

Australian Institute of Radiography



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**Discussion Paper: A Model of Advanced
Practice in Diagnostic Imaging and
Radiation Therapy in Australia**

**Report of the Advanced Practice Working
Group (APWG) to the Board of Directors of
the Australian Institute of Radiography (AIR)
May 2009**

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ACCRONYMS

ACPSEM –	Australian College of Physical Scientists and Engineers in Medicine
ACR –	American College of Radiologists
AIR –	Australian Institute of Radiography
APWG –	Advanced Practice Working Group
ARRT –	American Registry of Radiologic Technologists
ASA –	Australian Sonographers Association
ASRT –	American Society of Radiologic Technologists
ASUM –	Australian Society of Ultrasound in Medicine
CoAG –	Council of Australian Governments
CPD –	Continuing Professional Development
CT –	Computed Tomography
DEXA –	Dual Energy X-ray Absorptometry
ED –	Emergency Department
FDWP –	Future Directions Working Party
FNA –	Fine Needle Aspiration
FRO –	Faculty of Radiation Oncologists
GI –	Gastro-Intestinal
GP –	General Practitioner
IV –	Intravenous
IVU –	Intravenous Urogram
MRI –	Magnetic Resonance Imaging
MRT –	Medical Radiation Technologist/technology
MSK –	Musculoskeletal
NHS –	National Health Service
NZIMRT –	New Zealand Institute of Medical Radiation Technology
PACS –	Picture Archiving and Communication System
PAWP –	Professional Advancement Working Party
PDY –	Professional Development Year
PICC –	Peripherally Inserted Central Catheter
PTV –	Prescribed Target Volume
RA/RRA/RPA –	Radiologist Assistant / Registered Radiologist Assistant / Radiology Practitioner Assistant
RANZCR –	Royal Australian and New Zealand College of Radiologists
RIS –	Radiology Information System
RT –	Radiation Therapist / Therapy

INTRODUCTION

The modern concept of non-medical members of the medical radiation workforce practicing outside of their traditional occupational boundaries can be traced back to Dr K Swinburne. In 1971, in an article published in *The Lancet*, he wrote about ‘the possibility of improving diagnostic X-ray services and alleviating radiological workloads by using Radiographers or other non-radiological staff to distinguish normal from abnormal films’ [1]. This Radiologist, who was working Leeds in the United Kingdom (UK) at the time, went on to argue that the successful introduction of such a programme ‘would bring about an entirely new state of affairs in radiology in freeing highly trained doctors to concentrate on their true function as diagnostic physicians’ [1]. As Swinburne himself explained, this idea was not entirely new at that time, as radiographic practice had always included some informal image interpretation, even though most Radiographers still carry no formal responsibility for interpreting images or reporting the findings of examinations.

The technological world of medical imaging and radiation therapy has changed markedly since the 1970s, in ways that Dr Swinburne and his contemporaries could have barely foreseen. These technological advances have led to a rapid global expansion in the diversity and number of examinations and procedures performed in radiology and radiation therapy facilities. Indeed, of recent times it has been generally acknowledged that traditional practice models in health care, incorporating sharply demarcated role boundaries, are unsustainable in the light of projected further growth in demand for health care services and a decrease in the proportion of individuals in the population of working age.

It is unfortunate that demographic pressures and the global shortage of Radiologists and Oncologists are generally perceived as the dominant drivers of the development of advanced practice roles for Diagnostic Radiographers and Radiation Therapists. Comparatively little attention has been given to the improvements in patient care and service quality & safety that may flow from developing the occupational roles of the non-medical members of the medical imaging and radiation therapy teams. The first paper published in Australia on Radiographer role extension was a short article on the ‘red-dot system’ that appeared in *The Radiographer* in 1988 [2]. It called attention to the potential for a reduction in the rate of missed radiological

abnormalities in the Emergency Department, and consequent better patient outcomes, when Radiographers flag abnormal appearances to the referring doctor. However, illustrating the apparent challenges involved in implementing extended clinical roles and embracing the accompanying benefits, after 20 years the red-dot system is still not standard practice for Australian Radiographers. Rather, its use remains on the periphery of practice, inconsistently implemented across the country from region to region, hospital to hospital, and from Radiographer to Radiographer. There is a need for logical role development initiatives such as this to take place more quickly than has been possible to date.

This report is timely. There is an opportunity to establish new models of clinical care in medical imaging and radiation oncology, ensuring that quality of service and patient safety are prioritised above all else. It is also timely because it comes on the back of several government reports and enquiries that recommend fundamental changes to the way that health services are delivered in Australia. Recent reports strongly suggest the need for more interprofessional clinical practice and the sharing of some, defined tasks across traditional professional boundaries. Other developed countries have embraced the challenge of health workforce reform and have developed new models of care in radiology and radiation oncology. These changes are described in this report with a view to learning from the experiences of those at the cutting edge of change. While their experiences may inform change in Australia, there is no need to assume that one or other overseas model should be duplicated in this country and imposed on a different health care system. The challenge for the medical radiation professions in Australia it is to develop a model that fits the unique circumstances of the Australian health system and that will meet future demand for high quality medical imaging and radiation therapy services.

The risk associated with extended clinical roles involves individual practitioners exceeding their limitations, so called 'fringe practice' [3]. Doing so risks compromising quality and safety. There is need to ensure that the changes proposed in this document are managed in accordance with clearly defined guidelines for the scope of advanced practice. This report suggests that, out of necessity, some informal advanced practice is being performed in Australia without regulation or monitoring. The safe management of change requires the collaboration of the key stakeholders at the national, as well as a local level. Formal mechanisms for negotiation of practice boundaries must be put in place to ensure that advanced

radiographic and radiation therapy practice are performed within an appropriate legal, ethical, moral, social and economic framework to ensure the best possible outcomes for patients and for the health care system. This can only be achieved by interprofessional consultation, negotiation and teamwork.

The need for various forms of continuing and higher education was a strong theme of many of the focus groups and forums conducted by the members of the APWG. The acquisition of new, expanded knowledge and skills is recognised as a fundamental element of advanced practice. Thus, it is essential for tertiary education institutions and professional bodies to collaborate to provide high quality, clinical relevant education programmes that meet the needs of employers as well as those of individual aspirants to advanced practice. By necessity, advanced practice skills will be acquired in the clinical environment and so there is also a need for the education providers and the employers to work together to ensure that theoretical knowledge and clinical practice merge effectively.

This report results from the compilation of material from a wide range of sources, including in-depth consultation with the membership of the AIR. However, at the outset the APWG recognised that there is a range of other stakeholders that must be consulted if advanced practice roles are to be successfully implemented in the professions of Diagnostic Radiography and Radiation Therapy. Consequently, one of the recommendations put forward in this report is that further, high level consultation must take place in the immediate future. This report also describes the framework of a model for advanced practice but it may be observed that much of the detail is yet to be defined. The model can only be fleshed-out if all of the stakeholders come together in a spirit of cooperation and optimism.

The aim of this report is to present the case for the establishment of a model of advanced practice for the non-medical members of the medical radiation workforce in Australia and to propose strategies for the implementation of such a model. It does not attempt to explore issues of terminology or nomenclature, nor does it examine theoretical concepts of advanced practice via a literature review. That is done satisfactorily elsewhere. The APWG have sought to present a positive but fair case in favour advanced practice in a way that would be of practical use to the AIR in moving the debate forward on this subject. This report is not intended to be final or conclusive but is intended as a focus for further constructive discussion.

Terms of Reference

A decision was taken in August 2007 by the Board of Directors (BoD) of the AIR to establish the Advanced Practice Working Group (APWG) to follow-up on the foundation work done by the Professional Advancement Working Party (PAWP), which reported in April 2006. The Board established the terms of reference of the APWG with the overall aim of defining an 'Advanced Practitioner model'. Consultation with 'stakeholders' was a key requirement, with particular reference to the AIR's various Panels, Boards and Committees. From this consultation process the APWG was required to provide recommendations as to how practitioners in diagnostic imaging and radiation therapy could achieve 'advanced' status.

The specific terms of reference were as follows:

- To update/refine PAWP's definitions, incorporating new developments since 2005;
- To develop an implementation model based on the PAWP report; and
- To define the typical characteristics of current practitioners in order to define what the 'Advanced Practitioner model' would involve.

Expected outcomes were that the APWG will:

- Describe *existing models* and their effectiveness;
- Identify *blockers* to the implementation of the model;
- Provide *strategies for implementation*;
- Make *recommendations* on how Advanced Practitioner status can be achieved; and
- Develop *a framework* for the AIR to set standards for Advanced Practitioners.

The APWG was required to report to the Annual General Meeting (AGM) of the AIR in April 2009. A progress report was delivered at the AGM in April 2008 and the final report in early May 2009.

Membership of the APWG

The following AIR Members were appointed to the APWG by the BoD:

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Mr Eastgate replaced Mr Edward Caruana on the Working Group in early 2008. Also, until early 2008, administrative support was provided by Ms Marcia Fleet, who was until that time Professional Liaison Officer of the AIR.

Meetings

The APWG first met in September 2007 via teleconference. This was followed by the first face-to-face meeting in Melbourne on 17-18th November 2007. The Working Group subsequently held a further 7 teleconferences and 3 further face-to-face meetings. A face-to-face meeting of all APWG members was held with the Board of Directors on 29th May 2009 to discuss the final report, which had been submitted about 3 weeks beforehand.

THE CONTEXT

The origins of this report date back to 2002 when, at the AGM held in Coffs Harbour, a motion was passed to establish a 'steering committee' to investigate the model of professional practice of Radiographers and Radiation Therapists that might be appropriate 'in ten years time'. The motion further stated that the model should be 'put in place for implementation by the year 2012'. As a consequence of this motion, two previous working parties have deliberated on the development of the proposed practice model.

Future Directions Working Party (FDWP)

A report was given by the FDWP at the AGM in Cairns in 2004 [4]. The Working Party had been directed to investigate the expectations for the 'level of clinical practice expected in 2012', with reference to autonomy / responsibility, academic requirements, government regulations / legislation, political alliances, promotion of the model and relationships with other professions and the broader public [4].

The report raised questions about the preparedness of the profession as a whole for the development of new models of clinical practice. It was critical of the narrow views expressed by some Members of the profession, of the internal processes and structure of the AIR, and of the profession's lack of influence over political and bureaucratic decision making [4]. On the other hand, the report acknowledged that there was 'a significant proportion of the profession that believes that role expansion is not only desirable, but mandatory' [4]. Opportunities for an expanded clinical role for Radiographers were identified in image interpretation and reporting, as well as performing contrast media injections, breast biopsies and barium studies. For Radiation Therapists opportunities were identified for an extended role in treatment planning, as well as the clinical review and counselling of patients undergoing radiotherapy treatment.

The FDWP concluded by calling attention to an urgent need to address the challenges ahead. These they identified as the need to make changes to

Radiographer education programmes, to collaborate and be prepared to compromise with other stakeholders, and to act cohesively as a profession.

Professional Advancement Working Party (PAWP)

In 2006, PAWP presented a further report to the AIR Board of Directors [5] on terms of reference that, in précis, required the Working Party to:

- define the terms 'role extension' and 'role expansion' in the context of medical imaging and radiation therapy;
- investigate the role of Radiographers and Radiation Therapists as part of the multidisciplinary team, with attention to 'quality' and 'outcomes';
- seek evidence and where possible identify specific outcomes of changing roles, across both the public and private health care system;
- evaluate the feasibility of role expansion and role extension and identify a suitable model; and
- consider the necessary education requirements for the new roles.

PAWP proposed the development of a three-tier medical imaging and radiation therapy workforce model that incorporated the current 'Accredited Practitioner', as well as new 'Advanced Practitioner' and 'Consultant Practitioner' roles [5]. The latter two tiers were characterised according to PAWP's definitions of role extension and role expansion respectively. Role extension was considered to be the result of a more natural, evolutionary process.

As was the case with the FDWP report, it was concluded that there was some urgency for the proposed changes to take place. They feared that the opportunity 'may be lost' because health care professionals from other disciplines would soon assume these roles instead [5, p.17].

It is evident that there is overlap between the terms of reference of the APWG and those of the FDWP and PAWP. However, the work of the APWG has focused almost entirely on the development of an implementation model for 'Advanced Practice',

although it is not possible to ignore the potential for other tiers, particularly as they are already part of the practice landscape in other countries.

The PAWP report and other past reports have satisfactorily dealt with theoretical aspects of the issues involved in advanced practice and the previous working parties have waded through the now considerable amount of literature on the subject to varying depths. The APWG has attempted to build on the work of the FDWP and PAWP by targeting pragmatic issues related to the implementation of a feasible advanced practice model in the medical radiation professions.

Quality Use of Diagnostic Imaging (QUDI) QS3 Project

In 2005, the Royal Australian and New Zealand College of Radiologists (RANZCR) commissioned a Quality Use of Diagnostic Imaging (QUDI) QS3 Project [6,7], which examined the potential for 'role evolution' involving non-medical members of the medical imaging team. The broad aims of that project were to:

- investigate the roles and standards for Sonographers and Radiographers; and
- identify and recommend pathways for extending the clinical role of non-medical imaging practitioners that would enhance patient care by extending the capacity of Radiologists.

The consultants produced a literature review that may be criticised as somewhat shallow given that the authors made no mention of the several small scale Radiographer image interpretation studies performed in Australia over the years. The review also seemed biased towards the American model of role development. Nevertheless, it accurately identified a number of reasons for the significant changes that have taken place in medical imaging service delivery in recent times:

'Radiology teams are managing evolving business and operating environments, changing technology, demands for professional development and increased consumer awareness. These have contributed over time to the creation of highly complex, interdependent roles.' [6]

The project also produced a discussion paper titled *'Exploring Roles in the Diagnostic Imaging Team – Role Evolution and Radiographers and Sonographers'* [7]. Disappointingly, the authors recommended that a medical imaging practitioner could only achieve Advanced Practitioner status if they performed ultrasound, although characteristics of advanced practice were also attributed to rural and remote medical imaging practice. Apparently little consideration had been given to the possibility that if only Sonographers could become Advanced Practitioners there may be a concentration of senior, experienced Radiographers in ultrasound to the detriment of other important areas of imaging practice. It was noted in the conclusion that there were widely disparate interpretations and views of 'role extension' by various members of the medical imaging team [7, p.95].

The QUDI QS3 discussion paper was circulated for comments and feedback before the RANZCR released its own response [8], which took a more realistic perspective. The College acknowledged the need for change, recognising the valuable role played by Radiographers and Sonographers, and made it clear that there was some support for the concept of broadening the 'scope of the role of non-Radiologists (including other medical practitioners)' in medical imaging [8]. In the conclusion, however, it was stated that, 'Radiologists should continue to be responsible for the totality of the imaging service including patient assessment, evaluation and treatment review.' [8] It was further stated that:

'While there is scope for delegation of tasks associated with conduct of the procedure, at present it is the view of the RANZCR that the medical interpretation provided by the Radiologist which is an integral part of the provision of a quality diagnostic or interventional radiology service, cannot be effectively delegated to those who have not been specifically trained as medical practitioners and then as Radiologists.' [8]

However, in a climate where there is widening gap between service demand and the availability of Radiologists, it is an enormous expectation that they assume responsible for the entire medical imaging service, from the writing of the request form to the delivery of the signed report to the referring doctor. For a large proportion of imaging examinations and procedures the Radiologist is not at hand, while a Radiographer or Sonographer is. Further, in an era of high-speed, broadband teleradiology a growing proportion of Radiologists' reporting is performed

remote from the site where the examination has been carried out [9]. There are inherent risks in that model. Firstly, there is risk of Radiologists losing contact with patients [10], seeing them only as a series of images. Secondly, overseas teleradiology reporting by unknown, overseas-trained radiologists raises serious questions about quality and safety. It may be argued, therefore, that there is a need for redistribution of responsibilities as well as roles and tasks in order to ensure sustainable, high quality and safe use of diagnostic imaging services in the future.

Promisingly, the RANZCR response to the QUDI QS3 discussion paper concluded that, 'collaborative work with key stakeholders needs to occur on medical indemnity issues, on developing competencies and practice guidelines and clinical protocol development.' [8]

Radiation Oncology Inquiry: The Baume Report

In June 2002, the Commonwealth's Radiation Oncology Inquiry [11], which was chaired by Mr Peter Baume, reported that:

- Only four-fifths of the patients who should have received radiotherapy were receiving it;
- Waiting times were too long;
- There were critical shortages of Radiation Oncologists, Radiation Therapists and Medical Physicists to staff existing, let alone any new machines;
- Patients were falling through loopholes in cost shifting arrangements between the States and the Commonwealth; and
- Only some States (and no Territories) had a strategic plan for radiotherapy services.

Third among the five key recommendations of the Baume Inquiry was the following:

'[That the Australian Government] take steps to improve workforce numbers by providing a better career path for Radiation Therapists and Medical Physicists, with better remuneration and recognition for their roles. The number of entrants to these professions must also be

increased. That is, we must increase simultaneously recruitment to, and reduce attrition from the workforce.' [11]

The 'three main radiotherapy professions (Radiation Oncologists, Radiation Therapists and Medical Physicists)' were also advised that they must 'undertake mandatory continuing professional development [CPD]', as a means of ensuring that the services were of an appropriate quality [11]. Diagnostic Radiographers are now also required to undertake CPD in order to maintain their professional accreditation.

The Baume report precipitated substantial and rapid changes, although they were long overdue [12]. Over the five year period after the report was handed down:

- The number of radiotherapy units in regional and rural areas increased, including more single machine units.
- University places for radiation therapy students increased.
- The three radiotherapy professions (Radiation Oncologists, Radiation Therapists and Medical Physicists) developed CPD programmes.
- Funding has been provided by the Department of Health and Ageing for Radiation Therapists and Medical Physicists to attend national and international conferences;
- The Tripartite Committee has been formed, comprising representatives from the RANZCR's Faculty of Radiation Oncology (FOR), the AIR and the Australasian College of Physical Scientists and Engineers in Medicine (ACPSEM).
- The Baume report also recommended accrediting radiotherapy facilities. The Tripartite Committee is currently developing standards for radiation treatment services in Australia with funding from the Department of Health and Ageing. The standards are expected to be completed in 2010.

All of these initiatives have benefited the entire professional community of radiation therapy, as well as individual practitioners. Patients too have benefited greatly from the additional knowledge and skill of the radiotherapy team. There has also been a growth in the number of positions available, which appears to be largely met by the number of new graduates, such that workforce shortages are no longer closing radiation therapy facilities for long periods. There also appears to have been

substantial growth in the number of Radiation Therapists engaged in research, with some occupying full-time research positions. Meanwhile, there are fewer Diagnostic Radiographers performing research oriented roles as part of their work. This was well demonstrated at the AIR Research Symposium held in Melbourne in October 2008, where the vast majority of project presentations were given by Radiation Therapists.

The Baume report stressed the need to develop a greater variety of career development pathways for Radiation Therapists, outside of management roles. It was strongly suggested that clearly defined extended clinical roles were needed as a means of encouraging staff retention. It could be argued, however, that little real progress has been made against this recommendation to date. There is still a need to implement human resource oriented solutions to further improve radiotherapy service quality. This would help to consolidate the other positive changes that have taken place since the Baume report.

THE RATIONALE FOR CHANGE

Population and Workforce Issues

According to the Australian Bureau of Statistics (ABS) labour force projections for 1999 to 2016 'Australia's civilian labour force aged 15 and over is projected to grow to 10.8 million in 2016, an increase of 1.5 million or 16% from the 1998 labour force of 9.3 million' [13]. However, the projected 'average annual growth rate of 0.8% between 1998 and 2016' is less than half that for 1979 to 1998, with the annual growth rate in 2015–16 projected to be only one quarter of that for 1998–99, indicating increased slowing of the rate of growth of the labour force (Figure 1).

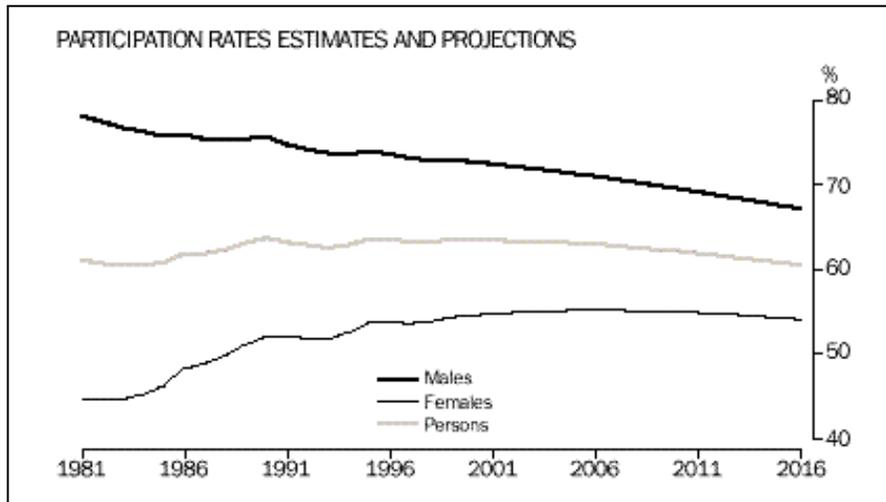


Figure 1: Past, current and future workforce participation rates [13].

There are numerous reports and published papers over the last decade or more that make similarly sobering predictions about changes in the health care workforce as a consequence of large scale demographic trends. There is now strong evidence for accepting the hypothesis that there will be a significantly smaller proportion of the population who are participating in the workforce in the future than has been so in the past. Indeed, the ABS labour force projections are summarised as follows:

'Because of the ageing of the population, population growth will slow. Therefore, it will not be possible for labour force growth to continue at historic rates.'

'Immigration and labour force participation rates may rise, which would moderate the fall in employment growth. However, any increase in these components is unlikely to be large enough to prevent a significant fall in employment growth from historical levels.' [13]

It is reasonable to predict that the slowing of the rate of employment growth will affect the health workforce to the same extent that it will affect other professions with which 'Health' competes in the labour market. In recent years, however, the health service industries have achieved higher growth rates than other employment sectors. Growth in health industry employment between 2001 and 2006 was 14% compared to 10% growth in the overall civilian labour force for the same period [14]. This may be attributable to affirmative action by State and Federal Governments in response to workforce shortages in a number of health professions. The question remains, however, whether such strong relative growth is enough to balance the large scale demographic changes, given that the labour market is likely to become increasingly competitive.

Exacerbating the labour force effects is the growing demand for services, which is also partly a consequence of the aging population. This is further compounded by the feminisation of the workforce [15], the natural attrition of 'baby boomer clinicians' [16] and attitudinal changes to work of 'Generation Y' [17]. Half-way through the ABS labour force projection period of 1999 to 2016 the health care system is chronically underfunded, overburdened and undersupplied with labour. There appears to be strong justification for change to meet these large scale trends and challenges.

There is an international trend in developed countries for the growth in demand for radiological services to outstrip the growth in the supply of Radiologists. This trend has been discussed elsewhere in relation to the Australian radiology workforce in the context of the need for the development of the Radiographers' role in the health care system [18]. The United States of America (USA) faces the same supply and demand issues [19,20]. For example, during the period between 1992 and 2002 the workload of the average full-time US Radiologist increased by 26%, taking the number of procedures performed per year from 11,000 to 13,900 [21], which is similar to Australian radiology workload estimates [22]. During the same period the annual increase in the number of Radiologists was only 1 to 1.5% [21]. Similarly, in

2001 the American College of Radiologists Task Force on Human Resources found that the number of Radiologist's entering the profession was growing by 2% per annum, while the number of radiological procedures was growing by 6% [23]. It is evident that the increasing demand for radiological services is not being met. The United States' response to this developing workforce crisis is discussed in the next section of this report (pp.31-35).

Staff Recruitment and Retention

Increasing the size of the medical radiation labour force, including Radiologists, Radiographers, Oncologists, Radiation Therapists and Sonographers, could meliorate the effects of the changing demographic profile of the Australian population to some extent. However, the above quotation from the ABS (previous page) warns against complacency in relying on such growth to improve a situation that is in part the result of unprecedented, large scale demographic changes. This warning is particularly pertinent because the health care system is facing increasing pressure in the foreseeable future as the population ages.

Unfortunately, there is relatively little data available about the non-medical members of the medical radiation workforce with which predict future trends, which is partly a consequence of non-uniform State registration and licensing requirements, as no national data base exists. Some large scale figures can be extracted from ABS census data, however. The recent Australian Institute of Health and Welfare (AIHW) report on Australia's health and community labour force in 2006 [24] shows that 'Total health workers' increased by 11.6% in the period 1996-2001 and 22.8% in 2001-2006 to a total health workforce of over half a million. The number of 'Medical imaging workers' grew at the above average rates of 25.4% and 28.2% for the same periods to a total of 10,477 [24]. As well as Radiographers, Radiation Therapists are included in this category, together with Nuclear Medicine Technologists and Sonographers. The report also shows that most of the growth between 2001 and 2006 took place in the radiation therapy workforce at 61.6% to 1,306, compared to 9.3% growth in the diagnostic radiography workforce to 5,979. For the same period the growth in the number of Radiologists increased by 11.8% to 1,530 [24].

There are few figures available in Australia of the vacancy rate in the medical radiation workforce. Nevertheless, there has been a generalised undersupply of Radiographers in the Australian health workforce for many years, more acute and recurrent in rural areas than in the city [25]. Diagnostic radiography and sonography currently appear on the list of occupations in demand for migration purposes [26]. Although comparable data is not available for Australia, it is of interest to note that, in a 2001 survey of healthcare workforce shortages in the US [27], the vacancy rate for radiography was the highest of all the allied health professions at 15.3% compared to, for example, 13% for nursing and 12.7% for pharmacy.

Australian undergraduate medical radiation programmes attract students with high university entrance scores, who apparently leak away from the profession quickly after graduation [28]. Between 2001 and 2005 the number of new graduates in 'Radiography' entering the workforce increased by 42.6% to a total of 814 [14]. The number of university places in Medical Radiation Science programmes has increased markedly in 2007 and 2008 and the pipeline effect of this increase is yet to be seen. Nevertheless, it has been argued that the solution to the ongoing problem of unmet demand for medical radiation personnel requires initiatives that address retention as well as recruitment. Although longitudinal tracking of graduates in this field is not currently undertaken, anecdotally it appears that there is considerable leakage from the profession within 5 to 10 years after graduation.

Although the reasons have not yet been investigated, and are likely to be varied, it has been suggested that the leakage is in part due to a lack of clinically-oriented career development opportunities [28]. Studies have found that intrinsic factors such as professional opportunity, recognition of accomplishments and variety of work are more important predictors of recruitment and retention of health professionals than extrinsic factors such as pay and conditions [29,30,31]. It has also been claimed that role development has potential to improve Radiographers' job satisfaction and the levels of staff retention [32]. Thus, it is argued that providing Radiographers and Radiation Therapists with professional development opportunities such as extended clinical roles will increase the likelihood of them staying in the medical radiation workforce for longer periods of their working life. Certainly, the Baume report placed great importance on this [11] and it seems that action since has benefited radiation therapy practice in Australia, as noted earlier in this report.

Government Policy Direction

As acknowledged in the recent report of the Garling Special Commission of Inquiry into the NSW public hospital system [33], access to the diagnostic technologies of pathology and medical imaging have an effect on other medical services. Unless the diagnostic services are working effectively patients are blocked from transiting through the system at various points, including emergency and critical care and in general practice. Hence, there is a dire need for governments to address the problems that are becoming increasingly evident in the delivery of diagnostic imaging services.

Arguments and recommendations in support of broadening the scope of practice of senior, post-graduate trained and qualified Radiographers and Radiation Therapists have appeared in several State and Federal Governments reports over the years. The earliest of these appears to have been in the 1980s [34,35] and focused on developing the knowledge and skills of Radiographers in image interpretation. The recent Productivity Commission investigation into the Australian health workforce [36] also addressed the supervised delegation of some reporting from Radiologists to Radiographers [36, pp.159-60]. This was in the context of Recommendation 8.3 of the report, which stated:

‘The Australian Government should increase the range of MBS services for which a rebate is payable when provision is delegated by the (medical or non-medical) practitioner to another suitably qualified health professional. Where delegation occurs:

- services would be billed in the name of the delegating practitioner;
- rebates would be set at a lower rate, but still sufficiently high to provide an incentive for delegation in appropriate circumstances.’ [36]

More broadly the Commission found workforce shortages across a number of health professions. It also found that the demand for health services will increase with population ageing, growing community expectations and developing technology, while the health labour market will become more constricted. The Garling Inquiry report also made detailed reference to growing demand for sophisticated diagnostic imaging services, including out-of-hours service provision and to the need to fast-track Radiologists’ reports [33]. It was further reported that in NSW both the

number of services and expenditure on those services is growing at a faster rate than the population growth. This is also likely to be so other Australian States.

The Productivity Commission made a number of recommendations aimed at 'training more health workers, increasing the retention and re-entry to the workforce of qualified health workers, and improving the efficiency, effectiveness and distribution of the available workforce' [36]. The Australian Government has responded to several of the report's recommendations, including the primary recommendation that the Council of Australian Governments (CoAG) endorses the National Health Workforce Strategic Framework (NHWSF) to address wide ranging issues. It is evident that reform of the health care workforce is high on the political agenda at both State and Federal levels of government. Indeed, the opening statement and terms of reference of the Inaugural Health Workforce Strategic Forum in May 2007, at which both the AIR and RANZCR were represented, read:

'Australia's health system is in need of reform to meet a range of long-term challenges, including access to services, the growing burden of chronic disease, population ageing, costs and inefficiencies generated by blame and cost shifting, and the escalating costs of new health technologies.' [37]

Among the outcomes of the Strategic Forum, in relation to emerging, new health care roles, it was considered that research should underpin workforce redesign and that a cost-benefit approach should be taken to issues of patient access, community need, safety and quality, workforce satisfaction and community preferences.

Based on wide ranging consultations, the National Health and Hospital Reform Commission (NHHRC) released its interim report into Australia's health care system in December 2008 [38]. A number of major challenges were identified in relation the health workforce issues, among which is the need to change the skill mix of multidisciplinary teams, deemphasising the influence of traditional professional boundaries that 'restrict the ability to use fully the skills of the health workforce' [38, p.24]. The proposed aim was to make more efficient use of the health care workforce by developing a new education framework that will 'facilitate the development of high-functioning, multidisciplinary teams' [38, p.332]. The NHHRC suggested that the education framework will include a number of inter-related components, among which the provision of a 'competency-based framework' was

identified as particularly important. The competency-based framework will enhance 'the effective use of all professional groups and individuals in ways that maximise the use of skills without compromising patient safety and quality of services' [38, p.332]. It is argued that in some cases existing professional boundaries are unnecessarily restrictive and counter productive and that future strategies will include 'extending the role of existing professionals'. The NHHRC cited the example in the interim report that 'reporting on X-rays might be undertaken by a medical imaging technologist' [38, p.327].

In its final report, 'A Healthier Future for all Australians', released in June 2009, the NHHRC recommended that, 'to improve access to care and reflect current and evolving clinical practice ...

'where there is appropriate evidence, specified procedural items on the Medical Benefits Schedule should be able to be billed by a medical practitioner for work performed by a competent health professional, credentialed for defined scopes of practice, and where collaborative team models of care with a general practitioners, specialist or obstetrician are demonstrated.' [39, p.31]

It was also stated that the Commission regarded changes to Medicare as 'both required and inevitable', although the changes would need to be made 'in a phased way and be strongly driven by evidence.' [p.117] It seems logical that the medical radiation professions should move in this direction.

OVERSEAS EXPERIENCE

A recent supplement of the journal *Radiography* described the progress that has been made towards the development of advanced practice roles for Radiographers and Radiation Therapists in various parts of the world. Cowling [40] explained the unifying, global limitations to the development of advanced practice. The principle limitations are the variable scope of radiographic practice and the extreme variation in entry level qualifications from country to country, and even within countries. Cowling described the current status of advanced practice as having four levels, where, on the first level, only the United Kingdom (UK) and the United States of America (USA) have successfully implemented advanced practice models in their medical radiation workforces. Australia, together with Canada, New Zealand, Japan and South Africa were considered to be on the second level of development, where the same driving forces exist but 'implementation has not yet happened to any significant degree' [40]. In this section of this report further consideration is given to the current state of advanced practice in New Zealand, the UK and USA, which, similarly to Australia, have a well developed health care system and face the same future challenges.

New Zealand

In 2008, the New Zealand Institute of Medical Radiation Technology (NZIMRT) released a report on role development and career progression [41]. It focused largely on medical imaging, although radiation therapy was included in phase one of the project, which was a survey of stakeholders (Technologists, Clinical Managers & Radiologists). Phase two involved the completion of a series of studies: a survey of IV cannulation in MRI; a pattern recognition case study; an image interpretation pilot; an MRI reporting case study; and an evaluation of 'Technologist-performed barium enemas' [41]. The report also included an extensive review of the literature. The overall aims of the project were to investigate the need for advanced practice and to make recommendations about the future career structure for Diagnostic Radiographers and Radiation Therapists in New Zealand.

A total of 173 Technologists' responded to the survey, of which 77% were Diagnostic Radiographers and the remainder Radiation Therapists. About 45% of the respondents felt that their knowledge and skills were not fully utilised and they suggested a broad range of possible extended roles (Table 1). The respondents strongly supported the development of formalised advanced practice roles (84%). It was concluded that Technologists wanted the opportunity to extend their role, with formal recognition after completing further academic and clinical education [41].

Table 1: List of the suggested extended roles for Radiographers and Radiation Therapist given by the three groups surveyed in New Zealand [41]. [Note. Extended roles that were listed in the report as 'single responses' are not included in this table.]

Medical Radiation Technologists	Clinical Managers	Radiologists
<u>Diagnostic Radiography</u>	<u>Diagnostic Radiography</u>	<u>Diagnostic Radiography</u>
Red dot system (ED extremities)	IV cannulation & injection	Ultrasound reporting
Provisional or double reporting (ED, mammography)	Red dot system	Preliminary reporting of ED trauma & fracture clinical images
ED & general reporting	Quality assurance/auditing	First reader for mammography
Vetting request forms	Vetting/prioritizing referrals	Preliminary reporting of GP general radiography
IV administration	Provisional reporting (ED)	CT colonoscopy & preliminary reporting
Performing barium studies	First read screening mammograms	Routine MSK MRI reporting
Performing IVUs	Breast ultrasound	DEXA BMD reporting
Breast ultrasound		IV cannulation/contrast media administration
FNA & core biopsy	<u>Radiation Therapy</u>	Performing barium studies and preliminary reporting
Management	On-treatment patient review	Tube/line placement
Research	Evaluating verification films	Consenting patients
	IV administration	
<u>Radiation Therapy</u>	PTV delineation	
On-treatment patient review	Basic dosimetry quality control	
IV administration	Patient counseling	
Evaluation of verification films		
PTV delineation		
Clinical/breast markup		
Education		[Note. No Oncologists' responses were reported.]
Research		

Similarly, the survey of the clinical managers (n = 18) found a high level of support for extended practice roles. Only one respondent did not support the 'concept of role extension' and only 2 did not support 'formalised advanced practice roles'. They were also asked to list roles that may be considered to be advanced practice that were either currently undertaken in their department or could foreseeably be undertaken by Radiographers and Radiation Therapists. The respondents' list of suggested roles is given in Table 1. The principle reason given for the managers' supportive attitude was the perception that advanced practice would improve job satisfaction, and thus recruitment and retention within their departments [41].

Responses were received from 29 Radiologists working in New Zealand (37% response rate), 15 of whom said that they had experience of Medical Radiation Technologists (MRTs) 'undertaking role extension activities in New Zealand or overseas'. No Oncologists were apparently surveyed. It was reported that there was a statistically significant negative correlation between increasing years of experience of the sample of Radiologists and their willingness to delegate tasks, although 24 of the 29 respondents supported the delegation of some tasks to MRTs (Table 1). Concerns were expressed by some Radiologists about having to monitor the Radiographers' performance, loss of control, turf infringement and the maintenance of service quality [41].

A brief summary of the methods, results and conclusions of the five pilot research studies that formed the second phase of the project is given in Table 2.

The report concluded with a series of recommendations, the first of which was that the medical radiation technology profession in New Zealand should introduce a three-tier career framework, including Assistant Practitioner, Practitioner and Advanced Practitioner roles. It was further stated that MRTs in New Zealand 'wish to, and are capable of performing extended roles' and that there is a need for a formal career structure that acknowledges expertise, increases job satisfaction and improves recruitment and retention. The report urged that this should take place 'in a planned and focused manner that emphasises safety.' [41] It was also recommended that the scope of practice of the roles is clearly defined, that national criteria for practice standards are developed, particularly at Advanced Practitioner level, and that education and training are nationally standardised, with postgraduate qualifications required for advanced practice. The report drew a

Table 2: Summary of the pilot studies undertaken in the New Zealand project [41].

Pilot Research Study	Summary
Survey of IV cannulation in MRI	<p><u>Method:</u> Cross-sectional survey; Sample size = 19.</p> <p><u>Results:</u> 14/19 performed venepuncture with formal training.</p> <p><u>Conclusions:</u> Venepuncture by MRTS is an accepted role; it improves workflow/efficiency and reduces waiting time.</p>
Pattern recognition evaluation	<p><u>Method:</u> Two-day pattern recognition workshop; pre-, post-, and delayed assessments; Sample size = 48.</p> <p><u>Results:</u> Agreement with Radiologists increased from 77% before to 82% after the workshop.</p> <p><u>Conclusions:</u> short courses of training are effective in improving the Radiographers' level of agreement.</p>
Image interpretation evaluation	<p><u>Method:</u> Mixed – questionnaire (MRT participants, n=10), interviews (4 MRTS & 4 Radiologist mentors) & assessment of image interpretation accuracy; participants were undergoing postgraduate education in image interpretation in appendicular skeletal trauma.</p> <p><u>Results:</u> MRTs confidence improved; more likely to perform better radiography; overall accuracy reached 93% & Kappa index of 0.86.</p> <p><u>Conclusions:</u> MRT reporting of trauma images should be embraced.</p>
Investigation of MRI reporting	<p><u>Method:</u> Mixed – questionnaires (senior MRTs in NZ, n = 91; UK graduates of MRI reporting course, n = 12); interviews (n = 4 MRI-experienced MRTs).</p> <p><u>Results:</u> Most NZ respondents saw reporting as a potential role extension; extra responsibility, workload and legal liability are important; UK respondents found MRI reporting challenging & rewarding, increasing job satisfaction.</p> <p><u>Conclusions:</u> Highly trained MRI-MRTs have a lot to offer.</p>
Evaluation of MRT performed double contrast Ba enemas (DCBEs)	<p><u>Method:</u> In-depth interviews with MRTs who performed enemas, a Radiologist & the Head of Department; common themes extracted.</p> <p><u>Results:</u> Stages of development – impetus (Radiologist shortage, waiting lists, interest in role extension, overseas developments); challenges (justification & accountability, education, patient acceptance); outcome (training, mutual benefits, qualities of MRT, job satisfaction, impact of role extension).</p> <p><u>Conclusions:</u> Introduction of MRT-performed DCBEs has been successful; many benefits; Radiologists supportive; need for continuous monitoring.</p>

distinction between 'advanced practice' and 'localized role extension activities that do not constitute formalised advanced practice roles' [41]. For the latter, in-house training was recommended, with national standards of clinical competency. All education programmes should be grounded in clinical skills and competency, according to the report. There would also be a need to establish preceptorship and

mentoring programmes, as well as CPD requirements. Advanced Practitioners would be expected to assume responsibility for 'practice supervision and clinical teaching and learning' as part of their position description. 'Stakeholder satisfaction' should be monitored and research actively supported by the NZIMRT, in collaboration with academic institutions.

Progress has continued since to completion of the NZIMRT report (Yielder J, pers. comm. 6th May 2009). New research has focused particularly on radiation therapy, although trials are also ongoing in medical imaging. A committee has been established within the NZIMRT to progress the report's recommendations and move advanced practice to the next stage. Hospital departments have been keen to develop their own trials and the NZIMRT committee has recently undertaken a survey to find out more precisely what advanced practice is already occurring. The committee's agenda also includes developing criteria and standards for advanced practice. There has been no further development in relation to the proposed assistant practitioner role.

The United Kingdom

In the UK, Radiographers' roles have been evolving in diagnostic imaging and radiation therapy over the last twenty years or more. This has occurred both in response to service demand and in accordance with government policy aimed at modernising the health care system. Initially roles developed in an ad-hoc fashion in response to local need and were supported with in-house education. The development of university-based postgraduate education occurred as it was realised that advanced practice roles were a national development. This was marked by the establishment of a Special Interest Group in Radiographer Reporting (SIGRR) in September 1996 [42]. The aims of the SIGRR were to 'facilitate an informed debate on radiographic reporting' and to 'develop and promote national and transferable standards'. Both the presidents of the College of Radiographers and the Royal College of Radiologists were present at the inaugural meeting, which stressed 'the need for cooperation between branches of the profession in relation to role extension of Radiographers'.

Much has been written about the development of advanced practice in the UK, however, in addition to using the literature as a source, the APWG decided to obtain some first-hand information by interviewing a number of UK Advanced Practitioners, in the form of a teleconference focused discussion. A list of the six Radiographers and Radiation Therapists interviewed is given in Appendix 4a, together with where they worked and their area of expertise. All members of the APWG also participated. A list of the questions used to guide the discussion is given in Appendix 4b. Minutes of the discussion were analysed and a summary of the combined responses of the UK Advanced Practitioners is shown in Table 3, categorised under five key questions. This data was also pooled with the data from other consultations conducted by the APWG, with detailed descriptions of the seven emergent concepts from the combined consultations given in the next section of this report.

First-hand information was also gathered by Ms Liza Ricote, one of the APWG members, during a 4 week tour of the UK funded by the Winston Churchill Memorial Trust of Australia. This Churchill Fellowship took place in October/November 2008, during the period of the APWG's consultations. The objective was 'to examine and evaluate the development and implementation of an alternative service delivery model within medical imaging and radiation therapy services in the United Kingdom and Ireland' [43]. Ms Ricote's Fellowship report is reflected in this report.

In England the Prime Minister vowed to Parliament to take charge of health workforce reform personally [44]. The shift in government policy to modernise the National Health Service (NHS) has had a substantial influence on the development of advanced practice roles in the UK. In addressing the need for better funding and improved overall staffing levels, the Department of Health's NHS Plan 2000 [45] identified the key areas requiring change, as follows:

- 'The NHS is a 1940s system operating in a 21st century world. It has:
- a lack of national standards;
 - old fashioned demarcations between staff and barriers between services;
 - a lack of clear incentives and levers to improve performance;
 - over centralisation of authority and disempowered patients'. [45]

In 2002, a document entitled '*Shifting the Balance of Power*' [46] detailed the Government's intentions to decentralise authority away from the Department of

Table 3: Summary of teleconference focused discussions with UK Advanced Practitioners.

<p>What is your role?</p> <ul style="list-style-type: none"> • Plan all palliative patients, treatment reviews, referrals back to the GPs and follow-up. Mentored by a clinical Oncologist for treatment reviews. • ED reporting started with 3 Radiographers, now there are 6. 12-14 hour coverage per day. • Progressive development. Started appendicular skeletal trauma reporting. Progressed to chronic degenerative conditions (arthritis). Now studying for axial skeleton reporting. • Best practice RT trials to evidence treatment and clinical needs. RTs are developing new research of their own. The importance of evidenced based practice. • Lower GI studies, while Radiologists still do upper. Double reporting with Radiologists. • Treatment, planning, clinical roles, MRI for RTs, brachytherapy, online image checking. • Develop clinical protocols and guidelines and help other staff to the same.
<p>Why was the position created?</p> <ul style="list-style-type: none"> • Developed with need of patients in mind - Patient focused. • Roles based on the particular needs of the health services - Service gaps. • Must develop a business case for positions that demonstrates needs of the department. • Had a long waiting list for GI contrast studies. • Has resulted in reduced waiting time for RT planning (10 weeks down to 2½-3 weeks). • Not enough reporting happening. Time for a report was increasing. Radiologists' time taken up in CT and MRI. • Anecdotally, services have improved – more patient-focused. Pre-implementation assessment would have been useful to know how effective it has been.
<p>Education & maintenance of competency/accreditation?</p> <ul style="list-style-type: none"> • Progressive development of competencies with experience and further study. • Strong clinical focus in education. Educational underpinning varies. • Coursework Masters (MSc) – modules through a university. • PgC (appendicular skeleton) + axial skeleton → Masters. Required to do 1000 cases with 95% agreement with Radiologists. • Did 1 year of a Masters on Barium Enemas + a reporting module. • Training within the department. No formal training other than 'in-house'. • Work with Radiologists, Oncologists and Physicists. Mentoring and supervision by Radiologists is essential. QA process - monitoring & auditing. • Annual audit of reports → 95% agreement. Department reporting meetings & case review. • CPD & special interest group of GI Radiographers. Audit of double reporting.
<p>Legal and industrial issues?</p> <ul style="list-style-type: none"> • Backed up by hospital. Trust indemnifies employees practicing at the level they are trained for. So far nothing has gone legally wrong. • Knowing your limitations & maintaining competency. Stick to protocols & guidelines. • Lines of reporting are largely to Radiologists and Oncologists for their extended roles. • Consultant takes responsibility for the RT planning and treatment. • SoR is acting to make it more rigorous and standardised. Positions are more formal. • Experience counts for allocation of AP roles. Small numbers, eg. 14 or 15 out of 70 staff. • Not necessarily linked to pay and award conditions, which causes some confusion.
<p>Attitudes of others?</p> <ul style="list-style-type: none"> • No negative reactions from patients. Patients aware that the doctor is available if needed. • Lots of support from Radiologists. Often do the jobs that they find mundane. • Consultants have grown to appreciate the benefits. It has altered their workload. • Radiologists are pleased and impressed and consult with the Radiographers on occasions. • Reporting Radiographer can become the 'gold standard' in limited examinations.

Health, by pushing the funding and decision making responsibility downwards, towards the patient. The strategy outlined in that document involved supporting new models of care and innovative ways of working in teams to achieve common goals, centred on improving the quality and safety of patient care.

Another document, titled *'Meeting the Challenge: A Strategy for Allied Health Professions'* [47], highlighted how the allied health workforce would be crucial in bringing about change by supporting innovative practice and through establishing models of competence-based and protocol-based care. This directly challenged the traditional expectation of treatment being profession specific and oriented, with rigid and impervious interprofessional boundaries. More recently the UK Sector Skills Council (Skills for Health) released a document titled *'Modernising Allied Health Professions Careers: A Competence-Based Career Framework'* [48], which further detailed the skills mix model. It addressed the need to provide a flexible and responsive health care workforce, allowing roles to be identified by competency rather than by profession. Managers are encouraged to determine the types of services required by patients along the care pathway, and where and by whom the services can most appropriately to be delivered. The framework provides guiding principles that allow practitioners to develop their role, increasing flexibility in the delivery of health care.

Meanwhile, at the Prime Minister's Challenging Cancer Summit held in May 1998 it was acknowledged that increased workload was impacting on capacity to deliver clinical services and that the system was already reaching a crisis point [49]. In April 2000 a decision was taken to pilot a 'four-tier' career progression framework within the radiography workforce, with the initial focus of the breast screening programme. Early indications of success resulted in the four-tier pilot model being extended to radiotherapy in 2001 and diagnostic imaging in 2002. All three projects had similar aims [49], which were to:

- redesign the clinical team based on skills and experience rather than profession;
- introduce a tiered structure that encouraged life-long learning and skills escalation;
- develop the occupational standards in each clinical field; and

- review and implement educational processes that would enable team members to develop new and valued roles.

The success of the pilot projects led to the four-tier model being implemented widely in the UK. The four-tiers comprise, Assistant Practitioner, Registered Practitioner, Advanced Practitioner and Consultant Practitioner. The Assistant Practitioners are part of the skilled health care support workforce. Registered Practitioners form the body of the workforce. This is the level attained on completion of the entry-level qualification. Advanced and Consultant Practitioner roles focus on the development of clinical expertise within a supportive team environment, incorporating extended scope of practice. They are defined as follows:

Advanced Practitioner (State registered): An Advanced Practitioner is autonomous in clinical practice, defines the scope of practice of others and continuously develops clinical practice within a defined field. [49]

Consultant practitioner (State registered): A consultant practitioner provides clinical leadership, bringing strategic direction, innovation and influence, through clinical practice, research and education. [49]

While the duties of Advanced Practitioners relate primarily to the delivery of patient care in their area of expert clinical practice, their roles include clinical and team leadership, the promotion of service improvement and interaction with the wider multidisciplinary team in respect of delivery of high quality care [49]. Consultant level practice is defined by four pillars of expectation: clinical expertise, research, education and management. Whilst consultants work across professional boundaries, their core role is defined by expert clinical practice in a particular field. They are leaders who are influential at the policy level and in the development of patient-centred services. They have highly developed clinical reasoning skills, demonstrated by education and clinical experience. Consultant Radiographers carry their own caseload and their scope of practice may mirror that of a Radiologist working in the same field [50].

Advanced and consultant practice are underpinned by post graduate education, which can be accessed through a number of UK universities. However, some local advanced practice is still occurring in isolation or small numbers. In such cases it is supported and regulated at local level in accordance with a degree of autonomy

dictated by the clinical institutions in which the practice takes place. These local models are justified through '*Shifting the Balance of Power*' [46]. Variation in practice roles is limited only by local need and the availability of local support.

Undergraduate Radiographer education is also changing in the UK to accommodate new expectations and objectives. It is expected that radiological aspects of image interpretation will become a core competency in the future. Hence, 'red dot' training and competency requirements already appear in the curriculum of some undergraduate courses in the UK. Teaching and observations performed in the clinical setting reinforce the flagging of abnormal findings as standard practice. A research project was recently commissioned by the Society and College of Radiographers and undertaken by academic staff of the University of Hertfordshire, led by Dr Richard Price [51]. The aim was to identify current and potential future practice developments in the diagnostic radiography and radiation therapy workforce. The information contained in the report was provided by 108 radiology managers from acute and general hospital departments. It confirmed that the scope of advanced practice is diverse and expanding, with 'service need' still being the principle driver.

For example, in gastro-intestinal care advanced practice now includes conventional sigmoidoscopy and colonoscopy, as well as CT colonoscopy [51]. This reflects the growth in demand caused by the national bowel cancer screening programme. In addition to reporting, many Radiographers are performing interventional procedures, such as inserting guidewires, feeding tubes, peripherally inserted central catheters (PICC lines) and other vascular catheters [51]. In radiation therapy more holistic roles are emerging that involve counseling and palliative care. New developments have taken place in specialist brachytherapy, on-treatment review clinics, and treatment planning and prescription [51]. In many cancer centres Radiation Therapists are taking a lead role in research. In general, Radiographers and Radiation Therapists are becoming more directly involved in the patient care pathway. In addition, some Nuclear Medicine Technologists are also beginning to develop a reporting role, although change has been slower than in radiography and radiation therapy [51].

Skill mix activities commenced later in Scotland and Northern Ireland and advanced practice roles are not as widespread as in England, although development is

ongoing. In Scotland, feasibility and pilot studies have been undertaken with a view to a proactive rather than a reactive approach. The number of Advanced Practitioners is increasing and there are a small number of consultant positions in both radiation therapy and diagnostic radiography [51].

While the four-tier model has not been implemented universally in the UK at this stage, the number of advance practice positions is growing and there is nothing to suggest that this will change. Rather, it has been reported that some consider the advanced practice model to be in its infancy [51]. Other key points in the recent College of Radiographers' report [51] are as follows:

- New advanced practice competencies are continuing to evolve across the spectrum of practice.
- A considerable number of Radiographers are now reporting independently of Radiologists.
- Collaboration with non-radiological clinicians is developing and community based service provision in smaller hospitals where a need exists may well provide opportunities for the future development of advanced practice.
- Very few advanced practice positions have been withdrawn or relinquished over the last five years and there is a need for continued expansion of advanced practice roles and competencies.
- Advanced practice roles are becoming embedded in the health care system, complementing the clinical roles of other health professionals and adding value to the patient care process. Benefits include:
 - greater flexibility in service delivery;
 - improved cost effectiveness;
 - freeing Radiologists for higher level clinical duties;
 - faster turnaround times and communication of results;
 - better utilisation of available resources;
 - higher levels of patient satisfaction with care; and
 - enhanced career pathways and job satisfaction.

If Australia chooses to follow the model of advanced practice that has been implemented in the NHS in the UK, radical approaches to collaborative clinical practice must be explored. These include the decreased emphasis on professional

boundaries, greater interprofessional teamwork, and allied health professionals working in roles that were previously performed only by doctors [52]. However, although similar in many ways, the health care challenges of Australia are not the same as in the UK, with its much larger population and smaller land area. While lessons can undoubtedly be learned from the UK experience in health workforce reform, there is an opportunity to develop models that address the specific needs of the Australian population and health care system.

The United States of America

As early as 1989/90, the American Society of Radiologic Technologists (ASRT) initiated discussions with the American College of Radiology (ACR) aimed at developing an advanced practice, Radiologist Assistant (RA) role for Radiographers, or Radiologic Technologists, as they are known in America. At that point in time the ACR opposed the development of educational programmes for RAs [53,54]. With demand for radiological services increasing, and recognising that expanding the career opportunities of Radiographers could help increase productivity and efficiency, the ASRT later re-initiated discussions with more positive outcomes.

In March 2002 the ASRT met with representatives of the ACR and American Registry of Radiologic Technologists (ARRT), as well as with the conveners of Radiographer educational programmes and government agencies. Two documents were drafted - *The Radiologist Assistant: Improving Patient Care While Providing Workforce Solutions* [55] and *Development of the Radiologist Assistant: concept, roles, and responsibilities* [56]. Agreement was reached on an Advanced Practitioner model designed to ‘... improve productivity, increase patient access to radiologic services, and enhance the overall quality of patient care’ [55, p.1].

According to May et al. [20], by the end of 2007 there were 10 education providers in the US offering RA programmes at Bachelor Degree, Post-Baccalaureate or Masters level. RA education programmes include a clinical component, Radiologist preceptorship and the maintenance of a clinical portfolio [20]. After completing their studies candidates are required to pass an examination that is administered by the ARRT. As of November 2007 there were an estimated 59 registered RAs in the US. However, in addition to RAs, there are an estimated 300 Radiology Practitioner

Assistants (RPAs) also working in the US who have graduated from Weber State University in Utah between 1996 and 2007 [20]. The ASRT and the ARRT are currently working with the Certification Board for Radiology Practitioner Assistants (CBRPA) to unify the two different advanced practice pathways that currently exist under a common credential and title of 'Registered Radiologist Assistant (RRA)' [57]. The ARRT states that:

'RRA role delineation should be considered as a vision of what will be created through the establishment of structured educational programmes, selection of appropriately qualified and experienced Radiographers, implementation of a certification mechanism, modification of existing regulations, and acceptance by the professional community. The outcome of efforts to establish a new level of imaging Technologist supervised by Radiologists will be enhanced access for patients to high-quality radiology services.' [58]

The majority of American States regulate or oversee the licensing of health professionals within their own jurisdiction, although some states do not regulate Radiographers at all [59]. The entry level qualification for Radiographers is also not standardised nationally and ranges from a two year certificate or associate degree to a four year Bachelor Degree. Consequently, only about half of the 50 states recognise the extended scope of practice of the RAs [60,20] and the services they provide are not currently recognised by the Federal Governments Centers for Medicare and Medicaid. Given the disparities between States, the roles and responsibilities of RAs are based largely on local need, including, patient population, practice setting, state licensure laws and regulations, institutional credentialing requirements and federal reimbursement policies. Although clinical practice varies from one centre to another [20], in general terms current RA and RPA roles include:

- evaluation of patients before, during and after procedures;
- performing examinations, including minimally invasive procedures;
- planning and monitoring examination protocols;
- obtaining consent for and injecting contrast media; and
- forwarding observations to the Radiologist about abnormalities.

The scope of practice of the RA is defined according to a list of 42 clinical activities that may be performed [58]. In addition, the ARRT specifies the procedures that RAs must complete prior to certification, as part of their clinical training [61]. They must demonstrate competency in 15 procedures, including 9 mandatory (eg. upper GI fluoroscopy, cystogram, lumbar puncture, PIC line insertion) and 6 elective procedures (eg. retrograde urethrography, lumbar myelogram, NG tube placement) for a total of 500 separate cases (375 mandatory and 125 elective). Each clinical activity and procedure requires either 'general', 'direct' or 'personal' supervision by a Radiologist [58], who must also verify the candidate's competency relative to a series of assessment criteria. The ARRT also requires the RAs to earn 50 continuing education points in each two year cycle, 35 of which must be relevant to their area of extended clinical practice [62]. In one study of four RAs the following clinical competencies were listed: lumbar puncture, upper GI examinations, small bowel imaging, barium enemas, joint injections, paracenteses, thoracenteses, cystograms, and insertion of feeding tubes, PICC lines and tunnelled catheters [63]. Other procedures performed under supervision included IVUs, CT urogram, retrograde urethrograms and peripheral venous diagnostic procedures. It has been suggested that an RA would save the Radiologist 100 minutes a day on average [63].

While RA's may perform the examinations and procedures, the Radiologists retain absolute 'responsibility for final image interpretation and for preparing a final written report'. It is specifically stated that RAs cannot substitute for a Radiologist, act independently, prescribe medications or treatments or provide an official opinion or written report about abnormal findings [64,20].

The payment and reimbursement arrangement for RAs is complex and the ACR and ASRT are working to 'untangle the current web of reimbursement regulations' [20]. Under the existing regulations, in which RA services are not officially recognised, there is little incentive for employers to engage RAs, even though they may gain in terms of productivity, efficiency and service quality [60]. A wage and salary survey performed by the ASRT in 2007 showed that the average salary of RAs is about 62% higher than that of other Radiographers [20].

May et al. suggest that there is a growing acceptance of the RRA role amongst Radiologists [20]. Indeed, in the July 2008 edition of *Radiology* two articles appeared debating whether RAs are 'the best new thing since sliced bread' or a

'Trojan horse' that would destroy the medical specialty of radiology [65,66]. The argument in favour of RAs claimed a list of potential benefits that included increased productivity and efficiency, establishing a career ladder for Radiologic Technologists, assuring patient safety and ensuring quality of care, and economic benefits in terms of reduced service costs [65]. Dr Ellenbogen concluded with the positive perspective that because extensive discussions had taken place between the ACR, ASRRT and ARRT, and consequently the RA scope of practice 'is limited and well defined', it is in the best interest of Members of the ACR and the profession 'to develop the RA to best serve our patients'.

The counter-argument was presented by another Radiologist, who wrote:

'It appears that Dr Ellenbogen, as well as the majority of Radiologists, believes that we will derive substantial benefits by absorbing RAs into our specialty, just as the Trojans believed that the Trojan horse would benefit the community. These Radiologists may indeed be right. The Trojans, as we now know, were wrong. Two lone Trojan naysayers who warned the Trojans to beware of horse were completely ignored, and Troy was subsequently destroyed.' [66].

Much of the argument centred on the concept that Radiologists are under siege and are in imminent danger of 'erosion of turf'. It was argued that while cooperation between the professional bodies and regulatory authorities had resulted in it being agreed and stipulated that final image interpretation and the preparation of the report would rest with Radiologists, there was still a concern that in time 'RAs could become independent, interpret images and bill for their own patients' [66].

Debate about advanced practice roles for Diagnostic Radiographers and Radiation Therapists will also ensue between stakeholders in Australia. However, as in comparison to the UK, Australia's health care system differs considerably from that in the USA. Given that advanced practice would be most appropriately developed in the public hospital system in Australia, although there are also undoubted benefits to private service providers, the debate is unlikely to be greatly concerned with issues of reimbursement for performing extended roles. Indeed, among the many findings of the consultations undertaken by the APWG, which are detailed in the next section of this report, Australian Radiographers and Radiation Therapists

considered remuneration for advanced practice roles of little concern. Industrial award issues seemed to confound an otherwise clear argument these roles must be implemented and have great potential to improve service access and the quality of patient care.

CONSULTATION: FINDINGS & OBSERVATIONS

The terms of reference of the APWG specifically directed that extensive consultation must be undertaken, particularly with the membership of the AIR. To achieve this, the APWG implemented a consultation framework that included the following:

- Separate diagnostic radiography and radiation therapy focus groups were held in Melbourne, Sydney, Brisbane, Adelaide (radiography only) and Perth (radiation therapy only). A list of those who participated in focus groups is given in Appendix 1a, together with detail of the medical radiation discipline and sector in which they worked, their gender and years qualified. The theme list used to facilitate the focus group discussions is shown in Appendix 1b.
- Discussions forums that were held as part of AIR State Branch meetings in Tasmania, South Australia and Queensland. A list of the meetings, including dates, locations and approximate number of attendees, is given in Appendix 2a, with a list of the questions used to generate discussion in Appendix 2b.
- The opportunity to make written submissions about advanced practice was made available via the AIR web-site, which was promoted in *Spectrum*, the AIR's newsletter, and at the national conference in Melbourne in April 2008. The AIR's Boards, Panels and Committees were also directly invited to make submissions. Information about the authors of written submissions is given in Appendix 3a and the questions asked are listed in Appendix 3b.
- A teleconference focused discussion with UK Advanced Practitioners was held in February 2008. A list of those who participated is given in Appendix 4a and a list of the questions asked to generate discussion in Appendix 4b. A summary of the outcomes of this discussion is shown in Table 3 (p.26).
- A teleconference, semi-structured discussion with medical radiation academics from seven of the eight Australian Universities that offer undergraduate medical radiation science programmes was held in November 2008. Six of the universities represented also offer postgraduate medical radiation education. A list of those who participated is given in Appendix 5a and a list of the questions asked is given in Appendix 5b.

Focus group training and preparation was undertaken as part of one of the face-to-face meetings of the APWG and detailed notes were made during and immediately after each focus group and discussion forum. These were pooled with summary transcripts of the teleconference discussions and the written submissions to form a combined discourse, which was analysed using qualitative research techniques. Although the detail of the teleconference with the UK Advanced Practitioners is reported in the previous section of this report (Table 3), it too formed part of the pooled data. Common themes were extracted and categorised. They were then condensed using an iterative process into seven key concepts, which exist in parallel and are summarised below.

Concept 1: Practice Standards and Guidelines

- It was widely recognised that there is a need to define the meaning of the term 'advanced practice' in the medical radiation professions and to provide a structure and framework for its implementation. The university academics concurred that it was not possible for education programmes to be developed unless there is a better understanding of the future direction of advanced practice. There was a general perception that this must include clearly articulated clinical practice guidelines and protocols as means of delineating the scope of practice and boundaries of each advanced practice role.
- There was a strongly recurrent theme that, while informants were eager for 'structure', the framework needs to be flexible enough to accommodate the local or specific needs of various health services, practitioners, communities, workplaces, patient presentations and so forth. A wide range of local variables were mentioned. The argument was put forward that it is matter of 'filling the gap' where a service is currently not readily accessible or it is compromised by staff shortages, excessive workload and limitations on the availability of Radiologists and Oncologists. Therefore, the model must not be too rigid, allowing enough flexibility for clinical guidelines to be developed locally, on the basis of 'need'.
- While the need for flexibility was strongly represented, so was the advice that advanced practice qualifications and credentialing should be nationally standardised and transferable between States. It was agreed that the advanced practice should not be too complex, as is the case with the different current

registration and licensing conditions in each State. International transferability was also thought desirable. The APWG received correspondence from three UK Advanced Practitioners who either wished to immigrate, or had immigrated to Australia but found that this was a retrograde step in their career path, because they could no longer practice at the level to which they had been trained.

- It was recommended that guidelines for advanced practice take into account future as well as current needs and should not be constrained by present conditions and traditional professional role boundaries.
- There was a strongly held belief that the accreditation process for Advanced Practitioners must be 'rigorous' and have 'credibility'. This extended to the understanding that there would also be credible and substantial reaccreditation requirements that would ensure the maintenance of competency. The benchmark of advanced practice would be the same as that demanded of Radiologists and Oncologists in relation to delegated tasks and roles.
- It was also clear that experience is an essential expectation of Advanced Practitioners. As one informant commented, 'undergoing formal study does not constitute advanced practice'. There was no clear agreement about how experience should be benchmarked, although it was generally agreed that Advanced Practitioner status should not be achievable by early career Radiographers and Radiation Therapists. This was linked to the issue of credibility and safety, with the perception that early career practitioners 'lack problem solving skills'.
- Where advanced practice was currently being performed by some Radiographers, Sonographers and Radiation Therapists there is a need for it to be formalised and regulated. This would help ensure that it is being performed to an appropriate standard and increase awareness of medico-legal liability and accountability.
- Advanced Practitioners must be prepared to assume both responsibility and accountability for their actions and should be educated about the medico-legal aspects of their extended role. It was stated that accountability and liability should be pursued as part of the agenda for national registration and accreditation.
- There was general agreement that the AIR should take the lead role in the accreditation of advanced practice programmes and courses, in consultation with other stakeholders. The AIR should also accredit individual Advanced Practitioners.

One informant suggested that the AIR should establish a 'college-like' accreditation process.

- There was also an expectation that Advanced Practitioners would possess leadership skills and that they would perform both teaching and research. These expectations should be reflected in the accreditation guidelines.

Concept 2: Service Quality and Access

- There was a strong, recurrent theme that advanced practice roles should be primarily focused on the needs of patients. It was perceived that there would be an improvement in the quality of patient care if advanced practice roles were implemented. Patient waiting times would be reduced and service access improved by reducing the dependence on Radiologists and Oncologists, who are not always available, for routine examinations and procedures. This slows and obstructs patient flow. Radiographers and Radiation Therapists can, and already do in some cases, 'fill the gaps' in the workforce.
- It was also felt that increased clinical roles and responsibility would increase Radiographers' and Radiation Therapists' consciousness of their 'duty of care' to patients. This could potentially improve the patients' satisfaction with their care. There is a need to increase public awareness of the potential improvements in care that could result from advanced practice.
- There needs to be 'peer recognition' of advanced practice, as well as 'greater public awareness'. The potential for advanced practice roles in the medical radiation professions to improve service delivery and quality of care should be strongly promoted by the profession.
- The overall efficiency and the rate of transit of patients through the system could be improved and the 'productivity of the workforce' increased by implementing advanced practice. There may also be substantial reduction in the cost of service delivery through the delegation of clinical roles by Radiologists to Radiographers and Oncologists to Radiation Therapists. This may be a 'cheaper alternative' to the current model, with its traditional, restrictive role boundaries. There may also be a 'financial saving' for patients if the service provided is delegated at a 'cheaper rate'. The current Medicare legislation is a significant impediment, however.

- The question was also raised as to whether in developing their advanced practice knowledge and skills Radiographers and Radiation Therapists would lose contact with their patients. The profession needs to recognise this risk so that Advanced Practitioners do not become 'educated beyond their true value' of addressing patient needs.

Concept 3: Education and Training

- Although experience was considered a key expectation of Advanced Practitioners, it was also strongly agreed that education must underpin advanced practice. All advanced practice courses and programmes must be credible and benchmarked to the same national standard. The standard should be set at Masters level, no matter whether the education is part of an 'in-house' programme, a formal university award programme or delivered by a non-university education provider.
- Education, like clinical practice guidelines and accreditation criteria, should be flexible and transferable. Courses and programmes should be mutually recognised and accredited across universities, with some informants arguing that particular universities should specialise in education for particular advanced practice roles, to prevent unnecessary duplication and concentrate academic expertise. The university academics also perceived a need to collaborate to offer courses that are both complementary and supplementary to each others' programmes.
- It was also commonly argued that courses should be widely accessible, with on-line, distance education being the preferred mode of delivery. This was considered important to meet the needs of rural and remote practitioners.
- All advanced practice study programmes would require a substantial clinical component that must be supported by the candidate's employer, including the provision of a suitable mentor or supervisor. This was considered particularly important in ensuring clinical relevance and addressing unique local needs. Some informants argued the need to develop 'workplace modules' that could be integrated into university courses. Education should be patient-focused.
- While flexibility was seen as desirable, so was structure. Programme structure should be aligned with clinical career pathways and the advanced practice accreditation requirements. Courses and programmes should be strongly clinically-

focused and competency-based, with clearly defined expectations and outcomes that are oriented to the needs of the profession and the workforce. There should also be flexible entry and exit points to accommodate varying needs, depending on the nature of the advanced practice role.

- There was general agreement that the universities were well placed to offer articulated programmes from graduate certificate through to professional doctorate, depending on the candidates past academic history and particular needs. Some universities already offer postgraduate programmes that are oriented towards advanced practice. Seven universities currently offer postgraduate ultrasound education and four offer image interpretation courses. Monash University has recently developed postgraduate courses titled '*Advanced practice in breast localisation and simulation*' and '*Radiation Therapist treatment review*', in collaboration with the Peter McCallum Cancer Centre and the North Coast Cancer Institute respectively.
- A disconnect between the tertiary education sector and the health service sector was evident. There were strong opinions expressed about the maintenance of standards of course delivery and content. Some informants criticised the currency and relevance of some university-based postgraduate programmes that are currently offered. Greater clinical relevance and quality improvement are needed.
- While the involvement of the universities was considered essential to set an appropriate standard, alternative education pathways should be available via education providers other than universities. However, there was also a perception that this may risk the credibility of advanced practice unless there was a common standard and quality assurance process.
- Particular reference was made to evidence-based practice, clinical decision making and research methods as part of advanced practice education.
- Finally, Advanced Practitioners should be expected to assume a teaching role.

Concept 4: Workforce and Employment

- Industrial and award issues were raised and there was a generalised lack of clarity about how advanced practice roles might be integrated with current roles and

employment conditions. Ideally, advanced practice accreditation guidelines should be reflected in position descriptions and job selection criteria.

- It was generally agreed that there was a need to have Radiographers and Radiation Therapists working in Advanced Practitioner positions before those positions were likely to become formally established. Remuneration for Advanced Practitioner roles may come later but it was not considered of great importance in the early stages of development.
- It was suggested that business cases, including a detailed explanation of the 'need for change', should be put forward to establish advanced practice positions within a health service. Business cases should be supported by evidence. There was common perception that implementing advanced practice roles would 'increase productivity', produce cost savings and improve the service quality and patient care.
- Advanced practice was strongly regarded as a means of improving staff retention, by giving recent graduates and early career practitioners something to aspire to. It was widely considered that providing opportunities for 'professional advancement' would help prevent leakage from the profession. There was also a perceived need to modernise general radiography and to make it a more attractive career path. One informant was adamant that general radiography is 'holding the profession back' because it is perceived as less challenging and less important than other imaging modalities. The practice of general radiography needs to be modernised.
- Informants identified shortages of Radiation Oncologists and Radiologists, as well as Medical Physicists. A high turnover of oncology nurses was also mentioned. It was recognised that the workforce demographics are changing and that the current health care system is in a poor state, and that these are the major drivers for health workforce reform. Most seemed aware of recent literature on this topic, particularly that on the development of advanced practice roles in the UK.
- Radiologists and Oncologists have many demands on their time and are not always present or available when examinations and procedures are being performed. This delays service delivery and blocks patient flow through the system. Advanced Practitioners would take some of the excess workload of Radiologists and Oncologists, freeing them for other, higher duties, such as performing complex interventional work. It is 'a matter of teamwork'.

- It was commented that only in the diagnostic medical specialties of radiology and pathology is the specialist expected to examine 'every patient', meaning such a large number of patients and wide range of conditions. In radiology there is an unrealistic expectation that all patients' images will be seen by the Radiologist, even if the patient's condition is of minor severity. Some of this work could be redistributed to experienced, postgraduate qualified Radiographers.
- Some informants claimed that advanced practice roles already exist in some sites. For example, Radiographers are already inserting PICC lines in some hospitals. The Breast Cancer Institute is supporting research into advanced practice roles at Westmead Hospital and research into first reporting of mammograms by Radiographers is taking place at Hunter Breast Screen in Newcastle. The Peter McCallum Cancer Centre is running trials of advanced practice roles for Radiation Therapists, in collaboration with Monash University.
- Others claimed that the process of change requires the formalisation of existing roles. At regional radiation oncology centres in Victoria and New South Wales Radiation Therapists already perform extended roles, out of necessity because of a shortage of Oncologists. They perform these roles with remote supervision from major metropolitan centres.
- The most commonly cited example of current extended practice was Sonographers' preliminary reports, which should be formalised. It was suggested that similar methods of utilising the Radiographers' opinion in the system could be implemented in general radiography and CT. A large number of respondents referred to Radiographers' frontline role in Emergency Department image interpretation and saw this as a logical and beneficial area of advanced practice.
- It was widely acknowledged that practice boundaries change with time and in the medical radiation professions changes in technology are a major influence. There has been massive technological change in recent years but workforce structure has not kept pace in terms of the realignment of roles and responsibilities.

Concept 5: Collaboration and Consultation

- While there was widespread support for the establishment of advanced practice roles, there was skepticism about what might be achieved in the face of expected

opposition from the RANZCR. Further development of the advanced practice model in the medical radiation professions will require extensive consultation with all stakeholders. Primary amongst these is the RANZCR, particularly in order to ensure that Advanced Practitioners can be mentored through their training.

- Several participants cited instances where Radiation Oncologists were actively supporting the development of advanced practice roles for Radiation Therapists.
- Some informants considered that other medical specialists who they work closely with would be supportive of advanced practice role development because they appreciate and value Radiographers' and Radiation Therapists' involvement in the health care team.
- External funding has already been received to support collaborations between universities and service providers on projects involving the development of advanced practice roles and models. There was a perception that further consultation, collaboration and teamwork would bring about more successful grant applications and projects. The need for close collaboration between the universities and clinical institutions was repeatedly emphasised.
- It was perceived as essential for the profession to respond positively to government policy and work with State and Federal governments to achieve optimum outcomes.
- It was felt that there was need for universities to enter into partnerships with each other in the provision of programmes and courses in order to maintain enrolments beyond the 'critical mass for economic viability'. One informant suggested the need for a common template for programme and course development, allowing for easier cross-accreditation of courses between universities.
- There was a common understanding that because clinical education would be an essential component of advanced practice programmes, universities need to work closely with employers.
- While the universities possess expertise in course development and delivery, they do not necessarily possess the expertise in current clinical practice in medical imaging and radiation therapy. Hence there is a need for the universities to access clinical expertise by collaborating with clinical institutions in order to develop and deliver high quality advanced practice course content.

- Although opinion was divided about whether or not education providers other than universities should be encouraged to provide advanced practice education, it was generally agreed that this should be considered. While some of the university academics were skeptical of this idea, others conceded the need for some parallel, smaller scale education opportunities. Such courses, however, should be subject to the same accreditation and quality assurance processes as university-based programmes in order to ensure their credibility. They may also be valuable as continuing education opportunities.

Concept 6: Research and Evidence

- The development of advanced practice must be supported by evidence that the change is both appropriate and effective. It should also lead to demonstrable outcomes that address identified 'service gaps' and the 'need' for change. Outcome measures were expressed in such variables as increased productivity, better quality of care, better utilisation of knowledge and skills, better health outcomes for patients and cost effectiveness.
- It was considered important that, once established advanced practice roles are 'researched' with a view to investigating the above outcomes. Some research is currently being undertaken into advanced practice roles in radiation oncology and breast imaging, some of which has been externally funded. Advanced practice was perceived as a very large field of research for the profession in the future and there is potential for further funding to be sought. One informant commented that the results of the research must be published in 'reputable journals' to ensure its credibility and wide dissemination.
- Not only must advanced practice be evidence-based but Advanced Practitioners must have a good understanding of research. Therefore, research methods and techniques should be an essential part of Advanced Practitioner education programmes. Ensuring that Advanced Practitioners have a clinical research role will increase their effectiveness and awareness of current best practice in their field of expertise. It would also increase their awareness of their accountability for their practice and help to inform the development of evidence-based clinical guidelines and protocols.

- It would benefit service delivery if Advanced Practitioners were equipped with the knowledge and skills to perform research and supervise the research of others, as well as carrying out quality improvement projects and cost-benefit analyses. It was generally advised that Advanced Practitioners should be required to evaluate and monitor their own performance in extended roles by carrying out regular 'clinical audits'. Their performance should be measured against the same standard as that expected of Radiologists and Oncologists.

Concept 7: Blockers and Limitations

- Definition of advanced practice and delineation of boundaries: Until there is an understanding of the scope and boundaries of advanced practice it is not possible to respond to the needs of the profession and community. There is a need for further consultation to develop practice guidelines and protocols.
- Apathy: There was a perception that opposition to the development of advanced practice will come from within the profession. Some Radiographers and Radiation Therapists will not want to perform advanced practice roles and they should not be coerced into doing so. There will be relatively few Advanced Practitioners needed.
- Lack of confidence: Some Radiographers and Radiation Therapists may feel that they do not have enough knowledge to pursue an advanced practice role. Others may simply lack confidence in their ability and find extended roles threatening.
- Risk of litigation: The additional responsibility and accountability of advanced practice roles, together with a perceived increase risk of clinical error, may deter some Radiographers and Radiation Therapist from pursuing advanced practice roles. This was placed in the context that there is a need for clear clinical guidelines and delineation of role boundaries.
- Medicare legislation: Changes are needed in the Medical Benefits Schedule (MBS) to accommodate the delegation of tasks from one health professional to another. The professional supervision clauses in the MBS relating to the provision of some diagnostic imaging services [67] are also unhelpful in the development of new models of care. They specifically limit the provision of some services, such as specific ultrasound examinations, to times when a Radiologist is available. This is already impractical and an impediment to service access. It would effectively

prevent patients accessing medical imaging services delivered by an Advanced Practitioner.

- **Industrial issues:** Many participants struggled with the relationship between the industrial award structure and defining a formula for advanced practice accreditation. There was a perceived need to align the career framework of advanced practice to industrial awards.
- **Medical dominance:** Although it was not often raised, some participants held strong views that advanced practice would not be possible because the RANZCR would simply not allow it. It was commented that 'turf' or interprofessional boundary issues were one of the greatest obstacles. Some recounted instances when they had been directed by Radiologists *not* to comment on abnormalities they see on images because it is 'not their job'. It was widely recognised that the approval of Radiologists and Oncologists was essential for the purpose of mentoring and supervision of Advanced Practitioner trainees.
- **Small numbers:** It is predicted that the future population of advanced practice Radiographers and Radiation Therapists will be a small proportion of the medical radiation workforce, as these will be specialised roles. Small numbers may limit the viability of postgraduate education programmes as universities compete for a limited population of potential students. Hence, future courses should include cross-university accreditation and collaboration rather than competitiveness.
- **Relations between the health and tertiary education sectors:** This relationship is generally weak and largely dependent on 'good will'. It must be strengthened, with a view to the sharing of resources across the health and education sectors, specifically related to mentoring and supervision of students, including at postgraduate level, to the benefit of both sectors.
- **Unresponsiveness of university administration:** Universities may be reluctant to entertain innovative models of postgraduate education in a climate of international economic uncertainty. Characteristically, the administration of universities is conservative and they may refrain at this time from entering into agreements with other universities or organisations in the health sector.
- **Funding of postgraduate programmes:** Australian universities are chronically under-funded and under-resourced. Many universities are struggling to meet their current expectations, let alone the expectation of providing clinical relevant

advanced practice education. The development and delivery of new postgraduate programmes will require considerable, specialised human resources.

- **Timeliness of course approval:** It was estimated to take up to two years for a new course proposal to negotiate the internal university approval pathways before the course can be offered. During this period there is no income stream and the universities must absorb the substantial costs involved in the allocation of academic staff time to course development.
- **Challenges from other health professions:** The development of extended clinical competencies for Radiographers and Radiation Therapists may be perceived by health professionals, other than the Radiologists and Oncologists, as impinging on their 'professional turf'. There was a perceived need for constructive consultation, with a view to gaining the support of other health professions for new models of health care.

Summary

It is evident that the above qualitative analysis is saturated with recurring themes. In fact, a number of themes were found to be represented in more than one of the emergent, parallel key concepts described above, thus binding the concepts to each other horizontally, as in a matrix. These common, horizontal themes were as follows: rigour and credibility; standardisation; consultation; need and relevance; flexibility; quality and safety; and accountability.

Not surprisingly, those who made submissions or participated in discussions and focus groups overwhelmingly supported the concept of advanced practice. Their interpretation of what constitutes advanced practice in the medical radiation professions varied, however. Most believed that it was related to their clinical role, with better service quality and patient care strongly portrayed as the principle foci, mainly through filling service gaps. Others claimed that their managerial or technical duties, for example, also constituted advanced practice. Nevertheless, there was wide agreement that the meaning of advanced practice needs clearer definition and that a framework is required that provides both structure and flexibility. Taking into account local relevance, national practice standards must be

developed in order to provide rigour and credibility to current and future advanced practice roles.

Similarly rigorous criteria are necessary in the accreditation of postgraduate education programmes. For Advanced Practitioners to have credibility their practice must be underpinned by high quality education, developed cooperatively and with consultation between universities and clinical institutions. It was perceived, however, that there are several of obstacles to be overcome for the universities to offer relevant programmes, including issues of resources and funding and the projected limited pool of potential students. It was generally agreed that programmes must have a substantial, supervised clinical component and should be both clinically-relevant and competency-based. It was believed that universities should collaborate to develop distance education programmes that are cross-accredited, with awards transferable between universities and with the AIR playing a lead role in course accreditation. Programmes should articulate to Masters and Professional Doctorate level, with earlier exit points that meet the practical needs of the candidates. However, the quality standard should be set at Masters level, with courses including research methods and evidence-based practice, so that Advanced Practitioners would have a sound knowledge of research, which they would apply in establishing need and evaluating the outcomes of new models of clinical practice.

It was considered that advanced practice roles should be supported by evidence and a wide range of benefits was suggested, such as increased productivity and efficiency and improved quality and safety of care. At the same time, informants also believed that a number of challenges must be overcome before implementation will be possible. Amongst these was the issue of Advanced Practitioners being held legally accountable and responsible for their practice. This was usually portrayed as a risk but some informants saw it as a benefit, arguing that the increased accountability would lead to Radiographers and Radiation Therapists rising to the challenge. It would thus have a positive effect on patient care and service quality.

It was commonly felt that modernising the workforce to meet current and future demands would allow better use of human resources, including by better utilising Radiologists' and Oncologists' time, and so improve the standard of care. The Radiologists and Oncologists were identified both as potential supporters and opponents in the development of advanced practice roles for Radiographers and

Radiation Therapists. There is apparently a need to improve interprofessional communication teamwork and it was seen as a major challenge to achieve interprofessional agreement around advanced practice. Although there was lack clarity about how workforce reform might be implemented, the benefits of restructuring the workforce and redistributing the workload were strongly argued. One of the major potential benefits was the creation of a clinically-oriented career path for younger members of profession, providing new challenges and opportunities for advancement.

THE MODEL & IMPLEMENTATION STRATEGIES

Defining the Role of Advanced Practitioners

The APWG interpreted the term 'advanced practice' to mean circumstances in which a Diagnostic Radiographer or Radiation Therapist performs a clinical practice, duty or task on a regular basis that is beyond the established core practice boundaries of their profession. In doing so the Advanced Practitioner functions at a higher level than would be typically expected, demonstrating clinical leadership and a high level of knowledge, skills, ability and personal attributes, as well as professional autonomy and responsibility. These are applied to a specific, delegated clinical role in order to provide optimum service quality and patient care.

Advanced practice roles must be approved by the Advanced Practitioner's employer as meeting a local service need and have the support of other members of the health care team. Both the employer and the Advanced Practitioner must be aware of the scope of practice guidelines and standards (once developed) and of the associated training costs, increased regulation and risk of litigation. Advanced Practitioner Radiographers and Radiation Therapists must be conscious that they are legally accountable for their actions and for any consequence of their practice resulting from an act that may be deemed negligent.

Advanced Practitioners will display the following attributes and characteristics:

- The capacity to operate at the forefront of professional practice;
- Advanced knowledge, experience, skills and sound judgment in clinical management and patient care;
- The ability to evaluate and critically analyse their own clinical practice and that of others, leading to research that will contribute to the evidence-base of the profession;
- Through interprofessional collaboration, quality improvement processes and other mechanisms, they will improve patient care methods and pathways;
- Willingness to progress their own professionalism and that of others through research, education and clinical audit;

- Engagement in a programme of competency maintenance and continuing professional development to accommodate further evolution of their role;
- Involvement in the dissemination of best-practice methods and research outcomes in state, national and international forums;
- The ability to exercise clinical autonomy and decision-making within the bounds of their practice limitations; and
- High level communication skills enabling them to work across professional boundaries and within the multidisciplinary team environment.

The Scope of Advanced Practice

It is proposed that Advanced Practitioners in the medical radiation professions occupy the positions titled 'Clinical Specialist' in their field of expertise. Listed in Table 4 below are the advanced practice roles in medical imaging and radiation therapy that the APWG advises are appropriate for future development. Detailed descriptions of tasks and competencies that could potentially fall under each role are given below.

Table 4: List of the proposed advanced practice (AP) roles for Australian medical imaging and radiation therapy 'Clinical Specialists'.

Medical Imaging AP Roles	Radiation Therapy AP Roles
Accident and Emergency Imaging	Image Guide and Adaptive Radiotherapy
Fluoroscopic and Interventional Imaging	Breast Radiotherapy
Ultrasound Imaging	Paediatric Radiotherapy
Breast Imaging	Palliative Radiotherapy
Computed Tomography (CT)	Radiotherapy Treatment Review
Magnetic Resonance Imaging (MRI)	Integrated Cancer Care

The Clinical Specialist, advanced practice roles that are described below are based on current scope of practice, advice from members of the profession, examination of the literature, and predictions of future needs. Also taken into account were such variables as technological change, anticipated growth in service demand, government priorities and the access requirements of the patient population.

Examples are given below of the expectations in terms of tasks and duties that may be performed under each Clinical Specialist role, although these are not intended to be either prescriptive or exclusive, and may vary in accordance with local needs. Tasks and competencies included are also dependent on future negotiations of role boundaries with neighbouring professions and other stakeholders.

Medical Imaging Clinical Specialists

Clinical Specialist in Accident and Emergency Imaging

- Triage of the medical imaging pathway for particular categories of patient presenting to the Emergency Department. Triage categories may vary depending on local need.
- Close consultation with Emergency Physicians and Critical Care Nurses in the management of patients undergoing medical imaging examinations in acute care. Note that clinical supervision and mentoring of this role may be carried out by either an Emergency Physician or a Radiologist.
- Highly knowledgeable and skilled in general radiography and trauma CT scanning. Note that in rural and remote locations, if there is no CT facility this role may still be developed and established around the skill-set of the local radiography workforce. For example, in some locations, although CT is not available, a sole Radiographer may possess high level general radiography knowledge and skills and provide valuable input into the patient care pathway beyond their core role, such as advising local GPs on patient discharge, transfer and retrieval. Rural radiographers already commonly perform this role. Remote supervision of the Advanced Practitioner in this role may be necessary where no Radiologist or Emergency Physician is located on site.
- Directly discharging patients from the Emergency Department in a defined range of patient presentations and conditions. For example, this may include patients who present with minor sporting injuries but have no radiological abnormality. It may extend to include immobilisation of minor, undisplaced fractures and soft tissue injuries and referral to the fracture clinic, where necessary. This role would help to free Emergency Department medical and nursing staff by reducing the need for patients to return to Emergency after radiographic examinations. It would

involve close consultation with Emergency Department Clinical Nurse Specialists and/or Physiotherapists.

- Frontline reporting of appendicular and axial skeleton plain radiography images in trauma to the Emergency Department medical and senior nursing staff. Radiographers have the advantage of having seen the patient at the time of the examination, which improves the accuracy of their reports. This 'hot reporting' may take a number of forms but should occur as close to the temporal point of care as possible, ideally while the patient is still in the Emergency Department. This form of frontline reporting may include, for example, the Radiographers' opinions entered into the PACS or RIS and other forms of direct Radiographer opinion giving. Where images are reported by a Radiologist at some later stage, the Radiographers' frontline opinion would be available to the Radiologist.
- This role may also extend to include the reporting of fracture clinic, progress radiography examinations or other outpatient cases, depending on local need. Fracture clinic reporting is often considered a low priority because an Orthopaedic Surgeon will have already viewed the images. However, it would serve as a means of developing, maintaining and improving the Radiographers' frontline trauma reporting accuracy.
- Education and training of other Radiographers in flagging radiological abnormalities on Emergency Department plain radiographs would also be an expectation of this role. It should be assumed that 'red dotting' will be a future core role of Radiographers working in the acute care setting. In time, this advanced practice role may evolve to include the training of other members of the health care team in image interpretation.

Clinical Specialist in Fluoroscopic and Interventional Imaging

- Performing gastro-intestinal fluoroscopic procedures such as barium enemas, meals and swallows. While the Advanced Practitioner is in training these examinations may be performed under the supervision of a Radiologist but Clinical Specialists in this field would be expected to eventually perform these examinations without direct supervision.
- Overseeing the delivery of services in an angiographic suite. This would involve working as part of a multidisciplinary team to provide diagnostic and interventional angiographic services. It would include a range duties, such as

performing fluoroscopy and radiography, preliminary interpretation of images to feed into the Radiologist's/Cardiologist's report, training of other staff, performing research, evaluations and clinical audits and so forth.

- Interventional procedures involving the use of fluoroscopy or plain radiography or both. These procedures would normally include PICC line insertion, the insertion of feeding tubes and NG tubes, depending on local need. Radiographers are already performing these procedures in some Australian hospitals. The role may extend to the insertion of Vascaths and other central lines, as a natural progression from PICC line insertion. Close collaboration with the patients' treatment team is an essential element of this role.
- Performing image guided injections into joints for diagnosis or pain management. Again, some Radiographers are already performing facet joint injections and arthrography using conventional and CT fluoroscopy.
- They would be highly skilled in intravenous cannulation and contrast media administration. They would be knowledgeable about complications and side-effects and would be able to initiate treatment when necessary.
- This role may extend to performing uncomplicated percutaneous biopsies and drainage under image guidance. It may also be appropriate under local circumstances to link this role to that of operating theatre (mobile) imaging.
- Providing a Radiographer's opinion or preliminary report to a Radiologist on examinations performed by the Advanced Practitioner. This is predicated on the evidence that 80% of false negative radiology reports are the result of not seeing the abnormality rather than not knowing the correct diagnosis [68]. It is recommended that a contingency pathway should also exist where the life or well-being of the patient may be at risk but a Radiologist is not available to report on the case or the Radiologist's report is delayed beyond a reasonable time frame. In such cases the Radiographer's opinion should be conveyed directly to the patient's Physician. In this instance, the preliminary report would be accompanied by a statement to the effect that 'this is the opinion of the Radiographer who performed the examination/procedure' and that 'if requested, a Radiologist's report will be provided as soon as possible'.
- In time, and again depending on local conditions, Advanced Practitioners in this Clinical Specialist role may be expected to report on their own examinations.

Clinical Specialist in Ultrasound Imaging

- This Clinical Specialist role is less sharply defined than others, as generally Sonographers are already required to have a Postgraduate Diploma, Masters Degree or Professional Diploma in ultrasound. It should not be assumed, however, that on this basis all Sonographers are automatically Advanced Practitioners. Some Senior Sonographers have more clinical knowledge, skills and responsibility than other less experienced Sonographers.
- There is a sound argument for formalising the current reporting role of Sonographers, who already produce an informal written report to the Radiologist and on occasions the patient's doctor. These Sonographer reports are also included in the patients' records in some cases. This role could be formalised by permitting suitably credentialed Sonographers to report on a limited range of examination types. Examples of the examination types that could be reported by Sonographers include, for example upper abdominal studies and routine obstetric date and morphology scans, depending on local need, capacity and competency.
- The Clinical Specialists may develop particular areas of knowledge and skill in, for example, vascular sonography or female and maternal sonography.
- Performing percutaneous biopsies and fine needle aspirations under ultrasound guidance. Note that this may overlap with the role of the Clinical Specialist in Fluoroscopic and Interventional Imaging on the one hand, and the Clinical Specialist in Breast Imaging on the other. However, the Clinical Specialist Sonographer's role may extend to ultrasound guided biopsy and aspiration of other lesions, for example, cyst or haematoma drainage.
- The establishment of Clinical Specialist Sonographer led services attached to Emergency Departments, GP Super Clinics, GP Plus Centres and the recently proposed 'Comprehensive Primary Health Care Centres and Services' [39], as well as mobile services. This has the potential to improve patient access, especially in regional and rural areas. The current Medicare legislation, however, discourages the development of such services by requiring supervision by a Radiologist.

Clinical Specialist in Breast Imaging

- Some Mammographers are already performing advanced practice roles, particularly in the BreastScreen programme.

- First reporting of double-reported screening mammograms should be undertaken by Clinical Specialist Mammographers. They could be readily trained to provide a preliminary report to a Radiologist, who would be the second reader. The Mammographers have the benefit of having spoken to and physically examined the patient as part of their core role. Research is already underway into this extended role, which would reduce the current expectation that two Radiologists to view all cases, although this may still be necessary in complex cases or where the findings are equivocal.
- Extending their role to first reporting would be a logical step for some Mammographers. It would help to address recruitment and retention in this field, which is a chronic problem.
- Core biopsy, fine needle aspiration and tumour localisation could be undertaken by Clinical Specialist Mammographers in this role. Again, this would reduce the demands on Radiologists and improve patient access to such services.
- Clinical Specialist Mammographers would be expected to be competent in both mammography and breast ultrasound.
- Given their close association with breast cancer patients at the time of diagnosis, it would be appropriate if Clinical Specialist Mammographers were trained in counseling. Mammographers should be able to develop this as an extension of their core role, working closely with the Breast Nurse Specialists in this field.

Clinical Specialists in CT or MRI

- In some ways, CT has become a generalist competency of Radiographers. However, relatively few have the attributes that would be expected of a Clinical Specialist in this field. Given its comparatively limited availability, MRI is more of a specialist imaging modality. Though improbable, it should be possible for a Radiographer to acquire Advanced Practitioner accreditation in both CT and MRI.
- A Clinical Specialist in either modality would be expected to triage patients and examination requirements, design and modify examination protocols and techniques, and perform or oversee examinations in complex cases.
- They would be highly-skilled in multi-planar and 3D imaging techniques.

- These Radiographers would be expected to be skilled in intravenous cannulation and in the administration of contrast media, as well as in initiating treatment in the case of an allergic reaction. They would also be able to manage soft tissue extravasation of contrast according to prescribed guidelines.
- In MRI they would assess patients with suspected orbital or other foreign bodies or surgical implants.
- They would produce a Radiographer's opinion or preliminary report on a specified range of examinations types, depending on local requirements. This preliminary report would be provided to the Radiologist who is to report on the examination. However, as recommended in relation to preliminary reporting in the Clinical Specialist role in fluoroscopic and interventional imaging, a contingency pathway should exist if the life or well-being of the patient is at risk and a Radiologist's report is unavailable or delayed.
- CT Clinical Specialist Radiographers may also be trained to perform minimally interventional procedures, such as biopsies and facet joint injections. This overlaps with the role of the Clinical Specialist in Fluoroscopic and Interventional Imaging.
- The CT Clinical Specialist may also perform CT colonoscopy and may eventually be trained to report on these examinations, depending on local need.

Radiation Therapy Clinical Specialists

Clinical Specialist in Image Guided (IGRT) and Adaptive Radiotherapy (ART)

- At some sites Radiation Therapists have already taken a lead role in the management of on-line imaging verification and decision making in 2D Megavoltage radiotherapy portal imaging.
- The Clinical Specialist in IGRT & ART will take a lead role in the management of all on-line imaging verification and decision making related to their particular area of expertise. For example, some may specialise in particular regions, such as prostate, while others may develop expertise in multiple treatment types, depending on local need.
- They will monitor and analyse 2D and 3D image data in relation to treatment decision pathways and the establishment of action thresholds, as well as developing new protocols and guidelines.

- They would have high level skills and knowledge relating to anatomy, image interpretation and image manipulation and would oversee the planning and delivery of radiotherapy treatments, in consultation with the Oncologists.
- Using their superior knowledge of CT cross-sectional anatomy, in this role the Clinical Specialist in IGRT & ART will be responsible for target volume delineation.
- They will be responsible for internal stabilisation of anatomical structures and the monitoring of daily volume variations using these techniques.
- They will be responsive to technological advances and new software applications in this field.

Clinical Specialist in Breast Radiotherapy

- Some Radiation Therapists have already expanded their role into breast mark-up. In many cases this occurs with 'on-the-job' training but no formal postgraduate education is currently required.
- This Clinical Specialist Radiation Therapist will manage the breast cancer patient's pre-treatment pathway from decision to treat to dosimetry sign off. Normally, this would include the following: patient counseling, evaluation of wounds, arm mobility assessment, point of care referral, clinical trial eligibility, target volume delineation, identification of regions of particular dosimetric significance, confirmation of simulation and treatment portals, and definition of the prescribed target volume.
- These duties and tasks will be performed in consultation with the Radiation Oncologist. The Radiation Therapist specialising in breast treatment will act as the communication conduit between the Radiation Oncologist, radiotherapy planning and treatment teams and the patient.
- The Clinical Specialist would have high level skills and knowledge in relation to all aspects of breast cancer treatment.

Clinical Specialist in Paediatric Radiotherapy

- Radiation Therapists' already take a lead role in the management of paediatric cases in some radiation oncology departments. They are a familiar face for the child, leading them through their radiation therapy journey, which is a frightening experience for children. This has led to better patient and family cooperation.

- The Clinical Specialist in Paediatric Radiotherapy will be a key member of the multidisciplinary treatment team, with high level skills and knowledge relating to the paediatric cancer patients, disease pathways and available treatment options, particularly chemo-radiation regimes.
- The Radiation Therapist will manage the patient's pre-treatment pathway from decision to treat to completion of the radiotherapy treatment, providing support and advice to the family and carers as needed. This would normally include gaining the trust and confidence of the patient and their family, health care advocacy and counseling, identification and resolution of issues that may impact on treatment, and general oversight of the patient's treatment pathway.

Clinical Specialist in Palliative Radiotherapy

- In a similar way to the Clinical Specialists in Breast and Paediatric Radiotherapy, this Radiation Therapist will take a lead role of the delivery of radiotherapy to palliative care patients.
- In consultation with the patient's Oncologist and Palliative Care Specialist, as well as other members of the multidisciplinary team, they would direct the patient's pre-treatment pathway from decision to treat to completion of the radiotherapy treatment.
- This would generally include monitoring the patient's general health status while undergoing treatment, pain management and mobility, their quality of life and psychosocial needs. It would also include establishing their priority level, evaluation of previous treatment, treatment simulation, definition of the treatment site, dose prescription, monitoring reactions and side effects, and discharge planning.
- They would have high level skills and knowledge of the palliative care of cancer patients, disease pathways and available treatment options.

Clinical Specialist in Radiotherapy Treatment Review

- Currently formal treatment review is undertaken by Oncologists, when they are available. However, as a matter of routine, Radiation Therapists conduct an informal assessment of patients undergoing radiation therapy while positioning them and delivering the treatment. In some radiotherapy centres in Australia this extended role has been already been formalised.

- The Clinical Specialist in Treatment Review would assume a formal role in, for example, the assessment of mobility, skin reaction, pain control, bowel and bladder control, cognitive state and general health status in the treatment of a wide variety of common cancers.
- Their role would also involve reviewing patient records, interviewing patients and their carers, identifying and recording matters of concern and resolving those that require attention, within established protocols and guidelines.
- They would possess high level skills and knowledge of patient review procedures and protocols and where necessary refer patients requiring medical or other interventions to the Radiation Oncologist, Oncology Nurse or other members of the multidisciplinary team.
- It may be appropriate that this Clinical Specialist Radiation Therapist is permitted to prescribe a limited range of medications, specifically to manage the side-effects of radiotherapy treatment.

Clinical Specialist in Integrated Cancer Care

- Ensuring a seamless cancer treatment journey for the patient is vital to ensure compliance, optimise outcomes and increase patient satisfaction with care. The support of patients undergoing radiotherapy is an area of practice that radiation therapists already perform to a large extent.
- The Clinical Specialist in this role will be responsible for coordinating treatment of patients suffering from common types of cancer, depending on local need.
- They will possess a sound knowledge of the various stages in the treatment pathway, including initial diagnosis, staging and workup, identification of social barriers to treatment, adjuvant therapies, liaison with relevant medical specialists, access to allied health support, knowledge of available radiotherapy treatments, post treatment follow-up and the continuum of care.
- While some may argue that this is the role of Oncology Nurses, Radiation Therapists are well placed to assume such duties and tasks given their knowledge and understanding of current treatment protocols, including and chemo-radiation regimes and side-effects.
- This Clinical Specialist Radiation Therapist would have a broad range of knowledge and skills and would be a key member of the multidisciplinary treatment team.

The Pathway to Advanced Practice

The model proposed in this discussion paper is intended for professional accreditation and continuing professional development, which is within the AIR's ambit. How the model will align with the diverse State and Territory industrial awards and local employment conditions must be negotiated as part of future consultations. When a Radiographer or Radiation Therapist attains professional accreditation at Advanced Practitioner level, they should expect to be remunerated according to their professional status within the relevant industrial award. Positions would be at least at 'Senior' level. It would be advisable if in the longer term Advanced Practitioner positions were formally established as part of the workforce and industrial award structure. The position descriptions and employment conditions should reflect the profession's expectations and accreditation requirements. This may not happen spontaneously and, as a first step, the profession should ensure that Advanced Practitioner status is covered under the national registration and accreditation scheme. The positive benefits of such a stance would include national uniformity of practice standards and a strong incentive for younger practitioners to remain in the medical radiation workforce.

The APWG advocates a flexible model of professional accreditation at Advanced Practitioner (AP) level. This would involve the completion of formal university-based programmes, workplace-based, advanced practice clinical modules and modules delivered by the AIR or by an external education provider. All Advanced Practitioner education programmes, whether university-based or otherwise, will be accredited by the AIR as appropriate to develop knowledge, skills and attributes commensurate with advanced practice in medical imaging or radiation therapy.

The pathway to Advanced Practitioner accreditation is represented diagrammatically in Figure 2, below. It is proposed that following completion of their entry level qualification the graduate would enter the workforce and attain AIR accreditation. It is acknowledged by the APWG that the professional development year (PDY) requirements are currently under review [69]. However, the outcome of that review is not expected to impact on Advanced Practitioner accreditation, other than that the PDY is the gateway to professional practice. Advanced Practitioner status would be part of a later, clinically-oriented career pathway that would involve studying for a formal university postgraduate award or completing workplace-based modules or

a combination of both. The programme of Advanced Practitioner study would require clinical preceptorship by a specialist medical practitioner that works closely with the candidate. In most cases this would be a Radiologist or Oncologist, however, it may be a doctor from another medical specialty that is relevant to the candidates field of developing expertise. Through this process of knowledge and skill acquisition it would be expected that the candidate would eventually meet the requirements of eligibility for AIR Advanced Practitioner accreditation.

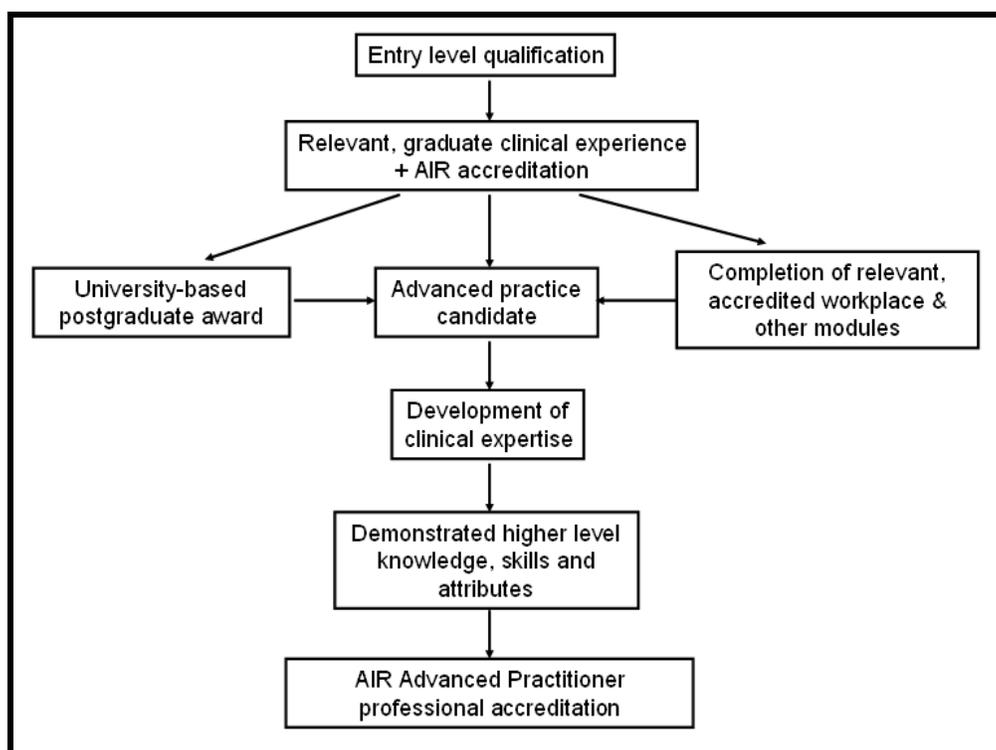


Figure 2: The proposed flexible pathway to professional accreditation at Advanced Practitioner level.

Some university-based postgraduate programmes already exist. However, the risk in advocating entirely university-based programmes as the sole pathway to advance practice is the lack of a component requiring clinical supervision, observation and assessment within the clinical environment. Universities need to develop programmes that are responsive to the needs of the medical radiation profession for high quality, clinically relevant postgraduate education. It is proposed therefore, that universities providing Advanced Practitioner education do so in partnership with clinical service providers and that the university programmes incorporate clinical

modules that are largely workplace-based. It would be expected that these university programmes, including the clinical components, would be delivered at the equivalent of Masters level and may lead to the award of a Graduate Diploma or Masters Degree. A Graduate Certificate would not be sufficient to attain Advanced Practitioner professional accreditation, unless the candidate was able to demonstrate that they had also completed sufficient Masters-equivalent, workplace-based modules in the relevant field, including training in research methods.

The development of workplace-based clinical modules creates the possibility of clinical service providers targeting their own, local workforce needs. It is recommended, however, that clinical modules are developed in collaboration with a university, which subsequently awards academic standing to the modules as earning credit towards a postgraduate award. To ensure credibility of the modules, the university would be expected to enter into an agreement with the clinical institution in relation to the development and delivery of the modules. Where the Advanced Practitioner candidate is enrolled in a postgraduate university programme, this may involve the transfer of a pro-rata proportion of the course income to the clinical institution to offset some of the costs of course delivery and clinical supervision or mentoring. Such agreements should be encouraged and supported by the AIR, particular in allocating seeding grants for advanced practice education initiatives.

The APWG also supports the development and delivery of modules by organisations outside the university and health service sectors. These may include the TAFE sector, private education providers, public or private clinical institutions and professional bodies, including the AIR. In order to be credible in terms of Advanced Practitioner accreditation requirements, these modules should also be eligible to earn credit towards a university award at Graduate Diploma or Masters level. Whether or not work-place modules form part of a university award, they will constitute an important means of earning CPD points for accredited Advanced Practitioners and thus maintaining their professional accreditation.

However unlikely, it is possible that an Advanced Practitioner could gain accreditation by completing an entire programme of clinical or other external modules without enrolling at a university and, therefore, without gaining the academic award to which they would otherwise be eligible. It is much more likely, and more desirable, that candidates will complete a combination of clinical,

workplace-based modules and university-based courses. It is also probable that the vast majority of Advanced Practitioner candidates will complete entirely university-based programmes, which must include a substantial clinical component.

Criteria for Advanced Practitioner Accreditation

Under the proposed model, Radiographers and Radiation Therapists to whom the above definitions and role descriptions apply, and who have earned appropriate educational qualifications, will submit an application to the AIR for professional accreditation as an Advanced Practitioner. On successful application, AIR Members will become *Member of the Institute of Radiography (Advanced Practitioner) - MIR(AP)*. Those who are Fellows will become *Fellow of the Institute of Radiography (Advanced Practitioner) – FIR(AP)*.

In order for an application to be successful the following criteria must be met:

- Completion of an AIR accredited postgraduate education programme relevant to their Advanced Practitioner, Clinical Specialist role, as follows:
 - The programme must include a substantial clinical component.
 - Clinical and external modules must be accredited by a university as contributing to a postgraduate qualification.
 - Clinical modules that are delivered 'in-house', together with external modules from other providers may conceivably form an entire programme of advanced practice education and training. If so a detailed syllabus must be provided by the applicant together with evidence that the modules were successfully completed.
- Support of their employer as meeting local service needs. That support will be manifest in:
 - The provision of a mentor under a clinical supervision model, and/or
 - Evidence of successful completion of workplace-based clinical modules.
- Advanced Practitioners will demonstrate clinical leadership, reflective practice and professional maturity. They will be capable of evidence-based decision making and interprofessional teamwork. They will be accountable for their actions and aware of their medico-legal and professional responsibilities.

They will also be capable of critical evaluation of own practice and identifying gaps in service delivery.

- Advanced Practitioners will actively participate in clinical audits and research.
- They will provide education and professional development opportunities for their clinical colleagues and may also perform undergraduate and postgraduate teaching.
- The Advanced Practitioner will have a clearly defined and articulated scope of practice, including evidenced based clinical guidelines and protocols that aim to ensure safe, high quality patient care.
- In order to maintain their accreditation as an Advanced Practitioner they must accumulate CPD points at a rate of no less than 50 points over a 3 year cycle, with at least 40 of those points relevant to their Clinical Specialist role and no less than 15 points in any one year.

Credentialing & National Registration

As discussed earlier in this report, there is growing evidence of the challenges facing the Australian health care system, particularly the ageing population and workforce and the increasing burden of chronic illness. These factors limit the capacity of the health workforce to safely meet projected demands on the health care system. The long-term challenges are compounded by the variable State registration and licensing regimes throughout Australia, a problem that inflicts the medical radiation workforce, as one of a number of allied health professions that are not registered in all States. Medical radiation practitioners are not registered in NSW or South Australia, where they are licensed to operate irradiating apparatus, which although an important part of the role of Radiographers and Radiation Therapist, does not cover other important aspects of clinical practice.

The 2007 Productivity Commission report on Australia's health workforce [36] suggested that the variation in the regulatory authority of Governments from one jurisdiction to another is a significant factor in inhibiting the efficient and effective deployment of the health care work force. Reform was recommended that would also allow job redesign, incorporating the development of scopes of practice across

the health care professions. The Commission also recommended the establishment of a common National Registration Board for all health professions.

A national approach to registration and accreditation for the health professions was agreed to by the Council of Australia Governments (CoAG) in March 2008, when CoAG signed the *Intergovernmental Agreement (IGA) for National Registration and Accreditation Scheme for the Health Professions* [70,71]. Consequently, the future development of legislation in this arena is underpinned by the following guiding principles:

- Providing for the protection of the public by making sure that health professionals are uniformly suitably trained, qualified and fit to practice in a competent and ethical manner;
- Alleviating health workforce shortages and pressures;
- Increasing the flexibility, responsiveness, sustainability and mobility of the health workforce; and
- Improving the transparency of registration and accreditation processes.

In October 2008 the AIR made a submission to the Australian Health Workforce Principles Committee for inclusion in the National Registration and Accreditation Scheme [72]. The submission argued that applying national regulatory and accreditation process to the medical radiation professions would:

- maintain high standards in operating/handling potentially hazardous ionising radiation equipment and radioactive substances;
- remove impediments for a flexible, nationally mobile medical radiation workforce; and
- position the medical radiation professions to respond to the need for increasing their scope of practice in health service delivery to meet the critical shortage of medical practitioners.

Therefore, the APWG proposes that, in parallel with the move towards national registration, the AIR develops a process of professional accreditation of individual Clinical Specialist, Advanced Practitioners and accreditation of postgraduate advanced practice education programmes. Other professions have already

established specialty scopes of practice using similar mechanisms. For example, through completion of accredited postgraduate programmes, Nurse Practitioners are nationally recognised as Advanced Practitioners by the Australian Nursing and Midwifery Council [73].

On 8th May 2009, in an Australian Health Workforce Ministerial Council communiqué, it was announced that from 1st July 2012 'Medical Radiation Practitioners' will be regulated under the new National Registration and Accreditation Scheme for the Health Professions, together with 12 other professions, 10 of which will be included in the Scheme from 2010. It is further proposed, therefore, that registration of Advanced Practitioners is vested in the yet to be established national registration authority under that scheme. Thus, there would be a specific subcategory of national registration for Advanced Practitioners. This would have the advantage of increasing the credibility and validity of advanced practice roles. It would be expected that the requirement of Advanced Practitioner national registration would be eligibility for AIR professional accreditation at Advanced Practitioner level, thus linking public and professional expectations of the advanced practice roles of medical radiation practitioners.

The Role of Research, Evaluation and Quality Assurance

The importance of research to the development of advanced practice roles cannot be overstated. The sustainability of the roles is dependent on evidence that their implementation is effective in terms of measures of quality of care, health outcomes, patient satisfaction, productivity, cost saving, staff recruitment and retention and other variables. The overarching hypothesis is that the implementation of advanced practice roles will lead to improvement in these measures, or at least no change. This must be tested and comprehensively monitored. There is a need, therefore, for the AIR to establish a research agenda in this field and to encourage research that targets advanced practice in medical imaging and radiation therapy. To this end, it is recommended that the AIR provide competitive seeding grants for pilot projects in advanced practice, with the requirement that funded projects will inform a further, external grant application in the same field.

A remark was made during in one of the consultations with the UK Advanced Practitioners that it was difficult to know what impact their role had because there was no 'before and after' comparison data. This is an important point. At this time there is very little information available about the existing medical radiation workforce, the work they do, or the effect they have in the health care system. Research and evaluation should begin now, prior to the implementation of an advanced practice model in order to determine the impact of future changes.

As indicated elsewhere in this report, knowledge of research methods and participation in research is a core characteristic of advanced practice. However, not all Advanced Practitioners will participate in or lead large-scale, externally funded projects. Nevertheless, research study design must be a core component of their education programmes, so that all Advanced Practitioners are capable of evaluating and monitoring their own clinical performance and that of their team. It will be a fundamental expectation that Advanced Practitioners participate in clinical audits and quality assurance projects related to their own clinical practice.

MOVING FORWARD

Recommendations

Number 1: Accreditation and Registration

It is recommended that the AIR develops a process of professional accreditation of Advanced Practitioner membership and Fellowship, and accreditation of postgraduate advanced practice education programmes. Advanced practice in the medical radiation professions must be nationally standardised and regulated. The APWG, therefore, recommends that while the professional accreditation of individual Clinical Specialist, Advanced Practitioners should be vested in the AIR, the registration of Advanced Practitioners should be through the National Registration and Accreditation Board, as a category of Radiographer and Radiation Therapist registration. It is further recommended that the primary requirement for national registration at Advanced Practitioner level should be eligibility for AIR Advanced Practitioner professional accreditation. The accreditation of postgraduate advanced practice education programmes, whether university-based or otherwise, should also be performed by the AIR, reporting to the national registration board.

Number 2: Interprofessional Practice Advisory Team (IPAT)

The APWG recommends to the Board of Directors that the AIR takes the initiative and engages other key professional organisations in discussions about advanced practice without delay. These discussions should initially centre on establishing the Interprofessional Practice Advisory Team (IPAT) with representation from across the medical radiation professions, as depicted in Figure 3 below.

It is further recommended that the terms of reference of IPAT would include:

- Identifying opportunities to apply new models of advanced practice that:
 - build interprofessional collaboration and teamwork;
 - are in the interest of better patient care; and
 - improve the quality of and access to medical radiation services.

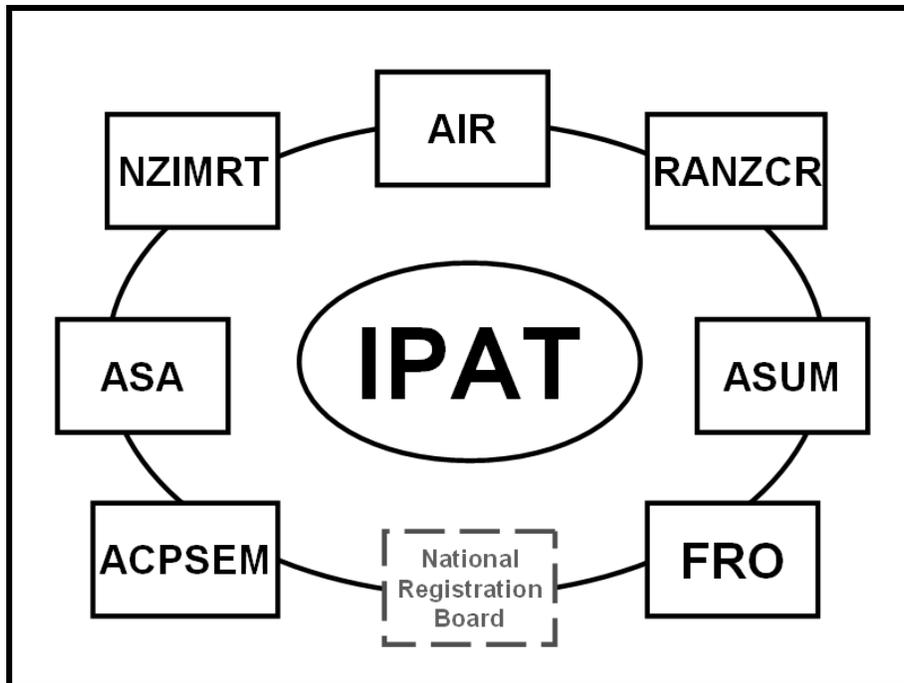


Figure 3: Recommended composition of IPAT. [Note that because the National Registration Board does not currently exist it would not be represented initially.]

- Strategic planning around the concept of advanced clinical practice in Diagnostic Radiography, Sonography, Mammography and Radiation Therapy;
- Creation of a framework for the local development of clinical practice standards, guidelines and protocols for advanced practice roles;
- Considering the professional indemnity issues related to advanced practice;
- Consultation with delegated representatives of the Australian Universities that offer undergraduate medical radiation science programs about the development of clinical relevant advanced practice education programs.

IPAT is a potentially powerful group and there will be high expectations that it responds to the need for change in a timely fashion and achieving outcome within a reasonably short time-frame. There is a significant risk, however, that it could become bogged down in interprofessional rivalry and conflict, and achieve nothing. Therefore, it is also recommended that:

- its coordination and management is contracted to a private, external organisation with specialist knowledge and skills in committee management;

- the chairperson is independent of affiliation with any of the professional bodies or the national registration board;
- it has a limited time-frame in which to meet its terms of reference and that its business is completed by a specified date, agreed when it is established;
- it reports to all of the represented organisations.

Number 3: Advanced Practitioner Advisory Panel (APAP)

It is recommended that, within the AIR organisational structure the Advanced Practitioner Advisory Panel (APAP) is established immediately and on an ongoing basis. The members of this Panel would be expected to have:

- first-hand knowledge and experience, either present or past, of advanced clinical practice in radiation therapy or medical imaging; and/or
- academic responsibility for the development and delivery of a programme of advanced practice education.

The role of APAP will be to:

- advise the Board of Directors on the establishment of a programme of seeding grants over the next 5 years for pilot projects that are aimed at investigating advanced practice roles and developing advanced practice educational programmes and resources;
- establish a research agenda in advanced practice within the profession;
- oversee the allocation of advanced practice scholarships for Members;
- oversee the professional accreditation of Advanced Practitioner Members of the AIR – i.e. MIR(AP) & FIR(AP); and
- advise the Professional Officer for Education and Development on the allocation of Advanced Practitioner CPD point allocations.

Number 4: Meetings with Government

The APWG also recommends that the AIR submits a copy of this report to the Federal Minister for Health and Aging and to senior bureaucrats in the Department

of Health and Ageing. It is further proposed that, subsequent to the submission of the report, the AIR forms a delegation of Members to make personal representation to the Minister about the proposed development of advanced practice roles in radiation therapy and medical imaging. Representation should also be made to senior bureaucrats and policy advisors in the Medical Benefits Division and the Mental Health and Workforce Division of the Department.

It is also recommended that meetings are held with the various State governments, most immediately in those States that are pushing ahead with the introduction of assistant practitioners. Clarification should be sought as to what mechanisms and processes will be put in place to protect patients from inappropriate practice and to assure their rights to high quality medical imaging and radiation therapy services. At the same time, the case should also be put for the introduction of accredited Advanced Practitioner roles for Diagnostic Radiographers and Radiation Therapists, regulated under the National Registration and Accreditation Scheme for the Health Professions.

Number 5: Leadership Training

There is a need to strengthen leadership within the profession. Consequently, the APWG highly recommends that the AIR invests in the development of a program of leadership training for its Members. For example, the process may be as follows. A limited number of places may be made available and Members and Fellows could be invited to apply. The training could include an on-line component, to assure wide accessibility, which would prepare participants for their attendance at a workshop. It is proposed that this is an annual event, which takes place in conjunction with the National Conference. The training programme should be substantially subsidised by the AIR.

It also recommended that the AIR supports and sponsors local leadership training, seminars and workshops, particularly in partnership with the State Departments of Health/Human Services. Members should be encouraged to attend these leadership training opportunities.

Number 6: Future Consultations

There is a need for a great deal of further consultation to take place within a short time-frame. At its first face-to-face meeting the APWG compiled a list of organisations that should be consulted in relation to the development of advanced practice roles in the medical radiation professions. While, under the terms of reference, it was not possible for the APWG to consult with these organisations, that list appears below for future reference. It is recommended that the organisations listed below receive a copy of this report and that they are invited to comment.

Royal Australian and New Zealand College of Radiologists (RANZCR)

Australian College of Physical Scientists and Engineers in Medicine (ACPSEM)

Australian Sonographers Association (ASA)

Australasian Society of Ultrasound in Medicine (ASUM)

The Australian and New Zealand Society of Nuclear Medicine (ANZSNM)

Australian Diagnostic Imaging Association (ADIA)

BreastScreen Australia

New Zealand Institute of Medical Radiation Technology (NZIMRT)

Australian universities that offer medical radiation education programmes

Both Federal & State government and opposition

Australian Government Department of Health and Ageing

State Government Departments of Health/Human Services

Medical Colleges:

- Royal Australian College of General Practitioners (RACGP)
- Australian College of Rural and Remote Medicine (ACRRM)
- Australasian College for Emergency Medicine (ACEM)
- Royal Australasian College of Surgeons (RACS)
- Royal Australasian College of Physicians (RACP)

Private radiation therapy service providers

Private providers of continuing professional education services

Relevant trade unions

Conclusions

There is ample evidence, presented in this document and elsewhere, that there is a need for change in the way that health care is delivered in Australia and that Government policy will be directed towards making change happen. The medical radiation professions have a choice to make. They can vehemently resist change, arguing that the current practice model is adequate to meet the current and future demands for diagnostic imaging and radiation therapy services, knowing that this is a false premise. Alternatively, they can sit on the sidelines and wait for the State and Federal Governments to impose changes that are driven by bureaucratic priorities and do not take into account the needs of either the professions or patients. This would be unwise. Or, acting in coalition, the medical radiation professions have an opportunity to take a proactive stance, proposing a new model of medical imaging and radiation therapy service delivery to Government that addresses the need for change and is both patient-focused and competency-based. The APWG argues strongly for that latter, even though this will not be easy. It is likely to require each profession as a whole, as well as individual practitioners, moving out of the comfort zones of their traditional practice models and into new territory. In reality, there is no choice to make – change must take place. The only question, therefore, how this change will be implemented.

Even though the 'higher end' of diagnostic radiology and radiation oncology has swelled enormously over recent decades, Radiologists and Oncologists lay claim to responsibility for the entire range of services and entire process of service delivery. This is unsustainable if we are to ensure that service quality is maintained, if not improved in the future, given that further technological changes are inevitable. In this discussion paper, the APWG has presented a proposal for profession-led change that takes into account the future needs of the Australian patient population. The proposal is well informed by the work of previous AIR working parties and investigations and projects conducted by other organisations. The new territory, therefore, is not entirely uncharted and, as discussed in this and other reports, substantial changes have already been made in the UK and USA. To assume, however, that 'one size fits all' and that Australia should simply adopt new practice models developed overseas, in countries with entirely different health care systems, would be a mistake. We can learn lessons from overseas models and take advantage of others experience but the opportunity exists for the development of a

practice model that is uniquely suited to the Australian health care system, the needs of the Australian population, the Australian professional landscape and the Australian tertiary education system.

The various elements of the advanced practice model proposed in this report should be considered negotiable. This is a discussion paper and the proposed model is intended as a focus for further discussion, with a wide range of stakeholders. In fact, one of the strongest messages conveyed during the consultations conducted by the APWG was the need for collaboration. This is in line with policies related to the development of interprofessional practice and teamwork, which have been powerful drivers in developing new models of care overseas and are increasingly touted as the future of health service delivery in Australia, as well as in other countries. While the needs of professions must not be overlooked, the trend is towards more patient-focused models of care, as opposed to traditional models that have been largely profession-focused. However, while interprofessional consultation and collaboration are the primary considerations, the APWG wishes to sound a clear warning that the process of model development and implementation must not become bogged down. In 2002 in Coffs Harbour, the AIR set a deadline of 2012 for the implementation of an advanced practice model. All effort should be made to adhere to that deadline, so there is a need to act decisively and act now.

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APPENDIX 1: Focus Groups

Appendix 1a: List and profile of focus group participants

Harjit Bariana	Phillipa Close	Diane Fiore	Peter Rouse
Stuart Baum	Jenny Cox	Matthew Fuller	Vanessa Sands
Catherine Beaufort	Jim Crowhurst	Jill Harris	Tom Steffens
Cassandra Beckett	George Dale	Claire Herbert	John Thomas
Sharon Brackenridge	Jo Debono	Ingrid Jolley	Alan Turner
Annette Brazell	Jim de Jong	Rachel Kearvell	Christine Visser
Julie Britten	Susan Doran	Sandra Mena	Kate Wilkinson
Joy Brumby	Nicole Eastgate	Naomi Nugent	Melissa Winkler
Angela Chan	Brendan Erskine	Jo Page	
Natalie Charlton	Carrie Finch	Samantha Redfearn	

Please note: The APWG apologises to anyone who participated in a focus group but whose name has been omitted from the above list.

Profile

Of the 38 participants list above:

- 20 are Diagnostic Radiographers and 18 Radiation Therapists.
- 28 are female.
- 16 have been qualified for > 20 years, 11 for 10-20 years and 11 for < 10 years.
- 33 were in full-time employment at the time and the remainder part-time.
- 30 worked in the public hospital system at the time, the rest in private practice.
- Most held positions with a title of Chief, Deputy Chief, Senior or Manager.

Of the 19 Diagnostic Radiographers:

- 13 are female.
- 8 have been qualified for > 20 years, 5 for 10-20 years and 7 for 5-10 years.
- 18 were in full-time employment.
- 18 worked in the public system.

Of the 18 Radiation Therapists:

- 15 are female.
- 8 have been qualified for > 20 years, 6 for 10-20 years and 4 for < 5 years.
- 15 were in full-time employment.
- 12 worked in the public system.

Appendix 1b: The theme list used for the focus groups

Context & Experience

- What do you understand by the term 'advanced practice'?
- Do you perform roles, duties or tasks that you consider 'advanced practice'?
 - What are they? (Please explain)
- Do Radiographers/Radiation Therapists you know of perform advanced practice?
 - What are their roles/duties/tasks? (Please explain)
- How did these roles, duties and tasks evolve?

Workforce & Service Provision

- Is there a staffing shortage or workload problem in your department?
 - If so, how is it evident? or How does it manifest itself?
 - Does it affect the quality of service & workflow? In what way?
- Do you think that an advanced practice model would improve the recruitment and retention of Radiographers/Radiation Therapists?
- What sorts of advanced practice roles (duties or task) are needed in the medical radiation workforce?
 - Currently? In the future?

Benefits & Risks

- What do you think the greatest benefits of advanced practice would be?
- Does anyone here believe that the AIR should not promote advanced practice?
 - If so, why not?
- What benefit do you think advanced practice might be to:
 - patients and other health service clients?
 - other staff in the health system?
- What do you think the biggest challenges are to developing advanced practice?
- What sorts of things worry you about advanced practice roles?

Education & Mentoring

- What part do you think that education should play a part in advanced practice?
- What level of education do you think would be appropriate?
- Do you think that Radiologists/Oncologists would be prepared to mentor or supervise Radiographers/Radiation Therapists in advanced practice roles?

Attitudes & Feelings

- Do you feel valued in your current role?
- Do you find your work rewarding and satisfying?
- What do you predict might be the attitudes and feelings of others that you work with? (include other MI/RT staff, Radiologists, other doctors, admin.)
- What do you think the attitudes and feeling of the general public might be to the development of advanced practice in our field?

Closing

- Are there any further comments you would like to make?

APPENDIX 2: Discussion Forums

Appendix 2a: A list of the associated events, including the dates, location and approximate number of attendees

- Event: Tasmanian Branch Meeting, Freycinet Lodge, Tasmania
Dates: 28-29th June 2008
Attendance: 60-70 Members
- Event: Victorian Branch Meeting, Hall's Gap, Victoria
Date: 3rd August 2008
Attendance: 50-60 Members
- Event: 'Country AIR', Queensland Branch Meeting, Stanthorpe, Queensland
Dates: 9-10th August 2008
Attendance: 20-25 Members

Appendix 2b: List of the questions used to generate forum discussion

Experiences

- Do you or others that you know of perform roles, duties or tasks that you consider to be 'advanced practice'?
 - If so, what are they?

Workforce

- Do you think that an advanced practice model would improve the recruitment and retention of Radiographers/Radiation Therapists?

Benefits

- What benefit do you think advanced practice might be to patients and other health service clients?

Risks

- What sorts of things worry you about the development of advanced practice roles?

Education

- What part do you think that education should play a part in developing advanced practice?
- What level of education do you think would be appropriate?

Attitudes & Feelings

- What do you predict might be the attitudes and feelings of others that you work with?

APPENDIX 3: Written Submissions

Appendix 3a: List of identified authors of written submissions and profile of all respondents

Authors of written submissions were advised that it was not compulsory to supply their name. The following 18 chose to identify themselves.

Michelle Apostolou	Dean Hogben	Jo Smylie
Chris Bates	Debbie Howson	Frances Sullivan
Aiden Cook	Lynne Ingram	Jennifer Thompson
Jo DeBono	Ingrid Jolley	Gillian Tickall
Jim de Jong	Sheila Moran	Lauren Winkley
Nathan Emanuel	Goran Obradovic	Caroline Wright

Please note: The APWG apologises to anyone who identified themselves as author of a written submission but whose name has been omitted from the above list.

Profile

A total of 37 written submissions were received:

- 25 from Radiographer or Sonographers and 12 from Radiation Therapists.
- 12 each from NSW and SA, 8 from Victoria, 4 from Queensland and 1 from Tasmania.
- 32 had completed an additional qualification or were currently studying. The range of programmes was from TAFE diploma to PhD.
- 29 worked in the public sector, 5 in the private and 3 in the university sector.
- 17 had been qualified for > 20 years, 6 between 10 & 20 years and 6 < 10 years. 8 responses were missing due to an error on the proforma.

Appendix 3b: List of the questions that were asked on the written submission proforma

- In which of the medical radiation fields do you practice?
- In what Australian State do you currently live and work?
- In what year did you qualify?
- In which sector do you work?
- Postgraduate qualifications (if relevant)?
- Summary of work history in the profession (in brief)?

- What activities do you currently undertake that you consider may be beyond the standard scope of practice?
- Has your clinical practice role changed over the years?
 - If so, how and under what influences?
- Can you provide examples of where your enhanced knowledge or experience has added value in patient care?
- How would you like to see advanced practice roles developed in your field?
- Do you have any further comments that you would like to make with regards to advanced practice?

APPENDIX 4: Discussion with UK Advanced Practitioners

Appendix 4a: UK Advanced Practitioners who participated

Ms Kate Burton, Radiation Therapist, Addenbrooke Hospital (Neuro-Oncology)

Ms Gail Darwent, Diagnostic Radiographer, University of Sheffield (MRI)

Ms Barbara Flanagan, Diagnostic Radiographer, Aberystwyth Hospital (GI Studies)

Ms Anne-Louise Ford, Radiation Therapist, Mt Vernon Cancer Unit (Dosimetry)

Mr James Knowles, Diagnostic Radiographer, Bournemouth Hospital (ED Reporting)

Ms Donna Routsis, Radiation Therapist, Addenbrooke Hospital (Technical/Research)

Appendix 4b: List of questions asked to facilitate discussion

Why was the position created?

- Does the role improve the quality of service to the patient or within the health system?
- What could have been done better?

Courses and training for the position

- What training/courses, either 'in house' or formal did you undertake to get accredited?
- What do you need to do for maintenance of qualifications?

Roles and duties of the position

- What is your scope of practice in your daily work?
- What teaching do you perform?
- What research do you do?
- What boundaries do you have on your position?
- Are boundaries merged or well defined?
- What is level of accountability?
- Is the position protocol driven?

Attitude of others

- What is the attitude of your fellow workers?
- What about Radiologists and Oncologists in particular?

Lines of reporting

- Who is responsible for your supervision?
- Who mentors you and who do you mentor?
- What is your medico-legal position?

Any other comments?

APPENDIX 5: Discussion with Australian Medical Radiation Academics

Appendix 5a: Medical radiation academics who participated

Assoc. Prof. Jenny Cox, University of Sydney, Sydney New South Wales

Assoc. Prof. Rob Davidson, Royal Melbourne Institute of Technology University, Melbourne, Victoria

Mr Shane Dempsey, The University of Newcastle, Newcastle, New South Wales

Mr Warren Lusby, Charles Sturt University, Wagga Wagga, New South Wales

Mr Jonathan McConnell, Monash University, Melbourne, Victoria

Assoc. Prof. Jan McKay, Curtin University, Perth, Western Australia

Dr Kerry Thoires, University of South Australia, Adelaide, South Australia

Ms Caroline Wright, Monash University, Melbourne, Victoria

Apology:

Assoc. Prof. Pam Rowntree, Queensland University of Technology, Brisbane, Queensland

Appendix 4b: List of questions asked to facilitate discussion

- In your opinion, what sorts of advanced practice roles are needed in the medical radiation workforce?
 - Currently? In the future?
- What part do you think that education should play a part in developing advanced practice?
- Do you consider your institution to be well placed to develop and implement advanced practice education?
 - If so, please elaborate?
 - If not, what needs to change?
- What level of education do you think would be appropriate?
 - ? entry requirements
 - How can CPD needs/requirements also be addressed?
- How can that education be made clinically relevant?
 - How can it be linked to advanced practice competencies and standards?
 - What quality assurance processes would be appropriate?
 - Should currency of clinical practice be a requirement for academics delivering advanced practice education?

- How can that education be made widely accessible?
 - How might it be packaged?
 - ? modular -> ? CPD
- Is there a place for “in-house” education programmes within clinical sites?
 - What the issues might be associated with this method?
- In what ways do you suggest current undergraduate MRS courses should be changed to prepare students for future advanced practice roles?
- What do you think the biggest challenges are to the development of advanced practice in Australia in the future?
 - What troubles you about the development of advanced practice?
- Radiologists and Oncologists would need to mentor or supervise Radiographers and Radiation Therapists in advanced practice roles?
 - What implications, if any, do see for the universities in such a model?