doctor's perspective as well as their own with comments such as those in the following quotations:

> RN.1: … he knows what he wants to see or he's clinically after something. So, he may do it for those reasons. He may know the patient really well and know what the last x-ray was and just want to follow through.

> RN.6: Yeah, we are, probably just to get, just a quick picture to see that, you know, the fracture is a fracture or the doctor feels that he may be able to see something to help.

> RN.7: … it's nice for the doctor to be able to, knowing it's been confirmed on an x-ray as opposed to wondering maybe if it were some cardio, cardiac involvement as well.

> RN.8: … as long as the doctor can make a diagnosis, you know, from that x-ray, it will assist him to make his diagnosis.

Both the nurses and doctors referred to radiography as a means of correctly triaging patients and making decisions about whether or not they can manage them locally. The doctors (GP.1, 2, 4, 5, 6, 7) portrayed this in terms of clinical decision making issues, with priority given to such considerations as timely retrieval, providing accurate information to colleagues at the referral hospital, better patient outcomes, and cost in terms of both money and time. The nurses (RN.1, 3, 6, 7, 8) described triage in terms of making decisions to allay patient anxiety by providing more precise information to the patient and reassurance about what will happen to them next. Some examples of both perspectives are given below:

> GP.1: It makes a significant difference to them to be able to get their film done here rather than go away and get a film done.

> GP.4: … you know, we can get a picture and get a definitive diagnosis without sort of having to send them, to bundle them into a car, get an x-ray, make phone calls, chase up the result and get them back for treatment. So, I mean it's, it streamlines our management in many situations.

GP.5: I think having some pictures when you need to speak to somebody at a definitive retrieval place, you can speak, "they've got a comminuted mid-shaft femur with fragments and God-knows-what-else". So, you're not saying "I think it's broke." So, it's all part of the deal.

RN.1: … you can tell them what they've got to deal with and they can plan accordingly, they know if they're not going for an overnight they can get a bag packed before the ambulance comes and go for there three or four days, it's much better planning when you're two and a half hours from the nearest base hospital. The size of the suitcase you pack can be quite important, particularly if they're going on their own and have no supportive family or no relatives close because they're often stranded.

RN.3: Yes, well that's the first thing, and then you'll get quicker, like speed for instance apart from relaxing and reassurance and helping them emotionally you've got almost immediate treatment. There's not many that wait that long at our local hospital for treatment. They can be assessed at their own hospital then the next day with plasters and things or they can be admitted then and there or the decision made that it's a chest x-ray and the condition's serious, right we need to ship them out straight away. So, all the triage the assessing the treatment follow-up can be in the one place and you can do your progressive, they can have their progressive x-ray if they need it right there too.

GP.5 argued that even in situations where the patient has suffered major trauma and is to be transferred it is a more comfortable wait for the rural GP and nursing staff if they know the nature of the patient's injuries. However, the principal role of the radiographic examination is to help the doctor make the decision as to whether or not the patient can be safely and comfortably transferred. Some of the things that must be considered in these situations are not directly related to the patient's medical condition or to the quality of the service. It was also commonly argued that treating the patient locally has a number of benefits such as, more immediate care, a more extensive support network being available to the patient, the continuum of care is unbroken, and the high cost of retrieval is avoided.

## Access and Availability

This is perhaps the strongest theme that emerged in this study in that it was expressed frequently by both radiographers and remote x-ray operators, if at times from different perspectives. Furthermore, it has been suggested that service access is one of five

concepts that are important in distinguishing rural health practice generally (Bourke et al. 2004), the others being the rural-urban health differential, confidentiality, cultural safety and team practice.

There are two emergent sub-themes evident from the data under this theme, 'Community needs and priorities' and 'Filling the gap'. The former relates to the fact that health professionals generally have a common sense of service to the community in which they live and this is apparently intensified by living in a small community. Rural health professionals appear to have a strong feeling of belonging to and supporting their often disadvantaged community. The second sub-theme is related to the fact that issues of geographical isolation and disadvantage necessitate solutions that might be objectionable on purely professional grounds. Therefore, there is an apparent acceptance by radiographers that just because there is no radiographer available doesn't necessarily mean that there should be no radiography service available, even if it means some compromise in terms of the quality of that service.

The other important reason for the strength and centrality of this theme is that it relates to the significance of this study. In Chapter 1 it was explained that if communities are to find ways of dealing with the looming crisis in the health professional workforce then alternative methods of health service provision have to be explored. The data presented under this theme suggests that rural health professionals and the community in general are accepting of role substitution as one possible solution to problems of access to health care services. This is not to suggest that all informants were comfortable with the idea of substitution. The scepticism that might be expected from an occupation whose professional boundaries appear to be under siege is evident in some of the radiographers' comments. Nevertheless, the remote x-ray operator program may be a useful example in the development of future rural health service delivery models. As one of the nurse remote operator informants suggested:

> RN.10: … having somebody who can do a lot of allied health-type things is a long way off yet, but now's the time to start talking about it so that in five or ten years you have people who can do these things under the supervision of the person who has the records and skills sort of thing. And, I mean, you know, radiographers are so used to having, we've had remote operators for so long we're more used to thinking and accepting that somebody else is going to be able to part of that job.

**Community needs and priorities**

A central element of this sub-theme is that rural communities are socio-economically disadvantaged compared to cities because of their geographical isolation from major centres of commercial activity, their smaller resident populations and the lower per capita income (ABS 1998, cited in Hugo 2002, p.38), as discussed in Chapter 2. Some of the informants made observations in this regard during their interview. For example:

> RR.1: There's a very poor transport system at [place name]. Alright, so there's, there's a big disability group out there, either physically disabled or financially disabled, and they haven't got vehicles. They've got no other way to travel.

> RN.2: They are pleased we didn't have to go to [place name] because a lot of people here are socioeconomically, aren't that far up the scale and it's a big thing for them to make a trip to [same place name].

> RN.6: I could see our community members having to drive a long way for x-rays and some of those people are poor and we can keep them here, save them some money and keep our health service viable.

Generally this means that the population has limited access to a range of services, health services included, a contributing factor to the generally poorer health of the rural population, again, as discussed in Chapter 2. To gain access to specialised services people have to travel, as mentioned in all of the above quotations, sometimes long distances over poorly surfaced roads, a journey that can be hazardous at night or in wet weather. The problem is compounded by a lack of public transport and the fact that ownership of private vehicles is less common in the country than in the city (Humphreys 2002, pp.283-285; ABS 2005). Travel and transport, therefore, was a common topic in the informants' interviews, radiographers, nurses and doctors alike (RR.1, 12, 20; RN.1, 2, 3, 9; GP.1, 2, 3, 5, 6, 7). Some examples, other than those given above, are as follows:

> RN.1: Regularly we get trauma that needs x-ray, and there's no public transport, they don't all have their own transport. It's been really handy to be able to just turn on x-ray and get on with it and much more convenient for a lot of people. Some of them have driven half and hour to an hour to get here anyway and if you greet them with, "I'm sorry you'll have to go to [place name]" and then [same place name] say, "Well come back next Tuesday", they're not very happy.

GP.2: …some people don't have cars and all that kind of stuff so it just makes it more convoluted and it actually simplifies things if you're able to do your own x-rays sometimes.

RN.3: Alright you can treat it as a fracture and plaster it if it's an arm or something and then send them off to [place name] or somewhere and get an x-ray and then come back and take the plaster off if there isn't or you just immobilise it, which is what we mostly do. Immobilise it in a sling and send them to [place name], which is a pain especially if they do it at ten o'clock at night or something. I mean sometimes you can wait until the morning.
I: When you say it's a pain, do you mean …?
RN.3: For the patient. For the community, you know, and then you've got the like, they've got to drive, not good roads and kangaroos.

GP.5: You're dealing with two hundred ks [kilometres]. What's two hundred ks? That's a few gallons of petrol I guess, wear and tear on the car and petrol's now $1.05 or something a litre here. So, it becomes, and they've got to dump the other three children with somebody to go and do that because it's ten o'clock at night.

RR.12: … like if you're out at [place name] you don't want to have to travel three hundred kilometres just to find out if you've got a broken finger basically. That was the whole idea, and it's for emergency.

The point was also made that the transport problem is particularly difficult for women and for older and disabled members of the community who are less independent and are also those most likely to need access to health care (Brown, Young & Byles 1999; Simmons & Hsu-Hage 2002, p.82). One of the nurses said that 'for some people it's a big thing that they don't have to try somehow and if they haven't got a car or know someone' (RN.2), and one of the GPs said about elderly patients that 'it would be so much nicer to just be able to keep them there and do it rather than booking an ambulance and sending them away' (GP.1).

The sense of community is arguably stronger in smaller rural population centres (Wolstenholme 1995). The isolation draws people together and tends to make the community as a whole more self-sufficient, people being more friendly, civic-minded and dependent on each other than is perhaps the case in metropolitan areas (Sidoti 1999; Simmons & Hsu-Hage 2002, p.82). However, Simmons & Hsu-Hage also point out that this can have some negative effects, one of which is that country people, particularly those who have been long time residents of a rural town, are often reluctant to travel

outside their community even when the need is dire. A similar thought prompted one of the radiographer informants (RR.1) to comment about a small nearby town that 'there's a big levee bank around [place name] and there's always a theory people just can't cross that levee bank'. Other than the convenience of being able to access services locally, if a person has strong ties to a town, such as family, friends and work, then it seems that having to travel to the nearest larger centre to access a service may involve appreciable social dislocation. It may also involve considerable financial cost both to the patient, as mentioned in some of the previous quotations, and to the health service if ambulance retrieval is required, as in the following quotations:

> GP.5: … certainly the flying doctor service at whatever they cost per hour, or up here it's either road ambulance, at a minimum it would be a couple of grand for this hospital, for a transfer to [place name 1] or somewhere, and if it has to go to [a capital city], commonly we have the chopper in from [place name 1], we get a fixed wing to fly to [place name 2]. That's a lot of money.

> RN.7: … it saves Joe and his family having to go to [place name], which is four hours away and a great cost to them. Plus, I might help the cost of the health service, if they're going to fly out it's three thousand bucks, if it's, you know, in a flighted vehicle it costs the family so, you know, it's pretty hard.

> RR.20: I think from memory, the transfer in the ambulance costs the hospital somewhere between 1000 and 2800 dollars. Not exactly sure of the cost, depending on one or two drivers.

Costs to the health service of such magnitude are not insignificant in a small rural community and if they are a frequent occurrence over a budgetary period other components of health service provision may consequently be less well funded. In spite of the many arguments about reasonable access to services and availability of transport some of the radiographers expressed scepticism about the validity of the transport argument. In some cases they understood the need for remote operators and appreciated the reluctance of the patients to travel long distances for a simple x-ray examination of a minor injury, however, they were sceptical of the need for remote x-ray operators to perform non-urgent examinations on patients who could realistically be expected to travel by private transport. For example, RR.1 said that 'a lot of those people can't travel so when those people say have an injury they can actually be done by remote operators', but also made the following assertion:

RR.1: I've put the guidelines down that people that can travel, people that come up to do their shopping, people that come here to the doctors, people that now come up here to see the movies, can also come up here and do x-rays, have their x-rays taken.

Another of the radiographers said that although remote x-ray operator radiography 'has its place':

RR.20: I don't think it's as important now as it was say ten years ago when distances were further. Even though they are the same physical distance apart, roads were worse, traffic conditions were worse, or the cars were worse, or, you know, like …
I: Transport was worse.
RR.20: Yeah. And, the idea of transport was different. You know, ten years ago you wouldn't go twenty ks [kilometres], you stayed at home. Today, twenty ks is nothing. You know, you'd go for a Sunday drive for twenty ks.

Another radiographer suggested that even though remote x-ray operators are 'providing a service to their community' it leads to some overzealous behaviour in performing non-urgent examinations that could and should be performed by a radiographer.

RR.13: If they're not too flat out with their general nursing duties and they've got the time, the doctor's keen to have a look at this foot on the spot, they'll have a crack at it I guess. It was a swollen foot and he had crutches, so I suppose it wasn't super urgent, it could have waited a day.

And yet another radiographer questioned whether it is really beneficial to the community to have a remote operator perform a poor quality examination that later has to be repeated only to find that an abnormality has been missed:

RR.12: … they may not take the right views and say. Oh, yeah you're right, off you go. And, I get 'em, and this happens on a reasonably regular basis, I get them later on and find that they've either had a fracture or still have a fracture, right. So, are we really looking after the public?

In this quotation RR.12 asked if role substitution is '… really looking after the public?' if the quality of the service is so poor that examinations and procedures need to be repeated, while RR.1 also drew attention to the additional cost to the public purse of repeated x-ray examinations.

RR.1: What gets me angry is … that a remote operator will do a film which is sub-standard, alright? This then gets put onto day sheets, which then come up

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here, which are then put through as statistics and Medicare and all that sort of stuff. I go down there and they're back on the list again for exactly the same examination. Repeat examination! … The statistics are wrong, Medicare is being charged double, okay, twice the radiation. Now that's what I find really, really exasperating and nothing is being done about it.

Clearly, this radiographer is incensed not only about the additional patient radiation dose from the repeat exposures but also about the double-billing of Medicare and the fact that there is apparently little concern about it.

The dominant consideration was verbalised succinctly by RN.2, who said:

RN.2: I just feel often, you know, I x-ray people and it saves them a trip or it confirms that they need to make a trip. I think it just gives them, I think it's just giving them a better service.

The remote x-ray operators seemingly defined the quality of the service in terms of the access and availability, patient convenience being a prime issue, and not necessarily in terms of radiographic image quality, as the radiographers tended to do. This was given as the justification for doing routine as well as urgent examinations in the following quotation from one of the doctors:

I: So do you think it's legitimate for people in your position to do routine radiographic work?
GP.6: Yes, it is, in remote areas like this it is, you know. It is under particular circumstances, it is. Routine x-rays. You know, follow up x-rays too. It would be useful I think. It saves patients inconvenience. They don't live in the town most of them, they're in the farm and things like that. They have to travel for this, and if it was a child, as I said, the parents have to come, at least one parent has to come.

There was also a frequently expressed perception that, if it was not for the availability of remote x-ray operator services, patients would have to wait unnecessarily for treatment (RN.1, 3, 9; GP.2, 3, 5, 6, 7). The following quotations illustrate this view:

RN.9: It means that quite frequently people can be treated here without having to be either waiting for days to know whether they need a plaster on something or, or going up the road at the very least, to [place name].

GP.5: Well, if they've got to drive a hundred ks [kilometres], what's a hundred ks? It's an hour each way of their time, sitting in casualty to see the junior intern of [place name] or a cheaper hospital, who may then decide for

all sorts of reasons not to x-ray something and also miss one, too, and turns up as a normal.

> GP.7: We are eighty kilometres away and the inconvenience for the patient, the parents, taking him away, waiting for four hours to six hours in the casualty, getting an x-ray by an on-call radiographer and then getting a registrar to have a look at it, and at the end, you know, they say, "Oh yes, not broken". So, he will come back after about eight hours, whereas, a local GP could have done that in less than fifteen minutes.

GP.5 clearly felt not only that it is inconvenient for the patient to be transferred to another hospital but there is also a possibility that when they get there and wait to see a 'junior intern' the quality of the service may be worse than he could provide himself.

The doctors mentioned service costs more frequently perhaps than the other informants and, as well as the issue of delayed treatment, GP.7 raised the issue of cost saving in the health care system, which he observed after thirty years in rural practice, is the cause of a perceptible decline in the quality of care. He said that he'd like to have a radiographer available to perform all examinations but 'the question is, are you going to leave a patient sitting there for hours before you get an x-ray, before you treat them?'. He went on to say:

> GP.7: It's an issue of cost saving to the public as well. It's not only the convenience, but the issue of cost saving. Look, you know, the medicine we practiced thirty years ago it's, we could have done the same thing now for half the cost of what the government is spending because for everything we're sending them away, which is really I think, the medical, the quality of care is lower now than what it used to be.
> I: Really?
> GP.7: Yep. Our health care system has gone down from what I have seen thirty years ago. Thirty years ago we had a freedom to see every patient, do what we need to do. Now there is restrictions because of the cost. The money is not there.

Here he linked the issue of service access and availability with that of cost. The expense of having an on-call radiographer available and the consequent salary cost to the health service is discussed in the next chapter, however, as one of the nurse informants pointed out in the following quotation, there is perhaps a benefit in shifting the workload, and therefore a portion of the cost, away from the regional referral hospitals by providing services in the smaller towns. The demand on services will thus be reduced at the larger

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hospital and the smaller community will benefit through the retention of a greater range of services.

> RN.5: … we get a lot of um, um, 'minor' stuff that would have to go to [the regional referral hospital] otherwise, yeah.
> I: So it's really just a question of stopping people having to go to [place name]?
> RN.5: Well it saves, you know, it saves the clinic down there. It saves the A&E [Accident & Emergency Department] down there and whatever and so and so forth, just making things, just shifting the workload that's all.

Returning to the central issue of health care disadvantage, GP.2 described the rationale for remote x-ray operator radiography as 'equity of access of services, provide more services locally, manage more things'. Several of the informants, including some of the radiographers (RR.1, 8, 9, 13; RN.1, 6, 10; GP.7) made reference to the importance of small rural towns retaining services locally rather than centralising services in larger towns. One of the nurse remote operators said that there was a need for more radiographers in rural areas because:

> RN.1: We've got more demand than we're meeting. I know in a perfect world it would be equal and it's never likely to be equal but it's a fair way short of equal at the moment. And, doctor's not really an over service type of guy and he's just one doctor. If we get our second doctor there'll be a greater demand.

GP.2 said that 'you need an x-ray service in most remote places. When you have a trauma it's pretty essential that you can do an x-ray', and GP.3 commented that what he sees as the main issue is that 'having someone that's on-call all the time being able to do x-rays is very useful to the town'. Speaking of her own decision to work in a relatively isolated rural community one of the radiographers commented:

> RR.8: Towns are dying if they haven't got a service or a hospital or some sort of a care centre there that acts as an operating. And, if you've got someone of a like-minded attitude I think is important, if it's a small town.

She expanded on this, saying that:

> RR.8: I'm about trying to prevent people from being flown out of the place. I'm about taking x-rays. I provide an ultrasound service here. I've gone on and done further education to get my ultrasound diploma for that reason, to try and keep people where home is basically.

In making this comment she displayed altruistic commitment to the community, which was noted in Chapter 4 as being a characteristic of the professions. She went on to suggest that the same characteristic can be identified in most rural nurses.

> RR.8: Um , actually I think a lot of them, a lot of nurses, will actually do it for the same reason I do, come to these places. They're from a small community, services needed, and they can see the merit in being there, available to do it. I actually think they've got a very honourable attitude to it most of the time.

Another of the radiographers (RR.13) suggested that the nurses who choose to become remote operators do so because 'they're providing a service for their community', while another (RR.9) said that it is because they genuinely care.

> RR.9: I find the remote operators come out of a group of nurses who are diligent and determined about what they're doing. These aren't the fly-by-nighters. These are people who really want to do what they want to do.
> I: So you're not just being polite when you say that?
> RR.9: No! But if you think about it, what people put their hand up to learn another skill they're not the people who don't care. They're the people who are diametrically opposed to that. They do care!

As already demonstrated by some of the previous quotations under this theme, both nurse and GP remote operators show a substantial commitment to their community. RN.2, for example, said that 'it's important more for the people than for myself'. This nurse also demonstrated altruism, which supports evidence discussed later in this chapter that several remote operators prioritised the needs of the community over any personal benefit to them in doing radiography. RN.4 agreed that doing x-rays is 'a necessary thing that we need, that somebody needs to be able to do it', reinforcing this as follows:

> RN.4: I see it as necessary so that, why should a person from [place name] have to go off to [second place name] to have a simple x-ray. I don't see it as a stripe or as better than anybody else or anything like that, no, not at all.  It's necessary and it wouldn't worry me if it wasn't me that could do it as long as somebody else could do it.

In the following quotation one of the nurses implied that the retention of services in the small town where she works in the mid-west of the State was so important that there was competition with a neighbouring town to get remote x-ray operator licence and provide a radiographer service.

RN.6: I sort of was a bit disappointed that [the doctor in the neighbouring town] got in in front of me because they're closer to [place name], to a radiology unit and our clients had to travel further to get x-rays and it was just basically maintaining the service in our town. But that was where I saw where we're competing to keep services in our small areas, but I don't think personally there was any competition.

She went on to explain that at one stage their small health service was threatened with downgrading and that gave her additional motivation to get an x-ray licence.

RN.6: I didn't want to see our community go backwards, as far as I can see, because at the moment we have nursing home patients in our hospital, we have patients so we're practically a multi-purpose service in ourselves and we went under review and they said, you know, one of the options is you become a first aid station and I thought, well that wasn't going to affect me as a community nurse because I was still going to have my job, but I could see it affecting the community and I thought, well, if we've got all these things up and running and we can keep this place staffed and staffed well then we may be able to maintain the service.

So, even though it was not going to directly affect her position in Community Health RN.6 felt that, as a senior member of the nursing staff in the town, she had an obligation to take on the extended role of limited licence radiography.

Another nurse (RN.10), who works in a Far West health service that has a full-time sole radiographer, put forward the argument that having some of the nursing staff licensed to do limited radiography offers them a fall-back position should the radiographer suddenly leave, as had happened in the past. She considered that they were lucky to have a full-time radiographer on staff at the time of the interview but said that recruitment is a real challenge: 'we cannot for love, manage, attract the specialties that we need out here'. She went on:

RN.10: I mean at least you can pick up nurses that can do x-rays. If the wheels fall off and, say [the radiographer] leaves for some reason and isn't replaced at least there's a level of service provision. I'd say that would be a very strong motivation for a lot of nurses as well.

It appears that in many less attractive, inland, moderately accessible or remote rural towns in New South Wales it is difficult to recruit and retain health professionals when they are also in short supply across the entire State. This perception was substantiated by one of the radiographers (RR.3) in discussing the plight of sole practitioners who apparently

have difficulty finding a locum replacement. He said that 'certainly radiographers don't grow on trees down this way, as they don't anywhere else'. The shortfall of radiographers in the New South Wales health workforce has recently been documented in a report commissioned by the New South Wales Department of Health (Egan & Harper 2004). This shortfall, which is also apparent in other allied health professions (Lowe & O'Kane 2004; Arthur, Sheppard & Dare 2005), fuels the need for an alternative way of providing rural health care services in small communities and thus to keep the towns viable.

**Filling the gap**

It was established in the previous chapter that there is a common perception that the radiographic images produced by remote x-ray operators are of poorer quality than those produced by rural radiographers. It has also been established above that under particular circumstances there is a perceived need for remote x-ray operator radiography. It can now be considered whether a lesser quality service could potentially meet the need. Therefore, data are assembled under this sub-theme to address the suggestion that remote x-ray operator radiography services adequately fill the gap where or when a radiographer is unavailable in rural and remote areas of New South Wales.

Besides the shortage in the supply of radiographers in New South Wales (Egan & Harper 2004), the other significant issue is the occasional nature of the need for radiography in small rural communities. It may be argued that radiography, like some other allied health services, is not an essential requirement in rural primary health care and yet in some circumstances, such as trauma, it can be an indispensable diagnostic tool, as discussed earlier under the sub-theme of 'Diagnostic responsibility'. For example, speaking of a position she had previously held before taking her current job, one nurse informant said:

> RN.3: … where I was before for two and a half years, because there it was two hours by road and you got a lot of injuries there and things that needed x-rays, a lot of chest infections, a lot of fractures and suspect things.

However, several of the informants were quite adamant that it is not feasible to have a radiographer on the staff of a small rural hospital to provide a service that is only occasionally needed. As GP.6 said, 'You don't have the workload for a full time radiographer', while another of the GPs commented:

GP.7: In a small town the need for a radiographer to take one or two pictures a day is unrealistic and uneconomical. … Can we expect a radiographer to be on-call twenty-four hours a day, seven days a week, like most of the GPs in rural areas work? Is it possible? It's not possible. No. The question is, in rural areas the need for a radiographer is well, is not, the need for a radiographer is not there and it's not sustainable.

One of the nurses (RN.2) described her radiographic workload as justified but also said 'it's very unusual that I would do more than two films a day and I would only do a few a week most weeks', which is not enough work to justify the employment of a radiographer. Some of the radiographers also identified this as a possible rationale for remote x-ray operator services. The following example is from the interview with a radiographer who has Area Health Service wide responsibility for radiographic services:

RR.9: I mean, I've got a place where we do fifteen hundred exams a year, but a radiographer goes out there for three or four hours every day. Does it as a compressed sessional thing, and it comes by as a remote operator there for anything that happens to go down after that. So, that's, so it's not about places where they get a radiographer service, which you can't justify having somebody there all the time, or even on-call, you know, it's just too, too light.

Another radiographer whose services are shared between two small rural hospitals also recognised the nature of the problem, saying that:

RR.11: I know that there are times when I have less than a full day's work and that in sparsely populated areas it may well not be enough work for a radiographer. I can imagine that in places where you may need to do an x-ray examination, um, once a week it's impossible to justify the cost of a radiographer.

Like RR.9 above, RR.3 in the following quotation considered that it may be necessary to have a remote operator service for after hours or on weekends when a radiographer might not be available.

RR.3: You've got a radiographer maybe that might visit one day a week and outside that time, you know, you may then have a remote operator that can do the semi urgent things that would benefit by being done straight away and not that particular day that the radiographer visits. So, you know, I think in the situations where they're used and utilised correctly I think they're good.

One of the GPs agreed that 'it gives us the opportunity to offer various x-ray images during the hours, after hours, and on weekends …', stating that this is because '… the

nearest available x-ray centres that have professional radiographers are at least an hour away'. In such circumstances some radiographers, like RR.3 above and RR.15 below, conceded that remote operators are perhaps an acceptable part of the rural radiographic workforce.

> RR.15: I think it's good to be able to provide that service 'cause I'm there one, one day a week, okay? And if that patient, if a patient comes into A&E and they sort of really need an x-ray. You know, like a little kid, not sure if his arm's broken or not, that type thing, I think it's good if they can do any x-ray, whether it be a nurse or a doctor or anyone like that, that has got a licence, and without sending the kid out, or to another town, or waiting until I'm there next, do you know what I mean?

Several of the radiographer informants made similar concessions to those in the above quotations at some point during their interview, giving qualified support for remote x-ray operator services. RR.1, for example, said that 'It's a worthwhile service having remote operators in remote areas but it is phenomenally hard work to maintain standards with them', referring again to the problem of poor image quality. RR.5 had similar mixed feelings, also expressing concern about the quality of the radiographs they produce: 'It's good to be able to access x-rays when they need to locally but again it's the quality of the x-ray they're getting …', also saying that, '… it would be great if you could have a radiographer do the x-rays, it's always better to have a radiographer do the x-ray than have a GP.' This latter opinion was one that was echoed by other rural radiographers, such as in the following quotation:

> RR.17: I'm simply saying that if there is a radiographer to take it, in the interest of the patient and the interest of the film quality, that they are the ones that should always be taking it. If they are available, and the public should understand that it's the remote operators who are purely a stop-gap measure in our profession to help rural medicine.

RR.17 also expressed the view that 'it's probably not fair' that patients have to make do with a 'stop-gap measure' that resulted in poorer image quality than if a radiographer did the examination but said 'that's the dilemma of the situation, isn't it, being remote'. He could see little alternative '… other than sending them in an ambulance or a car a hundred miles away to get a decent x-ray'. RR.9 also conceded that remote x-ray operators have a role, saying that 'the more remote you get the more imperative I think it is'. However, he also suggested that even very remote health facilities could benefit from '… either a

drive-in or a fly-in service where, or for more chronic things, you put a radiographer on the ground one morning or two mornings a week'.

Radiographers appear to be ambivalent about remote x-ray operators, appreciating their necessity but having reservations about the quality of the service they provide, which the radiographers define in terms of radiographic image quality. One radiographer informant described them as a 'necessary evil' (RR.11). It is generally considered that although remote operator radiography is not as good as radiographer-performed examinations there is no better service alternative, other than perhaps to increase the frequency of sessional visits by a local radiographer or for the patients to be transferred to a larger hospital for their x-ray examination, neither of which seems a universally viable option.

In the previous chapter some remote x-ray operators were quoted as saying that they did not necessarily aim to produce radiographs of the same quality as radiographers would (e.g. RN.2 & 5, p.144 & GP.3, p.149). Similarly, some remote operators said that it was not their intention to replace radiographers. RN.10, for example, agreed with RR.17 above that remote x-ray operators are 'a stop-gap measure', saying:

> RN.10: … you can't replace a radiographer if that's the delineated level of
> service provision. Um, we're a stop-gap measure. … The GPs wouldn't allow
> it. Your doctors wouldn't support a nurse doing x-rays all the time.
> I: Why?
> RN.10: Why? Because we don't have the expertise, we can't do the range of
> x-rays that the radiographers do and they want access to a full range of x-rays.

One of the other nurses (RN.4) supported this opinion, placing herself in the position of being the patient and saying:

> RN.4: … we haven't got a radiographer. I can see that, I can't see any reason
> why a nurse would have to have a remote operator's licence when you're
> working in a place where there is a radiographer. … I don't see any place for
> it where there's a radiographer. I mean, if I had, if I needed an x-ray I think
> I'd want a radiographer to do it if I had the choice, you know what I mean.

The data under this sub-theme translates into the perception that having a remote x-ray operator radiography service in a small rural town is perhaps better than having no service at all, even if the quality of the images produced is something of a compromise. In most towns the size of those in which remote operator services exist, it is evidently not

practical to have a full-time radiographer available because the number of examinations required is too few, although a radiographer may visit on a sessional basis from a nearby larger hospital. Even in those towns that have a full-time sole radiographer it seems unreasonable to expect that person to be on-call for emergencies all of the time, a demand which is discussed later in this chapter. The logical compromise is training a local nurse or doctor to do a limited range of x-ray examinations at those times when a radiographer is unavailable, was described by some of the informants as a 'stop-gap' measure.

## Patient Expectations

One important consideration is the way that patients feel about the standard of service they receive and whether it meets their expectations. Patients were not interviewed in this study, as that was not the aim, and so there is no first-hand evidence what the patient population thinks about remote x-ray operator services. However, several of the radiographers, some of the nurses, and a smaller number of GP informants commented on their perceptions of what patients think. In relation to this, the informants frequently expressed opinions that appeared to contradict one another, depending on their personal experiences. Consequently data analysis has resulted in two apparently opposing sub-themes, 'Patient indifference' and 'Patient appreciation'. It should be noted that the opinions and comments expressed under these two sub-themes are related closely to those assembled under the theme titled 'Professional Status and Esteem' in the next chapter. The latter reflects each profession's self perception and their perceptions of each other, while those described below under this theme of 'Patient Expectations' reflect the informants' perceptions of public opinion.

### Patient indifference

There is a perception expressed by several of the radiographers (RR.2, 6, 9, 11, 12, 13, 14, 15, 18, 20) and less so by the remote x-ray operators (RN.1,6, 7, 10; GP.2) that patients perceive little difference between a radiographer doing their x-ray examination and a remote x-ray operator doing the examination. This is strongly expressed by RR.20 in the following quotation, who said that:

RR.20: I don't think that the community at large care who does it, as long as it's done when it's necessary. I don't think the community at large have got any idea of what our job is. The HSMs [Health Service Managers] in the hospitals don't know what our job is, so Joe Bloe down the street, it wouldn't impact on him. He wouldn't have any idea of the issues that are actually important to a radiographer, like technique and radiation control and getting good pictures and having pride in your work. All of those issues that are not important to the mother who's got a fifteen year old with a chest injury that needs a chest x-ray. "Just do the x-ray, somebody, do it now", you know.

This radiographer perceived that even the senior staff in the hospital don't really have a great deal of knowledge of the radiographers' role, so why would patients know. Indeed, RR.20 suggested that if a patient or the parent of a patient feels that an x-ray examination is necessary then their only concern will be that it is done as soon as possible, with no appreciation of the issue of examination quality that is apparently so important to radiographers. Other radiographers maintained that the patient's greatest priority is not having to travel and leave their community for what they regard as a relatively simple test, as evident in the following quotations:

RR.13: I'm thinking the people are glad to have a remote operator take their images, say if they, a hundred kilometre trip, and some of these people in these remote sites are elderly, on pensions, financial things. They haven't got the access, haven't got the money. And, if the nurse's volunteering to take an x-ray on them to get an immediate, a nearly provisional diagnosis from a GP out there, they'll be happy to go with that.

I: Does it matter to the community whether it's a radiographer that does it, or if it's a nurse or a GP?
RR.19: No, it matters to them that the person doing it's competent. And, it matters to them that after it's done the answer that they want to obtain is obtained. And, the answer is, and the answer really is quite simple, I think, for a lot of the stuff. Do I stay here and get treated or do I go to somewhere else? What they don't want to have to do is to go somewhere else to get the answer to this rather simple problem. And, the simple problem is, is my finger broken?

This perception is supported by comments made by some of the nurses and GPs in the quotations below:

GP.2: Patients are very appreciative, they haven't got a car or whatever, you can do the x-ray, sort them out and they can go home and it's all sorted out and they're very appreciative …

RN.6: There's the travel and they're busy, and usually these accidents happen to the men and the men don't want any more time off the farm if possible because …, strap their finger and whatever and go back to work and come back in tomorrow.

GP.6: You know, it is a nuisance for them, you know, see most of the time some of the people they couldn't drive, they have to find somebody to take them to [place name]. It is an extra expenditure. The simple x-rays, limbs and chests I used to do it myself, but even for that too they have to go to [same place name].

It may be argued that this perception of patient opinion is probably accurate, as it is also supported by the comments made earlier in this chapter about travel and transport (pp.168/9). The desire not to leave their community is probably the strongest motivation for patients accepting whatever services are on offer at the time of their presentation. RR.13 said 'people are glad to have a remote operator take their images', while RR.15 agreed that patients prefer not to '… have to travel out of town or wait until the Wednesday' when the radiographer is available.

Some of the radiographer informants suggested other possible reasons for patient indifference about who does their x-ray examination. RR.2, for example, who works at a hospital where the groundsman used to do the x-ray examinations, said that 'people still say to me '"oh, the gardener used to do this"', their perception, he suggests, being that radiography 'can't be too hard'. This seems to substantiate the argument put forward in Chapter 3 that there is a public perception that radiography is no more challenging than amateur photography. As one of the radiographers said:

RR.11: There's a lot of people who have a trust in the technology. I've had an x-ray taken, what more do I need? So, it may not matter to them who took the picture or how it was taken.

One of the nurse remote operators suggested that because radiography is often portrayed from the technographic perspective, patients do not feel that radiographers have any real input into their care, which is perhaps a common perception (Smith and Lewis 2003):

RR.10: I don't think people seem to have any expectations that the radiographer has to particularly care about them as a patient, which, if you go to the doctor, you would expect that the doctor's going to listen to you and care about you, whereas the person who is just taking the x-ray is just doing a job, sort of thing. It's more a more mechanical process.

Some radiographers, such as RR.12, felt that the perception that radiography 'can't be that complicated … pulls our profession down in the public eye'. The opinion that radiography is perhaps considered 'easy' is dealt with in greater depth in the next chapter in relation to the theme of 'Professional Status and Esteem'.

There was also a view expressed that rural patients evaluate health service quality by quite different standards to the health professionals providing the service, access being the patients' highest priority. This perceived difference was reflected in RR.20's comment reported earlier that the general public 'wouldn't have any idea of the issues that are actually important to a radiographer', implying that they lacked sufficient understanding to make an informed judgement about whether or not they are getting a good quality service. Another radiographer (RR.6) summarised what she saw as the varying expectations that patients may have, placing herself in the patients' position.

> RR.6: I mean, I suppose it depends what they get out of it. Some people consider that an excellent examination is, alright, the staff have smiled at them, whereas some people would consider a quick, efficient, on-time service would be satisfactory, other people would consider that the results is the important thing and I think that's where I come from, comfort. That would be what would make me comfortable, whether I had confidence in the result.

RR.14 suggested that the patient public knows of and accepts the limited x-ray services.

> RR.14: I'd say they'd know that [the remote operators] can do x-rays, so I don't think they'd hesitate coming up here, you know, if they needed to. But I don't, you know, it depends on what it's for, I suppose. But I don't know whether they actually know any difference between me and them.

RR.6 also made the observation that some of her patients have very little experience with health services so they often have no real expectations, are sometimes 'fearful of the unknown', or perhaps see their diagnosis and treatment as a 'holistic thing' and, hence, feel more comfortable if the nurse or doctor does the x-ray examination.

> RR.6: They probably think it's better, the nurse who knows them because they've gone in and they've explained the problem and the nurse or the doctor actually then does the examination it's an all-inclusive thing …

One of the nurses (RN.1) said that when patients realised that she was able to perform their x-ray examination they were either 'pleasantly surprised and at other times we're

just taken for granted', suggesting that without any specific knowledge about health service availability patients' have no firm expectations. They seem generally happy to accept the services offered, as suggested by one of the radiographer informants below:

> RR.16: … people are providing a service that is very restricted, very limited and I think the general public know that. … and because it's a smaller community, people know each other. You know, she's not a qualified radiographer, they know she's one of the nurses on staff. So they're happy that she's able to produce this, but they know that it's probably not the best, but it's okay. And, I think that's how it is, generally, in the country, too. You know, it's like every service. We don't have the best, but we make the most of what we've got.

Like RR.14 in an earlier quotation, RR.16 suggested that people are aware of the service limitations but that living in small rural and remote communities they are used to making compromises between their needs and whatever limited services are available. Therefore, patient satisfaction is not necessarily directly proportional to the quality of care, nor indeed to the quality of a radiographic image. If patients can access a service within the town that meets a short-term need, even if the service is of lesser quality than that available to city residents, they are satisfied. The cost associated with the inconvenience of having to travel is considered to be proportionally higher than the risk associated with receiving a less than optimal quality service. This relates to the desire to retain local services, as described earlier under the sub-theme of 'Community needs and priorities' and as expressed again in the following quotation from a nurse informant:

> RN.6: … rather than take, you know, half a day to go for an x-ray somewhere. So, I think they do consider the fact that they like to use their local service. It may keep it there longer, um, they've probably used it before and everything has been OK, so why leave the town.

A similar view is reflected in the following quotation from one of the GPs who, when asked what would happen if there was no remote operator service in the town, replied:

> GP.4: I think it would be a negative thing more for the patients because it would involve them, you know, being transferred elsewhere to have x-rays done and, you know, probably eighty per cent of them are going to come back with a normal x-ray, so they've gone for no good reason. It's more relatives I think prefer their, particularly with the older patients, prefer their relatives to be, you know, it's much better for them to have their relatives in the hospital in [place name] than in a hospital in [the capital city] or [the closest large rural town].

Therefore, it seems probable that, while patients may be indifferent to who performs their x-ray examination, they do care about having at least some level of service available. One of the nurses (RN.6) recounted the story of a couple from Sydney who were visiting relatives who lived on a property. One of the visitors suffered a minor injury that necessitated an x-ray examination and was surprised that it could be done at the local hospital without delay. RN.6 thought that as a result the visitors gained a good impression of the local health care services, saying that:

> RN.6: … you know that these people are going to go away now and say, well, you know the health system out there was reasonably good, and they've got friends and family out there. They'll be happy with that, you know, the system's not too bad.

**Patient appreciation**

Although patient consumers of rural health services might not understand the various health professional roles and boundaries, they do have expectations about the availability of certain basic services. As one of the nurse remote x-ray operators commented:

> RN.7: I haven't heard them say, "yeah, that's great, what a lovely service". If there was a gap in the service we'd hear about it quick enough. You know, there would be, … it's the same, you never hear the good stuff, you hear the bad stuff.

This suggests that, although patients may not overtly support a service, if there is a threat to an existing service they would complain. One of the radiographers said that he once had to take the x-ray service out of a hospital with repercussions that he compared to 'the Easter passion play'. He believed that this was because 'the cost gets buried back there in the indefinables. 'Cos how do you qualify all of those things in terms of the real costs? You can't'. Thus, he suggested that the available health care services have an indefinable value to the community.

The value that patients and rural communities in general afford to their local health services is most apparent in the respect they have for the local doctor. As one of the radiographers (RR.1) said 'the mentality of the people out this way is the doctors are just God almighty' and 'Doctors are up on a great big high pedestal. Doctors are wonderful out here. Doctors are God'. Reference to doctors being considered equivalent to 'God'

were made by several radiographer and nurse informants and are discussed again under 'Professional Status and Esteem'. However, in regard to patients' perceptions, another of the radiographers said that:

> RR.15: Patients are just patients. They just want to know what's wrong with them. And, over there it's a little bit like their doctor's still God, you know, sort of like an older, you know, like ten years ago, doctors were gods and you did what your doctor said and you trust everything, whereas nowadays I think people, that belief's sort of gone. I think they still do think that way in [place name].

And another that:

> RR.20: [The doctor], the guy's been an icon in that area for thirty years now. If he said "jump" they say "how high". So, everybody's at this, looked after [the doctor], so he can do no wrong. So, for him to go and do the x-ray, "oh, yeah, [the doctor] did my x-ray". Not an issue.

There is apparently a perception on the part of patients that doctors are very valuable members of rural communities. Kenny and Duckett (2004) suggested that the sustainability of rural towns is often linked to the ability of community to attract and retain a medical practitioner. When linked to the shortage in the medical workforce, this gives rural doctors considerable power (Kenny & Duckett 2004). This is reinforced in the following quotation about the lengths that the residents of rural towns will go to in order to recruit and retain a general practitioner. Again, the opinion is expressed that this exceptional appreciation of doctors is an old-fashioned and uniquely rural attribute.

> RR.19: I think it's an old notion. You know, doctors, you know, they always, and particularly in the country, they are held in high regard. They can almost walk on water in country towns. They come to town and people move hell and high water to keep them here, to make their lives special and better.

One of the doctors (GP.4) commented on the strength of the trust that people have in him, adding that this trust can at times influence his radiographic practice adversely. He said, 'almost everybody in town, everybody knows me …' and because, unlike in metropolitan communities, people attend the same doctor and '… they talk to about, "I saw doctor so and so and he…", you know, you hear stories.' This potential creates a certain amount of vulnerability to community opinion for the doctor, which when combined with patients' general perception of doctors' God-like status, places pressure on the doctor to be

infallible in decision making. Thus, if the doctor decides that a patient needs to have an x-ray examination the patient will accept this decision without question and if the doctor does the examination himself or herself then it will surely be satisfactory from the patient's perspective, as implied in the above quotation from RR.20. However, from the data presented in Chapter 6 it is evident that radiographic examinations performed by GPs are not always of acceptable quality. GP.4, therefore, identified his perceived infallibility as a problem, particularly when he has to repeat an exposure. Patients don't always understand that in radiography a proportion of exposures are repeated out of necessity, even by the most diligent of radiographers (Kofler, Mohlke & Vrieze 1999). This is not usually problematic but this doctor said:

> GP.4: I mean, there is a stigma to actually taking the patient back in and doing the examination again … I see that, failing the first effort and then, I don't know whether I'm willing to admit that to the patient.

Although this was not a common observation amongst the informants, it suggests that patient perceptions of the infallibility of their local doctor may contribute to sub-optimal radiography being accepted by some doctors, which may require further investigation.

In spite of the apparent strong trust and belief in rural doctors generally, some informants described situations where they thought that patients made concessions for the fact that the GP is a 'doctor not a qualified radiographer'. For example:

> RR.16: They know that he's just puddling, where we know what we're doing.
> I: Just puddling. I like that.
> RR.16: It's a bit like me making the scones, puddling. Where somebody else had a lot more practice, gets them to rise beautifully, those scones in the oven.
> I: Yeah, so the public, do you think, sees it, you know, the difference, do you think it matters to them?
> RR.16: No, I think they're quite happy because they know they're being looked after. They feel they're being looked after and attended to, that they're getting the best that they can from him.

Again, this informant expresses the perception that the public are willing to compromise, provided they have reasonable access to a service. Furthermore, even though the doctor is working outside his or her professional boundaries the patients apparently value the services provided by the doctor so highly that they are willing to accept a lesser quality radiographic service than that provided if they had a full-time radiographer in the town.

There is also an opinion expressed by one radiographer that the general public perhaps perceive only two types of health professional, doctors and those that are not doctors. This relates to the quotation from RR.20 at the beginning of the description of this theme (p.182). If the Health Service Manager doesn't know what a radiographers job entails, why would we expect 'Joe Bloe down the street' to know. Therefore, while patients may perceive a difference between a doctor as opposed to another health professional doing their x-ray examination, they might not perceive the difference between a radiographer and a nurse remote operator doing it, as suggested in the following quotation from one of the radiographer informants:

> RR.18: From the general public's point of view, the teachers' assistant, everyone knows you cannot expect the same as you would from the teacher. Whereas a remote operator, the general public don't see a distinction between, in terms of professionalism in their areas, a nurse, a radiographer or a remote operator. Even though we don't think we're the same. Radiographers think they're good, and nurses, and vise versa. And, but the general public sees people like health professionals, full stop. The only group that I think that the general public sees different is doctors.

While nurses and radiographers may well perceive and perhaps contest their different roles, this radiographer considers that the patient public probably see no difference and are unconcerned with professional boundary issues. While this is not necessarily an isolated opinion and is discussed more fully in Chapter 8, it is difficult to substantiate it without having interviewed a sample of informants from the patient population.

Although there were some radiographer informants who clearly felt that patients are oblivious to their existence as a health professional group, others expressed an opposing view, suggesting that patients both know and appreciate their role. For example, in response to a question of whether he felt valued as a member of the health care team one of the radiographers said:

> RR.3: Absolutely, I do. I do, that's probably the reason why I'm satisfied where I work because when you work in a small country town, that's probably precisely why I do it. There's no more bigger buzz than walking through BiLo or Woolies and have a mother come up to you and tell you that little Johnnie's arm's healing nicely and she appreciated me coming out at one a.m. when he fell out of the tree or whatever.

There is a particular patient appreciation recognised by this radiographer that comes from being a sole practitioner in a small rural community, an appreciation that is probably unattainable for radiographers who work in a metropolitan teaching hospital with a staff of thirty or forty other radiographers. Another of the radiographer informants (RR.13) made a similar observation about being a sole practitioner, saying that 'You get a lot of feedback from patients and medical officers'. This appreciation is apparently reciprocated, as described in the following quotation:

> RR.13: …in the rural community, we do go that extra yard, because we can. Because we liaise better with the referrers. Because we can get on better with people, both patients and the referrers and the allied health staff. We might need for a patient to …, and I think we get a hand in the overall care of the patient here. Whereas the bigger departments in the cities do their bit, the patient's not seen again.

Another radiographer expressed a similar mutual appreciation between the radiographer and the patients as follows:

> RR.8: … if you can produce the best that you can produce here you possibly save them a three and a half hour trip. So, you always try very hard to produce what you can here to save them from going any further.

It may be argued that being the sole radiographer in a country town promotes a greater sense of professional esteem through a feeling of being valued by the community in a similar way, though perhaps not as intensely, as the local general practitioner is valued. Feeling a valued member of the community in turn creates higher levels of commitment, dedication and a feeling of responsibility on the part of rural health professionals, characteristics that are ascribed directly to higher levels of professionalism. This relationship with the community affects the professional status and esteem of rural health care providers, as considered in the next chapter.

## Commitment to Service

There is a perceived benefit to small rural and remote communities in having access to a radiography service, however, making it available requires professional and personal commitment and dedication on the part of the staff providing the service. This theme,

therefore, explores the origins and strength of that commitment under two sub-themes. 'Justification for licensing' deals with the way that the remote x-ray operators represent the need to have a limited x-ray licence. While the primary justification that was most often given was the sense of commitment to the community discussed above, there was also an element of personal and professional satisfaction evident in the opinions expressed. The second sub-theme, 'Altruistic servitude', isolates and examines more closely the balance between serving the community and the personal sacrifices and challenges that come with being a rural health professional.

**Justification for licensing**

The official justification for a nurse or doctor obtaining a limited x-ray licence at a rural or remote health facility in New South Wales is based on an informal agreement between the New South Wales Department of Health, the Environment Protection Authority and the New South Wales Branch of the Australian Institute of Radiography. If the staff of a rural or remote health care facility requests a new remote x-ray operator licence they are required to demonstrate a need in terms of a lack of availability of and access to radiographic services, defined by the following criteria: the distance to the nearest existing, radiographer-staffed service; the number and availability of other limited licence holders at the same facility; whether or not the facility has a full-time, part-time or sessional service provided by a radiographer; the number of radiographic examinations performed in the previous two twelve month periods; and, the number of patients who have been transferred elsewhere for radiographic examinations during that same period. The nomination must be supported by a local senior radiographer.

According to the licence conditions the licence cannot be used when a radiographer is in attendance at or on-call for the health care facility (see Table 2, p.20). Nevertheless, the justification for licensing has been, and continues to be, the focus of some controversy within the radiography community, as evident from the discussion of the history of the remote x-ray operator program in Chapter 2 (pp.23-30). For example, some radiographers argue that licences have, in some cases, been inappropriately allocated to communities where the services of a radiographer might otherwise be made available, as in the following quotation from one of the radiographer informants:

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RR.4: I mean if you're getting a service three and a half days a week and the nearest establishment's only twenty-eight kilometres there's no excuse for a remote operator. It shouldn't' happen. It really shouldn't. Anyone can drive twenty-eight kilometres.

In this instance the rural radiographer puts the case that a town that is situated only twenty-eight kilometres from the nearest radiographer-staffed x-ray facility has no justification for a remote x-ray operator licence. A similar point was made by one of the GP informants in reference to a previous place of employment:

GP.1: We were only thirty minutes from [place name], so the rationale for having an emergency radiography service when you're only thirty minutes from a tertiary hospital is probably not that good.

Another GP remote x-ray operator, however, practising in a town that is only twenty kilometres from a hospital that employs a radiographer argued that he needs to have an x-ray licence because the radiographer is not 'available twenty-four hours on-call and on weekends'. This GP suggested that the combination of the health service being unwilling to pay for the services of an on-call radiographer, and the radiographer's unwillingness to be available twenty-four hours a day, limits the access to radiographic services and he therefore needs a licence, particularly for after hours and weekends. He said:

GP.6: Would they really provide an on-call radiographer travelling twenty kilometres in the middle of the night, paying them and the radiographer, would they be willing? I doubt it. If they are willing to come down and x-ray a limb and they go back home and not have a sleep for the rest of the night. I doubt it. If they are prepared to do that, there is no problem from our point of view. We are too happy to use them if they are available twenty-four hours a day like the GPs.

GP.6 went on to suggest that the only alternative is for all patients who require an x-ray examination outside normal working hours to travel about one hundred kilometres to the nearest facility with a twenty-four hour radiography service. It is apparent, therefore, that geographical distance is not the only factor that needs to be considered in justifying a limited x-ray licence.

The combination of a lack of service availability and access together with a feeling of obligation to the community was often given as the reason for a nurse or GP choosing to get an x-ray licence. The community need rationale was evident in earlier quotations from

remote x-ray operators under the theme of 'Access and Availability'. Some further examples of remote x-ray operator informants citing their concern for the needs of their community as the reason for getting a licence are as follows:

> RN.6: We had one of the remote radiographers [i.e. remote x-ray operators] retired and left the district so we only had one person who was working part-time and she was looking fairly stressed by it all, and I had an interest in it and didn't know very much about it and thought, well, I can do this, this is, we need to make sure we keep this service here and I applied to do it.

> RN.9: … that really wasn't why I went and did it, because even as a sister on the ward, I didn't go and do it for the money, I went and did it for the need, the perspective of the place, because we're fairly remote.

While the primary motivation of providing 'a service to the community' was referred to by one of the radiographer informants (RR.8) as 'a very honourable attitude', this same radiographer suggested that there are a number of other alternative or accompanying motivating factors that should be considered. RR.8, an experienced rural radiographer who had worked with several remote x-ray operators, went on to list several possible justifications for licensing, each of which can be examined in turn in the light of the perceptions of other informants.

According to RR.8, some remote x-ray operator licensees 'wanted it [the licence] for the money'. However, several other informants (RN.3, 5, 6, 7, 8, 9; RR.20; GP.7) disagreed with that opinion, most suggesting that 'the money' would be an unrealistic motivation because the financial reward is not great and it is not worth the imposition. For example, with reference to the GP remote x-ray operators:

> RN.7: … they [doctors] earn their money out here. Lots of it, but they earn it. So, I can't see them wanting to take on, unless it was very, lucrative shall we say. I can't see why they would want to dabble in things like x-ray or physiotherapy or anything like that.

> I: At the moment, if you do an x-ray here at the hospital, how is that, who, where's the money come from for that?
> GP.7: Well, if I take an x-ray I charge them a consultation, which is normally what I would have charged anyway if I didn't take it. And, if I take an x-ray I get paid fifty percent or seventy-eight …
> I: Seventy-five, I think.
> GP.7: Seventy-five percent of the x-ray, yeah, Medicare rebate. So, for a limb x-ray I might get twenty-four dollars. That's about it.

And, with regard to the nurse remote operators:

> RN.8: You know, I mean, if I haven't finished my job, my own work, and I've spent, you know, time in x-ray, then that means I've stayed to do my work after hours I, you know, it's on top of…
> I: There's no real money for it?
> RN.8: No, and there is a little bit of pocket money.

> RN.6: … so, in actual fact by the time I go over, it doesn't pay me to do x-rays, put it that way. For the time that it takes me to set up, warm up, do the paperwork. I could probably do it, if I'm really, really in a hurry doing it, usually about thirty minutes, forty minutes. They pay me five dollars for that, they pay the hospital, no they pay me five dollars over and above my wage.

Therefore, the suggestion that either GPs or nurses would be motivated to take on the remote operator role, on top of their normal duties, purely for financial gain is unlikely in most cases.

Another alternative justification put forward by RR.8 for obtaining a remote x-ray operator licence was to gain a 'ticket to be able to put it on their resume and say, you know, "I've done it"'. The perception that having an x-ray licence was associated with greater prestige was not an isolated one, other radiographers (RR.1, 6, 7) also verbalising a similar belief, such as in the following example:

> RR.6: Well I suppose there's the kudos in providing that all around service.
> I: Could you explain how that might fit in as far as you perceive to what the doctor or nurse might gain?
> RR.6: Well, I don't know if it's a romantic view but I suspect, I perceive or suspect that doctors, nurses, the local vicar or whatever are the higher echelons of the local community and that's just one more thing that's going to put them up there.
> I: Another string to their bow.
> RR.6: Yeah. You know, that all complete, all encompassing perfect service person, service or whatever.

However, this suggested justification does not appear to be a strong motivating factor either, as illustrated by the following comments from some of the nurse informants:

> I: So, is it possible then that there could be, for some people who would get an x-ray licence, is there some sort of, um, you know kudos involved in it?
> RN.5: Not really because the people that would use it are in areas, in like in these remote type areas. Um, no, it wouldn't apply because mainly those sort

of people who are into doing all that sort of thing stay in the metropolitan areas, you know, they don't come out to these little God forsaken places.

RN.10: I've worked in bush areas all my life and it's, it's a good employment thing for me to have, as a remote radiographer [i.e. remote operator], as a midwife and a general nurse, it makes me a very employable entity …, not that recruitment's, you know, no-one's vying for jobs that hard out here. There's not that much competition.

RN.9: There are a certain number amongst nurses, you hear a lot of talk about empowerment and all these catchphrases. I'm a bit too old-fashioned for that. I really believe a good nurse has plenty to do in her own profession.

There appears to be a perception amongst some nurse remote operators that the development of new, extended roles is for 'younger, more career orientated [nurses], looking to what they can actually get out of their career' (RN.6) and perhaps also a more metropolitan mind-set (RN.5, 10). As RN.5 suggested, if a nurse is inclined towards career development they would not come to 'little God forsaken places'. RN.10 acknowledged that having a limited x-ray licence may enhance employment prospects for rural and remote nurses, although conceded that 'there's not that much competition'.

For the GP remote x-ray operators gaining another certificate or licence for the sake of prestige did not appear to be an issue, most rejecting the suggestion outright. Only two GPs chose to expand on their negative response, one commenting that patients may be more inclined to come and see him if they had a 'footy injury' because there is perhaps a perception that he's good with 'sports medicine things and orthopaedic problems' (GP.5). The other GP commented that having an x-ray licence made him feel more 'useful', explaining that 'if you work a busy weekend here and you can't take x-rays you realise that you're, you know, not doing as good a job as you could' (GP.4). However, he went on to add that he believed that 'if none of us had x-rays [an x-ray licence] here the health of the community wouldn't suffer'. The context that allowed him to make this observation was that he practiced medicine in a town that receives twice-weekly sessional visits by a radiographer and is within a one hour drive of a hospital staffed by several radiographers, where there was a twenty-four radiographic service. Only one of his two practice partners had an x-ray licence. He apparently did not consider that being able to provide a radiographic service is essential to the role of a rural GP. Rather it was what he and other GPs described as 'useful' (GP.1, 3, 4, 6) or 'handy' (GP.2).

The final alternative justification proposed by RR.8 for a rural GP or nurse getting an x-ray licence was that it gives them the opportunity of 'stepping outside of their role, doing something different, a bit of variety'. This perception is supported by several remote x-ray operator informants (RN.1, 2, 4, 6, 7, 9, 10; GP.2, 3, 4), with a sense of personal and job satisfaction gained from performing radiography, as expressed in comments such as those in the following quotations:

> RN.6: I knew I was coming back to work in a rural area and I knew that I would need those skills if I wanted to feel comfortable, satisfied with my work, my career out here. I married a farmer and I knew that I'd be moving on so I tried to get what I thought would be to my advantage and to the community's advantage. What I would need to be able to do, the work that I like I guess in a rural community and keep myself, keep my brain ticking over.

> RN.7: There's lots of benefits it gives me. I find it very enjoyable, it's something different. It gives you another insight into a part, not just nursing where you can see things a certain way, but when you're doing something else it opens up the whole picture a bit more.

> GP.3: ... having someone that's on-call all the time being able to do x-rays is very useful to the town. So, that's probably the main issue but at the same time, I think that it was something that I always wanted to be able to do, mainly just because it's another form of medicine.

In the above quotation RN.6 suggested that having the added role of doing radiography has been beneficial in keeping her 'brain ticking over' and thus increasing her level of job satisfaction, while also advantaging the community. When she married a farmer and moved out to the country she needed the mental challenge of work and doing radiography added to this. RN.7 similarly suggested that she finds doing radiography mentally stimulating, allowing her to escape routine nursing duties and gain a deeper insight into her patients' conditions, an opinion supported by RN.2 who saw a personal benefit in 'being aware of what's happening with my patients'. RN.1 also felt that it allows her to have a more positive input into the patients' management.

As well as being 'useful' GP.3 said he finds that having an x-ray licence adds to his knowledge of medicine, while also giving him the personal satisfaction of doing something that had always interested him. Another of the GPs (GP.4) also described doing radiography as something that aids his diagnostic capability and provides him with

a 'more concrete' diagnostic tool, which relates to the earlier theme of 'Clinical Management and Decision Making' (see p.164).

It was commonly considered, therefore, that while the principal justification for obtaining a limited x-ray licence is to benefit the community, there is perhaps some personal benefit gained in terms of increased job satisfaction. The mutual benefit was commented on by RN.6 who said that 'I think it gives a wider field, a wider area to work in … as well as providing a much needed service for the client in a rural place like [place name]'.

**Altruistic Servitude**

The expectations that are placed on rural health professionals to provide a service to their community can be onerous, particularly if the health service is short staffed or if they are a sole practitioner. They commonly demonstrate a commitment to service that is beyond the usual call of duty with the result that, out of necessity, they sometimes have to work harder. For example, some nurses who obtain a remote x-ray operator licence apparently do so because they can see the need for someone to be able to take x-rays in the absence of a radiographer, even though it increases their workload. Most of the nurse informants commented on this (RN.1, 2, 3, 5, 6, 7, 8, 9) and a smaller number of the radiographers and GPs also made reference to it (RR.11, 16; GP.1, 2, 3, 4). One of the radiographers, for example, made the following observation about a local nurse remote x-ray operator:

> RR.11: … she was busy, really busy doing her nursing work or whatever she needed to do and the x-ray part was only, you know, five or ten percent or incidental, so that the running of the x-ray thing was, you know, making sure that the machine was up and running and that was no great concern of hers at all.

Even though 'the running of the x-ray thing' is not a core nursing duty and only represents a small proportion of her work, the nurse referred to in this quotation apparently displays considerable commitment, performing her extended radiography role well and earning the praise of the radiographer. Some of the nurses were quite explicit in their statements that, although it was not a core role they do radiography because they felt that if they didn't they would be denying the community a service that is badly needed. It is not something that they choose to do but something they feel obligated or compelled to do. For example, RN.2 was apparently given no choice:

RN.2: … we had a Director of Nursing and a Deputy Director of Nursing and they both did x-rays and they were both in the process of moving on or retiring so they were looking for other people to do x-rays and I was pretty much there, I was told to.

Others said that they took on the role because no one else would and that they would be content not to do radiography if it wasn't for their sense of commitment:

RN.3: It does increase your workload. … Everyone thinks it's great and I think no-body else wants to do it because they do see it, there is that added thing of extra thing of work. It is extra work.
I: Extra work and extra responsibility and that sort of thing?
RN.3: And most, you know, sometimes I myself think, I almost wish I didn't have an x-ray licence and then I think, "no, it is a service". There's times when I wish I didn't.

RN.5: … quite frankly you know we only do it because there's no one else to do it and I think that applies to all remotes, they, you know. I've got enough to do running a hospital, I really don't want to knock off and take x-rays.

In the above quotation RN.3 made the point that sometimes, because it increases her workload, she would consider it a relief not to have an x-ray licence. Both of the nurses quoted above make reference to the additional workload, a common observation made by the nurse informants. Several said that they just had to 'fit it in' around their other duties and that patients sometimes have to wait until they are available. As suggested by RN.5 below, if they need more urgent attention the doctor apparently just has to send the patient elsewhere. These considerations are embodied in the following quotations from various nurse informants at different sites.

RN.1: It gets fitted in, depending on what's going on and depending how important the x-ray is, it gets fitted in. They don't generally wait more than their half hour. … People are pretty good about waiting. They know, mostly they're locals and they know that we've got limited staff. Sometimes we're quiet and they have the immediate attention of the entire shift, other times they've got to wait until we've finished.

RN.2: I think that because I've got a dual role, I have a clinical role and an administrative role, when I'm working a clinical day and we're having a busy day if I then need to do films on top of that I find that it makes it a really, really busy day.

RN.5: Well you know, you manage your time. Um, sometimes a doctor will ring up and say. you know, "I've got this, can you fit it in?", and if I can't I'll

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say so, and he … well it will just have to wait until, you know, they come or he'll send them to [place name], which is closest to here.

RN.6: I work three days a week. I was doing, like, three x-rays a day and trying to do my work as well and, you know, that's probably taken an hour and a half out of my day.

RN.8: You've got to take into account too we're doing this on top of our normal nursing duties, the majority of us. You know, I mean, if I haven't finished my job, my own work, and I've spent, you know, time in x-ray, then that means I've stayed to do my work after hours.

The provision of a remote x-ray operator service can be 'fairly demanding' according to RN.7 and, according to RN.9, it creates 'a sense of rushing at times to try and do your own clinical work because there's only one sister on the ward ever at a time'. Reliance on service provision and access that requires a considerable degree of additional personal commitment from staff who are already apparently heavily committed, suggests a need for careful service planning to avoid situations such as that described by RN.3 below:

RN.3: … you've got your eight hour shift, at which you're looking after your patients and looking at A&E [accident and emergency department], and then up come five x-rays from the doctor's surgery …

Commonly, when situations such as this eventuate the nurse remote operator has to assess her work priorities on the basis of the patients' condition. RN.3 went on to say:

RN.3: I mean, it depends, they just have to wait until you're ready. If it's somebody who is standing there with pain holding their arm, well I'll go and do it as soon as I can, and if they're very breathless and he's waiting on the x-ray for the chest, well I'll do that straight away. But, if they've come in, you know, and they're alright they just have to wait.

Although as Nurse Manager RN.8 is not usually 'clinically based' and therefore finds that she 'can more easily go into x-ray and do one if [the radiographer]'s not here', she described similar stress when 'if you're on the ward and it's pill time and someone turns up and you've got to do an x-ray then the patients' pills wait until you've done your x-ray'. RN.6 thought it would be preferable if other staff let her know in advance if a patient needs an x-ray so that she could 'make a time to suit myself a little bit'. Furthermore, because she is planning to retire soon she feels the need to hand over some of the

extended roles she has acquired over the years, the difficulty being that other staff, being aware of the additional commitment, seem reluctant to take on the additional duties.

> RN.6: I think it's irresponsible of me just to resign having all those positions and not actually have somebody working towards being trained up and I get the opinion that, "Uh, something else for me to do".

Like the nurse remote x-ray operators, the doctors find that performing radiography takes up a lot of their valuable time. Recognising this, one of the nurses (RN.7) suggested that because there are so many other demands on their time, doctors find radiography is 'distracting them from their core business'. This opinion is supported by the doctors themselves. For example:

> GP.3: I find the whole process of radiography taking up a lot of time, a lot of time when I would rather be doing something else. … you're probably there for an extra half, three quarters of an hour to do the films and make sure they're okay and then go on from there. Having to do that, I would much rather have someone else do that for me.

Because this time is on top of their normal workload it is, as RN.7 suggested, an unwelcome distraction and imposition. GP.2, for example, said that he only does x-ray examinations if 'it's quiet', otherwise 'if I'm fully booked, I haven't got time to do it', while GP.1 said that 'I've had instances when my day's been completely blown because I've had to go up and do films' and when that happens it 'just makes for an extra long day'.

While their level of commitment may be similar, this theme of 'Commitment to Service' brings to notice a distinguishing feature between nurse and GP remote x-ray operators. Because the GPs have so many demands placed on them by their own patients, they do not find the time to perform radiography on their colleagues' patients, even if their colleague does not have a limited x-ray licence. Some of the informants made reference to this (GP.1, 4, 5; RR.16), generally considering it an acceptable practice. It would seem logical that because of the demands of this extended role, GP remote x-ray operators should not be burdened by having to make themselves available to perform radiography on other doctors' patients. The patients who are attended by a non-licensed GP, therefore, will have to travel to the nearest hospital that has a radiographer on duty. Nurse remote operators, on the other hand, are not in a position to be selective about which doctor's

patients they will perform an examination on, receiving requests from all of the doctors in the town. It could be argued that, given this difference, in the interest of equity of access for all patients that it would be better to licence a nurse in a small rural hospital rather than a local GP, or else all of the GPs should be licensed.

Rural radiographers, particularly sole practitioners, also have their workload burdens that require a strong sense of altruistic service to the community. Their principal commitment is that of ensuring that a radiography service is available at all times of the day and night. This necessitates being on-call at those times when they are not actually working at the hospital. As one radiographer said:

> RR.2: [Although] it's not a high pressure situation, there is always the chance of you sort of getting a call at any time. It's reasonably quiet, I only get one a week or three or four a fortnight but there is always that, it's always in the back of your mind. It always seems when you're going out to dinner, that sort of thing, or you're just going onto the cricket field.

Being the sole radiographer in a small country town impacts on their private life, perhaps to a greater extent than is appreciated by other health professionals in the town, who usually have colleagues to provide back-up. One sole rural radiographer, who sees himself as 'tenured or tethered' to his 'work commitment', explained this as follows:

> RR.3: My children, my six year old knows how to turn on my mobile phone, they know how to answer my mobile phone. They know to come and find me on the ride on lawn mower when I'm out in the backyard. They take messages and they understand when, we're four houses from a park, and we walk to the park to go and have a ride on the slippery dip or the swings, when my mobile phone rings and we turn around and don't get to that park that's four houses away, that later on the day we might get there.

Another of the radiographers said that after years of being the only radiographer in town:

> RR.17: … I confronted management about the toll of the on-call burden of sole radiographers and just said that I wasn't prepared to do it anymore and that I wasn't prepared to work seven or eight hours a day, five days a week and then be on-call, week in and week out.

Apparently the argument put forward by this radiographer to the management was that he works 'hard enough five days a week, let alone being constantly on-call'. Eventually the management conceded that the radiographer should only be called in for emergencies and

would only have to attend if the referring doctor made the request personally. The radiographer described this as a 'mechanism that I've set up to make my life as tolerable as possible with being a sole operator [i.e. sole radiographer]'. As one of the GPs remarked about radiographers 'they don't like being called in seven days a week after hours, for stuff that will probably keep 'til the morning' (GP.5). One of the nurses agreed that younger radiographers in particular 'don't want to be on-call twenty-four hours a day, seven days a week. You know they've got families and everything' (RN.5). Other sole radiographers have explored different mechanisms to make their commitment more tolerable, some (RR.1 and RR.10 for example) allowing remote x-ray operators to share some of the on-call burden, thus strengthening their interprofessional relationship.

Finally, a good illustration of the degree of commitment involved is a story told by a sole rural radiographer in an 'Outer Regional' population centre (ARIA+ = 4.57). She prefaced it by saying that she didn't realise how isolated the women in particular are 'out on these properties'. She went on to explain that she can't really just take a day off from her work, even though she only works part-time, because there is no other radiographer who can fill her role if she is absent. She also said that she is aware that some people make a doctor's appointment around her availability, 'just in case they need an x-ray' and that:

> RR.14: It might only be a hundred ks [kilometres] away, but on a dirt track it takes them two hours to get into town. So, for them to think "Little Johnnie's sick, he may need an x-ray", or "he's hurt his arm or elbow" or whatever, "I'll ring up and make the appointment on a Tuesday", and they've left home at five o'clock in the morning. You know, five-thirty, six o'clock to get here in time to drop the other kids at Nana's and get to the doctor's appointment at nine o'clock so that they can come and see me, and then for me to be blazé and think, "Well, I've got a bit of a headache today, I won't go to work …". You just can't do it.

## Chapter Summary

The key concept of 'Service Provision and Equity of Access' deals with the broader issues involved in the provision of remote x-ray operator services. 'Clinical Management and Decision Making' relates to how the clinical decision making process is influenced

by a range of considerations, which are inclusive of the patient's clinical condition but not exclusively so. 'Access and Availability' encompasses issues related to ensuring that the population of small rural and remote communities has reasonable access to services that are commonly taken for granted in larger population centres. The theme of 'Patient Expectations' is inclusive of data portraying the informants' belief that while patients generally value the services provided by health professionals, they are indifferent to who performs their x-ray examination. The theme of 'Commitment to Service' relates to the dedication of rural and remote health professionals to the health and well-being of their communities. Rural health professionals are apparently guided by a strong commitment to the communities they serve. They take on extraordinary roles and responsibilities, often beyond those expected of their metropolitan counterparts. Remote x-ray operators generally take on radiography because they see a need for the service. Some remote operators even expressed ambivalence about having an x-ray licence, feeling that it adds appreciably to their work load but feeling compelled to provide a service that would otherwise be absent. Meanwhile, although in some cases rural radiographers questioned the motives of remote x-ray operators in obtaining an x-ray licence, others expressed admiration for those who take on this extended role.
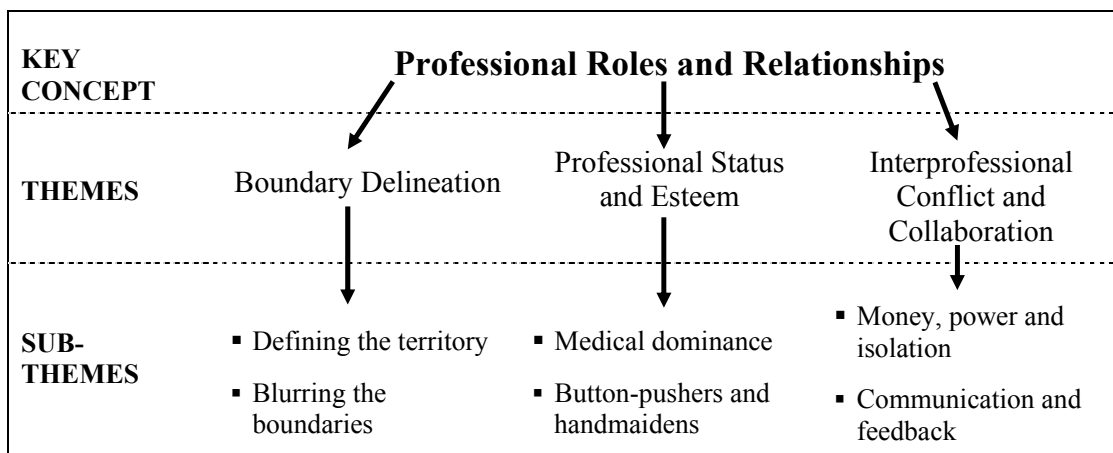
# Chapter 8

# Professional Roles and Relationships

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In this chapter the way that rural radiographers and remote x-ray operators interact with one another and the nature of the relationships that exist between them is examined. Given what is known of occupational territories and interprofessional boundaries, it could reasonably be assumed that because there is overlap of their occupational roles, the relationship would be a competitive one and that tension and conflict would exist between rural radiographers and remote operators. It is apparent from the data presented so far that on one side of the interprofessional boundary remote x-ray operators are not always cognisant or respectful of radiographers' professional territory, while on the other side of the boundary radiographers apparently perceive that remote operators perform radiography poorly and are a significant threat to their professionalism, if not to their jobs. It seems, therefore, that this division is a nidus of interprofessional conflict.

Figure 9 below illustrates the themes and sub-themes as they have emerged under this third and final key concept. The data that has been assembled under this key concept relates to the traditional status that the professions involved in the delivery of rural radiographic services have either enjoyed or endured, as well as the factors that have influenced and continue to influence their interprofessional relationship. Also considered,

| KEY CONCEPT | **Professional Roles and Relationships** | | |
|---|---|---|---|
| **THEMES** | Boundary Delineation | Professional Status and Esteem | Interprofessional Conflict and Collaboration |
| **SUB-THEMES** | ▪ Defining the territory<br>▪ Blurring the boundaries | ▪ Medical dominance<br>▪ Button-pushers and handmaidens | ▪ Money, power and isolation<br>▪ Communication and feedback |

**Figure 9:** 'Professional Roles and Relationships' cascading into themes and sub-themes.

however, are the evolving changes taking place in the rural health care sector and the potential for further productive changes to take place. Although this key concept of 'Professional Roles and Relationships' relates in several ways to the key concept of 'Dimensions of Practice', it also represents those phenomena that are perhaps less clearly definable and less tangible than those dealt with so far in the thesis. These include such issues as how one professional group perceives another, as well as how they perceive themselves, and consequently how they define their occupational role relative to other health professionals working in the same occupational arena.

## Boundary Delineation

This theme concerns the mechanisms that each of the three professional groups involved in this study use to define their boundaries in the world of rural and remote radiography. These mechanisms are described below in terms of the interaction between two seemingly opposing processes represented by two sub-themes. It is evident from some of the data presented in the previous two chapters that knowing where the rural radiographers' role ends and the remote x-ray operators' role begins can be difficult. It seems from the data that the challenge is, firstly, for each to appreciate their own and others' defined roles and responsibilities and, secondly, for them to function according to the limitations of those roles, taking into account the clinical and social complexities that arise.

It is also apparent that some of the processes or mechanisms in operation serve to limit the extent of each profession's role through definition or demarcation of their occupational jurisdiction. In this chapter the data pertaining to these limiting processes are described under the sub-theme of 'Defining the territory', which relates to how rural radiographers and remote x-ray operators define their role and responsibilities and how they differentiate between each other's role. At the same time, expansive processes also appear to operate to extend the jurisdictional territory of each occupational group by redefining their role and responsibilities, thus distorting and blurring the boundaries. The term 'role extension' has been used in recent times and in this thesis to describe such processes. In this chapter the expansive processes are described under the sub-theme of 'Blurring the boundaries'.

**Defining the territory**

As discussed in Chapter 4, it can generally be considered that each profession seeks to define its occupational jurisdiction or territory according to a set of key competencies or an area of expertise, although health professions also share some common competencies. It appears from the literature and from the data presented earlier in this thesis that radiographers lay claim to expertise in the production of high quality radiographic images and the limitation of radiation exposure. Therefore, it is argued that some radiographers perceive that nurse and GP remote operators are crossing a boundary and encroaching on what is the legitimate occupational territory of the radiography profession. How the different professional groups define this territory is important in understanding the degree to which the perceived encroachment is actually taking place. Primarily, the way that the radiographers themselves construct and represent what is encompassed within their occupation jurisdiction is of central importance. One of the radiographer informants defined radiography as follows:

> RR.9: I think radiography, medical radiography, is about producing the best diagnostic images for the patient, with least physical harm and discomfort, with the least radiation and the least cost at the most appropriate time. I don't think I've left anything out.

In giving what may be regarded as a concise definition of radiography, this radiographer displayed a sound perception of his occupational role. Although other radiographers did not provide such a concise definition, they also perceived differences between the role that they fulfil in the health care system compared to that of remote x-ray operators. For example, one of the radiographers, after describing how 'the Americans' have demonstrated that even a monkey 'can push the buttons and produce an image on a film', went on to say that:

> RR.12: … you have today's radiographer coming out, hopefully he can not only just push the buttons, he can process it and he can come up with the right views, look at those views, decide that I need to do further views on there because I think we've got such and such, and give the whole package to the radiologist to interpret. Whereas a monkey he can only just push the buttons because that's what that picture told him to do.

RR.12 subsequently indicated that the point he was attempting to make was that remote operators are 'more like the monkey' when performing radiography, while radiographers apparently function at a higher cognitive level. The interview went on as follows:

I: Okay, so they don't do the same as you, what do they do different?
RR.12: Well, okay they examine in general radiography, they examine just over sixty-two percent of my work. They do, as far as body parts are concerned but they are not trained, for instance, they can do a hand but they can't do a hand for foreign body localisation, right. So, that's where the percentage changes, you know, they can do sixty-two percent of the body but they can't do sixty-two percent of my work.

In this latter quotation, RR.12 firstly defines his 'work' in terms of the range of examination types he performs compared to the range of examination types that remote x-ray operators can legally perform. This suggests a simplistic understanding of his role, and one in which the boundaries are one dimensional and inflexible. However, he then went on to argue that 'they' [i.e. remote operators] can't really do 'sixty-two percent of my work' because he does more complicated cases[6]. The ability of radiographers to competently perform more complex examination types on more challenging patient presentations was considered in Chapter 6, under the theme of 'Competency Requirements', particularly under the sub-theme of 'Experience and adaptation'. It was apparent from the data presented under that sub-theme that the radiographic competence of radiographers exceeds that of remote x-ray operators. Another radiographer (RR.14) simply rejected the suggestion of a comparison being made between remote x-ray operators and a radiographer like herself who had years of previous experience working in 'huge trauma centres', saying that 'you can't compare that with somebody that's done a five-day course and also has other jobs.'

Other radiographers suggested that their occupational role and responsibilities extend beyond the task of performing radiography and that they provide a more complete service performing duties such as acquiring new equipment and performing the role of radiation safety officer. For example:

RR.4: I managed to get them a brand new mobile. We used to operate out of the cas [i.e. casualty] room so there were patients in beds there and I had to be working in a corner trying to do x-rays. So, that's when I started insisting they got moved … They had an old theatre out the back, which was just ideal for an x-ray department so I pushed and pushed and pushed and finally got them a nice new department out the back. So, that's how I won them over. Really, by offering them the service.

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[6] It should be noted that in fact the Type I.14R licence conditions do not exclude remote operators from x-raying a patient's hand for a foreign body as suggested by this informant.

RR.8: We were the area radiation safety officers as well … You and I have been working with radiation ten times longer than any enrolled or registered nurse has been.

The situation described above by RR.4 was one where a peripheral hospital was insisting on using remote operators for the delivery of radiographic services until, by persisting in making sessional visits, he convinced them of the benefits of having a radiographer. In the other quotation above, RR.8 made the claim that nursing staff do not have the expertise to oversee the use of ionising radiation, while radiographers do. Both radiographers in these instances argued that, because of their particular expertise, they have knowledge and skills beyond those offered by remote x-ray operators.

Another of the radiographer informants (RR.17) suggested that the radiographers' role in the health care system is well established and he therefore displayed some certainty that radiographers would be well defended in the case of an assault on their professional territory. He said:

RR.17: I know the medical profession relies very heavily on us and right through from general radiology, radiography, right through to CT [computed tomography] scanning, angiography, ultrasounds, tomography. They depend upon us enormously. I think we've got fairly good ammunition, we've got a lot of ammunition to prove that we are quite relevant in the medical profession.

This radiographer is placing his trust in the belief that doctors would not choose remote operators over radiographers, if that choice had to be made. While such trust may seem a dubious defence, this position is supported by some of the data presented earlier under the sub-theme of 'Filling the gap'. For example, as one of the nurse informants (RN.10) said 'doctors wouldn't support a nurse doing x-rays all the time' because 'we can't do the range of x-rays that the radiographers do and they [the doctors] want access to a full range of x-rays' (see p.180). Thus, it is suggested that rural doctors would not be supportive of a system that limited their access to diagnostic radiology to only extremity, limb and chest examinations. In addition, there is a considerable amount of data suggesting that, because there is no radiologist available in small rural hospitals, local GPs depend to some extent on the extended role of rural radiographers in providing an opinion about any abnormal appearances seen on radiographs. For example, one of the radiographers said:

RR.4: I mean radiographers we do pick up a lot of knowledge by taking x-rays, especially in some of the country areas. You are forced to read the x-rays you have to know what you're doing. Now, if you've got a remote operator doing it that really doesn't do that many x-rays, are they going to pick up the fractures? They're not. Not some of the more hair-liners, or even some of the pathology on the chest, so why do the x-ray?

While this is an unofficial role and a radiographer's opinion probably has no medico-legal significance (Smith 1995; Donovan & Manning 2006), the data suggest that it is a common role fulfilled by rural radiographers and one that GPs rely on under some circumstances. One of the GP informants said, for example, that:

GP.1: If he's [the radiographer] spotted anything I guess and he sends them up to us with the films or if there's something dramatic he comes down and we go to the hospital and sort it out.

The point raised above by RR.4, however, is that a nurse remote operator cannot provide this sort of support to the doctor. Indeed, even if the doctor is the remote x-ray operator they will not have the reassurance, if needed, of having a second, radiographer opinion about a suspected abnormality. There is a considerable amount of literature on 'radiographer reporting' spanning the last two decades or more (see Chapter 3, pp.52-54) but the importance of rural radiographers performing image interpretation and providing their opinion in the absence of a radiologist is absent from the literature and is in need of further investigation. While most published papers refer to radiographer reporting as an extended role, it is highly probable that it is an assumed role of rural radiographers, particularly sole practitioners, as suggested by the following quotations:

RR.2: I generally ring and if there's something suspicious or if they're up here and on-call or they come down and have a look at the films. They'll always ask for my opinion.

RR.11: [It's] not unusual to have someone write on a form "Ring me please if you see anything that you think I need to know about". There are those who know that they don't even have to write because they will, I do ring them, if there's something that they need to know about.

RR.13: In-patients particularly we do the provisional diagnosis and the phone call to the GP down their surgery, for in-patient care. And, the nursing staff now, we've had two staff putting our provisional diagnosis in the nursing notes. The nursing staff looked to us for the provisional diagnosis, because the

patient won't have seen the doctor until the next day. Anything significant, we ring.

> RR.15: … when you haven't got a radiologist on-site, it's about taking x-rays to diagnose and treat a patient and provide the best care that you can for them. And, not for us to diagnose by ourself but to diagnose in conjunction with other tests and their GP's opinion, what's wrong with them.

> RR.17: You know, particularly in a rural setting, you know, the doctors depend upon us so much, for interpretation, advice.

Some of the radiographers suggested that patients are sometimes treated on the basis of their opinion, presumably provided that that opinion is supported by other diagnostic information available to the GP at the time. For example:

> RR.1: If I'm not happy about something they will listen and they will act on that. I'd say probably thirty percent of x-rays that come through here patients are treated on what I say.

> RR.7: … they're in an uphill battle, a lot of the doctors out here, because they're not getting the support from the specialists … so they really do rely on our opinion … they often come up and verify it on the films themselves, but if I say there's a fracture that needs to be reduced they'll fill out the transfer form and, you know, they probably won't even come back and visit the patient, it'll just be sent through, because they're busy down there. They don't have support, they don't have anyone to pick up their surgery hours.

It is evident, therefore, from the above data that the entire role of rural radiographers, including that of performing more complex examination types and their image interpretation and provisional reporting role, could not be replaced by remote x-ray operators. Nevertheless, some radiographers expressed concern that wholesale substitution of their role could happen if strict criteria are not in place and strictly observed. For example, one radiographer said:

> RR.17: I've always been aware of the fact that there needs to be some sort of guidelines and restrictions. I'm, in one case that did happen, in that we found not only just doing peripheries, fingers and wrists, but if anything started to make out a travesty of our profession where we've trained for three years …

This radiographer apparently felt that there is a need to maintain control, for fear that the remote operators will break through the boundaries and begin doing examinations other than those prescribed on the limited x-ray licence. Indeed, there is some evidence that this

does happen on occasions, as described under the sub-theme of 'Licence breaches' (pp.108-117). Another of the radiographer informants expressed similar concerns as follows:

> RR.18: I think they are actually threatening your job in effect, because if at some point it would be state of, well, anyone could do the x-rays, all of a sudden "bang", you just work your day and remote operators could be doing all the evenings and weekends.

RR.18 went on later to describe remote x-ray operators as 'a poor person's adjunct to the radiographer', implying that he did not see them as a suitable substitute. In other cases, however, radiographer informants expressed ambivalence about the remote operators' role, such as in the following quotation:

> RR.3: I think in the situations where they're used and utilised correctly, I think they're good. I can see a lot of negative points and a lot of radiographers do, that they look at it from the perspective of here is somebody who hasn't done three or four years of radiography, has got very limited practical experience as well and they're coming out and taking my job. That's their perspective.

Although he apparently sympathises with the view that remote operators, with their lesser education and experience, should not be allowed to replace radiographers in the workforce, RR.3 seems to disown the perception that 'they're coming out and taking my job', as did RR.6 in this next quotation:

> RR.6: … obviously you've got the age old professional "you're doing my job or you're doing the job that a colleague of mine could do", but I realise that in a country this size you just, where you can't have a radiographer necessarily. You know, one radiographer can't get enough work to make it reasonable that they would be employed.

The comments made by these two radiographers are similar to those reported under the sub-themes of 'Licence breaches' (pp.108-117) and 'Filling the gap' (pp.177-181), where radiographers indicate that they are supportive of the concept of remote x-ray operators but with some reservations. It seems that while they acknowledge the need for remote operators 'in a country this size' (RR.6), they also wish to see a defined difference between the occupational territory which radiographers work in and the territory in which the remote operators are tolerated. One of the radiographers defined the distinction

concisely in the following quotation, again conceding that in some geographical locations where an x-ray examination is required the circumstances may not be ideal.

> RR.11: I imagine there are places where you need a radiographer, no, the word is you need to have an x-ray examination in less than ideal circumstances and using perhaps less than ideal equipment by somebody who has some idea of what they're doing rather than, you know, perfect equipment in perfect conditions by someone who's fully trained, to achieve a similar result.

RR.11 makes a distinction between places where 'you need a radiographer' and those where 'you need an x-ray examination in less than ideal circumstances'. Another of the radiographers (RR.9) put forward the argument that the current licence conditions, together with the physical limitations of the equipment they use, adequately restrict the occupational territory of remote x-ray operators:

> RR.9: … we've reduced what they do back down the tree to a point where we've given them a base model x-ray machine, and some cassettes and a list of things to do and how to do it, and a set of guidelines about this is what you're empowered to do and this is what you not empowered to do.

RR.16 agreed that the limited licence conditions are clear and 'restrict their boundaries', particularly in regard to 'the examination types and views that they can do'. However, as previously considered under the key concept of 'Service Provision and Equity of Access', the circumstances are not always as clearly definable as is implied in the above quotation from RR.9. At times complex clinical management decisions have to be made that involve such considerations as the immediacy of care or access to transportation and the use of diagnostic radiography can be an important component in the decision making algorithm. In relation to making such decisions another radiographer suggested that:

> RR.15: … as long as they're not going overboard. As long as they realise that they're just there, well I hope they realise that they're basically there to do things that need to be done pretty quick and they're restricted to do chests and extremities and pelvises.

RR.3 agreed that the remote operators should be confined to performing examinations that are 'the semi-urgent things that would benefit by being done straight away', while RR.20 suggested that the remote x-ray operators' decision whether to perform an examination or wait a day or two until the radiographer's next sessional visit should be

based on whether or not the outcome of the x-ray examination is likely to change the 'clinical management of the patient'. These appear to be valid suggestions, which if incorporated into evidence-based clinical guidelines could assist remote x-ray operators in their decision making and more clearly define their practice boundaries. However, at this time no clinical guidelines exist for limited licence radiography and so remote operators must decide the best course of action with only the licence conditions as a guide. Nevertheless, RR.13, the radiographer who conceded at one stage during the interview that, on some occasions, remote x-ray operators produce images as good as a radiographers' (p.144), also suggested that some remote operators also exercise sound clinical judgement about whether or not to perform an x-ray examination:

> RR.13: … this one particular site that's producing really good images but they're limiting their work to what they think they can do a really good image on. Which is correct, I think.
> I: What criteria do you think they use to make that decision?
> RR.13: I don't know. It might be body habitus to some certain degree. A big patient, they know they're going to have a terrible time with this patient, or a difficult patient. Or they might realise the pathology or the fracture that's going to be involved is going to be a bad one.

Thus, it is argued that, in some cases, an appropriate and responsible clinical decision is that the remote operator should not x-ray the patient because, based on criteria such as those listed by RR.13 above, the examination would fall outside of their knowledge-base and skill level and thus outside their practice boundaries. Such patients would then be referred directly to a radiographer for the examination. RR.20 agreed, praising the practice of a particular remote operator who 'will say no if the examination is beyond her scope'. While such decision making criteria may appear clear and explicit to radiographers, the challenge for relatively inexperienced remote x-ray operators is to decide which examinations are within their 'scope' and which ones are not.

Although some radiographer informants expressed concern about encroachment on their professional territory, it was generally evident that the remote x-ray operators saw no reason for radiographers to be fearful of wholesale substitution (RN.2, 4, 5, 8, 9, 10; GP.1, 2, 3, 4, 7). For example, in response to the suggestion that her remote x-ray operator role threatens the occupational jurisdiction of radiographers, one of the nurse remote operators, who was apparently aware of the perceived threat because of the hostile attitude of the local radiographer, said:

RN.5: [The local radiographer] doesn't really, really think there should be remotes [i.e. remote x-ray operators], remotes shouldn't exist.
I: Right.
RN.5: We really don't you know enough, shouldn't have anything to do with it. He doesn't do my job, I shouldn't be doing his. That's just that particular man, you know, and I've never come across anyone else that's come through that's been like that.

RN.5 went on to say that none of the locum radiographers she had encountered seemed to have the same issues with remote x-ray operators as this particular radiographer. She consequently dismissed the concerns as isolated to this one radiographer saying 'I can't see it you know, you know we're not like radiographers'. Another of the nurse informants (RN.3) supported the perception that not all radiographers feel threatened by remote x-ray operators, also concluding that it seems to be related to the personality of particular radiographers. She said:

RN.3: I think I've decided it's a bit more on personalities with x-ray radiographers and things. There's some who wouldn't care what you did and others who, I don't know whether it's protecting their territory or something, I don't know.

RN.10 also dismissed the professional boundary issues as follows:

RN.10: I think this territorial stuff, I can understand it in bigger centres, but out here we're more a support to the radiographer than a threat. I mean it's obvious we're limited. We can't do everything that you guys do.

RN.10, who worked in a hospital that employs a sole radiographer, suggested that it would be unreasonable and unnecessary for her to do radiography in a hospital where there was a large radiography workforce. However, because of the isolation and the shortage of radiographers she considered that her role was to provide back-up for the sole radiographer. The sole radiographer at this location, who was also interviewed (RR.10), apparently felt comfortable with the working relationship, suggesting that the perceived threat 'sounds a bit like city radiographers talking. There's no such thing as territories out here'. This radiographer also said that:

RR.10: I don't have a view that they're trying to take over my job and the nurses that I work with here don't want to do my job all the time.

Not all of the remote x-ray operators were totally dismissive of the perceived threat, however. For example, one of the GP remote x-ray operators empathised with the radiographers' point of view and suggested that other GPs would also empathise with radiographers on the professional boundary issue.

> GP.3: … I think it's a sense of loss that, you know, there's a possibility that if that was to snow ball and your career is being passed over to someone else, I don't think that's a good thing and I think a lot of GPs could feel the same way and I think a lot of radiographers would, would justifiably feel that if there are enough rural GPs doing their jobs well maybe they'll be out of work. I think that that's a reasonable thing to feel.

Another of the GPs (GP.7) said that he was aware of the radiographers' concerns and that 'they may feel that their livelihood is being under risk', however, he went on to argue that he only does 'an occasional x-ray over the weekends or at night time, in the middle of the night' and that he would be 'happy to call a radiographer if they are prepared to come'. Later in the interview the same GP said that:

> GP.7: I have a feeling that's the, the battle is there, you know, the professionals, you know, and they say, "Yes, my work is being taken over by the GP". But our work, the reasoning is never to take their work away, but to provide the quality care, the most inconvenience of the time that the patient presents to the hospital.

In this quotation GP.7 indicated two decision making criteria that he uses to justify his radiography role: firstly that it is an after-hours service; and, secondly that it is about providing care at the point of presentation for the convenience of the patient. GP.4 also said that it was a 'big benefit' to patients who present after-hours and GP.1, who suggested that it was more convenient for the patient if she performed the x-ray examination of a possible broken limb, also said she used her licence if it is 'something I need to treat in a more reasonable time frame'.

Several of the remote x-ray operators (RN.2, 3, 4, 5, 6, 9, 10; GP.1, 3, 4, 6, 7) expressed an understanding that their radiographic role was only intended as a contingency measure, as previously discussed under the sub-theme of 'Filling the gap' (pp.177-181). Generally, they considered that they did not possess either the requisite knowledge or the skills to completely substitute for radiographers. As one of the nurse informants (RN.2) said, 'I don't look at it like I'm competing with radiographers'. This also relates to the fact that

some of the remote operator informants said that they were not aiming to produce radiographs of the same diagnostic quality as radiographers do, as reported under the theme of 'Image Quality and Standards'. The following quotations also reflect this perception.

> GP.4: … I mean we do some simple pictures, you know from time to time. I mean I don't expect to be, to be, I'm quite happy to hear that their field of expertise is radiography, mine isn't. You know, I've got some level of, you know, I've got a practical skill in a limited area …
>
> RN.4: I just see that we are a remote operator, we're not a radiographer, we don't even, we're nothing like a radiographer. We are a remote operator that can do some simple procedures.
> I: Okay, so what sort of things do you think define the difference between remote x-ray operator nurses and radiographers?
> RN.4: I guess it's the difference between simple and complicated. I mean we have a simple, you know, you've got a fractured forearm, or a possible fractured forearm, … we can do the straight out simple x-ray …

Both of these remote x-ray operators make the distinction between simple examinations, which they feel that they can perform adequately, and those that require a higher skill level, GP.4 conceding that radiography is not his 'field of expertise'. Similarly, another of the GP informants (GP.1) said, 'I'm not a radiographer per sé, I don't have that depth of skills and it's not a thing that I do', and GP.2 agreed that 'radiographers do more complex views.' Another of the nurse informants (RN.2) said 'I don't even feel like I'm to their standards', and subsequently went on to say that she didn't believe that she was 'depriving' radiographers of their role.

Other remote x-ray operator informants drew a distinction between themselves and the radiography they do, and 'proper radiographers' and 'proper x-rays', as in the quotations from RN.3 and GP.7 on page 145 under the theme of 'Image Quality and Standards'. RN.3 described the situation where she might consider transferring a patient to a higher order hospital where there is 'a proper radiographer' and 'they can have a proper x-ray'. GP.7 said that if he has seen what he considers a 'suspicious lesion' on an initial radiographic examination and the patient needs a second examination, rather than performing the follow up radiography himself he will refer the patient to where they can 'get some proper x-rays'. Similarly, another of the GP informants (GP.6) said that if he

has trouble getting the views he wants on a patient 'I send the patient to a proper radiography, radiographer and get satisfaction.'

In the quotation below from yet another of the GPs (GP.3), a distinction is drawn between those patients for which there is concern about a serious, possibly life-threatening condition and those cases in which the provisional diagnosis is less serious. He implies that there are important diagnostic considerations related to the accuracy of the examination and his ability to correctly interpret the radiographs, relates to some of the data presented under the sub-theme of 'Diagnostic responsibility' (pp.158-164).

> GP.3: …if I was really worried about something like a malignancy or something I'd probably, I would send them off to another unit where they'd be done by a better trained radiographer.
> I: When you say a better trained radiographer, what does that imply?
> GP.3: Well, it implies someone that's doing radiography eight hours a day five days a week I guess. More experienced, um, someone that is actually a radiographer not just a remote GP with radiography accreditation.

In summary, remote x-ray operators apparently differentiate between patients on the basis of the examination type and availability of radiographic services, particularly after hours. In addition, they appear to rationalise the difference on the basis of such criteria as the patient presentation, the perceived difficulty of the examination and the provisional diagnosis. While the criteria of examination type and service availability are defined according to the licence conditions, the latter criteria are not and are less clearly definable. Consequently, the boundary between the rural radiographers' occupational role and that of remote x-ray operators is perhaps less distinct than may be assumed.

**Blurring the boundaries**

The second sub-theme that has emerged under this theme of 'Boundary Delineation', relates to the interdependence that apparently develops in rural health services because of professional isolation, the shortage of specialist providers and the collaborative nature of rural practice (Strasser et al. 2000; Alexander & Fraser 2001; Bourke et al. 2004). This was alluded to by one of the radiographers (RR.10, on p.214) who said 'there's no such thing as territories out here'. This radiographer later clarified this statement, suggesting that although boundaries between occupational territories do exist, they are crossed much more easily in rural compared to metropolitan health services.

RR.10: … the official boundaries blur but they don't intermix, they're still a boundary but it's not, it's got holes in it.
I: Right. It becomes broader?
RR.10: Yeah, there's no barbed wire on it. In Sydney there's barbed wire all 'round everybody's professional borders.

Being the most numerous of health professionals in metropolitan areas as well as in rural and remote locations (Larson, A 2002b), nurses have perhaps extended their professional territory more widely than other health professionals (Hegney 1997; Hegney et al. 2002). The data suggest that the broad nature of nursing work in some rural and remote health services has resulted in encroachment on the turf of several other health professions, apparently out of necessity. Rural radiography is only one of those neighbouring professional domains that has experienced this perceived encroachment, and a relatively minor one at that, an observation that is supported by the comments of one of the nurse informants, as follows:

RN.7: I think it probably happens more in the nursing, nurses stepping into medical officer roles than nurses stepping into the radiography thing. I think nurses do a lot more out bush, out country, than nurses in centres with a doctor on site. We do a lot more unofficial diagnoses, like prescribing and get, you know, run it by the doctors and stuff like that. There certainly is a blurring of the boundaries there and I don't really get what you mean by radiography.

In the above quotation, RN.7 suggested that the rural nurses' role infringes much more upon the traditional occupational domain of medical officers than on that of radiographers. The latter she dismisses as practically irrelevant compared to the 'unofficial diagnoses' and 'prescribing' that she and her colleagues do, apparently with the approval of the local doctors. At other times, because there is no doctor available, rural nurses substitute unofficially for the medical officer, again, out of perceived necessity, as described in the following quotations from some of the nurse informants:

RN.3: Sometimes there's no doctors, so we registered nurses pretty well always first line triage person with whoever comes through the door of the hospital, and though even if there's a doctor in the town it can be at least five or six or ten minutes before you can get to the hospital.

RN.6: … at times we haven't had doctors so we've had to pick up and find our way to do the best we can for our community without a GP and then we get a GP that comes in and then we're told that we've got to back off.

RN.9: Most of my registered nurses have done the FLEC course for instance, which is First Line Emergency Care. So, in the absence of a doctor one of them can take charge, successfully, on two occasions amazingly, a full on resuscitation. So, we do know about stepping over what some people would perceive as some boundaries, but once there's a doctor present we know what his role is or her role and what our role is. But we do have to push a bit hard against boundaries for the patient's sake out here.

In circumstances such as those described by RN.9 in the latter quotation, where there is no doctor available at the time a patient presents with a life threatening condition, there is no choice other than for the nurse to step into the doctors' role. However, the other notable aspect of the quotations from both RN.6 and RN.9 is that once a doctor is present the nurses apparently assume their traditional role. RN.9 suggested that the same would be true of radiography, in that:

RN.9: … places where there's available radiographers all the time it could be perceived as pushing into another persons professional territory, but I don't think out here that that applies.

The perception, therefore, is that it is only acceptable to cross professional boundaries when the services that are required are otherwise absent. As nurses are more likely to be available than any other health professionals, because of the larger nursing workforce, it is their role that is usually extended, hence the development of the nurse practitioner role in rural areas, blurring the boundaries between the rural GP and the rural nurse (Siegloff 1995; Roberts 1996; Hegney 1997; Ross 1999). One of the nurses gave the following example of the need for extended nursing roles:

RN.8: There's a girl [nurse] in [place name] who is, because they only have a doctor four days one week and I think it's five the next, or whatever, she's going to be rural/remote there for the times when he's not available. So there, you know, it fills the gap.

Furthermore, RN.8 and RN.9, experienced nurses with more than thirty years of rural practice between them, agreed that there is a role for rural nurse practitioners in disciplines such as mental health, where they are required to work under strict clinical guidelines. RN.9 also commented that:

RN.9: They even talk about a nursing diagnosis now and that word was taboo one time. But a nursing diagnosis, of course, is vastly different to a medical

diagnosis, because a nursing diagnosis is what we need to do to give care to
that patient, as nurses.

She went on to say that nursing diagnosis differs from medical diagnosis in that nurses
would not be expected to diagnose terminal illnesses or prescribe medications that may
have harmful side-effects. RN.8, however, said that:

> RN.8: … as for a radiographer nurse practitioner. Bullshit! You know! I
> mean, unless you're out there and you have a machine that was going to
> waste. But even then it should be brought somewhere where it can be used.

RN.8 indicated that she could not imagine that nurse remote x-ray operators were likely to
replace radiographers where radiographers already exist. One the GP informants argued
that nurse practitioner substitution of doctors is analogous to this, in that:

> GP.7: … where there is a doctor I don't think, you know, the nurse
> practitioner should be there. Like if there is a radiographer here, I don't want
> to be doing x-rays. Why do I want to be doing x-rays if she's here? [referring
> to the visiting radiographer].

This same doctor later said that he preferred not to use the term nurse practitioner,
preferring instead 'health nurse', a role he would support in areas where 'you can't get a
GP'. He suggested that these health nurses would be able prescribe 'some medicine, like
antibiotics for an infected ear and tonsillitis and earache, you know, that sort of thing'.
The extended model of nursing practice proposed by this GP bears a striking similarity to
the remote x-ray operator practice model.

The broader relevance of the nurse practitioner and role substitution debate to the future
development of the rural health workforce was noted by a variety of the informants. One
of the radiographers (RR.19), for example, proposed that, 'given the shortage of
radiographers', the radiographic workforce of the future may be as he describes below:

> RR.19: Given that, we now teach people radiography in a very highly
> professional, highly skilled, highly technical way, if there's more and more
> movement towards higher machines, radiographers want to move that way.
> My view, is that radiographers will work in a places where there's high
> complexity or high volumes. In remote areas operators may work in places
> where there's low volumes and, without being rude about it, low complexity.

This radiographer suggested a similar model could work in other allied health disciplines where:

> RR.19: … we teach nurses how to do basic physiotherapy, chest percussion, movement, how to put a crutch under somebody's arm, you know stuff that really belongs to a physio but we teach it to nurses, you know, because it's a rounding thing, so they need to be rounder.

Although not as expansive in their vision as RR.19, other radiographer informants also saw the value of multi-skilling in the rural health workforce, even under the current workforce model. For example, RR.8 suggested that rural health professionals have to be able to 'provide an all-round service', saying that 'you're not just one thing, you're, it's all about multi-skilling and the rest of it'. RR.10 suggest that multi-skilling was already part of the rural radiographers role in taking on tasks like bandaging musculoskeletal soft tissue injuries when the nursing staff were too busy and mobilising patients on crutches because there was no physiotherapist available. RR.8 also suggested that it's about teamwork – 'You look after each other in these places', while some other radiographers recognised that part of their broader role as a rural health professional is to offer minor forms of advice to their patients about the management of their injury or illness and perhaps about how to avoid a recurrence (RR.8, 10, 12), although RR.10 was quick to add that 'it's just my personal thoughts, not anything official'. RR.12 said that 'we [referring to health professionals collectively] are all in the prevention job', suggesting that 'prevention' is a core, generic role and common goal for all members of the health care team, in his opinion.

Like RR.19 above, RN.10, one of the nurse informants, also commented on the opportunity for extending the remote x-ray operator model into the domains of health professions, physiotherapy again being used as the example. In the following quotation RN.10 makes the point that because there is no physiotherapist at the hospital where she works, the rural nurses are required to 'dabble' in areas that are not part of their traditional role. She said:

> RN.10: Allied health is sadly diminishing in these areas. We have no fridge, no tea, no physio. Damn lucky to have a radiographer really! And this is a lot of the reason your nurses are multi-skilled. We dabble in all these things.

She expanded on this, saying:

> RN.10: When it comes to something like giving someone percussion and drainage, you know, if they've got a grotty chest, and you need to give them some chest physio, … Same with, you know, trying to assist someone to go from being bed-ridden to being ambulant and all the different stages of walking frames and things like that. We do that here because we don't have a physio.

RN.10 went on to define two criteria that apply to nurses performing extended roles: Firstly that 'if we did have a physio we wouldn't mess with it', which is similar to the limitation reported earlier in relation to nurses substituting for doctors; and, secondly that 'they don't dabble unless they're confident that they know what they're doing', being conscious of the risk of litigation when working outside their traditional occupational jurisdiction.

Another of the nurses (RN.9) acknowledged the extended role that nurses play in providing physiotherapy for patients in the absence of a physiotherapist as follows:

> RN.9: If we're going to do physio for any patient we would normally have a physio assessment and that physio would instruct the nurses about what was to be done for that patient … We had service one day a week up 'til a few months ago and then physios, like a lot of other clinicians, are a bit thin on the ground.

Again, the reasoning is the same, that if the particular health professional that usually provides the service is not available it doesn't necessarily mean that patients or the community in general should be totally deprived of that service, so long as they have someone who can adequately perform the necessary task. In the case of rehabilitation physiotherapy, however, the particular service RN.9 was referring to, a physiotherapist apparently oversees the treatment at a distance. Again, this is similar to remote x-ray operator radiography. Like several other informants above, RN.9 made the point that this form of substitution only takes place if the service is otherwise unavailable.

> RN.9: I don't look at it as pushing the boundaries because the same as when there's a doctor, if there's a physio available we have plenty else to do without pushing into their territory.

She later reaffirmed this position by saying that 'I really believe a good nurse has plenty to do in her own profession' without the need to 'tread on anyone else's professional territory', implying that such cross-boundary incursions are not pursued without consideration of their capacity to inflame interprofessional rivalry. Rather, as RN.7 said, there is an expectation that as a rural nurse 'you just take whatever's thrown at you in your stride and get on with it'.

The suggestion to perhaps extend the remote x-ray operator model of practice to other health professional areas was perhaps best framed by one of the nurse informants (RN.10) below. By doing so it may be possible to provide better allied health support and supervision for nurses who are working in an extended role in rural and remote locations where there are no specialist allied health practitioners. RN.10 said that:

> RN.10: Physiotherapy's no different to radiography if there's no allied health in the area, particularly now that we're getting aged-care. Alright, you're looking at these hospitals becoming formally acknowledged as being residential aged care, which they never have been before. So, we need allied health to be able to support those services that now formally we're providing.

The above quotation demonstrates in real terms that, because of rural Australia's changing population profile, new models of health care must be explored. The town that RN.10 referred to had no physiotherapist, no occupational therapist and no dietitian at the time of the interview, although they did have a full-time radiographer. It has an ARIA+ classification of 10.44 (Remote) and is a major service centre for a substantial portion of New South Wales's grazing land. The population of the town and surrounding rural community is aging and the town's rural hospital was recently remodelled to accommodate a greater proportion of long-stay, aged-care patients. Yet, as pointed out by RN.10, specialist allied health aged-care, services were seriously lacking and the nursing staff, who were expected to perform extended roles in support of the local population, received very little, if any, training and support in their roles.

In spite of the above arguments, some of the informants expressed scepticism about blurring the boundaries, multi-skilling, role extension or substitution as the possible solutions to the problems. Several of the radiographers (RR.4, 8, 12, 13, 18) expressed various concerns, even though as a professional group they are not without role extension aspirations themselves, as evident from the discussion in Chapter 3 about radiographer

image interpretation and reporting. One of the radiographers (RR.4), however, who earlier in his career had aspired to become a health service administrator, asked the following question: 'So why can't the Health Service Manager be a radiographer?'. In answer to this rhetorical question he explained that apparently at about the time he completed his Master of Health Service Administration degree, the New South Wales Department of Health approved a policy that Health Service Managers could only be selected from the ranks of the nursing workforce. Allied health staff, no matter what their qualifications, could apparently not apply. He seemed to have remained embittered about this insurmountable career obstacle and so continued the interview as follows:

> RR.4: And why can't I then do limited nursing procedures? Could you imagine the Nurses' Association saying yes to that? But they should. We know our anatomy, physiology. We all get taught hospital practice care of the patient, we all get taught how to do sterile procedures.

Later in the interview he posed a further question: 'Why can't you have a radiographer practitioner?'. With his rhetorical questions this radiographer suggested that, in his opinion, there is a valid argument for role extension to be 'rolled out' to encompass a wider range of health professions. Another of the radiographers (RR,12), also disgruntled about the number of nurses in health service administration positions, claimed to have seen evidence, apparently made available through his union, that a state-wide shortage of frontline nursing staff was directly attributable to having too many nurses performing administrative roles. He considered this incongruous on the basis that the two roles, nursing and management, are motivated by quite different goals, the former being primarily about patient care and latter primarily about the budget and resources. His argument was as follows:

> RR.12: Nursing is about nursing, full stop. Not management. You get a person who goes into nursing, they are a soft person who wants to help people, be nice to people etcetera. Now, if you have someone who's going into a managerial job … they have to be a bit of a hard nosed bastard, right. Now to me that's two ends of the stick …

Whether RR.12 is correct or not, both of these radiographers display some degree of resentment and an obstructive mentality, which they attributed to policy decisions that discourage cross-boundary collaboration. Further evidence of the struggle that sometimes

takes place between radiographers and health service administrators will be presented later in this chapter under the theme of 'Interprofessional Conflict and Collaboration'.

Other informants suggested that there is an inherent risk in role extension, which one of the radiographers described as follows:

> RR.8: I think we're opening ourselves up to all sorts of things, like thinking we're more important, more capable than what we really are, by going that one step further as well.

This radiographer went on to explain that because some health professionals may not recognise their boundaries or become overzealous in their extended role, the quality of health care could suffer and clinical error could leave some open to litigation. One of the nurse informants made a similar observation in relation to nurse practitioners, saying that:

> RN.9: … some of us sticky-beaky ones that have worked in intensive care and studied drugs and all the rest of it may have a limited knowledge about the dangers of certain things and all the rest of it. There are some who that if they're told they may can be gung-ho, without meaning to.

Both of these informants raised concerns that the blurring of practice boundaries may allow some practitioners to exercise greater autonomy than is appropriate for their level of knowledge. The experience of the remote x-ray operator program appears to support this perception in that some limited x-ray licence holders, who are not always cognisant of the potential risks, apparently over-step the boundary, being described as having a 'gung-ho' approach to radiography (p.150). Consequently, one of the radiographers (RR.13) warned of being 'very careful of nurse practitioners', adding that 'I'm hoping it's going to be very strict handing out of nurse practitioner licences or registrations'. Another of the radiographers (RR.18) who also expressed doubts about the benefits of role extension, suggested that in the process something valuable could be inadvertently lost in that 'different people have different areas of expertise and in reality they don't cross terribly well'.

The remote x-ray operators' role undoubtedly places pressure on professional boundaries in the rural health care system and some radiographers are apparently wary of the encroachment into their professional territory of less knowledgeable, less experienced practitioners. There is a need, therefore, to ensure that boundaries are clearly defined.

However, it can also be argued that, given the current scarcity of human resources in rural and remote health facilities, the aging patient population and the projected further shortfall in health care services, there is a need to de-emphasise professional boundaries. The less desirable alternative may be no services at all. As one of the GP informants said about merging health professional roles by blurring occupational boundaries:

> GP.4: Some people can cope with that, other people sort of feel threatened and feel people are invading their territory, and I think in the end, if there's no service or there's some service then what's wrong with having a service that might not be as good as, you know, we can take x-rays, they might not be as good, we don't take many, better than, at least we can do something that's useful. It helps us and helps the patient.

## Professional Status and Esteem

This theme relates to the way that interprofessional interactions are apparently influenced by the way that each profession as a whole or individual members of a profession see themselves and are seen by other members of the health care team and by the general public. 'Professional Status and Esteem', therefore, is about the way that attitudes, as opposed to the knowledge and skill components that were dealt with in Chapter 6, contribute to the shaping of professional territory and the interaction that takes place at the boundaries. From the data it appears that there are different attitudes evident in the three different professional groups and that the existing hierarchy inherent in the health care system contributes significantly to the extent to which each perceives themselves, or is perceived by others, to be a valuable member of the team. The implication is that each team member is expected to perform a role befitting their status.

There are two strongly supported observations that can be made from the analysis of the data assembled under this theme: firstly, doctors are perceived as being at the top of the health professional hierarchy; and, secondly, radiography appears to have relatively low status and radiographers suffer from poor professional esteem. Both of these phenomena are potentially problematic in clinical practice.

**Medical dominance**

Comments that doctors are regarded as 'God-like', are arrogant and egoistical, or have a superior attitude, recur frequently throughout the data. Reference was made to this in the previous chapter under the sub-theme of 'Patient appreciation' (pp.186-190). It was also an opinion expressed, in some cases quite vigorously, by both radiographers and nurses in relation to professional roles (RR.1, 3, 6, 8, 12, 15, 16, 20; RN.2, 3, 7, 8), although the doctors themselves, of course, did not use this language to describe their own professional status. Indeed, the doctors made little reference to professional status at all, suggesting that such considerations are of little concern to them as a professional group. This perception was noted by one of the nurse informants (RN.8) who said about doctors that 'they're not a threat and they're not threatened by you either.'

Some examples of the comments made by the radiographer and nurse informants about doctors are given below:

> I: You said a little while ago "he's God", did you mean this guy?
> RN.3: Oh no, that was the one, well this one's even God and Son and everything. I think this one's worse in some things. I don't know what it is. We've had such lovely, I mean he's nice some of the time and I don't want it to be, it's just this attitude sometimes. I don't know.

> RR.6: Basically I believe it when the students come out and become interns and residents and whatever else, that they're actually built up to believe that they are God, that they are invincible. Now, obviously the good ones realise that they're not invincible but they have to have that confidence to be able to get out there and do what they've got to do. So, that's what I think I mean by, I suppose by God I suppose, invincible.

> RN.7: They're not shy about it, like, they're a fairly egotistical bunch and you know they think, and they are, they're excellent. They're probably entitled to be proud of it but…

> RR.8: Well, I actually don't think that's what most doctors think, that someone could do something better than they could.
> I: So, doctors think that they can do everything better than everybody else?
> RR.8: And being important is fundamental to their profession, and that's cool. I don't have a problem with them being important. It's not fundamental in my eyes.

> RR.15: I don't give a shit what he thinks about himself, you know. He's a doctor, he does his job. I'm sure he has a bit of, people think he's a bit

arrogant but I get along with him fine. And, he respects me, as well, and he actually does respect what I do and he respects my opinion on something. But I do get along with him fine, but I think he does have a bit of an authority-type issue with a lot of staff and patients.

In some of the above quotations the view is expressed that the doctors' self-importance is not only fairly universal but is also innate in their professionalism, RR.6 suggesting that it is something that begins very early in their professional development. In saying that most doctors seem to believe that no one could do a job better than they could themselves, RR.8 also observed that, while 'being important' might be 'fundamental' to the medical profession, in reality this is of no great concern. Similarly, RR.15 says that even though the local doctor seems arrogant, he appears to value the role of the radiographer. RR.15 said that 'he respects my opinion', suggesting that this is because the radiographer and doctor share a common interest in diagnosis, which perhaps contributes to a degree of mutual respect. RR.1, on the other hand says bluntly that although it might seem that doctors regard themselves, and are regarded by others as 'God', they are in fact no different from anyone else:

> RR.1: Doctors are like you and I, doctors shit just like you and I, okay Excuse me. So, I've got no pretence about them. To me they're ordinary people…

Although, as suggested in the above quotation from RN.3, not all doctors are arrogant all of the time, in general the informants struggle to explain why they almost universally have a high self-regard. The doctors' attitudes appear to be related to issues of their need and desire to assert their professional dominance, as discussed below, although some informants suggested some other possible explanations. For example, RR.6 suggested that it may be related to having to make 'those decisions that have to be made', implying that self-assuredness is an essential requirement in making key decisions that affect peoples' lives. RR.16 says that 'doctors do have that slight superior calibre about them' and suggests that this is at least in part because people treat them as special and value their contribution to the community so highly (see 'Patient appreciation', pp.186/7). In a similar vein, money and social status are also mentioned as possible factors. RR.16 says about one doctor in a small outlying rural community that:

> RR.16: … he's probably financially gained heaps being out there, but then again, the community has gained so much by having him there too. The doctors out there come and go. There's another doctor, another practice out

there as well, and over the years the council, local council, has provided
facilities like free housing, free electrical, a car, and still they ask for more.

One of the nurse informants (RN.6) agreed that money is an essential attraction for rural doctors, saying 'they need money to live on and they're not going to come out here unless they are making some sort of money'. In this case the nurse was describing a situation where she was willing to curb her own aspirations for an advanced practice role and nurse practitioner status if it affected the earning capacity of the local doctor.

The dominance of medical practitioners that is described in many of the interviews with the nurses and radiographers would be of little concern, as suggested above by some of the informants, were it not for the fact that it has some negative side-effects. These are often associated with the doctors' willingness to engage in, or to coerce nurse remote operators to engage in fringe practice, being dismissive of mainstream opinion about limited x-ray licensing, and thus placing inappropriate pressure on practice boundaries. Fringe practice was discussed under the theme of 'Licence Conditions and Limitations', particularly under the sub-theme of 'licence breaches' (pp.109-113). Further, the tendency for doctors to accept less than optimal image quality because they do not apply traditional radiographic evaluation criteria, aiming instead to simply obtain a diagnosis with little regard for technical quality, was described under the theme of 'Image Quality and Standards' (pp.147-151). Central to these problems is the difference in professional status between doctors and other health professionals, the difficulty apparently being that communication is stifled. For example, in relation to the issue of image quality one of the radiographer informants said:

> RR.1: The nurses haven't got that humungous big ego that the doctors have,
> so you can talk to the nurses. They will take advice. The doctors will not.
> Doctors are hopeless, hopeless.
> I: Okay so what are the consequences of that?
> RR.1: Very poor radiography standards.

A comparison is made by this radiographer between doctors and nurses, the suggestion being that it is much easier to advise a nurse about radiography than it is to advise a doctor. Later in the interview RR.1 reaffirmed this opinion, saying 'they think they're God almighty and they won't take advice'. Other radiographers made similar observations, as in the following quotation:

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RR.3: You find it very difficult to explain a thing to a doctor generally, you know, anything. So, I'd imagine that if a radiographer said, "well okay you took these images and this is wrong with them or this is right with them", I don't know exactly how much they'd listen to you specifically.

In this case the radiographer suggested that even if advice about radiography is offered, there is a strong possibility that the doctor won't act upon it. Another radiographer (RR.20) suggested that the reason for this obstacle to effective communication is that, 'traditionally', doctors don't like to be challenged by perceived subordinates:

RR.20: I guess doctors have that aura of, you know, "I'll ask you, you don't tell me". And, because he's the doctor and traditionally you don't approach doctors and tell them they're doing things wrong, I guess is another part of it.
I: Right. So, you don't question what the doctor does?
RR.20: Well, you don't necessarily, not question it, you just maybe don't force the point with him.

Doctors, therefore, seemingly place themselves in a position of ultimate and sometimes total authority, which is apparently not open to scrutiny. Kenny and Duckett (2004) have observed that medical power is strengthened and institutionalised in rural practice. As one of the nurse informants (RN.2) commented about one of the local GPs 'he likes being his own boss, he likes not to be accountable to another senior person in the practice …'. Yet another of the nurses made the observation that:

RN.8: [The doctor] doesn't like us to step outside our boundaries.
I: Oh, okay.
RN.8: Okay, because we might be stepping into his territory. But then again he appreciates that if you have knowledge and you show that knowledge by what you, with your skills, not by speaking, he doesn't want to hear what you've got to say. He'd rather see you doing your job and getting on with it.

In this quotation, RN.8 implies a degree of subservience in her role, being expected to perform the duties that fall within the boundaries of the traditional practice role of nurses without voicing her opinion about patient management. Later in the interview she also said that 'you feel like they walk all over you to get what they want' (RN.8), suggesting that the relationship is oppressive.

The potential repercussions of this stifled communication are not only that the opportunity for teamwork is limited, communication being an essential component of effective teamwork (Norsen, Opladen & Quinn 1995; Abramson & Mizrahi 1996;

Lindeke & Block 1998; Hall 2005), but also that the risk of consequent poor clinical and clinical error is increased. There is limited sharing of knowledge about the patient and their condition. This bears similarity to observations that were made by Lingard et al. (2004) in relation to teamwork in the intensive care ward (p.72). Like the intensive care team, the rural health care team is apparently not a unified entity but rather a collection of individuals with their own agendas. In the intensive care situation reference was made to the concepts of 'ownership' and the 'process of trade', both of which appear relevant in the context of the rural health care arena. However, an extension of Lingard et al.'s observations was also noted, where some doctors who, having been challenged about their management of a patient by a perceived subordinate, apparently act in defence of their professional autonomy by deliberately rejecting the advice that is offered. For example, one of the radiographer respondents (RR.8) said that she was discouraged from offering an opinion about the outcome of a radiographic examination because in the past it had caused the doctor to react defensively.

> RR.8: I found also with him was, for patients that I said something, you know, he would actually totally turn the treatment around and go the opposite direction, purely innocently that I've said something. So, it doesn't benefit the patient.

In another case, at a different hospital, one of the nurses (RN.5) described a situation where, because of what she perceived as the doctor's need to 'save face', patients were treated as though they had a fracture even though a delayed radiologist's report had excluded a bony injury.

> RN.5: … 'cause usually if you know [the doctor] will find a fracture somewhere and put a plaster on and whatever. The results come back and say there's absolutely nothing there but the patients just come back in five weeks to have the plaster reapplied.

There is a similarity between this story and the admission made by GP.4 under the sub-theme of 'Patient appreciation' that he is sometimes reluctant to admit to the patient that he has made a mistake in his radiography and has to repeat an exposure (p.188). Doctors, it appears, like to express their considerable professional autonomy (Kenny 2004), sometimes using inappropriate and unnecessary mechanisms to do so.

**Button-pushers and handmaidens**

Radiographers, on the other hand, as commented earlier, seem to suffer from the perception that radiography is easy. This was previously referred to under the sub-theme of 'Patient indifference' (p.181-186). The critical issue, however, is that this perception impacts negatively on the professional esteem of radiographers, particularly the view that radiographers are just 'button-pushers'. Interestingly, this perception was not directly expressed by any of the nurses or doctors interviewed, although one of the doctors (GP.5) made the comment that 'it's all very well to take an x-ray, a trained monkey can do that', although he was not referring directly to radiographers at the time. Rather, the 'button pusher' perception was relayed by the radiographers themselves (RR.1, 6, 12, 13, 18), usually as part of a description of what they believed other health professionals or the general public thought about them or about what their job entails. Some examples of this are as follows:

> RR.1: I'm just a button pusher, that's all I am.
> I: So you've actually heard them say that?
> RR.1: I'm just a radiographer. I've put in that expression, "I'm just a button pusher". Yes.
> I: But is that a feeling you get or is it something that they have actually expressed to you?
> RR.1: No, radiographers are sub-standard to nurses. Nurses are, "I've come to the world". Radiographers are nothing, and that's a fact.

> RR.6: … in my opinion radiographers in this country have a, or had, I think it's improving, had a very low status in the hierarchy of the medical field. I think maybe their training wasn't good enough, they weren't bright, they were just considered to be button-pushers and pushers of plates underneath patients.

> RR.18: Well, many nurses seem to think that, basically, you bring the patient in, you push the button, and then you push the patient out. That's all you do. And, they don't understand that there's positioning involved, prep', setting up exposures. With this new machine which has automated exposures for a number of things does make that button pusher statement a little bit more of a reality.

Both RR.1 and RR.6 in the above quotations seem to agree that radiographers are on one of the lowest possible echelons of the health professional hierarchy, RR.1 stating that 'radiographers are sub-standard to nurses'. RR.18, who also apparently cares about what the nurses think of radiographers, proposes that the evolution of automated, more user friendly equipment adds to the nurses' perception that radiography is easy. He went on to

reflect that on 'the older equipment, everything has to be set manually', suggesting that he feels that automation of exposure selection has made radiography and radiographers more vulnerable to the 'button pusher' perception. The implication of this is that the 'mystery' that may have previously surrounded the selection of exposures has been removed, thus making the radiographers role more susceptible to 'routinisation', an argument put forward by Abbott (1988) (see Chapter 3, p.46). If this was the sole basis of radiographic practice perhaps RR.18 would be justified in this perception, however, as argued in Chapter 6, under the theme of 'Competency Requirements', radiographers make radiography look easier than it is (p.127). As another of the radiographers (RR.6) pointed out:

> RR.6: … the common misconception of radiography is button pushing. You just slap something on or up against a plate, film and you push the button and "hey presto" you've got the result.

Nevertheless, the 'misconception' that radiography is relatively easy seems to persist, apparently predominantly amongst radiographers themselves, with the belief that radiographers 'have basically one skill, we take x-rays', as expressed by another radiographer (RR.10). Yet another of the radiographer informants said:

> RR.8: Let's face it, we're not you know rocket scientists are we? That's part of the whole problem with radiographers not wanting remote operators is 'cause the secret's out then. We're not rocket scientists.

In a similar sense to RR.18 above, in this latter quotation RR.8 makes reference to the perception that allowing non-radiographers to perform radiography demystifies the task of taking plain radiographs and lays the profession open to their primary role being usurped by some other predatory professional group. Other radiographers expressed similar concerns, that there is a common perception that remote x-ray operators 'are doing exactly the same as what I'm doing, and they only took five days to go away and learn it' (RR.12). The same radiographer referred to remote operator as 'interlopers' and said that they are 'the Achilles' heel of our profession', while another radiographer made the following observation about the influence that remote operators have on the perception of radiographers and radiography:

> RR.17: Well, I think remote operators can diminish the perception of a medical imaging person, or a radiographer. … You give a person a crash

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course for three or four days and then they can take a radiograph. … It's, I find it's a little bit belittling. It's one of the reasons why I want to see it controlled, the profession has control over the remote operators. Yes, I find it a little bit belittling.

The perceived inadequacy of remote x-ray operator training was previously commented on in relation to their competency (p.121), however, in this case RR.17 states that he finds it 'belittling', a reflection on the effect that it has on his professional esteem. Other radiographers also appeared to find the fact that remote operators only have to do a few days training has a negative influence on their own and other peoples perception of radiographers' level of professionalism, as expressed in the following quotation:

RR.2: Well, even the nurses going to do the course are thinking, "well you know I can go away for ten days and come back and do this guy's job. How professional is he?". And, they seem to think because they're getting sent away to do that it must be easy. … it just doesn't do much for radiographers overall. Just the general perception of, you know, anyone must be able to take x-rays.

In this quotation, RR.2 expressed the concern that some of the remote operators who go away to do the course are doing so under the assumption that radiography is something that anyone can do with a minimal amount of training. One of the other radiographers (RR.13) also believed that this is true, but that it is a perception spawned out of ignorance and lack of contact with radiographers. He said:

RR.13: I just thought it was more a couple of remote operators before they started their courses, don't have radiographers on site. They have this perception that radiographers take photos. Push the buttons on the machine … the perception of us as button-pushers. They're more likely people that have nothing to do with us, staff-wise. Patients seem to be okay with us, they seem to appreciate the helping hand they get.

The counter argument, therefore, is that remote operators develop a higher regard for radiographers once they have attempted to perform radiography themselves, a view that is supported by the quotations on page 127, under the sub-theme of 'Experience and adaptation'. RR.11 made the observation, for example, that radiographers' expertise is recognised and appreciated more so by those nurses who have, with difficulty, attempted radiography themselves.

RR.11: I think in fact it often enhances what I do. Where I'm able to get a good picture first time and the nurses who used to take pictures, for instance, say, "Oh, yes, very good", you come along and you get it first time, "Oh isn't that wonderful".

In some instances the perception of radiographers as mere button-pushers was linked to the idea that they are overpaid for what they do, although again this was not a view directly expressed by any of the remote x-ray operator informants but second-hand by some of the radiographers. One example of this is that one of the radiographers (RR.12) told a story of how he found 'some nursing staff just up the corridor here' displaying the radiographs he had just taken on the viewer and telling the patient what he called 'bullshit stories' about what they could see on the images. This, he said, made him 'look stupid', especially because he was apparently aware that one of the nurses involved said that he 'didn't know anything about' image interpretation and referred to him as 'an overpaid, button-pusher'. Another radiographer (RR.3) also felt that he and other allied health staff in the hospital were often talked about behind their backs in relation to the amount of money they earn for on-call work. He said he was aware that in the 'back corridors' nursing staff were heard to say things like "Oh God, the radiographer's in again" and "here they are the allied health people milking the health service for what it's worth". One of the radiographers said that:

RR.7: [The nurses] think we're overpaid for some reason and I can't see why, given that we've done four years of Uni or the equivalent. I don't think, I don't know what they think behind closed doors, we don't talk. … most of them are quite good actually, yeah, but there's the odd few that think they should get their children to be radiographers because you don't do much and you get lots of money.

In all of these instances it is apparent that there is some degree of animosity between the radiographer and the nursing staff. For example, RR.7 made this apparent by saying that 'we don't talk', referring to the lack of communication with the nurses. It is also apparent that the issue of radiographers being perceived to be overpaid for the health care role they perform is the catalyst for many of the boundary disputes that occur between radiographers and remote x-ray operators or health service administrators. For this reason it will be dealt with in more depth under the theme of 'Interprofessional Conflict and Collaboration', however, in relation to the theme of 'Professional Status and Esteem' the problem is well illustrated by the following quotation from a senior radiographer:

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RR.9: … at times I've sensed though a, you know, I sense a resentment of radiographers who go and get a job at a place where they do one exam or two exams a day and who just sit there and say, "I'm a radiographer. I don't do anything", and make a lot of money from doing not much!

If RR.9 is correct that some radiographers behave as he suggests, it is difficult to dismiss the possibility that these radiographers are at least partly responsible for their own low professional esteem by underplaying their role in the health care system. Nevertheless, the trivalisation of radiography is something that rural radiographers are guarded against and it is apparently a potential source of conflict. This is particularly true for those sole practitioners who, as RR.7 observed, only perform general radiography – 'I'm just a general, just a general radiographer … I've done mammography but not here obviously and now I'm just a general [radiographer]', which suggests a perception that general radiographers are less highly regarded than those with specialist knowledge and skills.

In addition, it is noted that radiographers are employed in a workforce consisting largely of nurses and in some cases work in a hospital where some of the senior nursing staff, who may have administrative responsibility as well as a clinical role, have a limited x-ray licence. For example, a radiographer informant (RR.14) described the situation where, having found an obvious positioning error on a radiograph she 'might go and mention something' to the nurse who did it, but she said that she could not be sure 'whether or not they take that on board'. When asked why she was not sure if her advice would be heeded, she retorted 'Do you go tell your boss something like that?', making it clear that she felt over-powered, even in her own area of expertise. Under similar circumstances involving a GP remote operator, another radiographer explained the course of action as follows:

RR.20: It's not my place to confront him. I'm a technician. I don't have a clinical background as such. Like, you know, my job is just a technical position. I come under the HSM [Health Service Manager]. Now, the HSM and I have spoken about it, and she's spoken to [the doctor] about it. …You know, the guy's a doctor, he's got his licence to do it.

Other than the fact that this radiographer apparently considers that she does not have a clinical role but is just a 'technician', the remarkable aspect of this scenario is that she felt unable to speak directly to the doctor about his poor radiographic practice, instead approaching the HSM (a nurse), to whom she was immediately answerable. It is apparent

that this radiographer considers herself subordinate to both the doctor and the nurse, even in regard to radiographic matters. This seems to support the assertion that rural radiographers are well down the health professional hierarchy. As another of the radiographers (RR.12) said 'I'm not a doctor … The doctor is as far as I'm concerned the pinnacle … I assist the doctor'.

There is also apparently an opinion held by some of the radiographer informants that nurses have greater authority in the health care system than is perhaps either appropriate or productive, a perception that is examined more closely under the theme of 'Interprofessional Conflict and Collaboration'. For example, one of the radiographers made the following observation:

> RR.6: Basically I think nurses are very much, some nurses, are very much along the same lines as doctors in feeling that they run the hospital, they run the practices, the various things around.

In this instance, having previously stated that doctors 'believe that they are God, that they are invincible' (p.227), RR.6 suggested that nurses are not much better in terms of asserting their authority.

The professional status and esteem of rural nurse remote x-ray operators did not feature prominently in the interviews, although some expressed the view that performing radiography is a means of adding value to what they do as nurses and that they gain a sense of satisfaction from that, as described previously (p.196). Most of the nurses interviewed, however, regarded remote x-ray operator radiography as just another thing that they have to do (p.198) and that it was peripheral to their principal nursing role, even though some felt that it adds a challenging diversion from their routine work (eg. RN.9, p.153). In contrast perhaps to radiographers, the nursing profession has actively sought to extend its role and seek recognition for the important role played by rural nurses (Hegney 1997). This has been influential in building the professional esteem of rural nurses to the point where one of the nurse respondents (RN.7) felt confident in making the following comparison between her role now and what it was like when she first started nursing in a city hospital.

> RN.7: It's no longer the hand-maiden, the doctor's little helper thing. You get so much more autonomy and much more of a …, it's not a hand-maiden

thing, but certainly you didn't make decisions and you didn't do a lot of the stuff you do out here in a diverse country hospital where you are the first line for anything that walks in the door.

Another of the nurses (RN.10) also described the changes that have taken place in nursing practice as follows, believing that nurses have developed their diagnostic skills, even though they still look to the doctor for confirmation.

> RN.10: I think nurses now are becoming, they're training such that they're becoming more used to doing diagnostic, whether it's nursing diagnostic or trying to second-guess the doctor with the medical diagnosis. They're getting in and having a go because that's, that's their training now. And, nurses, generally speaking, are more confident in doing that.

While radiographers have a specialised and quite narrow role in the health care system, nurses have a broad and perhaps less clearly definable role. For example, one of the nurses (RN.2) explained that she is seen as an all-round resource person - 'when no-one else seems to know what they should do about something they seem to think that I will'. Another said that she has an important role in health promotion, suggesting great diversity.

> RN.9: We have a big role in getting patients to do the right thing about their health and, if they're already damaged in any way, we have a big role in educating about what they can do to get the best results.

In summarising this theme, it appears that while boundaries may be blurred somewhat in rural health practice, traditional barriers do exist to skills transfer and role substitution, as described under the previous theme of 'Role Delineation'. Doctors appear to be bound by tradition to occupy and defend their higher professional status. They seem to be distinguished and somewhat isolated from the rest of the health care team by their aura of superiority (although not all doctors are like that) and this appears to prevent effective communication and teamwork in some cases. Nurses seem to occupy a broad professional territory (Pearson 2003) and are proactive in seeking new, extended roles, as well as having considerable authority in the rural health care system. Radiographers appear to occupy a specialised niche in the system and appear to be lacking in professional status, which consequently impacts negatively on their esteem as a professional group. This makes radiography vulnerable to take-over because it is considered by some, perhaps poorly informed, senior staff to be a relatively undemanding but expensive service to

maintain. As stated earlier, the contest over professional territory is largely fuelled by these latter issues, as will be described under the following theme.


## Interprofessional Conflict and Collaboration

It is apparent from the data that the balance between conflict and collaboration in the arena of rural radiographic service provision plays an important part in shaping the relationship between rural radiographers and remote x-ray operators. Conflict, although fairly rare, often involves the radiographers and health service administrators, the latter commonly being nurses in the rural health care system. As mentioned above, these senior nursing staff often also hold a remote x-ray operator's licence. Doctors play a relatively minor role in conflict, although their involvement periodically exacerbates an already strained relationship. It appears that rural GPs and rural radiographers have a closer professional relationship, possibly because they share a common interest in diagnosis. As one of the radiographer informants (RR.8) said 'I'm quite happy to respect that boundary. That's their business, that's their thing. I actually will do my best to help provide that diagnosis for them'.

Collaboration, on the other hand, refers to the nature of the communication, feedback and consultation that takes place between the staff of the rural health care system that are involved in diagnostic radiography. This includes reference to GP and nurse remote x-ray operators, radiographers and, to a lesser extent, radiologists. This theme explores both sides of this balance, examining what the informants' perceptions are about how effectively they work together as a team and how teamwork could perhaps be improved.

### Money, power and isolation

Either separately or in combination the three ingredients that contribute most commonly to conflict involving rural radiographers and remote x-ray operators are money, power and isolation, although not necessarily in that order. The principal focus of conflict between radiographers and health service administrators appears to be budgetary issues, specifically related to the amount of money that radiographers earn on-call and the impact that this can have on the budget of a small rural hospital. On occasions, the need for

budgetary constraint leads health service administrators to make decisions about the management of radiographic services, sometimes without consultation with the local radiographer. This is construed by some radiographers as an assault on their professional autonomy, as illustrated by the following quotations from some of the radiographers:

> RR.4: … it's the same old story, if they have remote operators in the hospital, and they make sure they have one remote operator on duty all the time, but you've got a radiographer a lot of the CEOs [Chief Executive Officers], especially in the old days, would not call the radiographer, to save money.

> RR.7: I don't see eye to eye with the boss on certain issues but we still get along quite well. He's got his job to do and if that means cutting services to make the budget balance that's his choice but he won't be doing it to my department without a fight.

> RR.13: I've seen other radiographers in other areas rates of pay. Service managers, very professionally jealous that, disgruntled over radiographers ruining their budget for what they do. They don't appreciate taking x-rays and the money they earn. They don't appreciate any of that.

> RR.17: … management's always concerned with the cost of being on-call, of calling a radiographer in. And, even though it's found to be a pain in the proverbial, that they were always on the economics of it. If the doctor or sister could take the x-ray it's a saving for them.

In the above quotation RR.4 referred to a situation where, in order to save the hospital the cost of paying the radiographer to do after hours calls, the Chief Executive Officer (CEO) decided to organise a roster of remote x-ray operators to cover the on-call hours. This is, of course, illegal substitution under the Radiation Control Act 1990, if the radiographer is available (see p.113). In this case, when he confronted the CEO about this situation it escalated into conflict and as result, according to the radiographer, the CEO 'released to the paper what I earned!'.

Another of the radiographers (RR.17) reported a similar case of illegal substitution, as did other radiographers (pp.113-117), although none of the other examples of conflict resulted in public disclosure of private information. In RR.17's case the conflict apparently resulted in him taking a firm stand, stating that 'if I was available I was the one that was going to be taking the x-ray'. He went on to say that he 'had to sort of put management in its place about that'. RR.17, reportedly also took on the management over

other issues such as 'the on-call burden', management's unwillingness to provide for locum relief, and being called in for emergencies by nursing staff instead of by the doctor. He stated that he is 'happier with conflict if I can see some benefit coming out of it', which he saw as making his position as a sole radiographer more 'tolerable'. He also said that he recommended to a colleague that she submit a written report whenever she felt that the other staff or the management are taking advantage of her. It appeared that RR.17 advocates conflict as a necessary strategy in maintaining his professional autonomy.

Other radiographers who spoke of a history of conflict also seemed to have adopted it as a defensive strategy. For example, according to RR.18 he had been surprised at one time to find out that some of the nurses at the hospital where he had been the sole radiographer for many years had suddenly obtained a limited x-ray licence. Again, this was reportedly a unilateral management decision to reduce the cost of call.

> RR,18: I wasn't told anything about it. Several of them approached me and said, in quotes, they were told that the radiographer would help them. … That's when I learnt of the plan in this place, that there would be no need to call in the radiographer anymore. The nurses would do the calls.

He said that at the time that this happened 'with that particular management, I was at war with a number of other things …', which he described as '… a lot of skirmishes with other issues. There's nothing to do with this, but there were a lot of other problems.' He said that his response to this new problem, which had apparently arisen without warning, was that he refused to assist the newly licensed remote operators and consequently:

> RR,18: … there was a bit of conflict and I was told I should, and I said I wouldn't, because remote operators were just for that, for remote areas. Since I was within five minutes walk away from, well ten minutes walk, five minutes drive from the hospital, it's not like they didn't have anyone who would come out. It was a matter of saving money.

This radiographer said that he had since decided on a different, less confrontational strategy for dealing with conflict. He said, 'I sometimes think maybe keeping my mouth shut is better for peace'.

Therefore, while the issue of remote x-ray operator licensing is often a volatile catalyst in conflict, it is not necessarily the key ingredient. For example, another radiographer

(RR.12) described an incident that occurred in the emergency department when he needed to place a cassette underneath a patient who was thought to have suffered a spinal injury in a motor vehicle accident. According to RR.12, 'quite a ding dong' arose over how the patient was going to be moved to insert the cassette between the patient and the mattress, resulting in nursing staff refusing to assist and walking out of the ward, leaving the doctor and radiographer to perform the manoeuvre by themselves. The radiographer said:

> RR.12: … well they were going to write up a policy, the nurses, on my job, and I was a little bit cranky. But I've got a nurse in charge. She wasn't listening.

Apparently the radiographer was incensed at the idea that the nurses were trying to tell him how to do his job. While this was a boundary issue, it was not one directly associated with the role of remote x-ray operators, although the radiographer indicated that the remote operator issue was simmering in the background at the time of the incident and suggested that it may have been the cause of some underlying animosity. The outcome of the incident was that letters were written to various authorities but no action was taken. Fortunately, the patient was not harmed.

Some radiographers are apparently well known for their dislike of remote x-ray operators and have spoken out in opposition of them for many years. One of the nurse informants (RN.5), for example, said about one radiographer that 'he hates remotes, we're doing him out of work', suggesting a chronic boundary issue. One of the radiographer informants (RR.8) described one of her colleagues as getting 'very heavy handed with that sort of jazz', referring to an incident where it became known that a remote operator at a particular site had performed an examination that was not covered by the licence conditions. However, RR.8 disagreed with the way that the incident was handled, explaining that:

> RR.8: … to hassle her about it and tell her, you know, it's ridiculous, and that he's going to take her licence off her and da da da da da da da, is just not helping. Yeah, you've got to let them know they did wrong and that they're not going to do that again but, you know.

Another nurse remote operator (RN.8) described a difficult situation where she said that the radiographer had dismantled and hidden pieces of equipment to prevent the remote x-ray operators using the x-ray room and darkroom. This nurse also claimed that, because

of such behaviour by the radiographer and threats of having their licences revoked, some of the nurse remote operators at one site had refused to do any more x-ray examinations.

RR.8, the radiographer quoted above who disagreed with the behaviour of her colleague, made the observation that 'I don't think as an Area we do our profession any favours whatsoever', meaning that the behaviour of some of the radiographers in that particular Area Health Service attracts some negative notoriety for the profession as a whole and that this is counter productive. Later, RR.8 commented that some of the radiographers in the Area are 'so bogged down in their own self-importance and scoring points, it's just crazy'. This comment perhaps reflects the previously identified problem that apparently radiographers in general have low professional esteem and, hence, some radiographers feel the need to assert their limited power by whatever means they can, even if it is perceived by others as petty and unproductive.

A number of the nurse and radiographer informants expressed opinions about a division in the health care system between 'us and them', meaning the workers and the management. For example, referring to the Area Health Service central administration, one of the radiographers (RR.19) said very clearly that there is a perception of the centralised administrative unit as 'the big "Them"'. RR.19 went on to suggest there is little point complaining about conditions because once a decision has been made - 'what are you going to do about it?' - which suggests a feeling of powerlessness. Other informants expressed a similar view of the centralised power of management, for example, while describing the loss and down-grading of services at some locations, one the nurse informants said that, in her opinion:

> RN.7: … the [Area Health Service] seem to be single-handedly trying to destroy some of the services. They initially wanted to have a physio. They do try to recruit but now they're quite happy because it's so much money out of the budget. And, at the moment our maternity unit is closed because of the shortage of midwives but we've done dummy rosters and we can cover it and, but they seem to be quite… I don't know if it's just mismanagement or if it's, you know, if there's another agenda …

The above quotation relates to a discussion about one site where a sole radiographer who had worked part-time for many years had passed away sometime before. According to

RN.7 the Area Health Service management were 'happy just to chug along with the remote operators', effectively down-grading the service.

In another instance, one of the radiographers (RR.1) described an 'us and them' situation where she was 'told by the powers that be' that she would have to start providing a part-time service to a small hospital located more than a hundred kilometres from where she worked full-time. When this radiographer said it would only be possible to provide a service 'one half-day a week' conflict apparently arose, where:

> RR.1: … they [the health service administrators] jumped up and down, screamed and shouted and yelled and threatened and all this sort of stuff and I said, "No, that's it". Finally they settled down and said okay one half day a week. So, I did that and I've been doing that all last year and there's been not another murmur since.

While in this case it seems that the radiographer's argument prevailed over that of the management, it appears that there was a mismatch between the expectations of the managers and capacity of the radiographer to provide an outreach service. This apparent lack of understanding was also evident in RR.13's quotation on page 240, where he generalised that managers 'don't appreciate taking x-rays'. RR.13 expanded on this, referring to hospitals other than his own, saying that 'I've seen management in other places that don't appreciate the work that radiographers do', but then went on to suggest:

> RR.13: I think radiographers bring some of it on themselves being more, they're an isolated position. No one knows much about them, but they're not actually sharing what they do with anyone else either.

In saying this, RR.13 suggested that radiographers isolate themselves by not ensuring that management are more aware of their role. Like RR.8 above, who felt that radiographers don't do themselves 'any favours' by interacting negatively with management, RR.13 apparently felt that there is a lack of positive interaction taking place.

Another of the radiographers (RR.17) described radiographers as 'a bit more of an appendage in the system'. This was said in making a comparison with nurses who he suggested are far more dominant. He said:

RR.17: They're fairly powerful lobby aren't they? - The nurses' profession. I think they've got the weight of numbers. You learn to appreciate and love nurses, but that's probably not the same for radiographers …

Meanwhile, another radiographer said:

RR.12: There are no two ways about it, the Nurses Association. Look, that's stronger than the warfies. You know, we always said how strong the wharfies union was. The Nurses Association makes them look like pussy cats. But they do it by a very clandestine way. They do it quietly in the halls of parliament etcetera.

While this latter opinion is obviously an extreme view, it reinforces the general, underlying frustration expressed in various ways by several of the radiographer informants about their relative isolation and lack of power to influence change. They apparently wish to have control of the medical imaging world in which they are 'the experts', but control appears to be wrested from them by health service administrators. Added to this, it seems that in most cases where open conflict occurs the radiographer is a sole practitioner and is consequently already professionally isolated in a health system. Thus, nurse administrators are commonly perceived as having disproportionate power over rural radiographers. It can be argued that radiographers in this situation have no one within the organisational structure over whom they have authority and so feel disempowered and that they are at the bottom of the health professional hierarchy.


**Communication and feedback**

Having described above the apparent mechanisms of the occasionally occurring conflict, in most cases radiographers and remote x-ray operators have a comfortable, though not particularly close and productive, working relationship. The dominant opinion expressed was that communication and teamwork in regard to radiography was generally poor, although several informants acknowledged that better communication has the potential to improve the standard of remote x-ray operator radiographic practice. It seems that the principal reason for the perceived inadequate level of communication between rural radiographers and remote x-ray operators is the lack of availability of staff due to their workload and a lack of time to organise some form of formal feedback and consultation process. These are the structural impediments to collaboration that were described in

Chapter 4 (Lindeke & Block 1998). The following quotations from some of the radiographer informants illustrate this problem:

> RR.1: I'm a sole radiographer and I've got a big work commitment here. To be able to give half a day once a month, once every six weeks to two sites is almost impossible. I wouldn't go out to [place name] to do my own work out there, to try and get three people on site at the same time is impossible. I've never been able to do it. All the times that I have been out there to give them some form of education I have never ever got the three people that I want. Never.

> RR.2: …the offer's always been there, but I sort of go over there and there's usually just a mass of patients and I just get in and have to do it and then go. I found that a couple of the nurses that went away, me being there for a limited time and them on shift work we hardly ever overlapped for them to come in a have a look.

> RR.4: … any remote operator was supposed to be under the wing of the radiographer and it's easy to say "right you're it" but do they have the time to do it? How many of them have actually gone in the last year and inspected where they're doing those x-rays? I've wanted to.

Similarly, another radiographer (RR.14) said 'I don't really communicate with them at all', particularly in regard to 'anything to do with radiography', adding that the two remote x-ray operators at the site where she performs radiography sessions once a week are both busy senior nurse administrators. At most sites where some form of radiographic communication did take place it was irregular and most often just casual conversation rather than structured feedback from the radiographers to the remote x-ray operators about their radiography. As suggested earlier by RR.1 under the theme of 'Competency Requirements' and sub-theme of 'Continuing education' (p.133), even those formal continuing education sessions that have been organised have met with limited success either because the local remote x-ray operators are too busy to attend or because of lack of support from other radiographers in the region.

In spite of the element of negativity about the lack of regular structured feedback, the rhetoric about communication was generally positive. RR.1, for example, who expressed frustration in the above quotation about trying to get people together for structured feedback, also said that:

RR.1: I have put a lot of effort into them, yes, and I've still got a very good working relationship working with them, because they phone me up … you know, a fairly good relationship and they can actually phone me up now for advice and being able to talk them through examinations and talk them through.

Other radiographers also spoke positively about the communication they have had with remote x-ray operators (RR.8, 9, 13, 16, 18, 20). For example:

RR.16: Yes, we do get on well. There's only the one nurse who currently is the remote operator and I get on very well with her  and I'd say, "Look if you …". She'll say something, "Oh, I did a pelvis the other day and I cut off one side and blah, blah, blah". I make a couple of suggestions about what could have happened.

RR.20: So we would actually discuss it, and I've given her quite a few mini-lessons as to, you know, how to fix it and what to do and how to improve it. So, she was really quite open to being improved, in that sense.

Some of the remote operators also expressed satisfaction with the communication they have had with the radiographers. For example:

RN.1: [The radiographer] has been very good. She gives me a call and says, "I'll be in so and so, come in and have a chat about a couple of things if needs be".  … She's very good at critiquing them. She's honest and she's right when she sends something back, and she's picky too which is nice because if there is the slightest thing wrong then you know if that's all she can find you did okay. She's not rude about it or unpleasant about it and she's very private about it.

RN.4: … mainly any time we have a problem, we're trying to do an x-ray and we just can't get it right, you ring him up and he'll give some information on what we could do to improve it and he's always quite happy to do that.

GP.6: They do, they come and tell that whether the exposure is good enough. They do say that. Of course, and I, in that case I do, the following week when the radiographer comes I do discuss it too. … Actually, that helps me to improve my skills. I take it as a learning thing. Actually, quite often I ring the radiographer, radiologist too, and they ring me too if when I send patients there too, they ring me and they explain what is happening, and so we communicate, you know. I enjoy that communication.

In locations where radiographers and remote x-ray operators worked well together the radiographers are recognized as the local experts in medical imaging and the remote x-ray

operators willingly accept their advice on radiographic issues, even if the remote operator is also the Health Service Manager. It may be argued, therefore, that one possible means by which the professional esteem of rural radiographers could be improved is if they took greater responsibility for remote x-ray operator radiography and used their expert knowledge and skills to assist in achieving better radiographic outcomes. This argument is supported by the comments of some of the radiographers (RR.1, 3, 8, 9, 13, 16, 18, 20), as illustrated in the quotations below:

> RR.3: I think radiographers can't ignore remote operators … I think that radiographers need to have or be able to provide some direction to their implementation, to their training, to their utilisation. So, I think you'd be sticking your head in the sand to say, "well, they're out there but I don't really want to know anything about it".

> RR.8: … if anyone's got a problem with a remote operator they need to see me, not anyone else. I feel out of us radiographers with remote operators is that we should be their champions. We should be looking after them.

> RR.13: Once you see their limitations … It's just an overall team thing. I'm part of their team, now, I'm helping them out.

> RR.16: I don't feel threatened by them and I don't think that I threaten them. I wouldn't think so, no. Otherwise I don't think that they would come to me and ask the questions that they do. They probably just go along their own merry way.

It can also be argued that the ideal relationship, which one of the radiographers (RR.9) optimistically suggested already exists in his experience, would be one of mutual respect in which radiographers acknowledge the challenge faced remote x-ray operators and remote operators admire the expertise of the radiographers. RR.9 described the way that he perceives the relationship as follows:

> RR.9: … the radiographers respect, um, remote operators for what they've learnt and what they do know. They tend to help them. The remote operators, in their own way, are almost in awe of radiographers and the magic they can perform…

Hence, it can be further argued that, in order to achieve this ideal relationship, there is a need for both positive, supportive communication and constructive criticism. However, another radiographer (RR.3) made the observation that 'the communication between a

radiographer and a remote operator may often be more negative than it is positive'. RR.13 emphasised the importance of keeping the communication channels open, suggesting that there is a need to develop more effective means of monitoring the performance of remote operators and providing feedback. While some of the informants spoke of attempts to implement mechanisms by which remote x-ray operators could receive regular constructive feedback about the quality of their work, it was also commonly reported that these mechanisms could not be sustained. For example, RR.13 described the use of 'critique forms' that were sent back to the remote x-ray operators with each examination that came in for reporting. However, he also said that 'we haven't sent any out for a long time'. One of the GP remote operators expressed frustration about a similar system, which also apparently failed:

> GP.1: A form was given out and there was a self assessment. I must have done about two dozen of these bloody forms and I never got one back, so I got the shits. … [we] tried to find out what was happening with the forms. So, we just stopped doing it because we weren't getting any feedback.

The only regular, formal feedback process that is in place, therefore, is the radiologist's report but, as some of the radiographer informants commented, radiologists do not usually give the remote x-ray operators constructive feedback about image quality (see p.143). A radiologist's report is primarily aimed at identifying abnormalities rather than radiographic problems. One of the GP informants commented about the radiologists' reports that:

> GP.3: … from my point of view, I suppose, it would be important to get feedback on the quality of the x-ray but they don't often do that. You're more likely to get feedback on the quality of the x-ray from a good radiographer.

Furthermore, one of the radiographers (RR.20) commented that when some particular radiologists were asked to advise a GP that the quality of the radiographs he was producing was unacceptable, the radiologists refused. It was generally agreed that the radiologists' reports were not particularly helpful in assisting the remote operators to improve the quality of their radiography, although it was still considered to be a part of the quality assurance process.

## Chapter Summary

Under the key concept of 'Professional Roles and Relationships', the theme of 'Boundary Delineation' relates to how informants explained their radiographic role, as well as the perception that interprofessional boundaries are often blurred in rural and remote health care teams. 'Professional Status and Esteem' refers to how informants explained their position and their perceptions of others who they interact with in the health care system, and 'Interprofessional Conflict and Collaboration' concerns interactions between the various health professionals involved in rural and remote radiography. Some of the data included under this key concept highlight the potential for the development of new models of practice based on greater interprofessional collaboration, in the interest of better patient care. If such models are to be successful, however, they must incorporate organized, structured communication and feedback mechanisms.

Doctors have considerable status, power, prestige and autonomy in the rural health care system, while radiographers appear to suffer from poor professional esteem. There are potential problems with both. Several of the informants suggested that communication with doctors can be stifled because they don't take advice from a perceived subordinate health professional. Some radiographer informants thought that it is easier to give advice to nurses than to doctors and it is suggested that the consequence of the doctor not taking the radiographer's advice is poor quality radiography. Radiographers commonly claimed that they are seen as just 'button-pushers'. This relates to a perception that sharing the skills of radiographic imaging with other health professionals detracts from the mystique of radiography. This can impact on radiographers' professional esteem and isolates them in the health care system. Radiographers could improve both the quality of remote x-ray operator radiography and their own professional esteem by closer collaboration with the remote operators, particularly by providing support and continuing education. They could thus assert their expertise. Where radiographers had provided support to local remote operators it was well received and it earned them respect.

# SECTION THREE –DISCUSSION AND CONCLUSIONS

## Chapter 9

## Analysis and Discussion

The purpose of the final section of this thesis is to analyse the data that has been presented in the results chapters, to condense it and ultimately synthesise it into a single story line that describes the experiences and perceptions of remote x-ray operator radiography from the perspectives of the study informants (Llewellyn 1998). The analysis and interpretation of the data will also draw upon pre-existing background information and literature discussed in Section One.

The iterative process of analysis of the interview transcripts has resulted in the emergence of three key concepts together with their various themes and sub-themes, as listed in Table 11. Given the thoroughness of the data analysis process it can be confidently argued that each of the key concepts stands on its own. However, it is important to appreciate that relationships between the key concepts have also emerged at the level of the themes and sub-themes, reflecting both the commonality of the source and complexity within the data. Many of the relationships between the key concepts have been identified in the preceding chapters. These and other relationships will be discussed below in the context of the aims and objectives of this study, following a brief summary and overview of the key concepts.

## Overview of the Key Concepts, Themes and Sub-Themes

As explained in Chapter 6, the key concept of 'Dimensions of Practice' (Key Concept 1 in Table 11) combines those themes and sub-themes that relate to the guiding principles of both clinical practice and education in remote x-ray operator radiography. Strauss (1978) referred to social worlds as consisting of four elements, one of which included the organisational or structural components around which social interactions take place.

**Table 11:** Summary of the three key concepts together with their themes and sub-themes.

| Key Concepts | | |
|---|---|---|
| **Key Concept 1:**<br>**Dimensions of Practice** | **Key Concept 2:**<br>**Service Provision & Equity of Access** | **Key Concept 3:**<br>**Professional Roles & Relationships** |
| ▪ Licence Conditions & Limitations<br> o Range of examination types<br> o Licence breaches<br>▪ Competency Requirements<br> o Basic knowledge<br> o Radiation safety<br> o Experience & adaptation<br> o Continuing education<br>▪ Image Quality & Practice Standards<br> o Radiographic image integrity<br> o The clinical question<br> o The continuum of care | ▪ Clinical Management & Decision Making<br> o Diagnostic responsibility<br> o Triaging appropriately<br>▪ Access & Availability<br> o Community needs & priorities<br> o Filling the gap<br>▪ Patient Expectations<br> o Patient indifference<br> o Patient appreciation<br>▪ Commitment to Service<br> o Justification for licensing<br> o Altruistic servitude | ▪ Boundary Delineation<br> o Defining the territory<br> o Blurring the boundaries<br>▪ Professional Status & Esteem<br> o Medical dominance<br> o Button-pushers & handmaidens<br>▪ Interprofessional Conflict & Collaboration<br> o Money, power & isolation<br> o Communication & feedback |

*Row label (left column): Themes and Sub-Themes*

Abbott (1988) suggested that interprofessional boundaries are contested in three 'arenas', the legal world of the legislature or courtrooms being representative of that arena in which occupational boundaries are most clearly defined and least ambiguous. This first key concept, therefore, is inclusive of the organisational elements that help to define remote x-ray operator radiography. The theme of 'Licence Conditions and Limitations' refers to the legal jurisdiction as defined under the New South Wales Radiation Control Act 1990, 'Competency Requirements' to the acquisition of radiographic knowledge, skills and abilities, and 'Image Quality and Practice Standards' to the image quality criteria used to evaluate the outcome of radiographic examinations. Implicit in the theories espoused by both Strauss and Abbott is an understanding that, while organisational components assist practitioners to understand their occupational world and the boundaries of that world, different individuals and groups develop an understanding of the limitations according to their own interpretative processes. Therefore, a substantial amount of the data assembled under these themes relates to the differing interpretations and perceptions of the structural parameters of rural and remote radiography that were evident from the study informants, who were representative of the three different occupational groups that were sampled.

Abbott (1988) also suggested that occupational boundaries are least well defined in the workplace, where practitioners make decisions about the provision of a variety of services to various clients who may have different needs and expectations. The key concept of 'Service Provision and Equity of Access' (Key Concept 2 in Table 11) deals with informants' perceptions of how the decision making process relates to the needs of the patients from both the clinical and a broader socio-economic perspective. The theme of 'Clinical Management and Decision Making' represents the informants' perceptions of how the condition of the patient and the nature of the services they require influence how, when and where they are treated. 'Access and Availability' is inclusive of data related to the apparent health service disadvantage experienced in small non-metropolitan population centres. The data under this theme also represents the fact that compromise and extended practice roles are important aspects of rural and remote health care. As a consequence of their relative isolation and disadvantage the attitudes of both patients and health service providers appear to be different from their metropolitan counterparts. The theme of 'Patient Expectations' represents the informants' beliefs that the patient consumers of rural and remote health services are generally indifferent to professional

boundary issues. However, informants also portrayed patients as placing high value on health professionals and the services they provide. Rural and remote health professionals apparently reciprocate by making an extraordinarily strong commitment to the health and well-being of the local population, as evident from the data presented under the theme of 'Commitment to Service'.

Strauss (1978) suggested that, in addition to the influence exerted by the more palpable elements recognised as defining the extent of social worlds, the construction of a social world is dependent on a continuous and unlimited discourse. Therefore, 'mutual response' and the limits of 'effective communication' are also classical elements of social worlds (Strauss 1978). Further, Norsen, Opalden & Quinn (1995) defined the key elements of successful collaborative teamwork as inclusive of collegial relations based on equality, non-aggressive assertiveness, shared decision making and responsibility, and so on (see pp.68/9). The third key concept, 'Professional Roles and Relationships' (Key Concept 3 in Table 11), therefore, includes themes and sub-themes that relate to these less tangible components of the interprofessional interactions that take place in the world of rural and remote health care, and remote x-ray operator radiography in particular. The theme of 'Boundary Delineation' relates to how the informants distinguished their radiographic role and responsibilities from that of the other professional groups involved in the study. Under this same theme, however, within the sub-theme of 'Blurring the boundaries', there was a common perception represented in the data that interprofessional boundaries are less distinct and less important in rural and remote health care teams. The data included under the theme of 'Professional Status and Esteem' refers to the way that informants perceived and described their own and others status and position in the rural health care system. Finally, the theme of 'Interprofessional Conflict and Collaboration' concerns both positive and negative aspects of the interactions that take place between those health professionals involved in the delivery of rural and remote radiographic services.


## Experiences and Perceptions of Remote X-ray Operator Radiography

The central aim of this study, as stated in Chapter 1, was to document and examine remote x-ray operator radiography and the role of remote operators from the perspectives

of rural radiographers, nurses and doctors who have knowledge and experience of the provision of this service. It is apparent from Chapter 2 that rural and remote health care services are compromised by geographic, economic and social constraints. One of the many consequences is that access to and availability of services that are largely taken for granted in metropolitan population centres are limited, as is the number and variety of health care professionals. It has been argued that plain film radiography is an essential component of high quality health care and yet the number of examinations required in small population centres does not justify employing a radiographer. This means that patients who require complex diagnostic medical imaging investigations must travel to a major rural centre, or even to a capital city to obtain a diagnosis. Even relatively simple investigations may not be available when they are needed in small communities. There was agreement among the informants that this is why the remote x-ray operator program exists. It offers an alternative to patients having to travel in order to access plain film radiographic examinations for relatively minor injuries and illnesses. Consequently, there is a fundamental relationship between the theme of 'Access and Availability' under the key concept of 'Service Provision and Equity of Access', and 'Licence Conditions and Limitations' under 'Dimensions of Practice'. Appreciating this relationship is essential to understanding remote x-ray operator radiography and the role of remote x-ray operators. If it was not for the needs of the residents of relatively small and isolated rural and remote communities to access radiographic services, there would be no need to licence non-radiographers to perform a limited range of radiographic examinations. Issues of service access and availability, therefore, are strongly represented in data obtained from all three informant groups.

As explained in Chapter 2, the licensing program evolved out of a poorly controlled system of ad-hoc radiographic services provided by a variety of personnel ranging from the hospital handyman to the local doctor. As greater levels of professionalism developed in the occupation of radiography, concerns were expressed about the poor quality of the examinations performed by these non-radiographer operators of x-ray equipment. Furthermore, like other health professionals, as discussed in Chapter 4, radiographers desired to defend their occupational jurisdiction against what may be perceived as territorial encroachment by other occupations. Therefore, the world of rural and remote radiography is an arena in which, under some circumstances, the task of performing some

radiographic examinations is contested by different health professionals with differing perspectives, as discussed below.

**Perceptions of radiographic image quality**

It is evident that the quality of the radiographic images produced by remote operators is below the standard of those produced by rural radiographers. Radiographer, nurse and GP informants made reference to this. Further, the data suggest that the reason for the perceived difference in image quality is the differing perceptions of the three professional groups of the discipline of diagnostic radiography and, therefore, of the need to produce images of a particular standard.

The radiographer informants appeared to regard the radiographic image as a central element of their professional identity. This perception of the radiographers' role was supported by the opinions of some of the nurses and GPs, who also acknowledged that the quality of the radiographs that they produced was not of the same standard as those produced by radiographers – not 'radiographer films' and not 'proper radiography'. Some radiographers portrayed the radiograph as being like the work of an artisan or craftsperson, which bears their signature in the form of their personalised radiographic side-markers. The radiograph can thus be traced back to them as a visual representation of their professional values. Several of the radiographer informants expressed a view similar to that of RR.17 who said, 'It's all about image quality, and understanding physics … that's what our profession's about'. Hence, under the theme of 'Image Quality and Practice Standards' many of the radiographers appeared to strongly identify with the technographic aspects of their role, based on the importance they afforded to image quality. There is a relationship between this theme and that of 'Boundary Delineation' under the key concept of 'Professional Roles and Relationships', because of the perceived importance of image quality as a factor in defining the occupational territory of radiographers.

The radiographic image was also portrayed by several of the radiographer informants as a product that would be judged by the critical eye of a radiologist. Since the mid-1920s the central role of radiographers has been the technical production of images (Larkin 1983) and, because of their subservience to radiologists they expect to be judged and criticised if

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their work does not meet the prescribed standard. In order to avoid harsh judgement from a radiologist or another medical practitioner who may also view the radiographs as an aid to diagnosis, radiographers aim to achieve technical accuracy, as well as producing an aesthetically appealing image that will also yield a correct diagnosis. Thus, it can be argued that there is a perception that the degree to which a radiograph satisfies the radiographic evaluation criteria is visual evidence of the level of the radiographer's concern for the well-being of their patients, as well as their professional worth.

Remote x-ray operators did not appear to value radiographic image quality as highly as did the radiographers. For many of the remote operator informants, providing access to a radiographic service was apparently a higher priority than the quality of the radiographs they produce. It should be noted, however, that several of the radiographer informants also identified service access and availability as a high priority, although perhaps secondary to excellence in radiographic image quality. The comparatively lower priority given to service access by radiographers was evident in their scepticism about some patients' inability to travel to the nearest radiographer-staffed facility. One of the radiographers, for example, questioned whether it is really beneficial to the community to provide patients with a lesser quality of service – 'So are we really looking after the public?' (RR.12). Other radiographers said they saw remote x-ray operators as a 'necessary evil' (RR.11) or as just a 'stop-gap measure' (RR.17).

Trends were also evident in the different ways that GP as opposed to nurse remote x-ray operators perceived image quality, which seemed related to what are arguably their core occupational roles of diagnosis and treatment and patient care respectively. The opinion was strongly expressed by informants from all three professional groups that GPs are only interested in whether a radiographic examination confirms their provisional diagnosis. This was reflected, for example, in the opinion of GP.1 who said 'I'm doing it clearly with a purpose in mind'. Image quality appeared to be a relatively low priority, as long as the doctor can see the anatomical area of interest to their personal satisfaction. It was apparent that GPs are unconcerned about what the radiologist or anyone else thinks of the quality of their radiographs. GP.4 drew a clear distinction between radiographers, whose 'brief' it is to produce high quality images for a radiologist, and the GP remote operator's 'brief', which is to make a diagnosis - '[what] I'm interested in is the best quality x-ray that meets the requirements to make the diagnosis'. In most cases the doctors felt capable

of interpreting the radiographs and making the diagnosis themselves. The GPs'
radiological diagnosis is usually accurate enough to treat the patient appropriately without
the need for a radiologist's report, although some GP informants suggested that they
found the radiologists' confirmation reassuring on occasions. Further, some said that if
after viewing the radiographs they were still in doubt as to the diagnosis, they would refer
the patient to where a 'proper x-ray' (GP.4, 7) could be done by a radiographer, thus
seemingly conceding their own lack of radiographic knowledge and skill.

There is also an important relationship evident between the themes of 'Image Quality and
Standards' and 'Clinical Management and Decision Making', the latter falling under the
key concept of 'Service Provision and Equity of Access'. As commented at the beginning
of Chapter 7, this relates to the statement by Dr Seelentaag that a radiological
examination should be both 'competently performed and interpreted' to truly be of value.
There was concern expressed by some radiographers that the poor quality of remote x-ray
operator radiographs compromises the doctor's ability to make a correct diagnosis and
subsequent decision about patient management. RR.13 said, 'I worry about these patients
and the care they're getting', suggesting again that radiographers perceive a link between
image quality and the standard of care provided.

Different nurse informants conveyed the perception in various terms that they were
conscious of their radiographic images being judged by the referring doctor, the
radiographer and by the reporting radiologist. Some of the radiographer informants saw
this as a positive aspect of nurse remote operator radiography, in that it encourages them
to attempt to meet the prescribed standard, unlike the GPs who appeared unselfconscious
about others' opinions and just wanted a quick answer to a clinical question. Accordingly,
it was perceived that the nurses were less likely to take short-cuts and perhaps more like
radiographers in their approach to radiography – 'Nurses are assiduous … she is like we
are. Just doing the, just doing the films' (RR.9). However, it was also perceived by some
of the radiographer and GP informants that some rural nurses lack the basic knowledge
and understanding of the physical principles and equipment, anatomy and physiology,
radiographic pathology, mechanisms of injury and the clinical signs and symptoms of an
abnormality. Some radiographer informants perceived that because doctors have a better
understanding of these knowledge components of radiography they would produce better
radiographs, although it was also commonly noted that both nurse and GP remote x-ray

operators lacked an adequate understanding of the principles of image production and film processing. Some radiographer informants commented that some GPs are particularly careless about looking after the radiography equipment.

The nurse remote x-ray operators' perspective is also strongly represented within the key concept of 'Service Provision and Equity of Access', under the themes of 'Access and Availability' and 'Commitment to Service'. It is evident that nurses, perhaps more so than either the radiographers or doctors, attach great importance to ensuring that their patients and the community have reasonable access to care. They raise a variety of considerations that are seemingly of greater concern than producing high quality radiographic images. These include: lack of patient transport; age and disability of patients; the financial burden to the patient; the cost to the health service of retrieval; keeping the patient close to their support network; and, the retention of services in the community. It was therefore argued at the end of Chapter 5, that this broad perspective displayed by several of the nurse informants is reflective of the holistic approach to health care that is commonly considered characteristic of the nursing profession. It seems that the radiographic image has less intrinsic value to nurse remote x-ray operators than to radiographers.

In summary, although no quantitative or qualitative comparison of radiographs has been carried out to date, it appears that remote x-ray operators produce radiographic images that are generally of poorer quality than those produced by radiographers. Furthermore, it appears that issues of service access and availability and radiographic image quality are prioritised differently by remote x-ray operators compared to rural radiographers. Service access was an important concern for all three professional groups involved in the study. However, the radiographers generally gave a lower priority to the issues raised under the themes within the key concept of 'Service Provision and Equity of Access', compared to the theme of 'Image Quality and Practice Standards' within the key concept of 'Dimensions of Practice'. This difference appears to relate to the origin of the radiographers' occupational role and the centrality of image production to their professional identity. Remote x-ray operators, on the other hand, appeared to give more weight to issues related to 'Clinical Management and Decision Making' and 'Access and Availability', even if the quality of the radiographs is below the standard expected by radiographers and radiologists.

**Differences in radiographic competency**

While the differences in image quality between radiographs produced by rural radiographers and those produced by remote x-ray operators appear to derive from fundamental differences in their occupational roles, there were also apparent differences in the way that each professional group performs radiography. It was evident in relation to the theme of 'Competency Requirements' that radiographers display particular knowledge, skills and abilities in performing radiography in situations where the patient's ability to comply with the requirements of the examination may be limited. This is supported by reference to the literature in Chapter 3 of this thesis, particularly in relation to the contemporary perspective of radiographic practice. However, it is also evident from the data that remote x-ray operators generally lack this radiographic capability and, further, that there are distinct differences between the way that nurse and GP remote operators approach radiography.

The doctors' attitude was evident under all three key concepts within the themes of 'Image Quality and Practice Standards', 'Patient Expectations' and 'Professional Status and Esteem'. It was generally apparent that because they have so many demands on their time, and because they practice with a great deal of professional autonomy (Kenny 2004), there is a tendency for GP remote x-ray operators to be dismissive of the regimented, step-wise radiographic process. Several informants suggested that GP remote x-ray operators are inclined to take short-cuts and commonly display what was described by some informants as a 'gung-ho' approach to their radiography (RN.10, RR.14). Comments made by some of the GPs which reflected this attitude and approach included the following: '… this is probably, one hundredth of what you do in a day and so you do a whole lot of other stuff and you do enough to get by' (GP.2); and, '... [it] doesn't take a lot of skill and, you know, they're easy to do' (GP.7). This perception relates to the opinion expressed by several nurse and radiographer informants that the doctors' arrogance, self-assuredness and 'God-like' status often stifled effective communication and prevented them taking advice about matters, including about radiography (see 'Professional Status and Esteem', under Key Concept 3). Further, it was commonly considered to be the reason why GPs engage in fringe practice, including coercion of nurse remote operators to disregard the licence conditions, as reported in the sub-theme of 'Licence breaches'.

The belief that both GP and nurse remote operators lack knowledge and experience of radiography was widespread among the radiographer respondents. The balance of opinion seemed critical of the system that permits licensing of someone who has only completed a short course of instruction in radiography and has limited radiographic experience. However, several informants were of the opinion that GPs are potentially better equipped than nurses to perform radiography on patients with more complex presentations, by virtue of their superior scientific and clinical knowledge. Some of the nurses commented that they struggle to adapt to radiographic complexities that arise when the patient is in pain, their inherent response being to avoid exacerbating the pain and to make the patient as comfortable as possible. It is suggested that this is a consequence of their dominant patient care role, although the more 'nursey approach' (RN.7) to radiography is apparently not always effective in obtaining correctly positioned radiographic projections that will result in an accurate diagnosis. Through a combination of knowledge and experience, radiographers have learned techniques to adapt to the needs and limitations of more challenging patient presentations so that they can quickly and effectively obtain the views that are needed. This fundamental difference between radiographers and nurse remote x-ray operators was strongly represented in the data assembled under the sub-theme of 'Experience and adaptation'. While there was a perception that nurse remote x-ray operators are constrained in their radiography by their instinct to minimise the patient's discomfort, there was also a view expressed by some informants that they are more likely to conform to a regimented approach to radiography - 'they do what we teach them' (RR.9). Consequently, it was suggested that nurse remote x-ray operators are less likely to breach their licence conditions. However, there was also some evidence under the theme of 'Licence Conditions and Limitations' that at times nurses do exert pressure on the boundaries in relation to the range of examination types they perform.

Unlike the radiographers, the remote x-ray operators were not generally critical of the education and licensing process, although some nurse remote operators complained about the lack of continuing education opportunities and some GPs complained about the bureaucracy involved. Seen as a means of maintaining and increasing their radiographic competency, and substituting to some extent for their lack of experience, the dearth of continuing education and support appears to be a contributing factor to some remote x-ray operators' limited knowledge and skills in some areas. It is suggested that this is particularly true in regard to more complex patient presentations, such as radiographing

injured children, and to extending their range of skills. The GP informants, however, largely rejected the need for continuing education in radiography, usually because they were too busy with their core duties and other, seemingly more important continuing education requirements – 'Is that going to improve my medicine? And the answer's probably "No"' (GP.5).

**Commitment to serving the community**

It is evident from the data presented under the key concept of 'Service Provision and Equity of Access' that rural health professionals make a considerable altruistic commitment to serve their community. This was found to be common to all of the professional groups involved in the study. It was exemplified by the nurse and GP remote x-ray operators taking on their extended radiography role on top of their core duties. The remote x-ray operators commonly represented their reason for obtaining a limited x-ray licence in terms of being able to provide a service to their community, as evident under the themes of 'Access and Availability' and 'Commitment to Service'. It often resulted in them working longer hours, apparently with little or no financial or other benefits. Sole rural radiographers also sacrifice family involvement and social life in the interest of providing a twenty-four hour, seven day a week service. The lack of support for sole rural doctors and their families has been highlighted as significantly influencing recruitment and retention (Veitch & Grant 2004; Veitch & Crossland 2005). It is suggested, however, that the implications of the demands of rural and remote practice to rural allied health and nursing workforce planning is perhaps more significant than has been recognised in recent studies (Mills & Millsteed 2002; Heaney, Tolhurst & Baines 2004; Steenbergen & MacKenzie 2004; Stagnitti et al. 2005). This may be worthy of closer investigation.

As observed earlier, it was generally agreed by informants that the principal purpose of remote x-ray operator radiography is to prevent people in small rural and remote communities having to travel and for them to access more services locally. The informants empathised with the local patient population in regard to the limited access to health care services described in Chapter 2. It was apparent, for example, that remote x-ray operators take into account a wide range of issues when deciding whether or not to perform a radiographic examination and hence manage the patient locally. It also seemed that there was a common belief that retaining services in a small town maintains the

town's viability. Some of the sole radiographers saw their own existence in this light, in that being able to provide a range of medical imaging services saved people having to travel sometimes hundreds of kilometres to a larger medical imaging facility.

In order to help meet the health care needs of the community, rural health professionals apparently commonly work across professional boundaries. Several examples of extended practice roles, other than remote x-ray operator radiography, were referred to by the informants under the sub-themes of 'Filling the gap' (Key Concept 2 in Table 11) and 'Blurring the boundaries' (Key Concept 3). These included nurses performing duties that are normally considered a doctors' role, including diagnosis, prescribing and immunisation, and nurses carrying out minor physiotherapy treatments. These tasks usually fell to the nursing staff in the absence of the correct health professional because nurses are the most common health professionals available and also because the nursing profession has actively pursued role extension – 'this is a lot of the reason your nurses are multi-skilled. We dabble in all these things' (RN.10). Role extension was seen as something that rural nurses take on out of perceived necessity - 'we do have to push a bit hard against boundaries for the patient's sake out here' (RN.9). It has been claimed that the primacy of care in rural nursing necessitates leadership and crossing of professional boundaries in order to provide appropriate levels of health care for the people of rural communities (Keyzer 1997; Mitchell 2000). This is apparently equally true in relation to performing radiography as it is to other extended roles.

The justification commonly given for crossing boundaries was the difficulty in attracting health professionals to rural and remote locations. It was considered better to have a limited range of services available than no service at all – '…if there's no service or there's some service then what's wrong with having a service that might not be as good' (GP.4). There was very little evidence on the part of the remote operators of competition for extended roles. Several of the nurse informants said they would gladly relinquish duties that were seen as beyond their normal occupational jurisdiction if the services were otherwise available. There appeared to be broad agreement amongst the remote x-ray operator informants that they would prefer not to have to perform radiography but took it on because they were aware of the need for a service. While it was commented by several of the informants that radiography provided an interesting diversion from their routine duties, it added significantly to their workload, hours of work and responsibilities. It was

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considered preferable for a radiographer to be permanently available, an unrealistic expectation in the health care settings in which remote x-ray operators practice.

Many of the radiographer informants sympathised with the above perspective, appreciating that there are some locations and situations where a patient needs to have an x-ray examination performed but there is no radiographer available. However, some radiographers also had reservations about the quality of the service provided, as discussed above. They were also concerned that remote x-ray operator radiography engendered a perception that radiography must be easy. Radiographers commonly expressed a view that the patient population was generally indifferent to whether a radiographer or remote operator performed their x-ray examination, a view substantiated by some of the remote operator informants. The radiographers also commonly believed that the public has little appreciation of the issues raised under themes discussed earlier, or of different occupational roles and boundaries in the health care arena, even though it is often difficult to anticipate consumer preferences (Hegney et al. 2004). Nevertheless, this perception apparently contributes to the low professional esteem that was evident in interviews with some of the radiographer informants, creating a link between the themes of 'Patient Expectations' and 'Professional Status and Esteem'.

Conversely, some of the sole rural radiographers argued that their health professional role was highly valued by the community in general and that this was in part responsible for their commitment to service. Several radiographer informants described circumstances where they felt compelled to provide a service that requires them to work for seven to eight hours a day from Monday to Friday and also be on-call after-hours and on weekends. This onerous expectation has caused some radiographers to enter into conflict with the health service management, as described within the theme of 'Interprofessional Conflict and Collaboration'. A few of the radiographers said they had realised the benefit of having remote x-ray operators available in the hospital where they worked as sole practitioners, so that they could reduce the extent of their on-call commitment.

# Interprofessional Relationships in Rural and Remote Radiography

One of the objectives of this study is to examine the interprofessional relationship between rural radiographers and remote x-ray operators. This aspect of the study is largely covered by the data under Key Concept 3, 'Professional Roles and Relationships', dealt with in Chapter 8. However, there are also important linkages with themes and sub-themes in the other two key concepts, some of which have already been discussed above.

## Boundary construction and maintenance

In order to explain the relationship between radiographers and remote x-ray operators it is important to describe the perceived boundaries that separate them. Under the theme of 'Boundary Delineation' data have been compiled within the sub-theme of 'Defining the territory' relating to how the informants distinguished their radiographic role from that of other health professionals who apparently work within the same occupational arena. In its simplest form the boundary is represented by the Type I.14R radiation licence conditions, which dictate that a remote x-ray operator can only use their licence if a radiographer is unavailable, as described in Chapter 2 (Table 2). Remote x-ray operators are also limited to performing a particular range of examination types. These regulations define a relationship between the theme of 'Boundary Delineation' and that of 'Licence Conditions and Limitations' and are an example of what Abbott (1988) referred to as the arena in which boundaries seem least ambiguous. However, it is also evident from the data that, on occasions, some remote x-ray operators feel the need to act in breach of the licence conditions by performing examinations not covered by the licence (fringe practice) or performing radiography when or where a radiographer might otherwise be available (illegal substitution). Further, data under the theme of 'Clinical Management and Decision Making' demonstrate that there are occasions when a remote x-ray operator decides not to perform an examination that they are licensed to perform, knowing that the patient will have to be transported elsewhere to be attended to by a radiographer. It is apparent, therefore, that there are some circumstances, beyond the scope of the licence conditions, when remote x-ray operators must make decisions about whether or not to perform an examination. The criteria under which such decisions are made also serve to define the boundary between the role of remote x-ray operators and rural radiographers, which is apparently not as sharp and clearly defined as the licence conditions suggest.

A number of the radiographer informants advocated that remote x-ray operators should be confined to performing radiography only when an examination is required urgently or 'semi-urgently' (RR.3). They argued that those examinations that are routine or non-urgent should be performed by a radiographer. This implies that there is a clear distinction between urgent and non-urgent examinations, although RR.3 used the term 'semi-urgent', implying that there are degrees of urgency. It is evident from the data that the decision as to whether or not to perform a radiographic examination may be complex and the decision making criteria that are considered by GP and nurse remote x-ray operators are diverse. A list of those criteria apparent from the data in this study is given in Table 12, together with a brief explanation of each. They relate to issues covered by most, if not all, of the emergent themes.

Both the licence conditions and the various other criteria discussed above are examples of what Willis (1989) referred to as the process of limitation, by which rival occupational groups vying for control of the same or a similar task, distinguish themselves from the others. Abbott (1988) identified clientele differentiation as one of the rhetorical strategies of limitation that competing professional groups use to justify a claim over occupational territory. It can be argued that the criteria listed in Table 12 are examples of the various rhetorical means used by remote x-ray operators to differentiate between those patients (or clients) that they will x-ray and those they will refer to a radiographer. Under such criteria there would conceivably be a point at which a decision could be made one way or the other. However, currently remote x-ray operators must make this decision without the benefit of any prescribed clinical guidelines and protocols to inform, support and justify their decisions.

Other mechanisms of limitation have also been described in the literature as being used by rival groups to define occupational boundaries (see Chapter 4, pp.71-74), some of which were observed in this study. Calling attention to the lack of particular knowledge, skills and abilities on the part of a perceived competitor was observed by Norris (2001) amongst the various occupations involved in the treatment of musculoskeletal disorders. In this study, this rhetorical form of limitation was most commonly used by radiographers when describing remote x-ray operator practices, referring to their lack of ability to both perform radiography and to produce images of an acceptable standard. Meanwhile, some

**Table 12:** List of criteria that may influence the decision of a remote x-ray operator (RXO) whether or not to perform an x-ray examination.

| Decision Making Criteria | Explanation of circumstance(s) |
| --- | --- |
| Examination type | Under Clause 4 of the licence conditions a RXO may extend the range of examination types if the medical practitioner certifies that the life or well-being of the patient is at risk. |
| Availability of radiographer | Under Clause 1b(ii) of the licence conditions a RXO may perform an examination if the medical officer certifies that the examination must be carried out before the radiographer can reasonably attend the patient. |
| Availability of RXO | A RXO may decide *not* to perform an examination that they are licensed to perform because they are too busy with their other core duties. |
| Availability of transport | A RXO may decide to do a *routine* examination type that they are licensed to perform because there is no transport available for the patient to travel elsewhere. |
| Age, disability or socio-economic factors | A RXO may decide to do a *routine* examination type that they are licensed to perform because the patient is elderly, disabled, will be significantly financially disadvantaged, or because they have family, work or other commitments. |
| Cost of retrieval | A RXO may decide to do a *routine* examination type that they are licensed to perform because the cost of retrieval by road or air ambulance is too high compared to the potential benefit of a radiographer performing the examination. |
| Degree of difficulty | A RXO may decide *not* to perform an examination that they are licensed to perform because it is perceived to be beyond their level of competency. |
| Provisional diagnosis | A RXO may decide *not* to perform an examination that they are licensed to perform because the provisional diagnosis is such the doctor requires a more thorough examination and a radiologist's report. |
| Patient presentation | A RXO may decide *not* to perform an examination that they are licensed to perform because the patient's condition is such that the examination is likely to be unsatisfactory. |
| Body habitus | A RXO may decide *not* to perform an examination that they are licensed to perform because the body habitus of the patient is such that the image quality will be sub-standard, given the power of the available equipment. |

of the nurse informants made reference to the radiographers' perceived lack of skills in the humanitarian or patient care aspects of radiographic practice. For example, one of the nurses described radiographers as 'reasonably cruel people … where nurses, we tend not to want to hurt a patient' (RN.9). Also describing the nurses' apparently more gentle approach to radiography, RN.7 suggested that nurses are more empathetic than radiographers when dealing with patients who are in pain. There were numerous other instances where informants from all three professional groups highlighted limitations in the radiographic practices of the others, usually while accentuating positive aspects of their own radiographic practice. Examples include nurses and radiographers describing the doctors' manner as arrogant or egotistical, leading to them producing poor quality radiographs, and both radiographers and doctors commenting that nurses lack enough understanding of the basic scientific principles to perform radiography adequately.

Also in Chapter 4, Allen (2001) described the use of atrocity stories as a rhetorical mechanism to define boundaries in a multi-professional team working in a hospital ward in Wales. In a similar way to the mechanism described by Norris (2001) above, the stories highlighted the differences between the group who told the stories and those who were perceived as the rivals, while at the same time bonding the story-tellers together. In this study, atrocity stories were most commonly used by the radiographers and nurses and less often by the doctors as a means of defining boundaries. The radiographers told stories of poor radiographic practice by both nurse and GP remote x-ray operators as a means of emphasising a distinguishing characteristic. One example was the instance of a GP who missed diagnosing a patella fracture because he lacked the ability to perform the full range of views. Nurses used stories as a means of justifying their need to have a limited x-ray licence or to explain what may have been perceived as a licence breach or a poor standard of radiography. The nurses' stories often embodied the underlying message of their concern for the patient. Both nurses and radiographers told stories about doctors' superior attitude and behaviour, often depicting them in a poor light, as ineffective communicators or too busy to attend to detail.

Lingard et al. (2004), also cited in Chapter 4, described ownership and the process of trade as mechanisms that were used by members of a multi-professional intensive care unit team as means of maintaining the boundaries between one professional group and

another. In this study, radiographers frequently portrayed themselves as the custodians of the knowledge base of radiographic practice, although the circumstances are such that they are expected to share some of that knowledge with remote x-ray operators. In some cases the process of trade appeared to operate effectively and in return the radiographers involved were highly regarded, thus apparently gaining the respect of the remote x-ray operators in return for some radiographic knowledge. However, some radiographers were reluctant to share their knowledge for fear of losing control. This was apparently perceived by them as a more effective means of maintaining the boundary between them and the rival remote x-ray operators who were threatening their territory. In some cases the sense of ownership on the part of radiographers extended the x-ray equipment and ancillary tasks associated with radiographic examinations, particularly in relation to the perceived failure of some remote x-ray operators to maintain the equipment and attend to clerical duties. In one extreme case, a radiographer was reported to have dismantled the processor and hidden pieces of the equipment to prevent the remote x-ray operators using the x-ray room. This effectively placed an embargo on any trade, with some nurse remote operators at that site apparently subsequently refusing to perform radiography. While this radiographer may have achieved the objective he intended, the remote operators denied him their respect.

It appeared that some of the radiographer informants perceived conflict not only as a potential outcome of contests over occupational jurisdiction, but also as a means of defining their territory, and so on occasions they actively pursued conflict. The issue of remote x-ray operator licensing is thrown into the mix of money, power and isolation, the principal ingredients in most of the conflict described by informants under the theme of 'Interprofessional Conflict and Collaboration'. On some occasions, on the surface, conflict was about perceived licence breaches, and on other occasions tension may have arisen about poor quality radiographs produced by a remote x-ray operator. Some of the radiographer informants, however, appeared to employ this form of conflict as a means of establishing the boundary between their role and that of the remote x-ray operators. The underlying issues were perhaps the radiographers' professional isolation and disempowerment. In the case of such conflict, the radiographers risked being perceived as petty and as placing their professional insecurity ahead of the well-being of the patients.

Some radiographer informants voiced concerns about whether the licence limitations were strictly adhered to, and whether the Environment Protection Authority took the necessary action when it was known that a remote x-ray operator had breached the conditions of their licence. For the most part, however, it appeared that remote x-ray operator radiography is practiced within the limitations imposed by the Radiation Control Act 1990. Nevertheless, those relatively isolated licence breaches that do occur apparently have a considerable impact on the stability of the interprofessional boundary. However, several informants dismissed professional boundary issues as non-existent, claiming that the concept was irrelevant in the context of rural and remote health care. Some remote operators stated that they did not see their radiographic role as replacing that of rural radiographers. These views were evident under the theme of 'Access and Availability', where the remote operators role was portrayed as a means of filling the gap, and also under the theme of 'Boundary Delineation', where it was suggested that it is acceptable to cross a professional boundary if the services required are otherwise absent. Some informants acknowledged that wholesale substitution would be undesirable because radiographers provide a full range of examination types, whereas remote x-ray operators are limited to performing only some examinations. It was commented that radiographers possess a higher level of competency and also play a valuable role in providing their opinion to referring doctors about abnormal appearances on radiographs.

**The effects of status and power on teamwork**

As described under the theme of 'Patient Expectations', both radiographer and remote operator informants believed that most patients probably consider the availability of a radiography service more important than who performs their examination. This was partly related to an apparent perception mentioned earlier that radiography 'can't be too hard' (RR.2). It was claimed by some of the radiographer informants the role of remote x-ray operators contributes to a poor public perception of radiographers and radiography. The actual public opinion about remote x-ray operators remains open for debate, not having been a specific objective of this investigation. However, it appears that there is a relationship between perceived patient indifference about who does their x-ray examination and the poor professional self-esteem of some rural radiographers. The latter issue was strongly represented under the theme of 'Professional Status and Esteem'.

The apparent undervaluing of the radiographers' expertise was evident in the suggestion put forward by several radiographer informants that they are perceived by others as just 'button-pushers'. The button-pusher perception appears to be related in part to the historical reliance of the radiography profession on the technical skill elements of their occupation, as opposed to the indeterminate skills (Daly & Willis 1994). This appears to have created an impression that mastery of radiography is dependent only on being able to operate radiographic equipment. For example, one of the radiographer informants expressed the view that radiographers only have 'one skill', that of 'taking pictures' (RR.10). The danger of such a perception, as suggested by Abbott (1988) and others is that excessive codification or formalisation of expert knowledge makes an occupation more vulnerable to takeover. There was a belief evident in the data that remote x-ray operator radiography adds to this vulnerability by creating the impression that it only takes a few days, or perhaps a few weeks, to learn how to do the job of a radiographer.

Some radiographer informants, however, seemed to recognise that they also possess a range of indeterminate skills, which are related to what were described in Chapter 3 as the humanitarian aspects of radiography. These broader, less clearly definable skills relate to the generic health professional roles and competencies listed and defined as part of the competency frameworks shown in Tables 4 and 5. They include constructs such as patient interaction and communication, critical analysis and evaluation, ethical practice, and clinical decision making in the context of radiographic practice (Batten 1996; Sim 1999; Lam, Egan & Baird 2004; Lewis 2004). Under the sub-theme of 'Experience and adaptation' some of the remote x-ray operators identified these as areas of their own radiographic practice in which they could not match radiographers' competency. Nevertheless, many of the rural radiographers interviewed appeared to place greater emphasis on the application of scientific or technical knowledge and skills. It may be argued that this representation of radiography reflects a step-wise, linear model of radiographic practice, as described by some informants, rather than the holistic, patient-centric model proposed by Culmer (1997). Thus, it appears that rural radiographers generally regard the core component of their professionalism as the application of technology in the form of image production and radiation protection, rather than providing for the needs of their patients. Patient advocacy and altruism are important sources of power in the health care system and have long been recognised as valued constructs by both medicine and nursing (Porter 1992; Flynn 1995; Mallik 1997). They

are essential elements of professionalism in health care, as referred to in Chapter 4. Over 'technologising' the radiographers' role has apparently contributed significantly to their vulnerability to encroachment (Germov 1998, in Nancarrow & Borthwick 2005), which has in turn negatively impacted on their professional esteem.

The logical argument that follows from the above discussion is that in order to strengthen their professionalism, radiographers need to gain increased public recognition for the indeterminate skills they demonstrate in effectively managing complex clinical tasks on a range of patients suffering from a variety of illnesses and injuries. Price and Paterson (1996) also noted the need for the radiography profession to uphold its public obligation (Chapter 3, p.55). There is some evidence in the literature of such a change of emphasis taking place, as discussed in Chapter 3, but it did not appear to be strongly represented in the interviews with the rural radiographers in this study.

One means by which rural radiographers could perhaps increase their perceived association with the patient public, is to gain greater recognition for the role they play in image interpretation and diagnosis. The data suggest that rural radiographers provide an important service to GPs in consulting with them about the results of radiographic examinations. This supports the suggestion that, because of the absence of radiologists, image interpretation and diagnosis is an inherent part of rural radiographers' clinical practice, particularly that of sole rural radiographers. It has been suggested that advanced practice roles such as this have long been part of rural and remote health care. Bagg (2004) claimed, for example, that the nurse practitioner role has for many years been part of the routine duties of registered nurses working in rural public hospitals. Both GP and radiographer informants made reference to the radiographers' image interpretation role. It is apparently a role that distinguishes them from nurse remote x-ray operators, several of whom identified image interpretation as an area in which they lacked knowledge, skill and experience.

As commented in the introduction to the theme of 'Professional Status and Esteem' in Chapter 8, other than the generally low professional esteem of radiographers, the other observation that is potentially problematic is the GPs' apparent superiority. This was suggested by informants as contributing to stifled communication, licence breaches and poor clinical decisions. Also, under the sub-theme of 'Patient appreciation', one GP

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confessed that his perceived infallibility sometimes resulted in him feeling reluctant to re-x-ray patients when he initially produced a poor quality radiograph. Some of the nurse informants suggested that they were no longer perceived as doctors' 'hand-maidens'. While this may be generally true, given the recognition that nurses have gained for their key role in health service provision, there was also some data suggestive of nurses' traditional subservience to doctors in defending them from excessive workload and advocating on their behalf. There were other instances in the data, however, where nurses were critical of doctors and described how they played the doctor-nurse game (Stein 1967) by influencing the doctors' diagnostic or treatment decisions, sometimes by stealth.

Norsen, Opalden & Quinn (1995) defined the six elements of collaborative clinical practice as including communication and shared responsibility (pp.69). There was a considerable amount of data, particularly under the sub-theme of 'Medical dominance', suggesting that doctors' perceived 'God-like' status inhibits collaborative teamwork in rural radiography, as well as in the rural health care system generally. In Chapter 4, several authors were cited as having highlighted the importance of communication, particularly in relation to the negotiation of professional practice boundaries and responsibilities. It may be argued that negotiation in regard to role boundaries is of great importance in the rural health context where boundaries may be indistinct and flexible, as in the case of remote x-ray operator radiography. It appeared, however, that teamwork and collaboration in the delivery of rural and remote radiographic services is generally limited or non-existent. There was little evidence of formal communication mechanisms being in place and several informants identified structural impediments to collaboration (Lindeke & Block 1998), most commonly a shortage of available time to meet.

It was commented by some radiographer informants that nurses take advice about radiography much more readily than doctors – '… you can talk to the nurses. They will take advice. The doctors will not' (RR.1). Some rural nurses in managerial roles, however, were considered to have inordinate decision making power over radiographic services, and it seems that communication is also stifled on occasions between these nurses and radiographers. Some radiographers complained that health service managers either did not understand or did not appreciate the role of radiographers, and at times made decisions without appropriate consultation. This led some radiographers to despair of their professional autonomy, another of the essential elements of successful

collaboration identified by Norsen, Opalden & Quinn (1995) that was apparently lacking. The isolation of some sole practitioners was evident in this failed communication, which was reportedly commonly at the heart of conflict between radiographers and health service managers. Norsen, Opalden & Quinn (1995) also referred to cooperation, with collegial relationships based on equality and assertiveness without the need for aggression as two further elements of successful collaboration. These features also seem to be lacking in relation to sharing the role of the provision of rural and remote radiographic services between rural radiographers, nurses and GPs. As noted in Chapter 4, McCallin (2001), as well as other authors (Abramson & Mizrahi 1996; Manthorpe & Iliffe 2003; Hall 2005; Wilson 2005), observed that successful collaborative teamwork can be inhibited by the fact that different professional groups display differing primary values and dominant beliefs. This is apparently true in relation to this case study, as discussed earlier in this chapter in reference to differences in each professions perception of the discipline of radiography. It is further evident in the limited communication and collaboration that takes place between rural radiographers and remote x-ray operators.

## Relevance to the Development of Future Models of Health Care

The study described in this thesis provides an insight into the delivery of remote x-ray operator services in rural and remote New South Wales. In Chapter 1 the broader significance of the study was described in terms of its relevance to developing new ways of health professionals working together in order to help bridge the gap between the future health care demands of the aging population and future health care workforce supply. Conclusions drawn from investigation of the remote x-ray operator program may help inform the development of new models of health service delivery in rural and remote locations where access to various other specialised allied health services is also limited (National Rural Health Alliance 2004a).

The global population over sixty years of age is expected to triple by 2050 and the population aged eighty years and over is expected to increase fivefold (ABS 2003). In New South Wales the projections are similarly alarming, with predicted increases in the proportion of sixty-five year old and eighty year old individuals by about 87% and 113%

respectively by 2026 compared to 2001 (Garden, Moored & Jorm 2005). Over the same period, the proportion of the population of working age is expected to decline by about 4%. This unprecedented aging of the population is partly due to increased life expectancy, which is in turn attributable in part to better health care and improved living conditions. It has marked implications for health and disability services in the future because as the population ages, it places greater demands on the health care system, as well as on other components of the social infrastructure (Bishop 2005). It is predicted that demographic changes will result in a decrease in the proportion of the population experiencing 'disability free old age' (Garden, Moore and Jorm 2005) and an increased incidence of chronic disease (Alexander, Ramsey & Thomson 2004; Duckett 2005a).

In stating the case for redesigning the health care workforce in the light of the predicted aging of the population, Duckett (2005a) pointed out that chronic disease management relies 'not only on the skills of medical practitioners and nurses but also the skills of the range of professions that have emerged over the last century'. He argued that, therefore, health professionals need to develop new ways to practice in order to maintain or improve health care (Alexander, Ramsey & Thomson 2004; Duckett 2005a). It can be further argued that this is particularly the case in rural and remote zones. As explained in Chapter 2 rural and remote communities have some unique health service access difficulties compared to the cities, particularly in relation to specialised care (Productivity Commission 2005). These include issues identified by informants in this study, such as the following: because of the smaller population size, many rural and remote communities do not have the critical mass to support resident specialist health care providers; the need for patients to travel to access health services, results in financial costs, loss of income and disruption of family and social life; and, delays in the time taken to access services may ultimately affect the patients' health outcome (Productivity Commission 2005). Further, it is recognised that in comparison to metropolitan health facilities, the rural health care system is an environment in which collaboration and teamwork are important characteristics (Bourke et al. 2004). Given the generally lower caseloads, the diversity of patients' conditions and presentations, the narrower range of service options and the smaller number of providers, rural practitioners often work in multidisciplinary teams. This is particularly true in primary care (Lewis et al. 2003) where the roles of team members may overlap appreciably (Wakerman 2004).

Duckett (2005b) described one means of addressing the shortage of skilled health care providers as 'skills transfer'. This involves the delegation of tasks from one professional group to another, usually subordinate group. It is also termed vertical substitution (Nancarrow and Borthwick 2005). Willis (1989) described it as 'pass the task', the subordination of one occupational group by another by the delegation of more mundane, less desirable or less prestigious tasks (Willis 1989; Gieryn 1995). The dominant occupational group demonstrates their expertise by maintaining control over the process of delegation, as well as retaining supervisory responsibility over the performance of the tasks. Amongst other examples, Duckett (2005b) proposed that radiographers could delegate the performing of plain film radiography to an 'x-ray assistant' and that radiologists could delegate the reporting of some x-ray examinations to radiographers. Duckett (2005a) also suggested that such radical structural changes will 'disrupt current power and status hierarchies in the health sector and so will be challenged from the perspective of professional interest, advocating "social closure" of professional roles'.

The case study reported in this thesis is an example of skills transfer or substitution, although task delegation is not to a subordinate group. Nancarrow and Borthwick (2005) defined horizontal substitution as being that which involves 'providers with a similar level of training and expertise, but from different disciplinary backgrounds' transferring tasks or skills across professional boundaries. This definition appears to fit the case study of remote x-ray operator radiography, although it may be argued that there is a component of reverse vertical substitution, against the tide of medical dominance, in doctors performing tasks usually performed by radiographers. Nancarrow and Borthwick (2005) give some comparatively less robust examples of horizontal substitution, neither of which offers depth and breadth of the remote x-ray operator case study. They refer to the training of physiotherapy and occupational therapy assistants to become generic assistant practitioners, and the transfer of some foot surgery procedures from orthopaedic surgeons to podiatrists. The latter could be argued to be vertical substitution given that podiatrists are not medically qualified. Nancarrow and Borthwick (2005) also suggest that horizontal substitution is most likely to occur where practitioners normally perform similar roles and where tasks are not well defined, not protected by legislation, and do not involve a 'restricted technology'. None of these criteria apply to the case study presented in this thesis. However, they also state that horizontal substitution is commonly influenced by situational factors, such as the health care setting, shortage of staff, and service access

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difficulties. By definition, horizontal substitution also does not apparently involve a change in power, status or income, factors which are all relevant to the remote x-ray operator radiography case study.

It appears that radiographers have not successfully maintained control over remote x-ray operator radiography, even though doing so could conceivably help consolidate their professionalism. The reason for the radiography profession not having grasped the opportunity to control the performance of remote x-ray operator radiography may be related to the fact that the task has been allocated to practitioners of similar or higher status compared to radiographers, that is, horizontal substitution. This has made communication difficult in relation to poor radiographic practice by remote x-ray operators, as discussed under the previous heading. In some cases, for example, some radiographers described situations where, although they felt that there was a need to give advice to doctors about how to improve the standard of their radiography, it apparently seemed inappropriate to do so because of the doctors' higher professional status. It was suggested that the doctors would be unlikely to tolerate criticism from a perceived subordinate or that they would simply not follow the advice. One radiographer informant said that the doctor's 'hopeless' in this respect (RR.1). Other radiographer informants suggested that communication with nurse remote operators was similarly difficult if a nurse who was performing radiography badly was also the Health Service Manager and had authority over the radiographer – 'Do you go tell your boss something like that?' (RR.14). In these situations, the radiographers' expertise was effectively disregarded or undervalued, leading to frustration and anger on their part. It may be argued, therefore, that a potential hazard of horizontal substitution is the stifling of communication.

Substitution and skills transfer may be considered a substantial part of the solution to the future shortage of health professionals and the development of new interprofessional workforce models. In April 2003, the Health Leaders Network Conference was held with the theme of 'Designing the Health Workforce for the 21st Century' (Alexander, Ramsey & Thomson 2004). The aim was to explore the range of new skills that future health care workers would require to meet the looming challenges, including the aging population, the burden of chronic disease, the emergence of new information technologies, and issues relating to education, training, accreditation, pay and conditions. The theme of the conference was explained by the keynote speaker as follows:

Health care in the 21st century will require a new kind of health professional: someone who is equipped to transcend the traditional doctor-patient relationships to reach a new level of partnership with patients; someone who can lead, manage and work effectively in a team and organisational environment; someone who can practice safe high quality care but also constantly see and create the opportunities for improvement.

[Liam J Donaldson, Chief Medical Officer for England, *Health Leaders Network Conference*, Melbourne, 2-3 April 2003.]

Some aspects of this description of the 21st century health professional, such as the ability to work as a team member and having close partnerships with patients, are perhaps suggestive of the way that rural health professionals already practice, although there are also significant obstacles to be overcome, which will be considered in the concluding chapter of this thesis.

In other countries workforce restructuring is already underway, such as in the United Kingdom where the Prime Minister vowed to Parliament to take charge of health workforce reform personally (Salvage & Smith 2000). If Australia chooses to follow models that have been adopted in the National Health System in the United Kingdom radical approaches to collaborative practice must be explored. These include the decreased emphasis on professional boundaries, greater interprofessional teamwork, and substitution of nurses and allied health professionals in roles currently performed by doctors (Doyal & Cameron 2000). While lessons will undoubtedly be learned from the overseas experience in workforce reform, the health care challenges of rural and remote Australia are not replicated in the United Kingdom with its larger population density and smaller land area. Hence, the need to closely examine existing models of rural and remote interprofessional clinical practice such as the remote x-ray operator radiography program.

# Chapter 10
# Interpretation and Conclusions

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In Chapter 5 the method of data analysis and interpretation was described. According to classical grounded theory methodology this culminates in the process of selective coding (Llewellyn 1998). At this stage it is necessary to clarify the relationships between each of the key concepts via their themes and sub-themes. The intention in drawing together this case study is to distil a single story-line (Rice & Ezzy 2000) and a diagrammatic representation or map of a conceptual framework (Llewellyn 1998) that explains remote x-ray operator radiography from the perspective of the informants. The method of achieving this was synchronous with the comparative analysis process. The data were repeatedly interrogated to test relationships between the emergent themes and sub-themes under each of the key concepts, which were summarised in Table 11 at the beginning of the previous chapter. Thus, the story line and the conceptual model have been derived inductively from the raw data. In addition, the final deductive part of the process involved further cogitation of the literature in order to broaden the context (Pope, Ziebland & Mays 1996) and create a conceptual model and story line that explain remote x-ray operator radiography and are relevant to the study aim.

## The Relationships between the Key Concepts

The framework displayed in Figure 10 shows the interrelationships between the three key concepts which have emerged in this study. The primary key concept in remote x-ray operator radiography is 'Dimensions of Practice' (Key Concept 1 in Table 11), which is inclusive of the three themes that describe the central precepts upon which the practice of limited licence radiography stands. These are as follows: the licence conditions, which define the statutory limitations within which the practice takes place; the acquisition and maintenance of radiographic knowledge, skills and ability; and, the radiographic evaluation criteria, which serve as a means of benchmarking practice standards. As explained in the previous chapter, while the dimensions of practice can be defined in
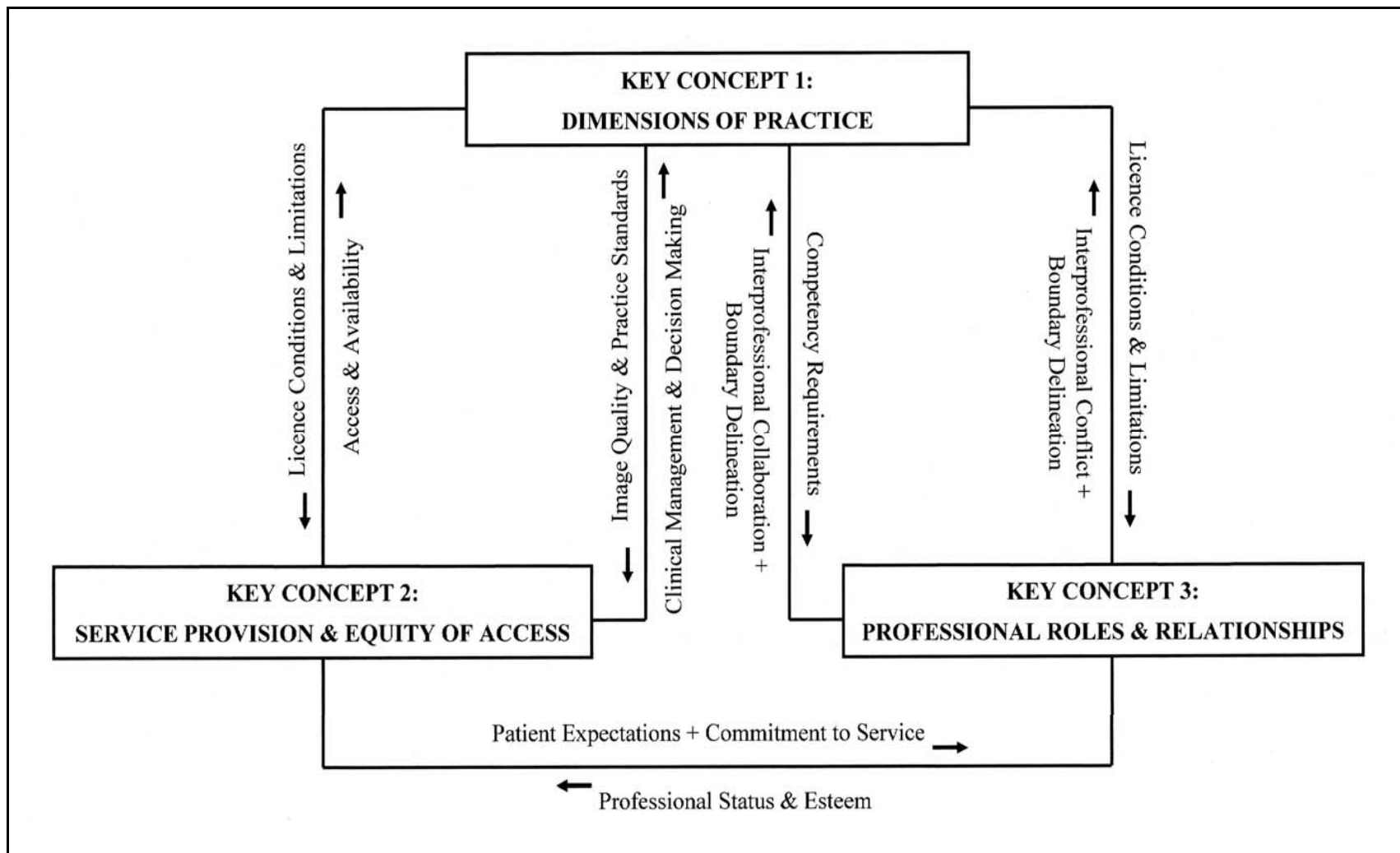
**Figure 10:** Framework showing how the key concepts are related via their various themes.

these terms, individual practitioners construct their own interpretation and understanding of these limitations, requirements and standards based on influences that arise out of the other two key concepts. These latter concepts may be regarded as somewhat more peripheral or external to the central concept of 'Dimensions of Practice'. However, the themes they encompass essentially shape the practitioners' understanding of the primary key concept.

Key Concept 2, 'Service Provision and Equity of Access', is representative of the realities of clinical practice in the rural and remote health care setting. The radiographic decision making process is affected by both the clinical condition of the patient and by other extrinsic factors such as their socio-economic circumstances and treatment expectations. Consideration is also given to the interpretation of these various factors and the value afforded them by the service providers. As shown in Figure 10, there are two well substantiated reciprocal relationships between the key concept of 'Dimensions of Practice' and that of 'Service Provision and Equity of Access' along two separate pathways. These relationship pathways are based on the balance between interrelated themes that link these two key concepts.

The first such relationship involves the precept that there are certain geographical constraints on the use of the remote x-ray operators' licence. It is further specified that the licence can only be used if a radiographer is not available at the time that an examination is required. Therefore, the conditions placed upon the use of the licence are related to issues of service access and availability. Conversely, limitations to radiographic service access and availability necessitate the existence of the licence. The second reciprocal relationship between Key Concepts 1 and 2 involves the balance between the standard of radiographic image quality considered acceptable by a nurse or GP remote x-ray operator and the diagnosis and clinical management decision they are attempting to make. The latter usually influences whether they choose to transfer the patient to a higher order hospital or treat them locally. It appears that the quality of a resultant radiographic image is perceived by remote x-ray operators as comparatively less important than the factors that motivate the decision to perform a radiographic examination. These latter factors are included within the themes under Key Concept 2 and their influence frequently contributes to the acceptance of substandard image quality. This second reciprocal relationship pathway between Key Concepts 1 and 2 is further strengthened by the belief

that poor radiographic image quality potentially limits the ability to make a correct diagnosis and subsequent clinical management decision.

'Service Provision and Equity of Access' (Key Concept 2) is also related to Key Concept 3, 'Professional Roles and Relationships'. The latter being representative of the roles, responsibilities, values and attitudes that are characteristic of each of the three different professional groups. This relationship is represented in Figure 10 by a single pathway between the two concepts, involving themes from each. As explained in Chapter 4 the status and power of a health profession is in part a function of the altruism they demonstrate in providing services to a population and in meeting the specific needs of both individual patients and the community in general. In response to this commitment, the occupation as a whole earns the status of 'a profession' and individual members of the profession earn the respect of the community and develop their sense of professional esteem. It was found in this study that the informants from all three professional groups showed a strong commitment to the communities they serve, in responding to patients' individual needs. This common professional role and responsibility is shown below in Figure 11 as cutting across the boundaries that might otherwise distinguish one health professional group from another, based on their core roles and responsibilities.

| Role & Responsibility | Rural Radiographers | | General Practitioners | | Registered Nurses |
|---|---|---|---|---|---|
| Core | Image Quality & Radiation Dose | | Diagnosis & Treatment | | Patient & Community Care |
| Shared | | Image Interpretation | | Triage & Clinical Management | |
| Common | Commitment to Service & Responsiveness to Patients' Needs | | | | |

**Figure 11:** Core, shared & common roles & responsibilities of radiographers, GPs & RNs.

It was evident from the data, as well as from the literature, that definable differences exist between rural radiographers, general practitioners and nurses. These differences are fundamental paradigms that are inherent in the core role and responsibilities of each, as

shown in Figure 11, although they are not their only roles and responsibilities. In Figure 12, the core and shared roles and responsibilities shown in Figure 11 have been transposed onto the preliminary conceptual model described at the end of Chapter 4 (pp.74-76 & Figure 2), illustrating their relationship to remote x-ray operator radiography.
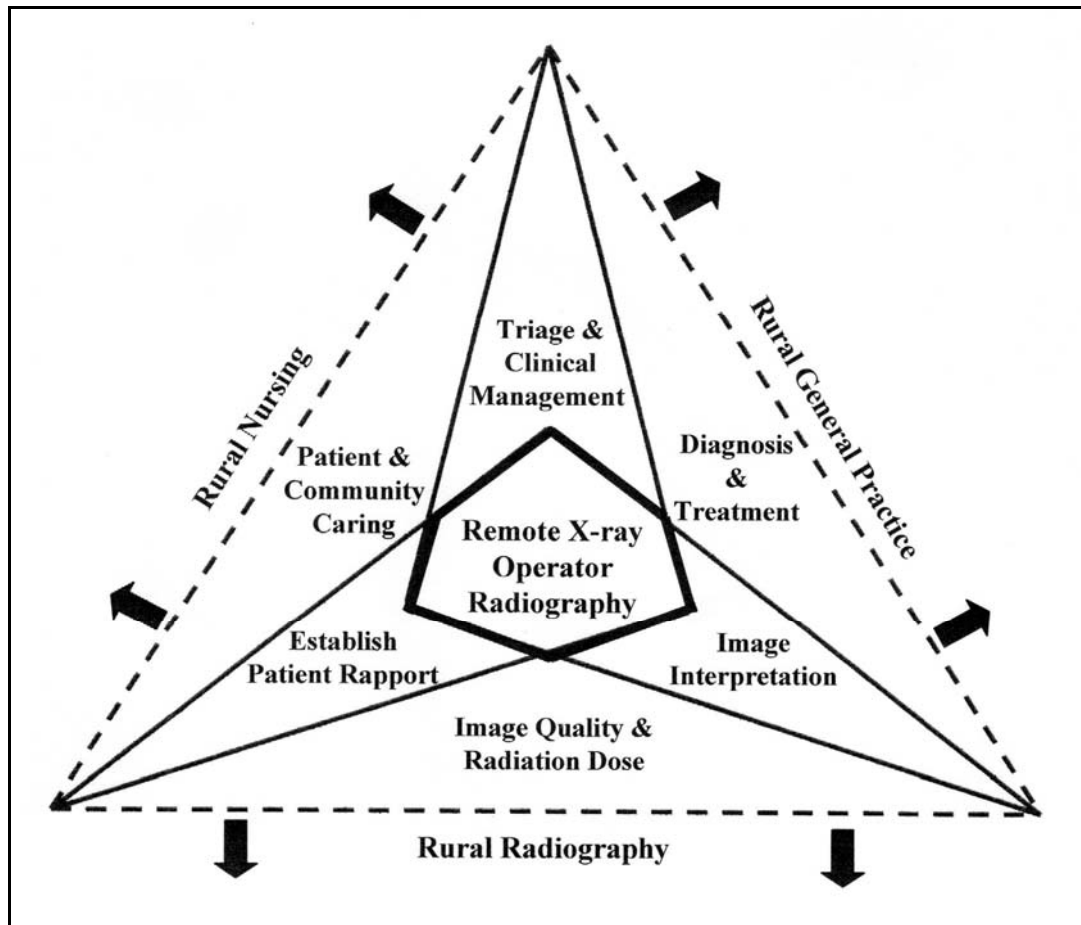


**Figure 12:** Core and shared roles and responsibilities transposed onto the preliminary conceptual model.

The three professions share roles and responsibilities to varying degrees, as shown in Figure 12. The GPs and radiographers share some responsibility for the interpretation of radiographic images, although the doctor has ultimate responsibility for the diagnosis and subsequent treatment of the patients, which is their core role. This study appears to support the evidence in the literature that the core role and responsibility of radiographers is the optimisation of radiographic image quality and minimisation of radiation exposure. There was substantial evidence in the data that the nurse informants perceived their core

role as holistically caring for their patient, the patients' families and the community, as supported by reference to the literature. However, in relation to radiographic examinations, radiographers assume some patient care responsibilities, especially by establishing a rapport with the patient in regard to compliance with the examination requirements. This is evidently an area in which the radiographers develop particular expertise, through experience. Nurses and radiographers, therefore, apparently share aspects of patient care in relation to their respective core roles. The nurses and GPs share a common role in the triaging and managing the care and treatment of the patients. Nurses normally provide some minor treatments but if the GP is unavailable, rural and remote nurses apparently assume the primary treatment role. As discussed in the previous chapter, these various roles and responsibilities have significant influence on the way that each professional group perceives radiographic practice.

Finally, completing the relationships between the key concepts, 'Professional Roles and Relationships' (Key Concept 3) is also linked to 'Dimensions of Practice' (Key Concept 1). This was evident along two separate pathways consisting of reciprocal relationships between themes from each of these two key concepts, as shown in Figure 10. These are more complex than the other relationships in that, under Key Concept 3 the themes of 'Boundary Delineation' and 'Interprofessional Conflict and Collaboration' have been split between the two pathways. Along one of the relationship pathways, there is an obvious link between the limited licence conditions and the delineation of the boundary between the role of rural radiographers and that of remote x-ray operators. However, there is also substantial evidence from the data that remote x-ray operator licensing contributes significantly to tension and conflict between the professions. This is ostensibly because it has the effect of blurring the occupational boundary. This made some of the radiographer informants feel that their core role was under threat. For others, although they did not perhaps feel threatened, it invoked a belief that there needs to be stricter licensing control and clearer delineation of the boundary. Along the other relationship pathway between Key Concepts 1 and 3, the acquisition and maintenance of radiographic competency by remote x-ray operators is a potential reason for collaborating with radiographers, even though it seems that continuing education and other forms of support are rare and sporadic. It can also be argued that such collaboration may be a means for radiographers to more clearly define their territory by demonstrating their superior radiographic competency, although this opportunity has apparently been poorly explored to date.

## The Conceptual Model

The final stage of the study requires proposing a conceptual model of remote x-ray operator radiography that can be justified both on theoretical grounds and on internal consistency within the data (Miles & Huberman 1994). At the end of Section One a preliminary conceptual model was put forward, based on the background and theory to this study (Figure 2, p.75). It was proposed that remote x-ray operator radiography takes place at the intersection of the occupational worlds of rural radiographers, rural general practitioners and rural nurses, the jurisdiction of each being diagrammatically represented by three overlapping triangles. It was argued that the overlapping areas represent tasks, roles and responsibilities that are shared between the professions, while the non-overlapping areas represent those that are professional specific. This argument is now supported by reference to Figures 11 and 12. However, the portion of the preliminary conceptual model that is the area of interest in this case study is the hexagonal-shaped region at the centre of the diagram where the three triangles representing the three occupational worlds all overlap with each other. Therefore, this is the area upon which the proposed conceptual model is based, as shown in Figure 13.

In Figure 13 the primary key concept of 'Dimensions of Practice', with its three themes and relevant sub-themes, is situated in the centre of the model, within the hexagonal-shaped region. This central portion of the model represents remote x-ray operator radiography per sé, being bounded by six features of the remote operator landscape that can be traced back to the data via the various themes and sub-themes that they represent. These boundary features are all apparently more dynamic and flexible than the themes that comprise the primary key concept. It may be noted that, compared to Table 11 and Figure 10 the wording used for some of the themes and sub-themes has been marginally altered. This reflects both the variability evident in the data, which results from the differing interpretations of individual informants and the professional groups that they represent, and the need to represent all of the themes and sub-themes within the confines of the conceptual model without congestion. The alterations to the terminology were based upon the relationships described earlier between the key concepts, as well as on the deductive analysis of the literature that accompanied the inductive analysis of the data (Pope, Ziebland & Mays 1996; Llewellyn 1998; Patton 2002).
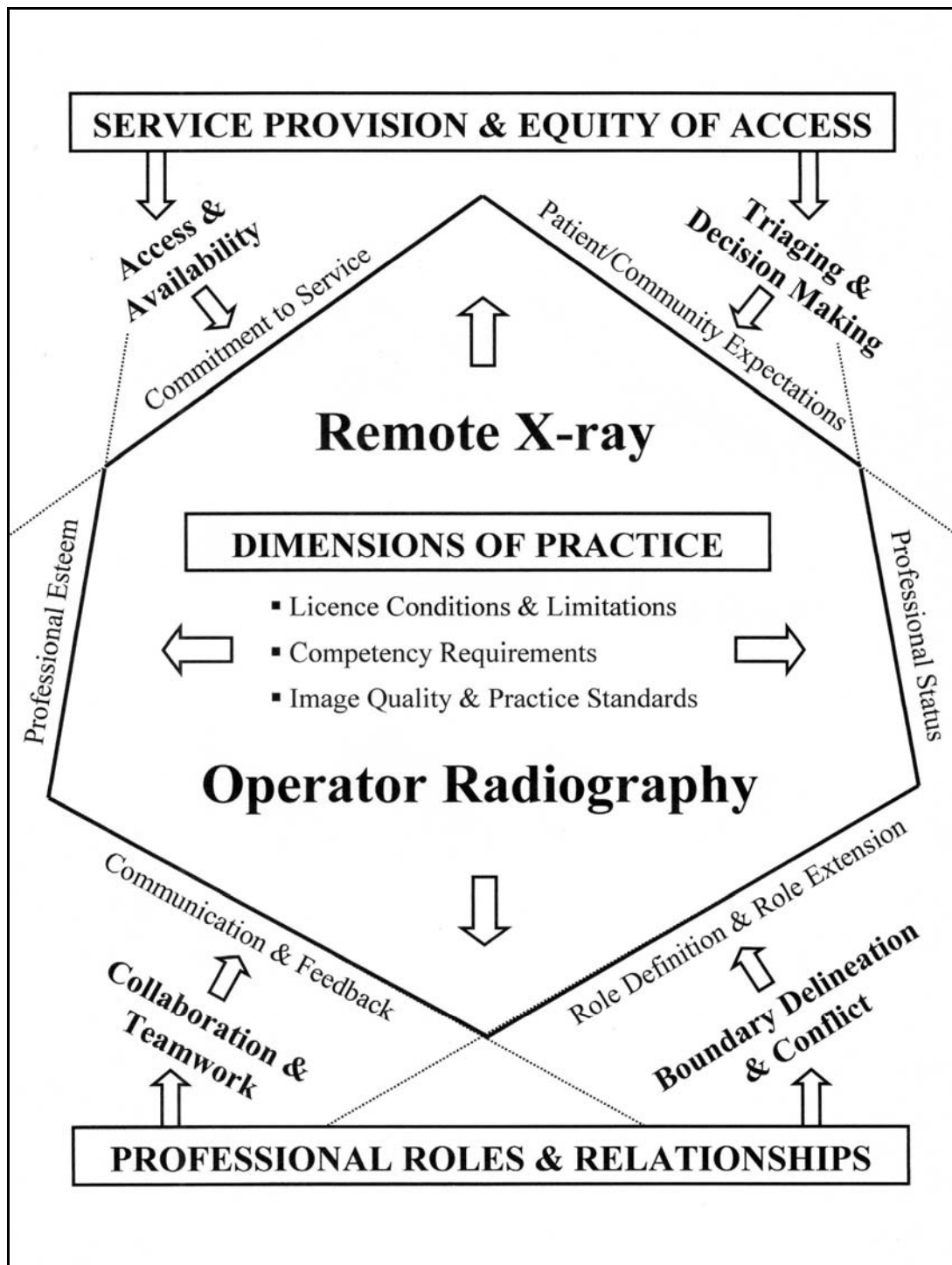
**Figure 13:** Conceptual model representing remote x-ray operator radiography.

The remaining two key concepts lie outside the central area of the model, although they both have a significant influence on remote x-ray operator radiography by placing pressure on the practice boundaries. 'Dimensions of Practice' acts principally to maintain the jurisdictional boundaries of remote x-ray operator practice, as represented by the arrows pointing away from the centre. However, issues related to 'Service Provision and Equity of Access' and 'Professional Roles and Relationships' commonly have destabilising effects on the boundaries. The former operates via issues of access to and availability of radiographic services and via the process of clinical assessment and management of individual patients on specific occasions of service. The latter involves opportunities for collaboration, on the one hand, and attempts to maintain or extend occupational roles, on the other, which are a potential cause of competition and conflict.

## Remote X-ray Operator Radiography: The Story Line

The ultimate goal of a grounded theory approach in qualitative research is to create a single story line based on the interpreted relationships between the key concepts, themes and sub-themes, which can be traced back to the raw data (Rice and Ezzy 2000) and is also relevant to the aims of the research. In this case study that story line is as follows:

> Remote x-ray operator radiography takes place where the occupational worlds of rural radiographers, rural nurses and rural general practitioners intersect. At this intersection some rural doctors and nurses are licensed to perform a limited range of diagnostic radiography examinations. This necessitates the sharing of some elementary radiographic knowledge and skills across the interprofessional boundary separating radiographers from nurses and doctors. The principal justification for this interprofessional rural clinical practice is to save residents of rural and remote communities having to travel to access minor radiographic services.

> The dimensions of radiographic practice by remote x-ray operators are primarily defined by the conditions of the Type I.14R x-ray licence, as specified under the New South Wales Radiation Control Act 1990. Further definition is provided according to the training of remote x-ray operators, which together with their experience, contributes to their competence to perform radiographic examinations and achieve outcomes consistent with prescribed standards. The degree to which this is perceived to be achieved is dependent on a number of factors. The most significant factor is the differing interpretations of radiographic practice and image quality between the three

health professions. These interpretations reflect the core health professional characteristics and roles of the practitioners.

The interpretation by rural GPs and nurses of the dimensions of radiographic practice is strongly influenced by issues of service access and availability. In the rural health care setting, health professionals are strongly committed to meeting patient and community priorities, needs and expectations, even if this necessitates crossing interprofessional boundaries. This commitment influences clinical decision making and patient management in regard to whether a radiographic examination will be performed by a remote operator or if the patient will be transferred to a radiographer-staffed facility. Remote x-ray operators generally place higher value on service provision and access than on issues related to the primary dimensions of remote operator practice. At times this leads to them breaching the conditions of their licence or attempting to perform examinations beyond the limits of their ability. The consequence may be the production of poor quality radiographs that may be inadequate to inform the clinical decision making process.

Radiographers, who identify the production of high quality diagnostic images with their integrity as health professionals, regard the production of poor quality images as the equivalent of providing a poor standard of health care. Unlike radiographers, the professional identity of nurses and GPs is not significantly related to their competency in radiography. Rural nurses gain professional status and esteem from their close association with patients and the community. They are apparently more regimented in their approach to radiography, although their understanding of the basic principles is generally considered less comprehensive than that of the GPs. Rural doctors, who have considerable professional status and autonomy, see their core role as diagnosis and treatment. They are generally unconcerned if their radiography is sub-standard, provided they can interpret the radiographs to their own satisfaction.

In spite of radiographers' higher level of radiographic competency, the perception that remote x-ray operators can perform their role contributes to radiographers' apparent low professional esteem. This is sometimes a source of conflict, although other factors, such as isolation and disempowerment appear to be underlying causes. The professional esteem of rural radiographers could be improved by greater interprofessional collaboration in providing support and continuing education about radiography to remote x-ray operators. It could also improve the quality of remote x-ray operators' radiographic practice.

## Conclusions and Recommendations

This study has provided a unique insight into the previously unresearched perceptions of limited licence remote x-ray operator radiography and the role of remote x-ray operators

in New South Wales. It is evident that this service addresses a need in rural and remote communities where x-ray examinations may be required but there is no radiographer available. However, it is also apparent that the quality of the radiographic services provided by GP and nurse remote operators is below the standard of that provided by rural radiographers.

The fundamental difference in the way that radiographers, nurses and doctors perceive radiographic practice and the role of radiography in the care and management of patients appears to relate to their core health care roles and responsibilities. For radiographers it is central to their conceptualisation of health care, while for nurses radiography is part of the continuum of care and for doctors it is one of several means at their disposal to confirm their clinical diagnosis and initiate treatment. The greatest concern of the radiographers appears to be that remote x-ray operators often produce poor quality radiographs, a perception that was supported by data obtained from the remote operators. Radiographers commonly expressed the view that remote operators' sub-standard radiographs add to the risk of misdiagnosis and frequently resulted in patients being unnecessarily exposed to radiation because of repeat examinations. Remote operators were generally of the opinion that although they do not produce radiographs of the same standard as those produced by radiographers, the quality is good enough to meet the need for a service that would otherwise be unavailable. Patients consequently receive more immediate treatment without having to be referred elsewhere for diagnosis. It is concluded that these divergent views reflect differences in the beliefs and values of the different health professions.

Substitution is seen as one of the options for meeting the future health care demands of the ageing rural population, in the light of the predicted reduction in the health care workforce. Horizontal substitution could provide part of the solution, particularly in health services where there is a shortage or absence of allied health services. It is apparent that such substitutions already take place and that nurses, with no specific training in their extended roles, do their best to fill the gap. However, the findings of this study suggest that if horizontal substitution is not carefully managed, service quality could decline, principally as a result of stifled interprofessional communication. Therefore, it is recommended that the potential for decreased service quality is acknowledged in the planning and implementation of future alternative models of health service delivery. Safeguards must be put in place to ensure that service quality is maintained or improved.

Although some radiographers perceived remote x-ray operators as a significant threat to their professionalism and their health care role, most recognised the need. Some remote operators empathised with the radiographers' concerns about professional boundary issues, but generally they could not conceive that their limited radiographic role could replace that of radiographers in the rural health workforce. Consequently, they did not generally perceive themselves as a threat but as a potential benefit to radiographers, as well as to patients. Further, all three health professional groups apparently share a common commitment to providing the best possible service to the health disadvantaged patient population under their care. Nevertheless, it was apparent in this study that communication between rural radiographers and remote x-ray operators was lacking and interprofessional teamwork was poor or non-existent. Several informants commented that they rarely found the opportunity to discuss radiography with each other, even though it was apparent that there could be considerable advantage in doing so. Few radiographer informants had actively sought to make contact with their local remote x-ray operators to offer assistance and few remote x-ray operator informants had attempted to pursue a program of continuing education in radiography. It is suggested, therefore, that the quality of remote x-ray operator services could be improved if a program of educational collaboration was a requirement of licence maintenance and renewal. From the broader perspective, it is also recommended that mandatory cross-disciplinary continuing education become a requirement for all rural health professionals involved in interprofessional clinical practice.

Lowering of the barriers to interprofessional clinical practice is seen as a desirable aspect of rural health care, as evident both from the literature and from the opinions of several of the informants in this study. However, it must be acknowledged that, although some barriers serve only to ensure the dominance of some professions, other barriers exist for sound reasons. Health professionals possess superior knowledge, skill and ability in their own occupational arena compared to those from other neighbouring arenas who may, out of necessity, cross an interprofessional boundary. As commented by some informants, there is a risk associated with extended clinical roles that involves individual practitioners exceeding their limitations. In doing so, they risk compromising the quality of the service and safety of the patients. The evidence presented in this case study suggests that this does occur in remote x-ray operator radiography, specifically in relation to breaches of

the licence limitations. It may be further argued that the opportunity to go beyond role boundaries would be even greater in fields that are not subject to legislative control.

As explained in Chapter 4, one of the more important aspects of interprofessional communication and teamwork is the negotiation of boundaries and scope of practice. Some radiographers argued that greater control and monitoring of remote x-ray operator practice is necessary. Often these arguments were framed in the context of a perceived need for stricter licence conditions and more frequent intervention by the Environment Protection Authority. An alternative approach that may be highly recommended and which has relevance to the findings of this study is the development of clinical protocols and guidelines for remote x-ray operator radiography. The negotiation and implementation of such guidelines would have a number of benefits, including: encouraging collaboration between rural radiographers and remote x-ray operators; informing the clinical decisions of front-line practitioners; and, serving as rational grounds for discussion if it was perceived that a licence breach had occurred. The guidelines could take into account the need for extended clinical roles, but also ensure the best possible quality of care for the aging rural population.

## Opportunities for Further Research

The use of qualitative, in-depth interviews in this study has provided a detailed understanding of the differences in the ways that rural radiographers, nurses and GPs experience, perceive, interpret and ultimately construct the role of remote operator radiography. The opportunity exists for further investigation in this and other health care fields using similar methodology. In particular, it is suggested that there is a need for greater research into the other extended practice roles that may currently exist in the rural health care system, some of which may be even less clearly defined than remote x-ray operator radiography. In addition, research of this nature will be important in the evaluation and monitoring of new interprofessional roles and relationships that must evolve in the near future as the profile of the health care system changes in rural and remote communities.

As is the case with all research, this study has brought to light opportunities to further expand the knowledge base in this field. Perhaps the most pressing is the need to verify the perception that remote x-ray operators perform radiographs that are below the standard expected of radiographers. This could be done by randomly selecting remote operator performed examinations and comparing them to established radiographic evaluation criteria or to a similar set of radiographer performed examinations, or both. Assuming that there is a significant difference, as suggested by this study, there is also the question of whether or not poorer quality remote x-ray operator radiographs lead to significantly increased proportion of missed or incorrect diagnoses. This is a considerably more complex research question. Furthermore, again assuming that remote operators do perform poorer quality radiographic examinations than radiographers, there is also the question of the nature and effectiveness of an intervention aimed at improving their performance.

The other area of research that directly relates to this study is to extend the sampling frame to include health care administrators, patient consumers of rural radiographic services, other health care professionals, and university academics who provide formal health professional education. As previously commented, although they are not necessarily in the frontline of radiographic service delivery, it is possible that they will have an opinion about non-radiographers performing radiography. It may also be of interest to explore the impact of radiographer role development (as explained in Chapter 3), as it evolves, on the broader perceptions of radiographic practice in Australia.

Finally, outside of this field directly, but relevant to the findings of this study is the opportunity to further investigate opinions, attitudes and behaviours in relation to health care roles that extend outside traditional professional boundaries. In the light of proposed changes to the health care workforce, particularly with regard to skills transfer, it may be both appropriate and timely to examine the issues involved. Such research would be useful in informing the current debate about renegotiating role boundaries. Potentially fertile areas for future research in this field of study include the influence of gender and the educational background of health professionals on their attitudes to role or task substitution.

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# APPENDIX A

## Ethical Considerations

The following is a summary of the ethical considerations in this study. The wording on the Information Sheet and Consent Form are also included in this appendix.

- The integrity and autonomy of participants was respected at all stages. Only those who expressed interest in the participating in the study were included. Volunteers made the decision to participate in the study on the basis of full disclosure of the study's methods and purposes, provided in writing (see below) and orally.

- Those who volunteered for the study but were subsequently not required were informed of this in writing as soon as possible.

- Informed consent was received from all informants (see below).

- While it was unlikely that the subject of remote operator radiography would be distressing to the participants, all possible precautions were taken to ensure that the researcher was sensitive to the interviewees' emotions throughout the data collection.

- Analysis of the interviews followed standard procedures for qualitative analysis. All interviews were analysed with the intent of capturing the subjects' tacit and verbalised explanations, experiences and perceptions of remote x-ray operator radiography.

- Data was not and will not be used for any purpose other than that described in the ethics application. Completed consent forms and identifying data were stored in a securely locked filing cabinet. Only pseudonyms or codes will be used in publications derived from this research.

- On completion of the research, taped interviews and transcripts will be destroyed according to the University of Newcastle procedures.

**INFORMATION SHEET**

**The role of rural nurse and GP limited licence Remote X-ray Operators
in the provision of rural and remote radiographic services in NSW**

*Investigators:* Dr Jon Adams, Project Supervisor & Lecturer in Health Social Science, School of Medical Practice and Population Health (Ph: 02 4923 6466), Professor Peter Jones, Co-supervisor & Professor of Rural Health, University Department of Rural Health, Northern NSW (Ph: 02 6767 8462), and Mr Tony Smith, PhD student & Senior Lecturer in Medical Radiation Science, School of Health Sciences (Ph: 02 6767 8464), The University of Newcastle.

Limited licence remote x-ray operator radiography is worthy of investigation but to date no research has specifically sought to explore the issues surrounding this practice. In response, this qualitative research study will examine the experiences and perceptions related to remote x-ray operator radiography of those health professionals involved in the delivery of rural radiographic services.

The study aims to:
- Investigate and highlight the experiences and perceptions of key health professional stakeholders of remote x-ray operator radiography
- Help inform key health professional organisations and governmental authorities of the issues that affect the performance of limited licence radiography on the ground

Participation in the study is voluntary and you may withdraw at any time if you wish, without having to explain why. A decision not to participate or to withdraw will have no adverse repercussions. Interviews will take between 1 and 1½ hours and will be conducted at a mutually convenient time and place. The interview will be tape-recorded with the participants' consent and participants will be able to review, edit and erase any part of the interview that they wish to. Alongside those introduced by the participant the interviews will explore a number of key themes issues as follows:

- How health professionals represent and explain remote x-ray operator radiography in the context of their own clinical practice
- Actual clinical experiences of the participants with limited licence radiography in their locality
- Interactions between the different health professionals who provide rural radiographic services

*Complaints:*
The University requires that all subjects are informed that if they have any complaint concerning the manner in which a research project is conducted it may be given to the researcher, the supervisor or, if an independent person is preferred, to the:

Human Research Ethics Officer
Research Branch
The Chancellery
The University of Newcastle
CALLAGHAN  NSW  2308
Telephone (02) 4921 6333.

**We recommend that you retain this Information Sheet for your files**.

**Faculty of Health**
**The School of Health Sciences**
**Medical Radiation Science**

**CONSENT FORM**


# The role of rural nurse and GP limited licence Remote X-ray Operators in the provision of rural and remote radiographic services in NSW


*Investigators:* Dr Jon Adams, Project Supervisor & Lecturer in Health Social Science, School of Medical Practice and Population Health (Ph: 02 4923 6466), Professor Peter Jones, Co-supervisor & Professor of Rural Health, University Department of Rural Health, Northern NSW (Ph: 02 6767 8462), and Mr Tony Smith, PhD student & Senior Lecturer in Medical Radiation Science, School of Health Sciences (Ph: 02 4921 6718), The University of Newcastle.


If you wish to be interviewed as part of this study please carefully read the following consent form details below, sign the form and return it in the reply paid envelope.


## CONSENT

I agree to take part in the interview described on the information sheet (enclosed) and give my free consent. I understand that I may end the interview at any stage and do not have to give a reason for withdrawing if I am not happy with any aspect of the research process. I understand that there will be no negative repercussions of a decision to withdraw.

I realise that the interview will be taped (with my consent) and will be later transcribed. I know that if I wish to stop the tape and/or review, erase or edit any of the tape recording I am free to do so at any time. I know that the tape will be erased after being transcribed.  I am assured of both confidentiality and anonymity regarding the information I provide. All questions I have have been answered to my satisfaction at this stage.



**Signed: _____Date: _____**



**PLEASE PRINT NAME: _____**



**Please place the completed Consent Form and Contact Details Form**
**in the reply paid envelope supplied.**

# APPENDIX B

# Comparison of Potential and Actual Informants

Although representativeness is not necessarily important in qualitative research, tests were performed of how representative the final sample of informants was compared to the pool of potential informants in terms of:

- the degree of rurality and remoteness of the locality where they worked
- the number of years they had held an x-ray licence, and
- the number of years they had practiced in a rural location.

As shown in Figure 4, Chapter 5 potential radiographer informants numbered 43 and potential remote x-ray operator informants numbered 40, while the actual informant sample sizes were 20 and 17 respectively.
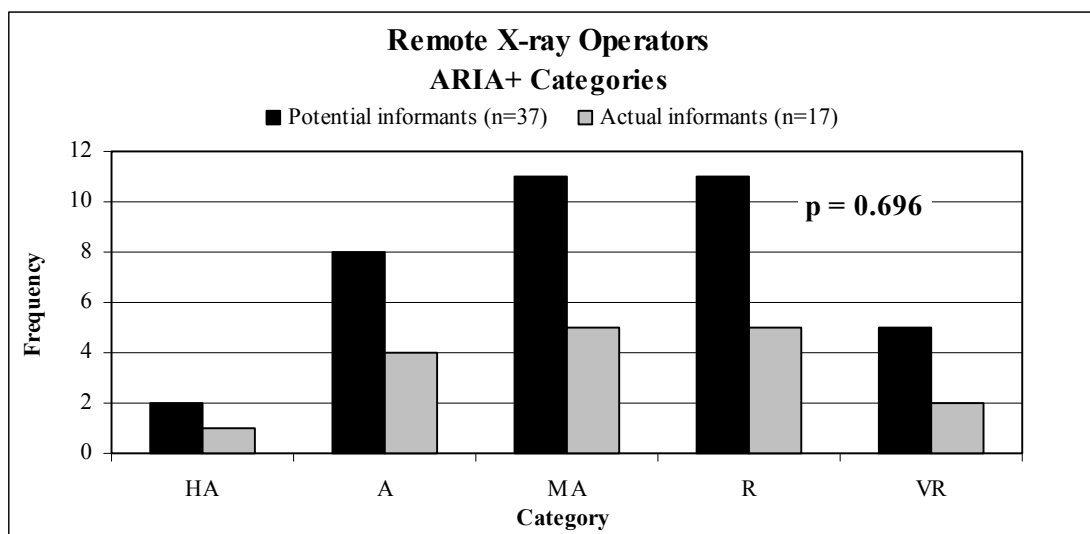
**Rurality and remoteness**

ARIA+ values were obtained from the website of the National Key Centre for Social Application of Geographical Information Systems (www.gisca.adelaide.edu.au/). The values for the various categories of populated locality are as follows:

- High Accessible (HA) – Values of 0 – 1.84
- Accessible (A) – Values > 1.84 – 3.51
- Moderately Accessible (MA) – Values of > 3.51 – 5.08
- Remote (R) – Values of > 5.08 – 9.08
- Very Remote (VR) – Values > 9.08

The mean value for the potential remote operator informants was 5.45 compared to 5.12 for the actual sample of informants. For the rural radiographers the values were 2.94 and 2.97 respectively. In both cases a students' T-test showed that there was no statistically significant difference ($p > 0.05$) in the mean degree of rurality and remoteness between the potential informants and the informant sample. A graphical comparison of the relative distribution of the potential and actual informants is shown in Figures B.1 and B.2 for the remote x-ray operators and rural radiographers respectively. Note that missing data is due

to potential informants providing inadequate or inaccurate information about where they perform radiography.

**Remote X-ray Operators**
**ARIA+ Categories**
■ Potential informants (n=37)   ☐ Actual informants (n=17)

p = 0.696

(Frequency vs Category: HA, A, MA, R, VR)

**Figure B.1:** Distribution of remote operator actual informants versus potential informants across the five ARIA+ categories.

**Rural Radiographers**
**ARIA+ Categories**
■ Potential informants (n=43)   ☐ Actual informants (n=20)

p = 0.971

(Frequency vs Category: HA, A, MA, R, VR)
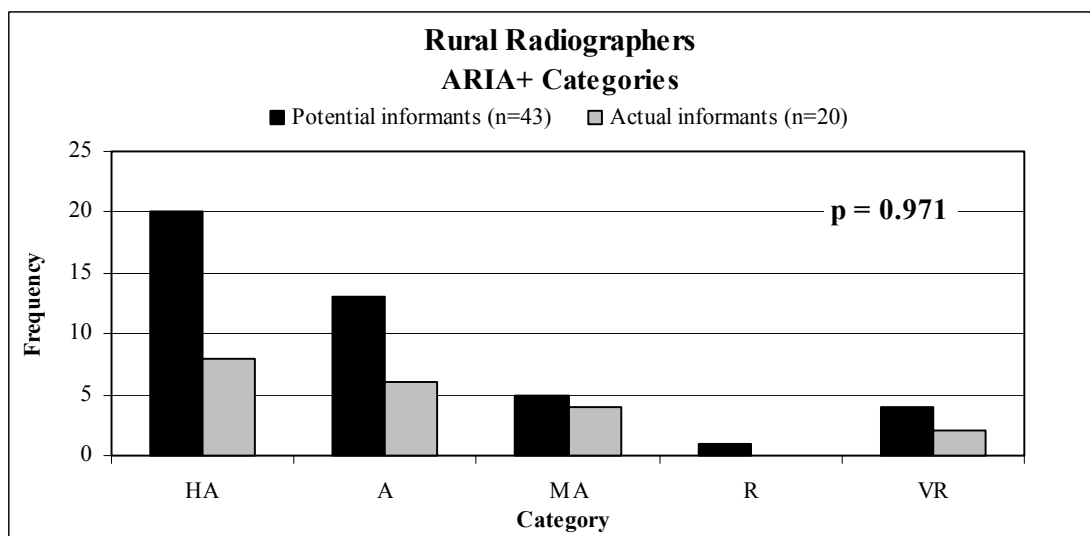
**Figure B.2:** Distribution of radiographer actual informants versus potential informants across the five ARIA+ categories.
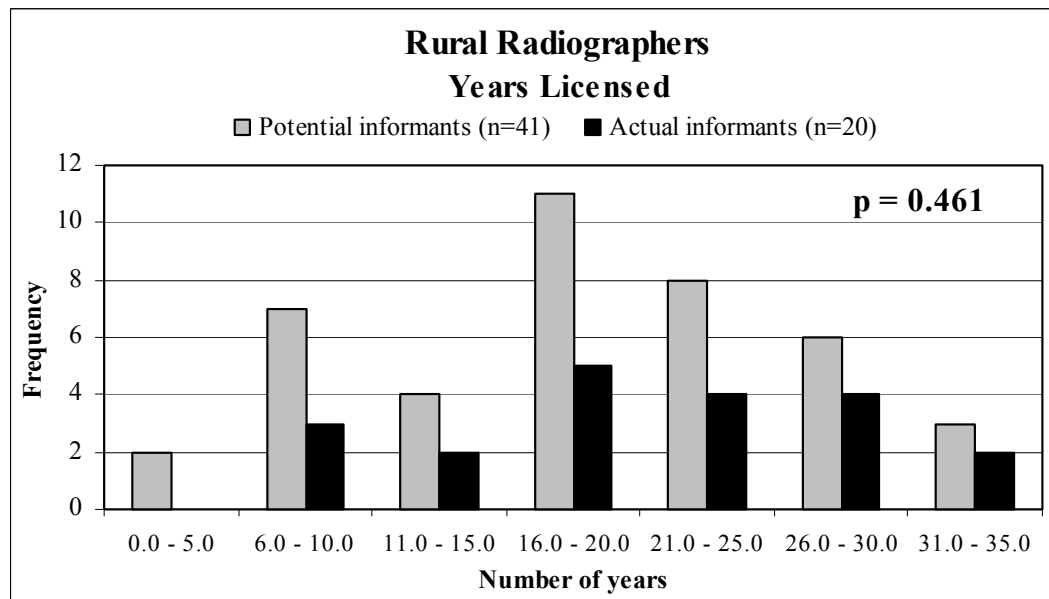
**Number of years licensed**

Figures B.3 and B.4 show a comparison of the distribution of the numbers of years that the remote operators and radiographers had held an x-ray licence respectively. The length

of time has been categorised into five-year bands from zero to thirty-five years. Again, it is evident that the group of actual informants is comparable to the larger group of potential informants. A students' T-test, which was performed on the raw data not on the categorical data, showed no statistically significant difference in the mean values for either the remote operators or the radiographers ($p > 0.05$).
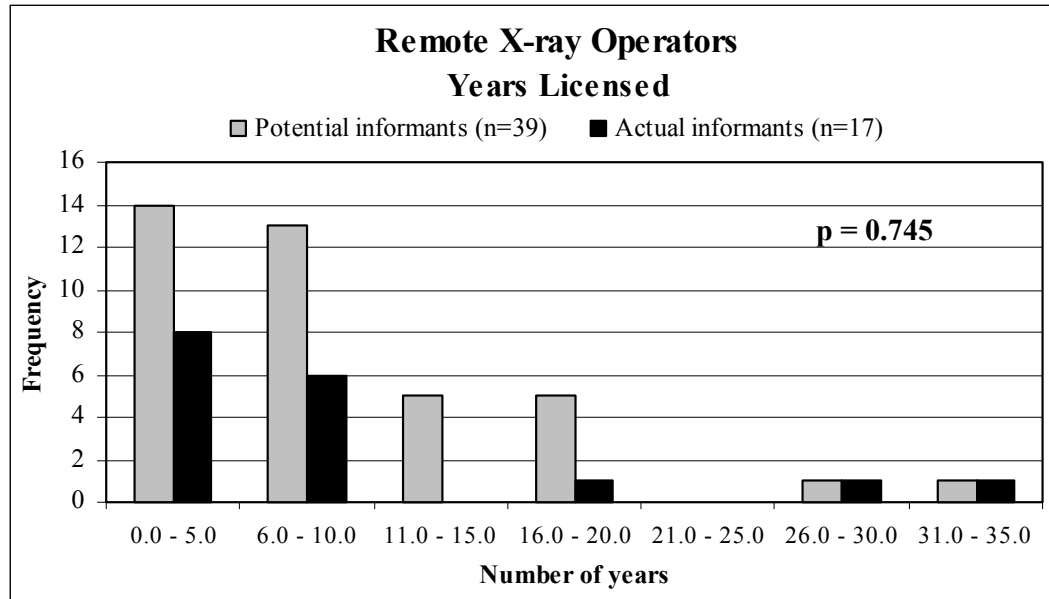


**Figure A.3:** A comparison of the distribution of the number of years licensed for the potential and actual informant groups of remote operators.
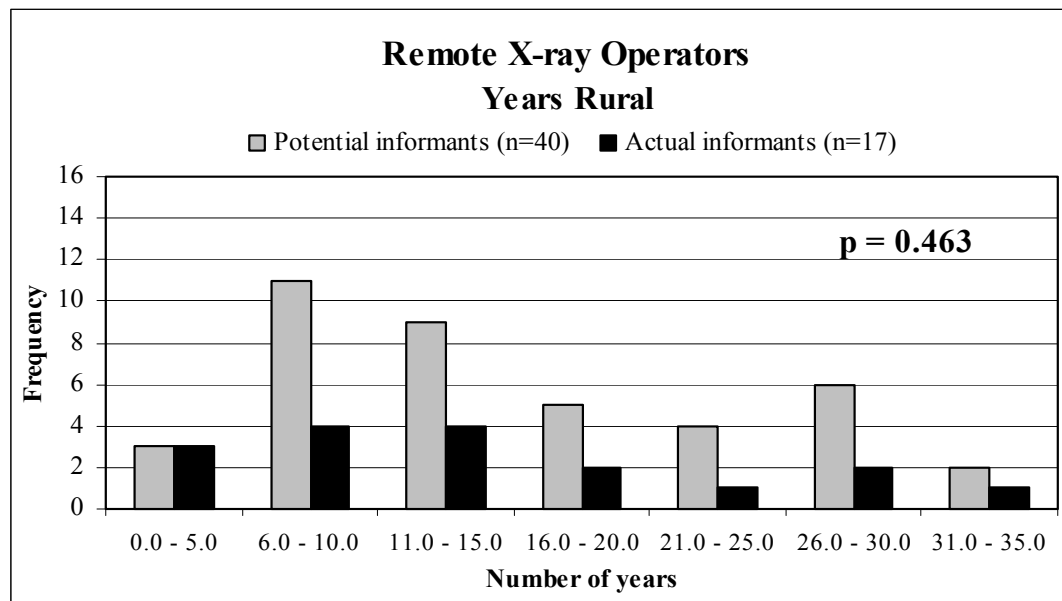


**Figure A.4:** A comparison of the distribution of the number of years licensed for the potential and actual informant groups of radiographers.
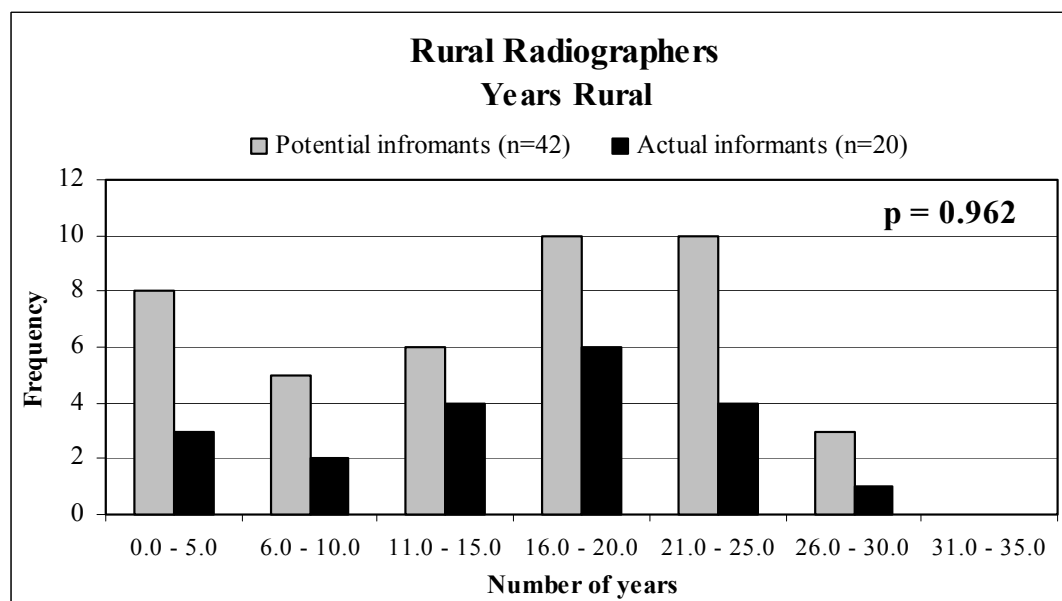
**Number of years in rural practice**

Figures B.5 and B.6 show a similar comparison for the distribution for the number of years spent practicing in a rural area for remote operators and radiographers respectively. Once again the actual sample shows no statistically significant difference in mean values compared to the potential informant group using the same method of analysis.



**Figure A.5:** A comparison of the distribution of the number of years practicing in a rural area for the potential and actual informant groups of remote operators.



**Figure A.6:** A comparison of the distribution of the number of years practicing in a rural area for the potential and actual informant groups of radiographers.

# APPENDIX C

## Sample of the Pilot Interview Data

The following data and analysis is a sample of that extracted from the three pilot interviews that were conducted with a rural radiographer (RR.P), a nurse remote x-ray operator (RN.P) and a GP remote x-ray operator (GP.P). The data was used to inform the development of the interview theme list that was to be used in the formal data collection.

The rural radiographer (RR.P) spent a great deal of time talking about breaches of the licensing conditions by remote x-ray operators and the need to for radiographers to take greater responsibility for, and provide better support to nurses and GPs who were expected to undertake this role out of necessity in smaller rural communities. This theme, for example, is illustrated in the following quotation:

> RR.P: They're a necessary evil. In the greater world there would be no such thing. We would have a radiographer everywhere that there was one needed. But we have to be realistic enough to realise that in New South Wales with the vast distances, the same as Queensland and Western Australia. But you have to be realistic enough to appreciate that it is going to happen in New South Wales, we can't put a radiographer everywhere that there's going to need to be a, an x-ray examination taking place. So therefore we're stuck with them, there is no two ways, no alternative. So what we as a profession have to do is make the most of it and say right what can we do to support these people?

This particular radiographer also identified on several occasions throughout the interview that GP remote operators are more difficult to communicate with than the nurses:

> I:[7] What differences do you see, if any, between nurse remote x-ray operators and GP remote x-ray operators? Are there, are there clear differences?
> RR.P: Oh, very much so.
> I: Oh, right okay.
> RR.P: I would say the clear difference is um, how much they would be prepared to step over the boundaries of what their licensing laws are. How much they're prepared to listen to and accept advice. Ah, certainly the nurses are nowhere near as inclined to be pigheaded about it and "I'm the doctor I've done what I've done and this is what I'm going to do."

---

[7] The symbol 'I' is indicative of the interviewer speaking during the interview.

The nurse remote x-ray operator (RN.P) also identified medical dominance as a significant issue in her clinical practice, particularly in terms of limiting what she can and can't do. This frustrated her, particularly when she observed what she regarded as bad clinical practice, made her feel devalued, and was a potential source of conflict at times:

> RN.P: … my problem is that he constantly tells me I have no diagnostic role, which I know I don't have a diagnostic role, but I have no input into the x-ray process, I take the pictures, that's me. His theory is that I'm here only to take the picture. I'm not to have any input into actually telling him what I think I might see on those films. And there have been times where I felt that he, from the x-rays and from my interpretation of the x-rays he shouldn't be treating a patient in, on site, but I'm not allowed any input into that.

In spite of this she felt that the x-ray service she and her fellow nurse remote operator provided was valuable to the community because it saves the cost and inconvenience of patients having to travel to larger centres for simple x-ray examinations:

> RN.P: I really believe it's a vital service because before we had an operator we spent a lot of money shipping people out to [name of a larger rural town] for routine fairly simple straightforward x-ray stuff. It meant a lot of money in ambulance transfers. Um, it's certainly been a cost saving thing and I certainly believe therapeutically it's been a good thing for the people here.

In addition, having an x-ray licence has allowed her to develop some complimentary clinical skills beyond her usual nursing role:

> RN.P: It's a good compliment to my role. Um, I like trauma nursing, I'm involved, I like emergency nursing, um and it just, yeah it gives me more information, it gives me a bigger picture when I've got that up my sleeve as well. And it allows me to go, oh look and this is something else that's adding to the picture of what's going on with the patient.

The GP remote x-ray operator (GP.P) voiced the very strong opinion that his position as a rural doctor was so demanding that there was little time to consider any form of continuing education in radiography, although doing radiography makes his life more tolerable and he considers it an essential part of his clinical practice:

> GP.P: … being able to do radiography makes life a little bit more interesting for you as a rural GP just because you can see ah the clinical diagnosis earlier rather than later on, that's straight away. So it's very good to have a skill to do it and it's an essential part of a country GP.

Throughout the interview he recounted various clinical situations in which being able to perform radiography was a useful adjunct to his usual range of diagnostic and therapeutic skills:

> GP.P: It's after hours x-rays.  Say a child comes with a greenstick fracture.  You know.  Not all the time, ah you have the radiographer around so you've got to learn how to do it, and the, the positioning and the views that are necessary to determine whether the fracture needs reduction or not.  Sometimes you know acute shoulder injuries like a dislocation, you need an x-ray to, even before you reduce.  So you've got to have some skills of x-rays when the radiographer is not available.

Furthermore, like the nurse remote x-ray operator he identified the fact that patients did not have to leave the community for relatively minor x-ray examinations as important:

> GP.P: See hips, we try not to do it, but there are occasions that we do the hip just to make sure there is the line of fracture visible.  Elderly people, like in the nursing home people, it's a terrible ordeal for them to go and have to be transported to [name of a larger rural town] just for an x-ray.