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Research article

The sustainability of the New Zealand radiation therapy workforce: Factors that influence intent to leave the workplace and profession

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ABSTRACT

Introduction: The demand for radiation therapy services in New Zealand is growing due to an increasing and ageing population. The radiation therapist (RT) workforce is currently in a vulnerable state and this study aimed to understand RT perceptions on intent to remain in both the workplace and profession. Understanding factors that contribute to satisfaction and retention are important for the development of strategies by healthcare leaders to improve workforce sustainability.

Materials and methods: All current practising RTs were invited via email link to complete an online survey. Multivariate regression models were used to investigate any impact of demographic, workplace and professional variables on intent to remain in the workplace and intent to leave the profession.

Results: Three hundred and sixty two (91% response rate) RTs completed the survey. Key findings include: a) 33% are thinking of leaving their current workplace with 31% of these intending to leave within the next 12 months; b) 35% intend to change careers before they retire; and c) 25% indicated they would leave the profession if they could. Workplace satisfaction, being challenged and a lack of career development opportunities were common factors that influence intention to leave both the workplace and profession.

Conclusions: Strategies to ensure the sustainability of the RT workforce in New Zealand need to focus on developing a robust framework for career development including advanced practice opportunities that challenge RTs and ensuring workplaces create an environment that promote a sense of pride, camaraderie and flexibility in how they operate.

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Introduction

Cancer is a leading cause of morbidity and mortality in New Zealand, accounting for almost one-third of all deaths [1]. New Zealand is focused on having a health system that delivers consistent and modern cancer care, equitable cancer outcomes, fewer cancers and better cancer survival [2]. The National Radiation Oncology Plan 2017–2021 details seven key prerequisites to developing a world class radiation oncology service, of which number three is to “have sufficient numbers of trained staff to meet demand and develop the service” [1]. Key to the plan is the requirement to have a workforce with a wide range of skills, experiences and competencies.

The radiation therapist (RT) workforce is small at 396 registered professionals working across the ten public and private cancer centres in New Zealand [3]. Current workforce data suggests that the workforce is gradually increasing in numbers. However, despite a mean length of service of 8.7 years, it had a current vacancy rate in 2019 of 7% and a turnover rate of 8.8% which is higher than any other allied health profession in NZ [4]. With an average of 22 graduates entering the workforce annually from the single education provider and the profession being on Immigration New Zealand’s long-term skills shortage list of occupations there are significant issues recruiting and retaining RTs, placing the workforce in a vulnerable state. Any increase in demand for services could lead to long wait times resulting in poorer health outcomes for patients [5], staff burnout due to increased pressure to perform in understaffed clinical services [6] and ultimately result in a loss of reputation as a profession to work in leading to further losses in the workforce. Radiation oncology workforce shortages are not

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isolated to New Zealand with staff shortages being well publicised over the past ten years in Australia [7].

Good workforce retention is crucial to ensuring a well-functioning health service capable of delivering positive health outcomes. Several factors such as limited opportunities for professional development, working conditions and issues with management have been identified in the literature to influence a RTs intent to leave the profession [8]. The issue of RT career advancement has been well documented [9–13]. Halkett et al [14] found that RTs perceived that there were limited opportunities to specialise and that any further education had little chance of being recognised. In other words, the more experienced and further educated an RT becomes the less satisfied they are with career advancement opportunities. Those who were not satisfied agreed that they would leave the profession if they could [14]. There are currently a handful of RTs practicing in advanced RT roles in Australia and New Zealand; these are not formally recognised by the profession and are based mostly on local need and may not attract additional salary [15]. In addition, some research identifies key issues for RT intention to leave the workplace. Halkett et al. [14] found that 20% of RTs surveyed were thinking about leaving their current workplace with half remaining in Australia, 15% moving overseas and the remainder undecided.

Research on the New Zealand radiation therapy workforce is scarce and mostly made up of unpublished working papers. This study aimed to gain an understanding of the state of the New Zealand radiation therapist workforce, specifically identifying perceptual factors that influence the intent to remain in the workplace and the intent to leave the profession. Associations with demographic, workplace and profession variables were investigated.

Material and Methods

An exploratory cross-sectional survey based closely on a validated questionnaire developed in Australia [14] was used address the aim. To contextualize and validate the survey for the New Zealand workforce a co-design approach focusing on community engagement and integrated knowledge translation was employed [16]. An expert advisory panel was assembled comprising of the Radiation Therapy Advisory Panel (clinical leaders from the ten cancer centres) along with a representative from the University of Otago (undergraduate provider), New Zealand Institute of Medical Radiation Technologists (professional body), New Zealand Medical Radiation Technologists Board (MRTB; registration body), Ministry of Health (cancer team) and unions. The group assembled for a one-day workshop facilitated by the Ministry of Health. Following the workshop, the survey was piloted with ten radiation therapists with varying years of experience [17].

The questions were grouped by key constructs to keep the participant focused [18]. Section one related to demographics, current employment and if the RT moved from overseas to work in New Zealand. Further sections explored perceptions on RT qualifications, workplace satisfaction, career and future intentions, professional development, working in New Zealand and RT research. A range of question types were employed, all making good use of different rating scales.

The entire population of 396 radiation therapists who have a current annual practicing certificate issued by the MRTB in 2019 were invited to participate. A multi-channel approach (email, social media and verbal communication) was used to reach the participants. Achieving a high response rate was important to understanding the perspectives of the RT workforce given the sample size. RT treatment centres who achieved a 70% or higher response rate received a team lunch funded by a research grant to thank them for their participation. The survey was open and col-

lected data from 30 September 2019 until 30 October 2019. A reminder email was sent on 14 October to improve the response rate [18]. RTs completed the survey via Qualtrics® and accessed via an open link. Ethical approval was obtained from the University of Waikato Human Research Ethics Committee (Health): HREC (Health)2019#63.

SPSS® V25 was used for data analysis. Participants could choose to not answer any question and still progress through the survey. This resulted in some questions having missing data; this was generally much less than 2% for each question with only one question in the analysis having 4% missing data. Data used for analysis had the missing variables replaced with the series mean for that question [19]. A descriptive analysis was initially conducted to provide an overview of the participant characteristics.

The dependent variable intent to remain in the workplace was measured with a single yes/no question. The dependent variable intent to leave the profession was the sum of three yes/no items. For the independent variables, principal components factor analysis with varimax rotation was used to identify underlying factors of RTs perceptions on working in New Zealand and their workplace (i.e., independent variables). Cronbach's alpha was used to calculate the reliability of the scales except for intent to leave the profession, which used the KR-20.

Binary logistic, multivariate regression analysis was used for the dependent variable intent to leave the current workplace and hierarchical, multivariate, linear regression was used for intent to leave the profession. Independent variables were grouped into demographic (sex, age, etc.), workplace (public or private workplace, workload, etc.) and profession (qualification, pride working as a RT, etc.). Utilizing a parsimonious model approach, variables with a $p < 0.25$ were carried forward into the final model.

Results

Demographics and preliminary analysis

There were 362 RTs who acknowledged the participant information sheet and completed the survey, resulting in a response rate of 91%. All cancer centres achieved the 70% response rate required for a team lunch (range 77–100%). The average time to complete the survey was 23 min. Table 1 summarises the demographics, qualifications and employment characteristics of the participants.

Six factors were identified in the analysis of workplace perceptions: Safe culture for learning, Workload, Professional value and advancement, Professional development, Quality of service and Variety of work. Supplemental File 1 displays the results of the factor analysis along with descriptive statistics and Cronbach's alphas for the factors.

Intent to remain in workplace

One third of RTs are thinking of leaving their current workplace. Of this group, 31% are planning to leave in the next 12 months, 25% within the next 1–2 years, 21% in 3–6 years, 4% after 7 years and 19% when a role becomes available. Additionally, 12% of those leaving plan to work in another NZ RT department, 21% plan to move overseas, 45% are undecided where they will go and 22% site other reasons, mostly retirement.

The model included eight independent variables in the logistic regression model and accounted for 20% of the variance as to what keeps a RT at their current workplace (see Table 2). For demographics, having a BSc qualification decreases the likelihood of staying in the workplace. Other significant variables included workload satisfaction and professional development; increases in

Table 1
Demographic, workplace and professional characteristics of RT respondents.

Variable and Attribute	n	%	M	SD
Age (years)				
≤30	127	35	36.3	10.3
>30	237	65		
Sex				
Male	47	13		
Female	315	87		
First Qualified				
New Zealand	282	78		
Overseas	80	22		
Availability for work limited by caring for dependants				
Yes	109	30		
No	253	70		
Qualification				
Certificate	4	1		
Diploma	65	19		
Bachelor Degree	233	77		
Master Degree	3	1		
Other	8	2		
Years practicing			13.0	9.2
Employer				
Public DHB	267	78		
Private Practice	57	17		
Both Public DHB and Private Practice	18	5		
Role*				
Staff RT	211	56		
Supervisor RT	61	16		
Specialist RT	44	12		
Section Head	16	4		
Educator/Tutor	17	5		
Research RT	8	2		
Charge RT /Manager	15	4		
Other	8	2		
Contracted hours worked per fortnight				
0–20	12	3		
21–40	81	22		
41–79	94	26		
80	177	49		
Desire to change contracted hours in the next year				
No change	254	75		
Increase hours	17	5		
Decrease hours	69	20		
Overtime hours worked per fortnight				
1 h or less	211	63		
Greater than 1 h	126	37		
Participate in on call				
Yes	131	45		
No	162	55		
Call backs per year				
0	17	14		
1–10	67	55		
11–20	25	20		
21+	14	11		
Average length of call back (hours)				
<1	0	0		
1–3	76	72		
3–6	30	28		
Taken a career break				
Yes	169	49		
No	173	51		
Number of career breaks				
1	64	38		
2	65	38		
3	21	13		
4+	18	11		
Longest Career Break				
<1 year	89	53		
1–5 years	71	42		
Greater than 5 years	8	5		

* Some RTs hold multiple roles.

both variables results in an increased likelihood of remaining in the current workplace.

Participants who indicated that they are thinking of leaving their current workplace were asked what it is about their workplace that makes them want to leave. The need for change or a

Table 2
Variables associated with intent to remain in the current workplace.

Variable	β	p	Odds Ratio	95% CI	
				Lower	Upper
<i>Demographic</i>					
Qualification	−0.88	0.04	0.41	0.18	0.98
Age	0.42	0.25	1.04	0.97	1.12
Availability for work limited by caring for dependants	0.38	0.21	1.46	0.81	2.63
<i>Workplace</i>					
Safe Culture for learning	0.75	0.67	1.08	0.74	1.57
Workload	0.45	0.03	1.57	1.06	2.32
Professional Development	0.87	<0.01	2.39	1.54	3.69
Variety of Work	0.00	0.99	1.00	0.56	1.81
<i>Profession</i>					
Years of experience	−0.01	0.88	0.99	0.92	1.08

new challenge, dissatisfaction with career progression and burnt out were the three most common reasons. Alternatively, those RTs who had no plans to leave their workplace cited satisfaction with radiation therapy, good work conditions and satisfactory morale and/or camaraderie between staff as the three most common reasons to stay.

Intent to leave profession

Twenty percent of RTs plan to remain working in the profession until they retire with 35% expecting to change careers and the remaining 45% unsure. One quarter of RTs either agree or strongly agree that they would leave radiation therapy if they could.

The dependent variable intent to leave the profession was used in a multiple regression model. Five variables *age, variety of work, workplace satisfaction, years of experience* and *proud working as an RT* were statistically significantly correlates (see Table 3). The older the RT gets, the more satisfied they are with their workplace and the more proud they are working as a RT, the lower their intent to leave the profession. Additionally, as the RT becomes more experienced and the variety of work index increases the greater their intent to leave the profession.

Participants who planned to leave the profession were asked how important various factors were when making their decision. The need for change or a new challenge, having flexible working arrangements and working conditions were the three most important factors. Alternatively, those RTs who had no plans to leave the profession cited good morale and/or camaraderie between staff, satisfaction with the profession and flexibility in work arrange-

ments as the three most important factors. The least influential factor was research opportunities.

Discussion

The study aimed to gain an understanding the perceptions of RTs working in New Zealand, particularly factors contributing to intent to remain in the workplace and leave the RT profession. RTs identified workload and working conditions as significant factors that influence their decision to stay in both the workplace and profession; this is consistent with previous research on health care professionals [8,20].

Creating a workplace environment where the staff numbers and skill mix are sufficient, RTs can spend the proper amount of time with patients and the job can be completed within the paid time available were found to positively influence a RT remaining in their workplace [8]. For the two-thirds of RTs who intend to remain in their current workplace, being satisfied with their profession, good work conditions and good staff morale were the main reasons to stay. These differed slightly from what was seen in Australia where location, satisfactory salary and good working conditions were the main reasons to stay working where they were [14]. Location or pay rate were not factors in either intent to leave the workplace or the profession for New Zealand RTs. The majority rated their pay rate either good or very good.

More than a third of New Zealand RTs stated they would change careers before they retire. This number is alarmingly high considering that only 13% of Australian RTs stated they would change careers [14]. The reasons for leaving included working conditions,

Table 3
Variables associated with intent to leave the profession (M = 0.66, SD = 0.36, KR-20 = 0.68).

	Unstandardized Coefficients		Standardized Beta	Sig.	95% CI for B	
	B	Std. Error			Lower	Upper
<i>Demographics</i>						
Age	−0.02	0.01	−0.73	<0.01	−0.03	−0.01
Contracted hours worked per fortnight	0.00	0.00	0.03	0.63	0.00	0.00
Gender	−0.06	0.05	−0.72	0.18	−0.15	0.03
<i>Workplace</i>						
Work for DHB	0.00	0.07	0.00	0.99	−0.13	0.13
Work regular overtime	0.05	0.04	0.07	0.23	−0.03	0.13
Participate in on call	0.05	0.04	0.06	0.28	−0.04	0.13
Quality of service	0.05	0.04	0.08	0.17	−0.02	0.12
Variety of work	0.14	0.05	0.17	<0.01	0.05	0.23
Workplace satisfaction	−0.20	0.03	−0.44	<0.01	−0.26	−0.15
<i>Profession</i>						
Years of experience	0.02	0.01	0.57	<0.01	0.01	0.03
Proud of working as an RT	−0.12	0.03	−0.21	<0.01	−0.18	−0.06
Taken a career break	−0.05	0.04	−0.21	0.24	−0.14	0.03

F (12,253) = 10.53, p < 0.001, Adjusted R² = 0.30.

lack of challenge and variety of work. The challenge is not research related as a move into academic or research roles is not a priority for RTs with eight percent indicating their desire for this change which is consistent with other studies [8,14]. Although some RTs describe their roles as monotonous, variety of work is not a driver to keep an RT in the profession and was negatively associated intent to stay which translates to a desire for RTs to specialise or advance in their practice [8,9,11]. The majority of RTs are employed in a staff RT capacity and only 12% are practicing in specialist roles, with limited opportunities to advance within the current clinical environment. This needs to change to reverse the potential mass exodus of highly skilled RTs.

The need for a formalized framework for RTs to expand their practice is well documented [9–12]; despite this need, there seems to have been little done implementing this in Australia and New Zealand. In Ontario, Canada an advanced practice Clinical Specialist Radiation Therapist (CSRT) role and practice framework has been successfully implemented [12,13]. This has relieved local workforce pressures while allowing RTs to work at the full scope of their practice [9,12]. Advanced practice roles that challenge the RT and allow them to specialise within their profession are essential for the sustainability of the workforce and radiation oncology service as a whole. The consequence of not developing advanced practice roles in New Zealand has now been quantified by this study, particularly considering more than 90% of the workforce has taken the time to respond to the survey and voice their perspective.

The New Zealand Cancer Action Plan details the need to identify scopes of practice to expand and to align with new models of care along with where resources need to be targeted to meet the future need [2]. Developing a new model of care that will enable radiation therapists to advance their career by working towards advanced practice is incredibly complex, requiring legislative change, advanced education and new scopes of practice to be developed. There are opportunities to learn from other related professions e.g. nursing and nurse practitioners [21] and countries such as Canada [9,12,13].

The study has some limitations in that it does not seek the perspectives of RTs who have left the workforce due to current challenges locating them within the study timeframe. Understanding the perceptions of those who have actually left the workforce and the motivations for that decision would provide valuable insight to either validate the current study or add further variables to the model of RT workforce retention. Further, there are additional factors to consider when understanding the sustainability of the workforce as a whole. Modelling the supply of RTs into the workforce (domestic new graduates and overseas trained RTs immigrating to New Zealand) and balancing that against how many RTs are expected to leave based on the study and naturally due to retirement is required. These factors will allow the supply of RTs to be estimated for future years. Matching supply with intent to leave and expected demand will enable any shortfall to be identified and highlight issues to be prioritized; this is in line with the New Zealand Cancer Action Plan's directive [2].

Finally, this study is quantitative by design; an opportunity exists to further qualitatively explore the significant factors identified in this study, namely workplace satisfaction and why the work is not challenging. Gaining a more in-depth understanding of the extrinsic and intrinsic motivators that lead to a RT leaving the workplace and profession will enable the RT workforce retention model to be strengthened ahead of the study being repeated in the future to assess the impact of any strategies implemented from this study.

Conclusion

This is the first study in New Zealand to provide a comprehensive overview of the radiation therapy workforce and describe the

perspectives of RTs on their profession, workplace satisfaction and intent to remain both in the workplace and the profession. Key stakeholders are now able to clearly understand the state of the workforce and prioritize areas for action. Supportive and flexible working conditions and opportunities for career advancement have the highest influence on RT workforce satisfaction and retention. Strategies that promote a positive workplace culture and develop new models of care for career advancement are likely to improve workforce satisfaction and retention of RTs in both the workplace and profession. Good workforce retention is crucial to ensuring a well-functioning, cost effective health service capable of delivering positive health outcomes for its population.

Ethics statement

Ethical approval was obtained from the University of Waikato Human Research Ethics Committee (Health): HREC (Health) 2019#63.

Consent to participate was obtained from participants after they reviewed an information sheet and then checked a box to acknowledge this in order to advance to the survey.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary material

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.tipsro.2020.11.002>.

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