

**THE LEVELS OF CONFIDENCE, AND RESPONSIBILITY ACCEPTED, BY  
AUSTRALIAN RADIATION THERAPISTS IN DEVELOPING PLANS AND  
IMPLEMENTING TREATMENT**

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## **Abstract**

The purpose of this research was to assess i/ how confident radiation therapists (RTs) are in developing a series of plans that have increasing levels of difficulty, and ii/ the level of responsibility that they are willing to accept in relation to these treatments being implemented without the Radiation Oncologist (RO) countersigning the plan. A self-administered questionnaire was designed around a set of 6 clinical planning scenarios demonstrating increasing levels of difficulty. RTs were asked how confident they were in developing the plan and what level of responsibility they were willing to accept in implementing the treatment for the plan, as well as reasons for the way they answered. 203 radiation therapists returned a completed questionnaire (response rate 38.7%). All RTs indicated that they were confident to complete all the plans regardless of difficulty ( $P<0.0001$ ) except for newly qualified RTs in their first year of practice who indicated a lack of confidence with the most difficult case only. Contrary to the high levels of confidence however RTs overall were only willing to accept responsibility for implementing treatment for the 2 basic level scenarios ( $P<0.0001$ ). To gauge the clinical usefulness of this finding a clinical centre audit was conducted that indicated that basic level procedures account for around 30-40% of a department's workload. This is an important finding for the role expansion or advanced practice debate.

## **Introduction**

When Radiation Therapy (RT) became a degree in Australia around 1990 it was expected that the level of responsibility of Radiation Therapists (RTs) would increase both within the existing work role and within new work roles as technology and clinical practice naturally developed over time. Increased opportunities would also arise for postgraduate qualification leading to new or advanced areas of practice and new levels of responsibility. The topic of expanding practice and advanced practice within the Medical Radiation Science professions has been discussed in many countries for many years. The Australian Institute of Radiography (AIR) recently published the report by the Professional Advancement Working Party (PAWP) which looked at role extension (enlargement of current practice) and role expansion (advanced practice with formalized role development)<sup>(1)</sup>. The College of Radiographers (CoR) in the UK has also produced a range of documents, such as those that define a framework for clinical leadership and a scope of practice with advanced roles<sup>(2, 3, 4)</sup>.

Whilst it is good to have reports that describe advanced professional activities, there is a need for research that actively measures and documents the competence and willingness of practitioners to work within extended or advanced roles. During 2005, RTs in Australia participated in a research project that sought to measure their confidence and responsibility when questioned about working in an expanded responsibility framework.

The research project collected an enormous amount of both quantitative and descriptive data, and the bulk of the data was used as the submission for an honors degree by one of the authors (Burr). This paper reports only the main quantitative analysis of RT confidence and responsibility that was completed during 2006. The descriptive data will be reported on at a later time.

## **Introduction**

Planning is a normal part of every RTs role in Australia. It forms a significant part of RT training, and as part of maintaining currency for practice it would be assumed that all RTs would be rostered through planning for a portion of the year. It would be expected

that Australian RTs working in their own departments would be able to plan the majority of cases that presented to the department, if not on their own then with the support of senior planning staff. RTs should have workplace and work-role competence and confidence.

It is normal practice for plans which have been developed by a Radiation Therapist (RT) to be checked by one or more other RTs (usually a senior or experienced RT), and in some circumstances or according to department protocol a medical physicist. This is a universal quality assurance procedure that ensures the correct treatment has been developed and calculated. In Australia one of the roles that Radiation Oncologists (ROs) have historically had is to sign off on the treatment plan developed by the RT. This latter action, is not a universally accepted quality assurance activity, and does not necessarily assess the degree to which the plan or plan calculations and dosimetry conforms to the treatment prescription. Rather, the signing off of the plan, developed by the Radiation Therapist, is often considered to be for treatment authority <sup>1</sup> and/or medical billing reasons.

Historically the acceptance of the plan as meeting the prescription requirements has been based on personal or subjective judgment of the plan. In the past different RTs, and different ROs, and different departments, may well have assessed or dosed the same plan differently. If we consider the standard 4 field box arrangement, in the past we may have dosed this plan to the periphery isodose (95%, 96%, 97% or 98%), or we may have dosed to the isocentre (100%) and some may have dosed to the dmax (104% etc) with or without normalising any of these values to 100%. This type of dosing would lead to a range of different doses being received across volumes and hence potentially different outcomes.

In the last decade there has been an increase in publications, and advancements in technology, to assist RTs and ROs to develop and assess plans against objective measures. Examples include; conformity of plans to International Commission of Radiological Units (ICRU) Reports 50/62 recommendations <sup>2,3</sup>; introduction of department protocols; highly developed prescriptions including full and partial dose objectives and dose constraints; and the ability to assess plans using dose statistics and DVHs.

With the higher degree of objective plan evaluation associated with modern radiation therapy, and the universal quality assurance checking of the conformity of the plan to the prescription, the questions are then proposed as to whether it is still necessary for the ROs, who have written the authorized prescription and outlined the target, to countersign the plan prior to the commencement of treatment? And if it is required are there particular circumstances where it is necessary?

The aims of the research were to:

- Assess how confident radiation therapists are in developing a series of plans that have increasing levels of difficulty, and
- Assess the level of responsibility that Radiation Therapists are willing to accept in relation to these treatments being implemented without Oncologist viewing or countersigning the plan.

### **Research Methods**

To investigate the levels of confidence and responsibility in the context of this research a questionnaire was designed and sent to a sample of Radiation Therapists across Australia. Ethics approval was sought and granted for the research from the University of Newcastle, Faculty of Health Sciences, Human Research Ethics Committee.

Initial support for the research was sought from Chief RTs. An introductory letter, information sheet, authority to proceed form and the questionnaire were forwarded to the chief radiation therapist of 36 out of about 48 Australian departments. These departments were those that the University has some regular contact with. The introductory letter identified that the research project was auditing an aspect of clinical practice and had low level to no risk to the RT participants, and involved the collection of non-identifiable non-personal data. If the chief Radiation Therapist agreed to allow the centre to be involved in the research they returned a signed “authority to proceed” form and provided the numbers of therapists at the centre. Twenty-Five departments returned a signed form agreeing to participate in the research by the due date. From information supplied to centres it was understood that all institutions participating accepted the

research as a clinical audit exercise and no further institutional ethics approvals were necessary to conduct the research<sup>4</sup>.

To recruit Radiation Therapists from the participating centres, individual staff packages were developed that contained a participant information sheet and the questionnaire. These staff packages were provided to staff in sealed envelopes via the chief Radiation Therapist or their nominated representative at the department. Staff who chose to participate in the research completed the questionnaire, sealed the questionnaire in an envelope that was provided, and returned the questionnaire to a designated collection point within the department. Departments returned all completed questionnaires in a replied paid express post bag package or box that had been provided to the department. Five hundred and twenty-four (524) questionnaires were sent to twenty-five (25) departments in five (5) states within Australia.

The questionnaire used within this research was designed around six clinical scenarios that matched the three levels of plan complexity described in ICRU Reports 50 & 62. These complexity levels are categorised as: Basic, Advanced and Developmental plans. A description of these terms can be found in the ICRU Report 50<sup>2</sup>, however the terms reflect the level of increasing complexity of the voluming methods used, plan development and plan evaluation methods, and RT treatment. In an effort to increase the questionnaires applicability for all RTs across all sites within Australia the language used within the questionnaire was kept simple and department specific type language and terms was not used.

The 6 scenarios (S1 – S6) were:

***Basic Plans***

- S1. a palliative single field spine plan
- S2. a palliative parallel opposed hip plan

***Advanced Plans***

- S3. a radical 4-field prostate plan
- S4. a radical breast tangent plan

***Developmental Plans***

- S5. a radical multi-field chest plan
- S6. a radical multi-field brain plan

The following information was provided with each case:

1. a brief patient history including the patient's diagnosis
2. the location of the tumour, described by either anatomical landmarks or a description of a GTV/CTV/ PTV defined by the Radiation Oncologist,
3. information about the imaging data set used to develop the plan
4. a detailed prescription including intent of treatment, technique to be used, a tumour dose prescription and where appropriate full or partial Organs at Risk tolerance doses
5. an explanation of the plan that was developed for the case, with dose distributions, plan statistics and DVHs, and
6. an explanation of the quality assurance procedure completed as part of plan checking

For each scenario the participant was asked the same purposefully designed questions about confidence and responsibility.

Question 1a asked: Based on your professional knowledge and skills, would **you feel confident** in applying the prescription (dose) to this plan, developing a plan and treatment sheet, and sending the treatment sheet for checking? Answer Yes or No.

Question 2a asked: A senior radiation therapist or another experienced radiation therapist has checked the plan. If the radiation oncologist doesn't view or countersign this plan would **you accept responsibility** for the treatment to be given? Answer Yes or No.

In an attempt to assess the participant's true feelings (the emic perspective) about their confidence and their level of responsibility within the scenario, participants were asked within questions 1a and 2a to disregard all issues of perceived liability and departmental protocols when answering about the scenarios.

For both questions 1a and 2a there were a follow-up questions (1b and 2b) that asked RTs to indicate why they had answered the way they did. A list of reasons (forced responses) was supplied that could be ticked, and/or responders could provide their own answer. RTs were also asked to rank a series of 13 pre-defined items that might be

linked with accepting increased responsibility for dosing plans and commencing treatment. An open ended question provided RTs with an opportunity to indicate other items that they felt were important in assuming the role of dosing plans.

A range of professional information about the participants was collected. For the purposes of data analysis these items were categorised by 11 major categories, such as age, initial qualification, current position etc. These major categories were stratified into sub-categories, an example being the major category of current position where there were sub-categories of Professional Development Year RT (a PDY RT is a graduate RT in their first year of practice), base grade RT (all levels), NSW level 3 RT (or equivalent), senior RT.

The questionnaire was piloted on 3 Radiation Therapists. From feedback changes were made to the original questionnaire to reduce the time taken to complete the questionnaire. This was done by changing some open ended questions to forced response answers. The individual questionnaires sent to centres were coded by the research supervisor so that the conduct of the project and analysis of the results by the honours researcher was anonymous. Radiation Therapists were given 6 weeks to complete the questionnaire. Questionnaires were sent to departments for distribution to Radiation Therapists in July 2005, responses were received by the end of August 2005, and all data was analysed in late 2005 and early 2006.

For data management the yes/no categorical answers to questions 1a and 2a were entered into the database Microsoft Access, and the statistical program InStat. The Fishers exact test was used to determine the statistical significance of the Yes / No responses to questions 1 and 2, and the results were considered statistically significantly when  $p \leq 0.05$ . Analysis was undertaken for the pooled RT responses, and also for the sub-categories of RTs. In those sub-categories where there were too few responses to allow for accurate statistical interpretation, the trend of the Yes / No response was analysed. Pre-defined list items and open ended responses were entered into Microsoft Access. Open ended questions were thematically analysed for emerging themes not identified elsewhere in the research.

## **RESULTS**

The research project collected an enormous amount of both quantitative and descriptive data, and the bulk of the data was used as the submission for an honours degree by one of the authors (Burr). This paper reports only the main quantitative analysis of RT confidence and responsibility that was completed during 2006. The descriptive data will be reported on at a later time.

All 25 centres which agreed to participate in the study returned some completed questionnaires. Of the 524 questionnaires that were sent out to RTs 203 completed questionnaires were returned by the completion date (response rate 38.7%). Table 1 describes the study participants.

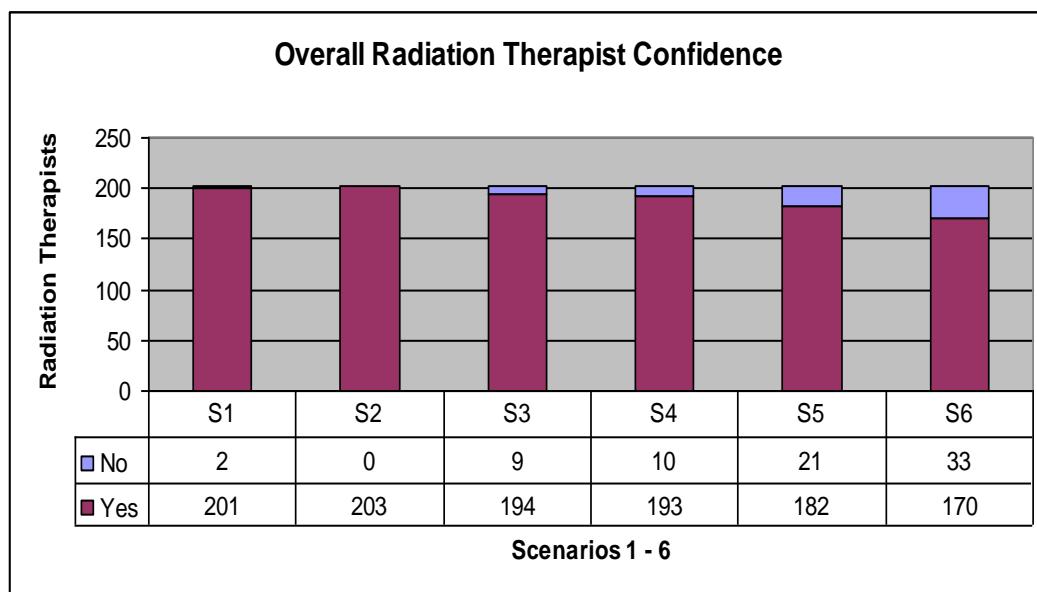
Table 1 Study participants' professional demographics

Demographics Table			
Major Category	Sub-Category	Percent (%)	Number (203)
Age	< 25 years old	25.1 %	51
	26 – 35 years old	39.4 %	80
	36 – 45 years old	20.2 %	41
	> 46 years old	14.8%	30
	Unanswered	0.5%	1
Gender	Female	69.5 %	141
	Male	28.5 %	58
	Unanswered	2 %	4
Initial Qualification	Certificate / Associate Diploma	6.4 %	13
	Diploma	26.6 %	54
	Degree	67 %	136
University / College Attended	Within Australia	91.1 %	185
	Outside Australia	6.4 %	13
	Unanswered	2.5 %	5
Amount of time spent within Australia working as an Radiation Therapist	0 – 1 year	13.8 %	28
	2 – 5 years	28.0 %	57
	6 – 10 years	22.7 %	46
	11 + years	35.5 %	72
Worked overseas as a Radiation Therapist	No	68.0 %	138
	Yes	32.0 %	65
Current Position	PDY	12.3 %	25
	Base Grade (all levels)	35.0 %	71
	NSW Level 3 (or equivalent)	10.8 %	22
	Senior	36.5 %	74

	Other	5.4 %	11
Amount of time working in current position	0 – 1 year	39.4 %	80
	2 – 5 years	41.9 %	85
	6 – 10 years	9.4 %	19
	11 + years	9.4 %	19
Currently work in a Public or Private centre	Private	30.5 %	62
	Public	69.5 %	141
Majority of career in Public or Private centre	Private	16.7 %	34
	Public	76.8 %	156
	Equal	6.4 %	13
Where did you complete your PDY	Private	12.3 %	25
	Public	87.2 %	177
	Unanswered	0.5 %	1

**THE CONCEPT OF CONFIDENCE:** Pooled analysis indicated that Radiation Therapists within Australia were confident to apply the prescription and develop a plan and treatment sheet for all levels of plan difficulty ( $P \leq 0.0001$ ). See Figure 1.

Figure 1. Results for overall confidence within the 6 scenarios, ie “pooled analysis”, for all Radiation Therapists.  $P < 0.001$  for all scenarios



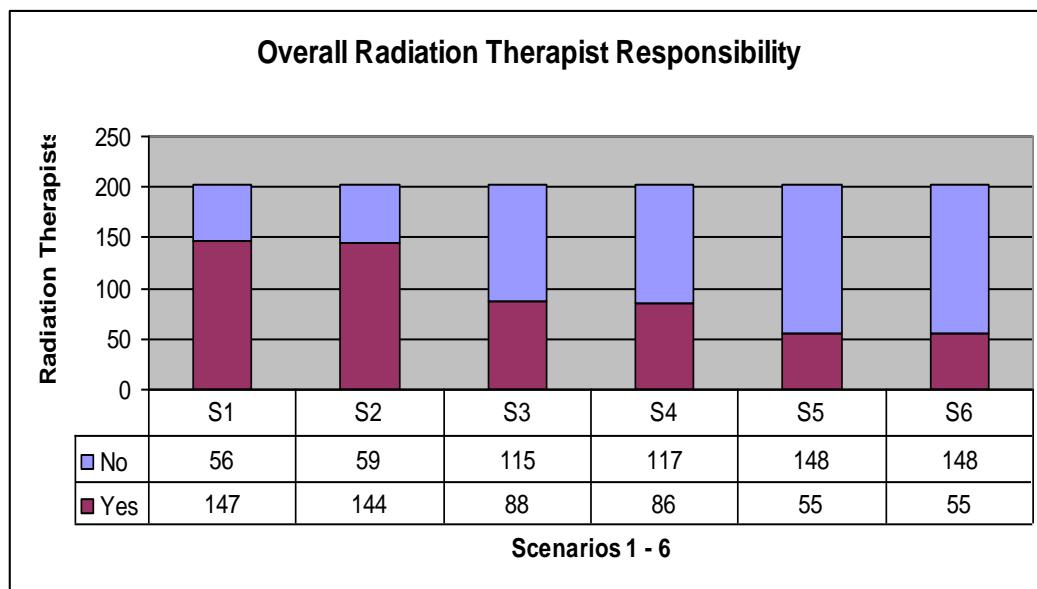
S1 to S6 = Scenarios 1 to 6

An analysis of confidence by sub-category of RTs for each of the 6 scenarios indicated that all sub-categories of Therapists were confident ( $P \leq 0.05$ ) to plan scenarios 1-6,

except for Professional Development Year RTs (PDYs) who indicated confidence in scenarios 1-5 but not scenario 6. The majority reason PDYs cited for their lack of confidence was the complexity of the most difficult plan and lack of training in these types of complex situations.

**THE CONCEPT OF RESPONSIBILITY:** While the pooled analysis indicated that Radiation Therapists within Australia are willing to accept the responsibility for implementing the two basic level plans (scenarios 1 and 2) into treatment without an RO countersigning the plan ( $P \leq 0.0001$ ), there were several sub-categories of RT who were not. Figure 2 shows the overall results for willingness to accept responsibility.

Figure 2 Overall results for RT responsibility within all 6 scenarios.



An analysis of responsibility by sub-category demonstrated that certificate and associate diploma initially qualified RTs, overseas qualified RTs, and PDY RTs, were not willing to accept responsibility for the basic level plans (scenarios 1 and 2) (see Table 2), rather they were uncertain about accepting responsibility.

Table 2 Analysis of category and sub-category for Scenarios 1 and 2 (basic level plans).  
ns = not significant result indicating neither willingness or unwillingness to accept responsibility.

Major Category	Sub-Category	S1 P-value (Yes, No)	S2 P-value (Yes, No)
Initial Qualification	Certificate / Associate Diploma	ns / (7,6)	ns / (7, 6)
	Diploma	0.0047 / (42,12)	0.0047 / (42, 12)
	Degree	0.0003 / (98, 38)	0.0012 / (95 , 41)
University / College Attended	Within Australia	0.0001 / (135, 50)	0.0001 / (135, 50)
	Outside Australia	ns / (9, 4)	ns / (6, 7)
Current Position	PDY	ns / (14, 11)	ns / (13 , 12)
	Base Grade (all levels)	0.006 / (52, 19)	0.01 / (51, 20)
	Level 3	ns / (17, 5)	ns / (16, 6)
	Senior	0.0005 / (58, 16)	0.0011 / (57, 17)

For the two advanced level plans (scenarios 3 and 4) there was no category or sub-category of RTs willing to accept responsibility for implementing treatment without an RO signature on the plan. PDY RTs, and RTs who either currently worked in or who had spent the majority of their career in a public centre, were statistically significantly unwilling to accept responsibility for the advanced level plans (see Table 3). All other categories of RTs had a non-significant result and showed a general trend away from acceptance of responsibility as the cases got more complex. When compared there was a significant difference between private and public RTs, with public RTs being more unwilling to accept responsibility for scenarios 3 and 4 than private RTs.

Table 3 Analysis of category and sub-category for Scenarios 3 and 4 (advanced level plans).  
ns = not significant result indicating neither willingness or unwillingness to accept responsibility.

Major Category	Sub-Category	S3 P-value (Yes, No)	S4 P-value (Yes, No)
Current Position	PDY	0.0059 / (3, 22)	0.0016 / (2, 23)
	Base Grade (all levels)	ns / (34, 37)	ns / (32, 39)
	Level 3	ns / (6, 16)	ns / (6, 16)
	Senior	ns / (41, 33)	ns / (41, 33)
Currently working in a Public or Private centre	Private	ns / (40, 22)	ns / (38, 24)
	Public	0.008 (48, 93)	0.0008 (48, 93)
	Private vs Public	≤ 0.0001	≤ 0.0004
Majority of career in Public or Private centre	Private	ns / (20, 14)	ns / (19, 15)
	Public	0.05 (60, 96)	0.04 (59, 97)
	Private vs Public	≤ 0.0372	≤ 0.05

In keeping with the shift away from acceptance of responsibility with increasing plan and treatment complexity, there was no sub-category of RTs willing to accept responsibility

for the two developmental level plans (scenarios 5 and 6) without an RO signature on the plan. Table 4 shows the sub-categories that were significantly unwilling to accept responsibility. The trend in all other sub-categories of RTs was away from acceptance of responsibility.

Table 4 Analysis of category and sub-category for Scenarios 5 and 6 (developmental level plans).

Category	Sub Category	S5 P Value / (yes, no)	S6 P Value / (yes, no)
Age	< 25 years old	<0.0001 / (6, 45)	<0.0001 / (6, 45)
	26 – 35 years old	0.0094 / (23, 57)	0.0152 / (24, 56)
Gender	Female	0.0002 / (40, 101)	0.0001 / (39, 102)
	Male	0.0124 / (15, 43)	0.0217 / (16, 42)
Initial Qualification	Degree	<0.0001 / (33, 103)	<0.0001 / (32, 104)
University / College Attended	Within Australia	<0.0001 / (50, 135)	<0.0001 / (51, 134)
Amount of time spent within Australia working as an Radiation Therapist	0 – 1 year	0.0008 / (2, 26)	0.0001 / (1, 27)
	2 – 5 years	0.0008 / (11, 46)	0.0008 / (11, 46)
Worked overseas as a Radiation Therapist	No	<0.0001 / (35, 103)	<0.0001 / (35, 103)
	Yes	0.0327 / (20, 45)	0.0327 / (20, 45)
Current Position	PDY	0.0003 / (1, 24)	<0.0001 / (0, 25)
	Base Grade (all levels)	0.0033 / (18, 53)	0.0058 / (19, 52)
	Level 3	0.0217 / (3, 19)	0.0546 / (4, 18)
Amount of time working in current position	0 – 1 year	<0.0001 / (13, 67)	<0.0001 / (13, 67)
	2 – 5 years	0.0298 / (28, 57)	0.0196 / (27, 58)
Currently work in a Public or Private centre	Public	<0.0001 / (26, 115)	<0.0001 / (28, 113)
Majority of career in Public or Private centre	Public	<0.0001 / (33, 123)	<0.0001 / (35, 121)
Where did you complete your PDY	Public	<0.0001 / (43, 134)	<0.0001 / (43, 134)

## **DISCUSSION**

When asked within the context of the research why they had such high levels of confidence Australian RTs indicated three main reasons: (i) they all felt their training and experience had prepared them to do these types of cases, (ii) that they had the support of other RT staff around them to assist when necessary, and (iii) that the scenarios provided a detailed prescription which allowed them to know the requirements for completion and acceptance of the case.

Given these results, it is then surprising that there was willingness to accept responsibility only for basic level cases, and large agreement for non-acceptance of responsibility for advanced and developmental plans. Analysis of the forced choice responses indicated that the reasons for acceptance of responsibility for the commencement of basic level plans into treatment without an RO countersignature related to the simplicity of the case and the quality assurance of another RT checking the plan was enough reason for them to accept responsibility. Reasons RTs gave for the non-acceptance of responsibility for the more difficult cases included: that these cases were becoming more complex and RTs became less willing to accept another RT checking their plan as an authority to treat; that ROs have more clinical knowledge about the patient and that they might change their mind or pick up something about these complex treatments if they see the plan; that ROs are ultimately responsible and they should accept the responsibility.

A number of RTs took the opportunity to respond to the invitation to provide open ended comments on the issue of acceptance of increased responsibility. The following quote is symbolic of the pro-responsibility comments:

"With a comprehensive prescription and, methods that define dose ranges & critical structure doses, I see no reason as to why Rad Oncs need/should sign dose plans. There may have to be a way for them to sign the prescription and to sign for the voluming of PTVs, which may be for medico-legal reasons, which then leaves us free to take full responsibility for dosimetry. QA will be a vital part of taking on these extra roles."

The following quote sums up many of the arguments put forward for non-acceptance of responsibility of the higher level cases:

"I don't believe that an RT can have the same clinical knowledge as an experienced doctor. With the rapid development of advanced multi-modality techniques in oncology, a specialist needs to be responsible for the dosing of complex 3D planning. The efficacy & efficiency of planning is greatly enhanced with an experienced planning RT but at present we don't have the clinical knowledge of a medical degree, or the clinical/specialist knowledge of other modalities. That does not mean that

some responsibility cannot be shown for standard, straightforward planning as long as definite benchmarks are set."

Table 5 provides the top five results for the ranking of items that RTs chose were associated with the role of accepting more responsibility for dosing plans and commencing treatment without an RO signature on the plan.

Table 5 RT ratings of importance factors for acceptance of responsibility

ITEM	RANK
Being trained in the role at work	1
Years actively working as an RT	2
Being rostered through planning	3
Having the support of the Oncologists to do the role	4
Holding a senior position	5
Having the appropriate professional insurance to cover this work	6
Years of qualification as an RT	7
Completion of the PDY	8
Having your professional association (AIR) support this role	9
Having studied for a degree in RT at a University	10
Having postgraduate qualifications in the role	11
Having worked in a public department	12
Having worked in a private department	13

Participants were also invited to list any other items that they considered important in assuming responsibility for dosing plans and commencing treatment without an RO countersigning the plan. These items were analysed to identify the most common themes not found in the predefined list. The following five themes emerged from the analysis.

1. Having Strong and Well Developed Protocols & Guidelines
2. Planning Experience, Confidence and Competence
3. A Good Understanding of Dosimetry Techniques
4. Postgraduate Training/Dosimetry Training/Specialist

## Training

### 5. Help/Support from other Radiation Therapy Staff

So the question asked now is how clinically significant are these results? This research has indicated that there is potential for basic level treatments to be commenced on treatment without an RO's countersignature on the plan. To define the impact that this could have within the workplace an analysis of patient load in NSW was undertaken.

The 2004 Radiotherapy Management Information System Report (New South Wales Health) detailed the five most common cancers that were treated in NSW with a curative intent versus a palliative intent in 2004. [Table 6](#) shows these results interpreted from the report data, indicating that around 29% (2332 patients) of the five most common cancers treated with radiation therapy were palliative, basic level treatment type patients. It should be noted that this data set does not detail all cancer types and is therefore probably under-reporting palliative treatments many of which come from "other" cancer sites not detailed in the report such as melanoma, colon and un-specified sites origin cancers.

Table 6 The most common cancers (new and recurrent) divided into radical & palliative intent (data adapted from the original report)

Five most common cancers	Radical	Palliative
Rectum	282	90
Lung	558	1058
Breast	2270	620
Prostate	1332	425
Head & neck	732	139
Totals (no. & %)	5674 (70.9%)	2332 (29.1%)

An audit performed from January to the end of June 2005, of patients treated at a major NSW public radiation therapy facility, indicated that of the 801 patients that received Radiation Therapy treatment 44% (352) were treated with a palliative intent using basic level planning and treatment techniques.

A combined audit was also performed across two private radiation therapy practices to see how many patients received palliative Radiation Therapy treatment over a six month period. For the period of 1st February 2005e1st August 2005, 640 patients received Radiation Therapy treatment and of these 245 (38.3%) were treated with palliative intent using basic level planning treatment techniques.

From these three sets of data it can be seen that basic level type treatments form between 29.1% and 44% (37.1% average) of the patient workload in a Radiation Therapy department in NSW, for which RTs could assume responsibility for commencement of treatment.

## **Conclusion**

In NSW, the government policy “Prescription and Treatment Sheets for NSW Health Radiation Therapy Facilities 2006”,<sup>1</sup> indicates that Radiation Oncologists are required to sign the plans that RTs develop. As part of universal quality assurance checks all plans are cross-checked by other senior RT staff members and independent computer based dose checks. This signing of the plan by the RO appears mostly to be for treatment authority reasons and not as part of the quality assurance checks. ROs have many roles in a department and signing plans that meet prescriptions, and that have been independently checked, is a task that takes them away from other more meaningful activities.

This research suggests that RTs could be given this responsibility for all basic level cases. RTs are however reluctant to progress the issue of responsibility for higher level plans and treatment without the clear development of protocols and procedures, without structured education and training, without department support and without the appointment at a senior or advanced practitioner level.

## **Conflict of interest statement**

The authors have no conflict of interest.

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