Not Government Policy

TE AHO O TE KAHU CANCER CONTROL AGENCY

CANCER SERVICES PLANNING

Radiation Oncology

Model of Care

September 2024

FOREWORD



In Aotearoa | New Zealand, approximately 27,000 people are diagnosed with cancer every year. Currently, around one in three of these people will receive radiation therapy during their cancer course.

The delivery of radiation therapy is complex and requires a highly skilled radiation oncology workforce using specialised technology to provide this highly effective treatment. At present, not all people in Aotearoa have equitable access to radiation oncology care. Patients and whānau often need to travel long distances to receive treatment and many experience barriers to doing so.

Radiation oncology services in Aotearoa are facing many critical challenges. These include workforce shortages, service sustainability, and limitations of infrastructure capacity.

The restructure of the healthcare system, with the removal of District Heath Boards and the creation of Health New Zealand, has provided a perfect opportunity to reconsider how radiation oncology services are designed and delivered to best meet the needs of people in Aotearoa.

Recognising this opportunity, Te Aho o Te Kahu has facilitated a whole of system project to look at how cancer services are structured and how they could better deliver patient and whānau focused, high-quality, sustainable and equitable care. The project involved extensive stakeholder consultation to understand what was, and was not, working in the current system and led to the development of models of care for all cancer services including surgery, radiation and medical oncology and stem cell transplant.

The radiation oncology model of care is one outcome of that work. The model of care is aspirational and describes the key attributes of an optimal national radiation oncology service in Aotearoa. It sets a clear direction for the future, and a proposed vision as to how radiation oncology services should be organised and delivered to create a positive system shift and improve care for patients and whānau across Aotearoa.

How will this vision be turned into a reality? It will be a challenging task and one that requires support and commitment from Health New Zealand to implement. The healthcare professionals and support services that provide radiation oncology treatment are dedicated, compassionate, and driven. However, services are strained, and there must be action to bring about meaningful change.

We would like to acknowledge all those across Aotearoa who have been affected by cancer – either living with the disease, supporting others, or those who have lost loved ones. We hope this model of care captures your needs and wishes, and the needs and wishes of your whānau as we aim to develop and deliver the highest levels of cancer care.

Noho ora mai.



Dr Claire Hardie BSc, MBChB, MHSM, FRCR, FRANZCR
Radiation Oncologist and Chair of Radiation Oncology Working Group

ACKNOWLEDGMENTS

The Te Aho o Te Kahu Radiation Oncology Model of Care Project Team would like to acknowledge the role and contribution of all those who have taken part in the development of the Model of Care for Radiation Oncology. This work would not have been possible without a significant collaborative effort from patients and whānau, and all those involved in the delivery of radiation oncology services.

The generous contribution of time, knowledge and expertise by clinical and operational staff and consumers, has been invaluable in shaping the direction of this work and informing the key steps to achieve optimal and sustainable radiation oncology services across Aotearoa | New Zealand.

In addition to best practice standards and evidence, this document represents the cumulative feedback, information, and advice from those providing care for people receiving radiation oncology services across Aotearoa. It also incorporates insights from patients and whānau who have received radiation oncology services.

Ngā mihi nui mō te whau wā ki te āwhina.

Thank you for taking the time to contribute.

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PURPOSE OF THIS DOCUMENT

There is a need to improve equity of access to, and sustainability of, radiation oncology services in Aotearoa. These improvements will ensure optimum care for patients and whānau and a fulfilling environment for those working in radiation oncology.

This document outlines the key attributes of an optimal radiation oncology service designed to deliver equitable, high-quality, and effective radiation oncology care for patients and whānau. Consolidating these attributes into a national model of care forms the basis from which future planning and ongoing quality improvement can occur.

To guide the evolution and enhancement of radiation oncology services in Aotearoa, this model of care will be used alongside an implementation plan that will be developed by national commissioners in partnership with service providers.

Radiation therapy is a core aspect of cancer treatment, estimated to contribute to 40% of all cancer cures (Department of Health Cancer Policy Team, 2012). Radiation oncology service providers in Aotearoa are committed to providing safe and effective patient care. However, there are significant challenges impacting service delivery and many opportunities to improve patient care and equitable access to treatment and care.

The term 'model of care' has many different interpretations. In this document, model of care is used to describe how services are designed and delivered to ensure that the needs of all people and their whānau are consistently met when receiving radiation oncology care.

The attributes of an optimal service described in this document reflect the views and recommendations of the radiation oncology sector and stakeholders, alongside best available evidence. The listed attributes include current practice that already reflects optimal care, opportunities to evolve current practice, and some entirely new ways of working.

The model of care has been drafted with Te Tiriti o Waitangi at the forefront of thinking. This includes considering how radiation oncology services will need to evolve to address racism and discrimination, how to balance leadership between providers and Māori communities, how to empower consumer and whānau voice, optimise shared decision-making and resources, and how commissioners and providers will be accountable for Māori health equity.

The intention is that this model of care will be used to drive the changes needed to improve radiation oncology services and provide information to support decision making and strengthen cases for investment.

Whilst this model of care focusses on public hospital and specialist services for radiation oncology, it is noted that radiation oncology services are sometimes delivered in partnership with private providers. This model of care is intended to

identify optimal attributes for all publicly funded radiation oncology services in Aotearoa, regardless of where care is provided.

Next steps

This document is not intended to address how the system will move from the current state to the future state; this will be done via an implementation plan developed in collaboration with service providers and national commissioners. The implementation plan will form a blueprint to take Aotearoa radiation oncology services from the current under-resourced state to the equitable, timely, accessible, and technically advanced services that they need to be.

Radiation oncology services in Aotearoa are integrally linked with other public cancer treatment services that deliver concurrent or sequential cancer treatment and support, such as medical oncology and surgical services. The development of the radiation oncology model of care has been considered alongside the development of models of care for other cancer treatment services. How these services are linked and delivered, alongside links with other primary, secondary, and tertiary health services, will remain critical during implementation planning to ensure a seamless pathway for patients and whānau.

STRUCTURE OF THIS DOCUMENT

This document provides a brief summary of the current state of radiation oncology in Aotearoa, and then sets out the attributes of an optimal, future-focused radiation oncology service.

This model of care document is presented in two parts. The first describes the current state of radiation oncology services in Aotearoa. This highlights contemporary issues and constraints, and thereby sets out the rationale for change and improvement.

The second part is focused on the future state and describes the system attributes required to deliver an optimal and seamless pathway for patients and whānau requiring radiation oncology treatment. The first section starts with a description of a future focused, aspirational patient pathway, and what patients should be able to expect at each step of radiation oncology care. The second section describes the system attributes – across seven chapters – that are required to create a seamless patient-focused pathway and optimal radiation oncology service provision. These attributes will form the foundation of implementation planning and are intended to support decision-making and service planning by the commissioners of radiation oncology services.

The attributes in the model reflect a **whole-of-service perspective**. This offers the opportunity to be innovative, while remaining mindful of the need for all aspects of a service to be high functioning for improvement to occur. The model of care also reflects a **whole-of-system** approach to recognise the contribution of all parties (including private centres and non-government organisations) involved in delivering radiation oncology services.

In this document the term **national commissioner** is used to broadly describe the entities who are involved with commissioning radiation oncology services at a national level. This includes policy makers, service commissioners and planners. This document also refers to **providers**, which is used to represent all parties involved in the direct delivery of radiation oncology services. This includes service leaders, clinicians and support staff involved in day-to-day operation of services. Throughout the document there is also reference to providers utilising **national policies, processes and guidelines**. Where these don't currently exist or are not in an optimal form, the expectation is that these will be developed and maintained by national commissioners, in collaboration with providers.

Whilst this document tries to distinguish what needs to occur at a national level and at a regional/local provider level; within these categories not everyone will be responsible for all attributes. It is also acknowledged that there is a need for system-wide ownership of the new model of care, recognising that patients and whānau view the system as one entity, and their pathway within it as a continuous set of experiences.

DEVELOPING THE MODEL OF CARE

This model of care is a synthesis of evidence and international best practices complemented by the perspectives of those who best understand radiation oncology; patients and whānau who receive treatment and those who deliver care.

In 2021, Te Aho o Te Kahu | Cancer Control Agency commenced the Cancer Services Planning (CSP) programme to develop and provide strategic advice that could be used to improve the delivery, efficacy, and equity of cancer treatments within the reformed health system.

Phase one of this programme involved engagement with a wide range of stakeholders to understand the current challenges and the priority areas for action. This culminated in a current state report that included a high-level vision for change; *He Mahere Ratonga Mate Pukupuku, Cancer Services Planning* (Te Aho o Te Kahu, 2022).

Phase two of the programme was established in 2022. In Phase two, Te Aho o Te Kahu has engaged with service providers and key stakeholders to develop new models of care across four key cancer treatment modalities: surgery, radiation oncology, stem cell transplant, and systemic anti-cancer therapy (SACT).

During Phase two, meaningful progress has been made to respond to the feedback of stakeholders and deliver on the phase one recommendations, by developing future facing models of care across the cancer treatment modalities. This phase has a three-step approach, with step one for radiation oncology now complete.

Steps:

1. Definition and agreement of the shape of the proposed model.
2. Assessment of the difference between what is proposed and the current reality and optimal service attributes.
3. Engagement with national commissioners, and associated stakeholders, to develop implementation plans that address these differences.

The development of the radiation oncology model of care has included:

- the establishment of a project team within Te Aho o Te Kahu
- ensuring the work includes an overarching focus on eliminating inequity, prioritises accessibility and acceptability, and meets our obligations and responsibilities under Te Tiriti o Waitangi
- continued development and refinement of the Phase One findings
- a national workshop with stakeholders from all radiation oncology centres, consumers, advocates, and Māori leadership to test initial ideas, held March 2023
- engagement with clinical leaders
- discussions with service leads and managers
- virtual meetings across Aotearoa with clinical staff delivering services including radiation oncologists, radiation therapists, medical physicists, nurses and allied health practitioners.

All steps have been informed by the aspirations of providers and whānau experiencing radiation oncology services in Aotearoa. The document is also informed by *Rongohia Te Reo, Whatua He Oranga: The Voices of Whānau Māori Affected by Cancer* report with references from this report included throughout the model (Te Aho o Te Kahu, 2023).

Te Tiriti o Waitangi and the model of care development

The model of care has been drafted with Te Tiriti o Waitangi at the forefront of thinking.

The current cancer inequities between Māori and non-Māori are evidence of the failure of the health system to enable Māori to exercise authority over their health and wellbeing, and the failure to engage effectively with diverse Māori realities (Ministry of Health, 2020).

To ensure Te Tiriti o Waitangi principles were consistently considered and prioritised, the following framework (Table 1) has been applied.

Table 1: Applying Te Tiriti o Waitangi Principles: Project Framework

Te Tiriti o Waitangi Principles	**The attributes in this model of care will enable commissioners and service providers to....**
Tino Rangatiratanga Provides for Māori self-determination and mana motuhake in the design, delivery, and monitoring of health and disability services	Provide and educate Māori whānau with the information and resources they need to exercise tino rangatiratanga over their treatment journey. Ensure services are designed sustainably and in partnership with appointed equity champions and Māori consumer representatives.
Equity Requires the Crown to commit to achieving equitable health outcomes for Māori	Put in place a range of priorities and resources to ensure that Māori have equitable access to services. Support the inclusion of mātauranga and te ao Māori practices alongside westernised treatments where appropriate.
Active Protection Requires the Crown to act, to the fullest extent practicable, to achieve equitable outcomes for Māori. This includes ensuring that it, its agents, and its treaty partner are well informed on the extent, and nature, of both Māori health outcomes and efforts to achieve Māori health equity	Be informed by key strategic documents and programmes focused on equitable health outcomes for Māori, including: • Government response to Hauora Manaaki Ki Aotearoa Whānui - Health and Disability System Review • Government response to Pūrongo a te Komiti Whiriwhiri Take Māori – The Māori Affairs Committee inquiry into health inequities for Māori • Whakamaua: Māori Health Action Plan 2020 – 2025 • He Pūrongo Mate Pukupuku o Aotearoa 2020 - The State of Cancer in New Zealand 2020 (Te Aho o Te Kahu, 2021)

Te Tiriti o Waitangi Principles	The attributes in this model of care will enable commissioners and service providers to....
	• Te Pae Tata interim New Zealand Health Plan 2022 (Te Whatu Ora and Te Aka Whai Ora, 2022) • Insights gathered through Te Aho o Te Kahu Māori community hui series in 2021 (Te Aho o Te Kahu, 2023) and the wider Cancer Services Planning programme.
Options To provide for kaupapa Māori health services and to ensure that all healthcare services are provided in culturally appropriate ways that recognise and support the expression of hauora Māori models of care	Strengthen relationships with kaupapa Māori health providers who in turn can support patients and whānau to receive services in a mana enhancing manner. Incorporate insights and opinions from kaupapa Māori health providers, Māori health professionals and whānau Māori to understand cultural sensitivity and opportunities for improvement. Recognise that kaupapa Māori health providers have an influence which they naturally incorporate in their daily work routines. Support all people working in radiation oncology cancer treatment services to develop their knowledge of and ability to deliver culturally safe care. This includes: • embedding cultural protocols and priorities into service designs • ensuring all staff members are familiar and comfortable with key concepts such as tapu, noa and tikanga practices • ensuring staff understand and can apply various Māori health models (Te Whare Tapa Wha, Te Wheke, Te Pae Mahutonga, and Te Waka o Meihana). • recognising and supporting any whānau Māori who may be disconnected from their cultural roots.
Partnership The principle of partnership, which requires the Crown and Māori to work in partnership in the governance, design, delivery, and monitoring of health and disability services. Māori must be co-designers, with the Crown, of the primary health system for Māori.	Partner with Māori (including Hei Āhuru Mōwai, clinicians, heath providers, patients and whānau) to develop a robust clinical and operational governance structure, inclusive of monitoring and evaluation, that places equity and tino rangatiratanga at the centre and is consistent with the aforementioned national strategic health documents. Incorporate insights and opinions from kaupapa Māori health providers, Māori health professionals and Māori patients and whānau to understand cultural sensitivity and opportunities for continuous improvement.

An equity-led and whānau centred model of care

There are many drivers of inequity. These factors can be at a societal level (eg, social determinants of health) or more directly related to cancer treatment and care (eg, the design of cancer services). While the radiation oncology model of care is limited in its ability to affect the broader factors, there is good evidence that a focus on factors such as service design and delivery can address inequities (Gurney et al., 2019).

In developing the attributes of the radiation oncology model of care there has been a deliberate focus on how to improve the accessibility, availability, acceptability, and standardisation of service delivery at each step. Each attribute has been tested for its influence in addressing inequity and how it reflects a whānau centred approach.

The following questions have guided the analysis.

1. Who is most affected by this issue/work, and how are they affected?
2. Are Māori needs and aspirations identified?
3. How will this work improve the experience of people and their whānau?
4. What Māori and Pacific health gains will come from this work?
5. Will this work develop or progress kaupapa Māori initiatives?
6. How do the wider determinants of health impact on this work?
7. How are Māori, Pacific and disabled people involved in planning and decision-making?
8. How will this work contribute to more equitable cancer outcomes for Māori, Pacific and disabled people?
9. What unintended consequences might arise? Who is going to endure these consequences the most? Are there risks for widening the equity gap? How could these be mitigated?

Māori community hui

Te Aho o Te Kahu community hui were held across Aotearoa in 2021. The aim of these hui was to hear the stories and experiences of whānau Māori, so that their voices could help shape the future direction of cancer care. *Rongohia Te Reo, Whatua He Oranga: The Voices of Whānau Māori Affected by Cancer* report was released in 2023 and summarises the themes and insights from the hui (Te Aho o Te Kahu, 2023).

Aspirations identified by whānau Māori included:

- reorientating services to meet the needs of Māori
- developing a system that accommodates kaupapa Māori concepts, so Māori feel supported to undertake and complete treatment
- ensuring support is available for both the patient and their whānau

- ensuring system mechanisms are developed that encompass te ao Māori and mātauranga Māori concepts and that these are made available to patients and whānau, addressing racism in all its forms.

Whānau Insight pop-up boxes

Some of the insights gained during the community hui process have been included throughout the model of care document. Examples of key insights that helped shape the model of care have been included in 'whānau insight' boxes in each section.

ABOUT RADIATION THERAPY

Radiation oncology services provide radiation therapy as a method of treating cancer. Radiation therapy uses ionising radiation to destroy or damage cancer cells to stop them multiplying and growing. Radiation therapy can be used to cure cancer, to reduce the size of a cancer before surgery, to reduce the risk of the cancer returning after surgery, and in palliative care to relieve pain and other symptoms. It can be part of the treatment for almost all cancers, including some types of benign tumours, and can be targeted to anywhere in the body.

Patients receiving radiation therapy may also receive other types of cancer treatment, including surgery, SACT, transplant and cellular therapies, and palliative care services. Radiation therapy is suitable for most patients, including older people, or people with multiple co-morbidities that may mean they are not suitable for other types of treatment.

Patients needing radiation therapy will discuss treatment options with a radiation oncologist. Once a treatment course is agreed several steps are undertaken to assess, prepare, and plan for treatment. Planning and quality assurance checks may take two hours or two weeks, depending on the complexity of treatment. A radiation treatment course can vary from a single treatment to eight weeks of daily treatment, with each treatment taking between 10-30 minutes to complete.

There are several different workforces involved in the delivery of radiation oncology care. This includes specialist staff who are trained to directly deliver radiation therapy and a wide range of allied health and other support staff who are critical to the provision of high-quality care.

The majority of radiation therapy is delivered on a linear accelerator (LINAC). LINACs, and other equipment used for radiation therapy, require custom-built facilities, specialised equipment and operate mostly as an outpatient service. However, certain treatments and the management of acutely unwell radiation oncology patients may require inpatient care.

There are different types of radiation treatment available, including:

- **External beam radiation therapy** is when a LINAC creates a radiation beam (photon or electron beam) and it is directed at a site within the body. Computer software adjusts the beam's angle, shape, and intensity to accurately deliver each treatment plan. Most patients receiving radiation treatment receive external beam radiation therapy. Stereotactic radiation therapy is a form of external beam radiation therapy.

- **Superficial radiation therapy** is a form of external beam radiation therapy that uses lower energy beams. It is delivered using low energy x-rays and does not require a LINAC. This type of radiation does not penetrate very deeply and avoids deep tissue damage. It is mostly used in the treatment of superficial skin cancers.

- **Brachytherapy** is when implants containing radioactive material are placed into the cancer or surrounding tissue within the body and deliver a very localised radiation dose. Implants may be permanent or temporary. Common indications include cervical, endometrial, and prostate cancer.

- **Radioisotopes (theranostics)** involves swallowing or receiving an injection of radioactive material that specifically targets cancer cells that take up the radioactive material. The radioactive material leaves the body in hours to days.

Radiation oncology services are capital and resource intensive. LINACs cost around 4-5 million dollars per machine with a lifespan of up to ten years; however, the associated infrastructure, technology, equipment, and workforce costs can be five or six times this amount. Despite the large infrastructure cost, radiation treatment is considered a very cost-efficient treatment modality overall due to the number of people that can receive treatment and the relatively low operational and maintenance costs of a LINAC over its lifespan.

Advances in radiation oncology services enable health care professionals to treat and manage disease with increased accuracy. A combination of modern imaging techniques and LINAC technologies allow tumours to be accurately targeted, thereby reducing the amount of radiation received by healthy tissue. This can mean a reduction in side effects and may enable a larger dose of radiation to be delivered per treatment, which decreases the overall number of treatments required.

CURRENT STATE OF RADIATION ONCOLOGY SERVICES IN AOTEAROA

Each year around 12,000 people in Aotearoa will have a first specialist assessment (FSA) appointment with a radiation oncologist and the public health system will deliver 160,000 radiation therapy treatments (Te Aho o Te Kahu, 2021).

Radiation treatment is provided across 24 LINACs delivering radiation therapy in public cancer centres, with a further eight LINACs in private cancer centres. The current distribution of LINACs is outlined in Table 2. LINACs are located within six public regional radiation oncology centres, with each region delivering to populations ranging from 350,000 – 1.9 million people.

Table 2: Distribution of LINACs in Aotearoa

Provider	Owner	Number of LINACs	Location
Auckland	Public	6	Auckland
**Northland*	*Public*	**1*	*Whangārei*
Auckland Radiation Oncology (ARO)	Private	2 (one additional LINAC estimated to go live in 2025)	Auckland
Waikato	Public	4	Hamilton
Kathleen Kilgour Centre (KKC) **	Private	3	Tauranga
MidCentral	Public	4 (may decrease once regional LINACs operational)	Palmerston North
**Hawke's Bay*	*Public*	**1*	*Hastings*
**Taranaki*	*Public*	**1*	*New Plymouth*
Capital and Coast	Public	3	Wellington
Bowen Icon Cancer Centre	Private	1	Wellington
Canterbury	Public	4	Christchurch
St George's Cancer Care Centre	Private	2	Christchurch
Southern	Public	3	Dunedin

**Regional LINAC placement currently in progress, estimated to be operational between 2025-2028 (Northland 2026, Hawke's Bay 2028, Taranaki 2025) **KKC is contracted to provide public radiation*

therapy funded by Hauora a Toi Bay of Plenty. There is additional treatment infrastructure in private centres - ARO has a CyberKnife, St George's has a MR-LINAC.

Whilst radiation treatment is delivered in main centres, most cancer centres provide outreach or visiting outpatient clinics for patients living in rural and smaller urban areas for patient assessment and follow up.

Currently, some public radiation oncology centres outsource to private providers to maintain timely access to treatment for patients in their region. One of the private centres also exclusively provides the core publicly funded service for their region under multi-year contract with Health New Zealand. Two private centres have invested in additional highly specialised treatment machines. These are CyberKnife in Auckland and MR-LINAC in Christchurch and there is not a pathway for public patients to access these.

There are some pathways available for patients to access highly specialised, high-complexity treatment modalities that are not available in Aotearoa, such as proton beam radiation therapy. However, this involves high costs and the pathways can be challenging to navigate with access to treatment not always approved.

A more detailed description of the current state of radiation oncology services can be found in *He Mahere Ratonga Mate Pukupuku, Cancer Services Planning* (Te Aho o Te Kahu, 2022).

Issues with the current state

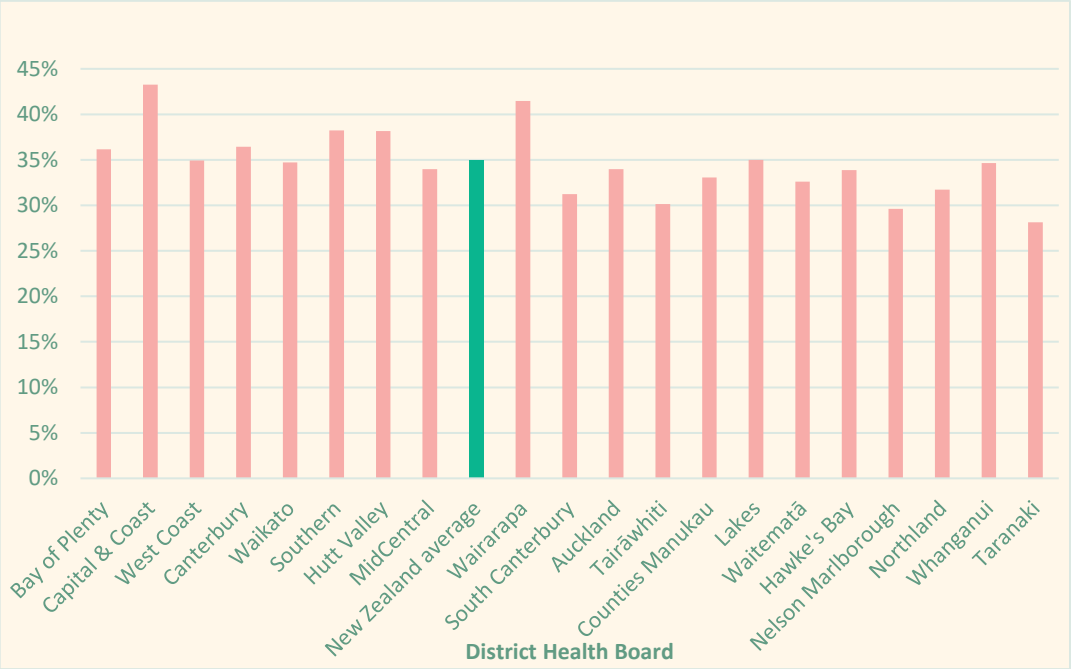
Not all people in Aotearoa have equitable access to the radiation oncology services and the treatment they need. *He Mahere Ratonga Mate Pukupuku, Cancer Services Planning* provides a summary of the issues currently faced by radiation oncology services in Aotearoa and outlines a compelling case for change. A summary of the key issues is provided below.

Service distribution and inequities in access

Since LINAC machines are in main centres, many people need to travel – often long distances – to receive radiation therapy. This often requires people to live away from home for periods of up to six weeks or more. The distance to radiation therapy facilities can be a factor in whether people decide to receive radiation therapy or not, as it impacts on time away from work, home and supporting family or friends.

It is estimated that approximately half of all new cancer patients would benefit from radiation therapy; however, currently only 33% of people with cancer in Aotearoa receive radiation therapy (Barton et al., 2014) (Jaffray & Gospodarowicz, 2015). This drops to as low as 28% for people in some areas as seen in Figure 1. The 33% intervention rate in Aotearoa is considerably lower than the optimal radiation therapy intervention rate of 48% recommended by The Royal Australian and New Zealand College of Radiologists (The Royal Australian and New Zealand College of Radiologists (RANZCR), 2023).

Figure 1: National radiation therapy intervention rates 2020/2021



At a national level, Māori have a higher intervention rate for radiation therapy than non-Māori; however, it is unclear the extent this might be in response to lower access to other treatment options (Te Aho o Te Kahu, 2022). It is important that radiation oncology data are viewed alongside surgical and systemic therapy data, as radiation therapy may be used when other treatments are not offered due to advanced stage at diagnosis or co-morbidity.

Service planning and infrastructure

Currently each radiation oncology centre operates autonomously and is individually accountable for providing its catchment population with equitable and timely access to treatment. This service model makes it difficult to collaboratively plan and deliver patient treatment and individualise services to meet patient needs. The overall impact is inequity of access to care for patients, a stretched workforce and a siloed radiation oncology service that is vulnerable to disruption.

Appropriate funding for replacement and new LINACs is difficult for individual regions to prioritise due to high costs and competing capital demands. All public radiation treatment centres are over 100% capacity, with some centres reaching 140% by running the LINACs afterhours through additional shifts. Whilst this assists in meeting clinical need, it creates a challenge to have adequate time for essential machine maintenance and quality assurance activities and can impact LINAC lifespan. More LINACs are needed to meet both current and future demand. Figure 2 shows projected LINAC availability across three different intervention and retreatment rates.

Figure 2: LINAC supply versus demand. The intervention rate (IR) is the proportion of all registered cancers that are treated with at least one course of radiation therapy while the subsequent retreatment rate (RTR) is the proportion of all radiation therapy.



The current service planning model also means that new technologies and innovation are considered and implemented regionally, leading to inconsistent access. Without a systematic approach to assessment and implementation, this is likely to create inequities and inconsistent access across Aotearoa and potentially contribute to inefficient use of the system.

Workforce issues

The radiation oncology workforce is facing a number of critical challenges, including understaffing, concern about future workforce sustainability and staff burnout, and limited workforce diversity. A focus is needed on improving cultural safety across the workforce to better address the needs of people with cancer and their whānau.

The current radiation oncology system has seen a lack of systematic, forward-thinking workforce planning, making the sustainability of service delivery a major concern that each region has been trying to solve individually. This is exacerbated by having to respond to increasing demand, therefore reducing time and capacity for strategic workforce planning.

TE AHO O TE KAHU CANCER CONTROL AGENCY

THE ATTRIBUTES OF AN OPTIMAL RADIATION ONCOLOGY SERVICE

AN OPTIMAL RADIATION ONCOLOGY SERVICE

The attributes of an optimal radiation oncology service are presented in two main sections.

Section A (page 23) describes a future-focused, optimal patient pathway. It outlines the care that patients and whānau can expect to receive from a high-quality radiation oncology service.

Section B (page 33) provides a description of the system attributes that are needed to achieve this optimal patient pathway and ensure seamless care for patients and whānau requiring radiation treatment.

The attributes are described across seven chapters:

1. Leadership and governance
2. Service distribution
3. Service delivery
4. Workforce
5. Facilities, infrastructure and technology
6. Service performance, quality and safety
7. Research and clinical trials.

The attributes in each of these chapters will form the foundation of implementation planning and are intended to support decision-making and service planning by the commissioners of radiation oncology services.

SECTION A – OPTIMAL PATIENT PATHWAY

RADIATION ONCOLOGY TREATMENT PATHWAY

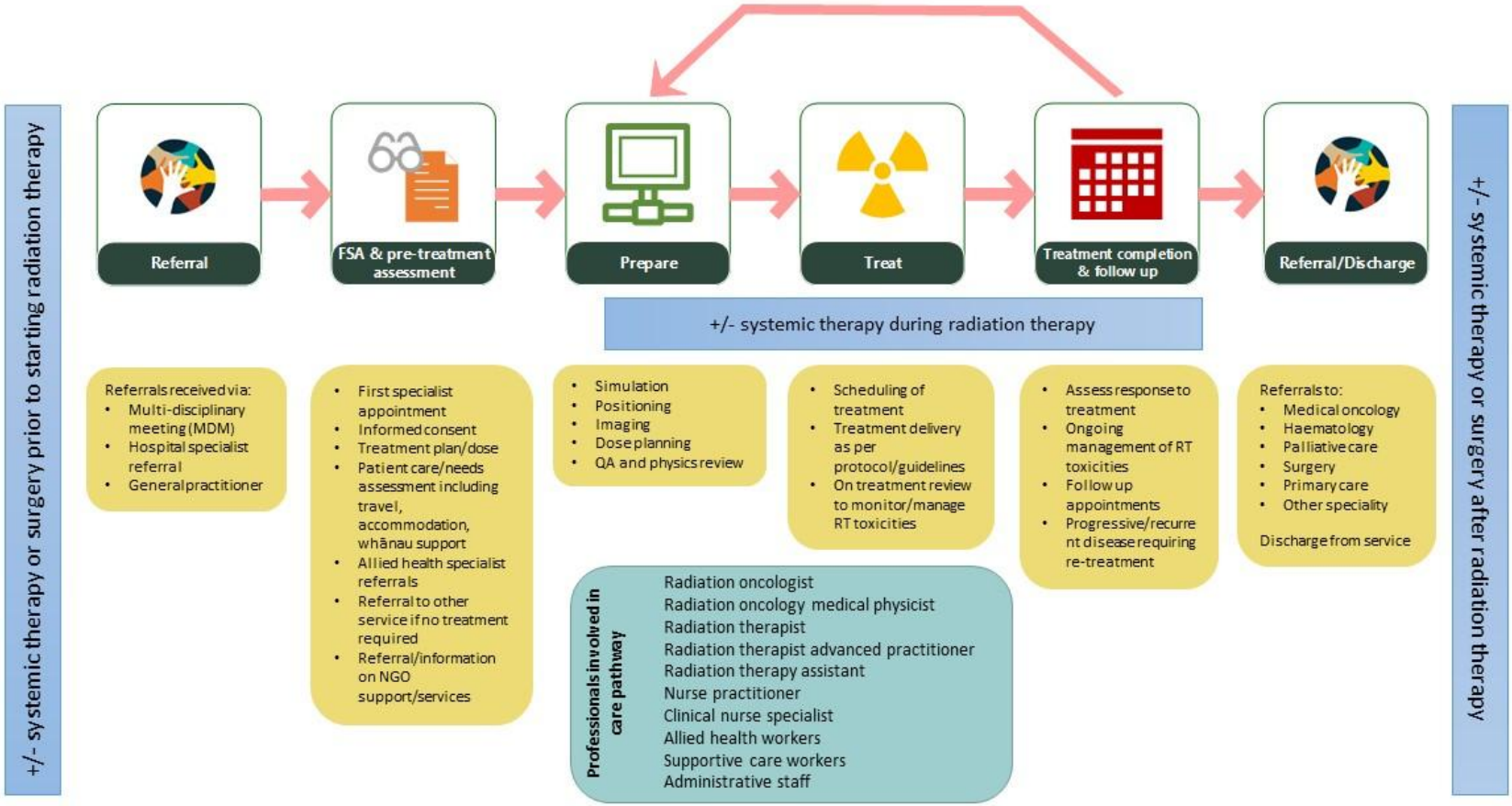
While all patients will follow a similar pathway, each patient's radiation treatment plan will be developed specifically for them, meaning people's pathways might look different. Similarly, patients may move through the pathway at different intervals depending on treatment intent, treatment complexity and whether they are receiving other treatments. Other treatments may take place before, during or after radiation therapy.

Cancer treatment modalities other than radiation oncology include surgery, systemic anti-cancer therapies, targeted therapies eg, hormone therapies, immunotherapies, and transplant and cellular therapies. These therapies are each tailored to the specific needs of the patient and the nature of their cancer. There may also be a need for additional treatment of other pre-existing conditions prior to starting radiation treatment. In order to provide the best possible outcome and quality of life, the treatment plan will depend on factors such as cancer type, stage and prognostic factors, together with patient/whānau choice.

What patients and whānau can expect at all stages of the radiation oncology treatment pathway

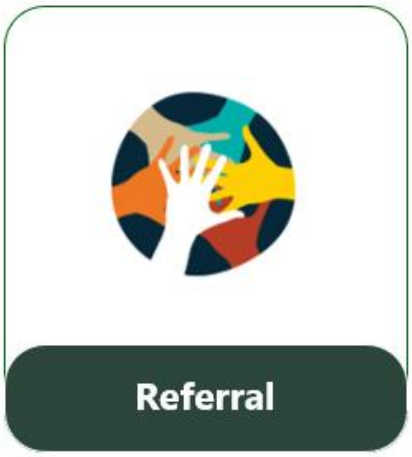
- All people will be treated with respect, dignity, and in support of their independence. They will be treated in a manner free from discrimination, coercion, harassment and exploitation, and in alignment with the Health and Disability Code of Rights (Health & Disability Commissioner, 1996).
- The cancer care system will prioritise the needs and experiences of whānau and communities, preventing illness and supporting good health and wellbeing for all New Zealanders, no matter who they are or where they live.
- Patients and whānau will be at the centre of care, with influence over how services are planned and designed. They will contribute to planning to shape the care available to them locally and regionally.
- The health system will value the voices of patients and whānau in all service design and improvements, including Māori, Pacific, disabled people, ethnic and rainbow communities.
- The supportive care needs of patients and whānau will be assessed and addressed throughout their cancer journey.
- Allied health services will be offered and available to patients and whānau throughout their cancer journey.
- Interpreters, education, and information resources in different languages will be available and accessible to patients and whānau.
- Patients and whānau will be provided with clinical information in a manner that they can understand to make informed decisions.

Figure 3: Optimal radiation oncology patient pathway: the care that patients and whānau can expect to receive from a high-quality radiation oncology service. Note that patients may receive other types of treatment before, during or after radiation treatment.



Referral

Patients are referred to radiation oncology services in different ways. This may be following a multi-disciplinary meeting (MDM) or from a hospital specialist following an outpatient clinic or inpatient admission. There may be times when patients are directly referred by their general practitioner (GP).



What patients and whānau can expect at this stage of the radiation oncology treatment pathway

- Radiation oncology services will have access to all the information needed to review a patient's referral.
- A patient referral will be reviewed in accordance with established national guidelines and considered consistently and equitably, regardless of where the patient lives.
- Patients will receive contact from a member of the radiation oncology team prior to their FSA, to understand their individual access needs for appointments. This will include a discussion around travel and accommodation requirements and the option of bringing whānau support to the FSA.
- An FSA will be scheduled as soon as possible after referral, with timing depending on the patient's cancer type, symptoms and urgency of assessment. Patients will be informed and updated if there are any delays and will have a contact point to answer questions or concerns prior to their appointment.
- In advance of the FSA, patients and whānau will have received all the information required to ensure they know what to expect from the appointment.

First specialist assessment and pre-treatment assessment



An FSA will be scheduled as soon as possible and as clinically indicated, after a patient has been referred to radiation oncology services. The timing of this appointment will depend on the patient's tumour type, symptoms, and the urgency for assessment.

During the FSA appointment, patients and their whānau will discuss possible treatment options and outcomes and potential side effects of each treatment option. If the patient is suitable for radiation therapy, a detailed explanation of the treatment process will be provided.

What patients and whānau can expect at this stage of the radiation oncology treatment pathway

- During their FSA, patients and whānau can expect to have their individual needs and circumstances considered and prioritised. They will be fully involved in treatment option considerations, including, when appropriate, where treatment is provided. If there is a clinical indication for a highly specialised treatment, treatment may only be available at certain centres.
- As part of considering treatment options, clinicians will also consider and discuss suitability and eligibility for enrolment in available clinical trials.
- As part of the pre-treatment assessment process, a patient's individual needs including travel, accommodation and whānau support requirements, will be discussed. Patients and whānau will have confidence that any necessary applications to the National Travel Assistance (NTA) Scheme will be completed in a timely way and required supports put in place.
- Patients will be referred to allied health services for prehabilitation and rehabilitation requirements (such as support relating to nutrition, movement and function, speech and swallowing and emotional and mental wellbeing).
- Patients and whānau will be made aware of appropriate support services and non-governmental organisations (NGOs) that provide services they might benefit from.
- Early involvement of, and timely referral to, other clinical services will be arranged as required. This includes early referral and access to palliative and/or respite care as needed.
- Patients and whānau using radiation oncology services will have the information necessary to make informed decisions in accordance with their rights and their ability to exercise independence, choice, and control.

- Patients and whānau will have a clear understanding of what to expect after treatment is complete including physical and emotional symptoms and follow up plan with referral to community and other services as needed.
- If the decision is made to proceed with radiation treatment, patients will provide informed consent, or this may be completed prior to their preparation appointment for treatment.
- Patients and whānau will leave their FSA with a good understanding of when and where treatments will occur, including having a contact point for any concerns.
- If, in consultation with the radiation oncologist, a patient and whānau, decide not to receive treatment, they will understand next steps and alternative care arrangements. This may include a referral to a different specialist team or their primary care team. The decision to not receive treatment can be revisited by the patient and whānau at any time.

Preparation for treatment



Radiation oncology is individualised for each patient and requires a simulation appointment to prepare a customised treatment plan for external beam radiation therapy or brachytherapy. During a patient's simulation appointment, radiation therapists will position the patient in a suitable and stable position for treatment. Immobilisation equipment such as custom moulds or thermoplastic head and neck masks may be required to achieve this. Measurements, photographs, and sometimes small tattoos are made on the patient's skin to ensure accuracy and reproducibility of the positioning for treatment. A scan is performed once the patient is positioned and is used to generate the radiation treatment plan.

Using the information from the simulation appointment, the radiation oncology team will develop the optimal treatment plan(s), confirming the number of treatments and total dose to be delivered.

What patients and whānau can expect at this stage of the radiation oncology treatment pathway

- FSA and simulation appointments will be offered and arranged on the same visit when clinically appropriate and possible, to minimise travel requirements; especially for patients and whānau that are required to travel a long distance, disabled people, or patients that face financial, practical, or other barriers to travelling to appointments.
- During the simulation appointment, patients will understand which parts of their body will receive treatment and they will know the number of expected radiation treatment appointments they need to attend.
- Prior to simulation, patients will have the simulation and planning process discussed with them. Depending on treatment requirements, a discussion may include consent for tattoo skin markings, bladder/bowel filling requirements or preparing for immobilisation techniques, such as having a thermoplastic head and neck mask made for accurate treatment delivery.
- On leaving simulation appointments, patients will have a good understanding of the next step in their care.

Treatment



Patients may receive radiation as a one-off treatment in a single appointment, or they may require up to eight weeks of daily treatment appointments.

Radiation treatment can be delivered externally, using a LINAC, or skin unit (SXR) or internally, which is known as brachytherapy. It can be delivered as a single treatment modality (radiation therapy alone), sequentially or concurrently with other treatment such as chemotherapy and hormonal therapy. If surgery is part of the treatment plan this may be before or after radiation treatment.

What patients and whānau can expect at this stage of the radiation oncology treatment pathway

- Patients will receive radiation oncology treatment as close as possible to home, or their preferred location, as available services and their clinical condition and comprehensive care plan allows.
- Patients and whānau will be able to access highly specialised services, in accordance with established standards of treatment, regardless of where they live.
- If patients and whānau are required to travel to receive specialised treatment, or to receive treatment sooner than can be provided locally, they will receive travel and accommodation support.
- Regular reviews of patient wellbeing will be undertaken while treatment is delivered, to monitor and manage treatment side effects.
- Radiation oncology services will be run efficiently to ensure timely and equitable access to treatment, in accordance with nationally established guidelines.
- Patients will start treatment within agreed timeframes in line with nationally developed guidelines. Exact timeframes will vary depending on urgency of treatment and timeframes may be exceeded if there are unexpected patient delays such as inadequate wound healing.
- Patients who require allied health services will have timely access regardless of where they live.

Treatment completion and follow up

Once radiation oncology treatment is complete, there may be additional appointments for management of treatment side effects.

Usually, 3-8 weeks after the last treatment, an appointment with the radiation oncology team will occur. The GP practice will also be sent a summary treatment report and will often provide general health care throughout radiation oncology and after treatment is complete.

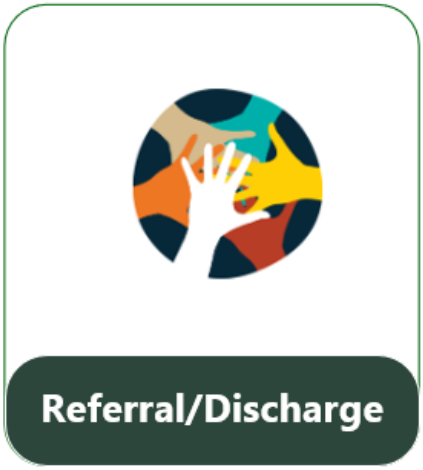


What patients and whānau can expect at this stage of the radiation oncology treatment pathway

- At the completion of treatment, patients and whānau will receive a written summary of their treatment in language that is accessible and understandable. Patients can also expect copies of this summary to be saved in their hospital records, shared with the multidisciplinary team that contributed to their care, and with community and primary care services.
- Information will be provided about any ongoing or expected side effects, how to manage them and who to contact should any concerns arise. This will include the psychosocial impact of cancer and preparing for life after cancer treatment finishes.
- Patients will receive individualised post-treatment care, in line with evidence based best practice (defined by cancer type and treatment intent). Patients will know when they will be followed up, by who, what tests to expect and the timing of these tests.
- Patients and their GPs will have appropriate contact points and links to clinical teams as required.
- Patients and whānau will be made aware of appropriate support services and NGOs.
- Ongoing assessment and support post-treatment will continue as long as required for optimal patient care. This is particularly relevant when a patient is impacted by side effects post radiation treatment.

Referral/Discharge

Once treatment is completed, a patient may be referred to other treatment providers depending on their tumour type and symptoms. Follow up and post-treatment surveillance in the radiation oncology service will follow a nationally consistent approach. If it is appropriate to discharge the patient, the radiation oncology team will refer the patient back to primary and community care for ongoing management.



What patients and whānau can expect at this stage of the radiation oncology treatment pathway

- Patients and whānau will have an individualised survivorship plan. This will include clear accountabilities for primary care, cancer services, and other community-based providers to ensure coordinated and seamless care to respond to patient needs.
- Following radiation oncology treatment, patients and whānau will have access to primary care services with the information and expertise to manage appropriate ongoing care in partnership with the treating team.
- Patients and whānau will be able to re-enter the radiation oncology service if required. There will be clear pathways for primary care and community services to facilitate this process efficiently.

SECTION B – OPTIMAL SYSTEM ATTRIBUTES

1. LEADERSHIP AND GOVERNANCE

Radiation oncology services will be strengthened through integrated national and regional leadership with a Te Tiriti o Waitangi focus. Leadership structures will support national strategic planning, and will enable policy development to be supported by technical radiation oncology expertise and well connected to operational work.

Effective leadership and governance arrangements are critical to ensuring that radiation oncology services can be effectively and appropriately delivered. A key driver of the health reforms was to eliminate unwarranted variation by establishing structural arrangements that unify and simplify healthcare delivery. This included standardised operating models, nationally led planning and regional service delivery to improve equity, performance, maintain stability, ensure sustainability and enhance innovation.

A single nationally organised public radiation oncology system, provided across multiple sites, will maximise the opportunities of scale and integration within a decentralised service delivery model.

Consistent with *Te Pae Tata Interim New Zealand Health Plan*, the development of a national radiation oncology service includes the establishment of national strategic and clinical networks, along with regional hospital and specialist networks to develop a unified system for radiation oncology *(Te Whatu Ora and Te Aka Whai Ora, 2022). He Mahere Ratonga Mate Pukupuku, Cancer Services Planning* proposes three levels of leadership for robust governance (Te Aho o Te Kahu, 2022). These levels are designed to connect strategic thinking with frontline expertise, and to integrate policy into practice. The three levels of leadership are:

- National **strategic leadership** to drive cancer planning and decision making, including determining priorities and approaches to delivering and monitoring service improvements. To be effective at improving cancer outcomes and eliminating inequity, strategic leadership must include Māori, multi-disciplinary clinicians and experts, and people with lived experience of cancer.
- National **clinical leadership** to focus on ensuring quality and consistency of radiation oncology care for all, and to manage the integration of strategic policy into practice. This leadership requires cross-discipline radiation oncology subject matter expertise, Māori leadership and inclusion of people with lived experience of cancer.
- **Operational service delivery leadership** to take responsibility for the delivery and maintenance of a robust and resilient model of care, through effective operational management at regional services and local sites.

Whānau Insight: Tino Rangatiratanga - Māori cancer leadership is needed at every level

Whānau regularly spoke about shared leadership and decision-making. Hui participants acknowledged that whilst the system has some mechanisms to engage with Māori (eg, Māori Advisors on governance groups etc), many whānau felt that Māori were still not genuinely engaged in cancer decision-making processes. Some whānau felt that the current mechanisms within the system were tokenistic. These views were reinforced by some iwi leaders, who felt that there was inconsistency in the way they were engaged with.

Rongohia Te Reo, Whatua He Oranga | The voices of whānau Māori affected by cancer, 2021.

Attributes

1.1 National commissioners and providers set a course for action that embeds Te Tiriti o Waitangi principles in a dynamic system, that has the agility to continually address inequities in health outcomes for Māori over time and delivers on the aspiration of the Pae Ora (Healthy Futures) Act 2022. This involves the following actions:

i. National commissioners and providers will prioritise action to address discrimination, bias and systemic racism throughout the radiation oncology system.

ii. National commissioners and providers will include Māori leadership at all levels of the radiation oncology service with specific funding allocated for these roles.

iii. National commissioners and providers will keep patients and whānau at the centre of cancer care and included in the planning, design and improvement of services.

iv. National commissioners and providers will incorporate insights and opinions from kaupapa Māori health providers, Māori health professionals and whānau Māori when undertaking service development and service improvement.

1.2 All national and regional radiation oncology leadership groups will ensure effective bi-directional communication pathways and appropriate escalation pathways are in place for the timely and effective communication of issues. Accountability mechanisms will be in place to ensure timely resolution of identified issues.

1.3 National commissioners will work in partnership with providers to establish radiation oncology as a single national service that is delivered at multiple sites.

1.4 National commissioners and providers commit to achieving national alignment of clinical practice and service delivery in the interests of more consistent clinical care, patient safety and treatment outcomes. Systematic approaches to implementation, maintenance and monitoring of this alignment will support the success of nationally consistent service delivery. Service delivery will be adjusted for the needs of regional populations, where clearly justified, but will rely on common principles to ensure alignment.

1.5 National commissioners will ensure that there is dedicated and effective **strategic leadership** for cancer, to drive national planning and direction setting.

1.6 National commissioners and providers will work in partnership to establish strong radiation oncology **clinical leadership**, representative of the sector.

1.7 National commissioners and providers will establish and maintain effective radiation oncology **operational service delivery leadership,** within each of the four regions (Northern, Te Manawa Taki, Central, and Te Waipounamu). These will be strongly connected to other cancer treatment modality services (such as medical oncology and surgery). While regionally defined, strong alignment with national principles should be maintained unless there is justification for departure. These structures will take responsibility for the delivery of a robust and resilient model of care for radiation oncology that meets the needs of regional communities *(described in Chapter 2: Service Distribution*).

1.8 All radiation oncology leadership groups will have a mandate to make change and influence the wider healthcare system to achieve effective results, in line with nationally established priorities as well as regional objectives. The membership of leadership groups will ensure technical advice is translated to meaningful change.

1.9 All radiation oncology leadership groups will have access to the necessary infrastructure and information to support effective clinical and operational governance, including sufficient time and administrative support to execute duties.

2. SERVICE DISTRIBUTION

Radiation oncology will be developed as a national service, delivered by four regional networks across multiple sites providing care that meets the requirements of the population they serve. This will ensure that services are accessible to patients and their whānau, whilst recognising the significant infrastructure costs associated with radiation oncology treatment. If patients and whānau are required to travel to access care this will be supported by well-defined pathways and travel and accommodation support.

Radiation oncology service distribution planning will focus on improving access, intervention rates, and ultimately outcomes for patients. The establishment of multiple campuses within a region can increase access to radiation oncology services and reduce travel for people with cancer and their whānau. For example, once the three regional LINACs (announced in 2019, currently in development) are operating in Northland, Taranaki and Hawke's Bay, patients and whānau living in those regions will experience an overall 80% reduction in travel time and travel distance (see Figure 4).

However, decentralisation of radiation oncology services will not address all access issues, and decentralisation needs to be balanced against the relative high cost of initial outlay and infrastructure required to deliver treatment. There are also small volume, high-complexity services and techniques that require a degree of centralisation to maintain safety and quality.

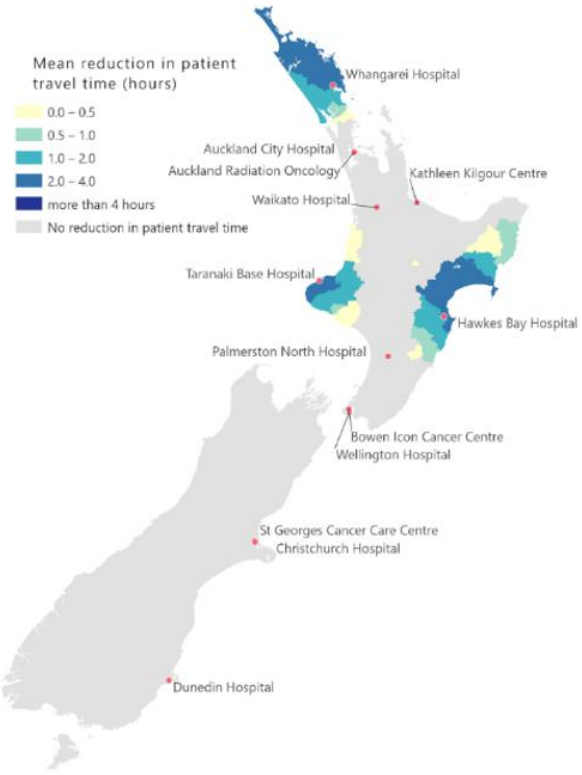


Figure 4: Mean reduction in patient travel time in Northland, Taranaki and Hawke's Bay once regional LINACs are operational.

Equitable access to radiation treatment will be improved by reconfiguring radiation oncology services as a coordinated national service, delivered across multiple sites. This will serve the needs of those who use the service and those who work in it.

Attributes

2.1 National commissioners will work in partnership with providers to establish radiation oncology as a national service, delivered by four regional networks established by Health New Zealand.

2.2 The four Heath New Zealand regional networks – Northern, Te Manawa Taki, Central, and Te Waipounamu – will drive provision of care across multiple campuses. This is when one main provider supports other smaller providers within each region.



Figure 5: Health New Zealand regional network boundaries

2.3 Campuses within each region may provide different complexity levels of treatment. Each site will have appropriate staffing and equipment to deliver the complexity and type of treatment appropriate to that site. This includes LINACs, treatment planning and oncology information systems, appropriate service contracts, equipment, and access to critical imaging technology.

2.4 Each of the four regions will provide:

i. LINAC capacity to serve their region, including multiple campus sites to improve access to treatment.

ii. Brachytherapy and superficial radiation therapy in at least one site in each region.

iii. Outreach clinics to improve equity of access to services. Outreach clinics will be offered either in person or via telehealth[1], to reduce travel burden, enable care closer to home or at a location preferred by the patient when appropriate.

2.5 Effective modelling and planning around LINAC capacity and the procurement and replacement of LINACs will be undertaken nationally and supported regionally. Given the long lead-time required for the replacement and even more so for the placement of new LINACs, a proactive national planning process will ensure high quality, timely care is able to be continually provided in each region *(described in Chapter 5: Facilities, Infrastructure and Technology).*

2.6 There will be national planning around delivery of advanced treatment techniques. Planning will consider regional specialisation, ensuring appropriate technical expertise is maintained alongside access to care. This will be regularly reviewed, to ensure equitable access in the context of increased utilisation of advanced techniques.

2.7 Highly specialised services required by a small number of patients and requiring the use of specialised equipment will be provided nationally. There will be clear, nationally developed processes and pathways in place to support access, including nationally agreed access criteria and a multi-disciplinary review process.

2.8 All providers will utilise nationally developed processes to ensure that if patients and their whānau are required to travel to receive treatment, they are well supported to do so in an equitable way, to a level that ensures travel is not a barrier to them accessing care.

2.9 As new technologies emerge there will be proactive planning to ensure there are clear pathways and equitable access to specialised services *(described in Chapter 5: Facilitates, Infrastructure and Technology).*

2.10 There will be clear pathways to access services not currently available in Aotearoa, such as proton therapy, as required *(described in Chapter 3: Service Delivery).*

2.11 Decisions around new sites, or the 'upgrading' of complexity of care provided by a current site, will be made nationally.

i. Priority will be given to supporting access to people with cancer and whānau, balanced against ensuring that the investment requirements would deliver appropriate benefit. Regional volumes must be sufficient

[1] Refer to The Royal Australian and New Zealand College of Radiologists, Radiation Oncology Telehealth Principles document, available from: https://www.ranzcr.com/fellows/rad-onc/professional-documents/radiation-oncology-telehealth-principles

to support the addition of new facilities and ensure they will be effectively utilised.

ii. Workforce planning will be closely aligned with planning around new sites to ensure the availability of all necessary staff to run a service.

2.12 Whilst there will be a strong national radiation oncology service, there will be regional flexibility to ensure that services meet the needs of their population.

3. SERVICE DELIVERY

Radiation oncology providers will prioritise the accessibility and acceptability of services for cancer patients and their whānau. Service providers will focus on ensuring all patients, regardless of location, are well supported to receive high-quality care in a timely manner.

Due to the geographical location of radiation oncology treatment services, patients and whānau are often required to travel to receive treatment. Service delivery should be designed in a way to make treatment as accessible and acceptable to patients and whānau as possible, keeping their needs at the centre of service delivery.

Keeping care patient-focused may mean that certain aspects of care are provided in different locations to accommodate access to treatments.

For this model to be successful, it requires:

- clear treatment pathways
- clear referral processes across the full multidisciplinary team
- effective information systems so that critical patient data is accessible across locations and regions
- fit-for-purpose travel and equitable accommodation support for patients and whānau
- robust communication pathways between centres and different clinicians involved with care.

Whānau Insight: NTA a source of frustration

NTA was frequently cited as a source of frustration for both whānau and those working in the wider cancer sector. Whānau shared stories of inflexibility, racism, and bias in how the NTA program is currently delivered, concerns over the minimum distance criteria to access funds, gatekeeping by staff and a lack of flexibility in accommodation options, such as the use of koha to pay for accommodation.

Given that NTA is based on a reimbursement model, some Māori working in the wider cancer sector described NTA as 'a failure in itself; 'you must pay for the journey before it is of use to you. What if you don't have that money in the first place?'. Māori working in the wider cancer sector are frustrated that the recommendations from a 2018 review of NTA have not been implemented.

Rongohia Te Reo, Whatua He Oranga | The voices of whānau Māori affected by cancer, 2021.

Attributes

Overall service delivery

This chapter describes the attributes of optimal service delivery in terms of what providers will deliver. There is an expectation that national commissioners will support all providers to do this with appropriate resources and funding.

3.1 All providers will uphold the Health and Disability Code of Rights, ensuring that all patients and whānau are treated with respect, dignity, and independence, in a manner free from discrimination, coercion, harassment and exploitation (Health & Disability Commissioner, 1996).

3.2 All providers will ensure patients are continuously informed of their treatment options and plan of care. This includes ensuring patients have all the information and resources they need to exercise tino rangatiratanga (self-determination, autonomy) over their treatment journey.

3.3 All providers will undertake high-quality MDMs in line with nationally developed standards and guidelines (Te Aho o Te Kahu, 2024).

3.4 All providers will foster strong partnerships with other clinical providers to strengthen join-up care for patients, including hospital specialist services and primary and community care providers.

3.5 All providers will have access to a regularly updated national repository of education and information resources. Resources will be available in multiple languages and will include accessible information appropriate for disabled people who require alternative formats (eg, braille or Easy Read). This will also include resources suitable for children, adolescents, and young adults.

3.6 All providers will utilise interpreters as required and provide patients and whānau with nationally consistent education and information.

3.7 All providers will utilise nationally developed processes to ensure patients and whānau are well supported to travel for care if required. This will include access to appropriately funded travel and accommodation that avoids financial hardship. All providers will ensure services have appropriate administration staff to facilitate travel and accommodation coordination requirements to meet the needs of the patients and whānau.

3.8 All providers will have access to electronic booking and scheduling systems and ensure people are informed of appointments in a timely manner, recognising the burden on patients and whānau in preparing for a treatment date.

3.9 All providers will demonstrate a person and whānau centred approach in operational processes, such as the scheduling of appointments with consideration to an individual's circumstance, health status and travel requirements.

3.10 All providers will have reliable, efficient access to electronic clinical records, radiology imaging and reports, and test results that are required to provide safe and high-quality care. This includes access to tests done in the community and across different regions. National commissioners will ensure this is coordinated across the country.

3.11 National commissioners and providers will create and adhere to a nationally agreed emergency management and business continuity plan. This will mitigate the impact of planned and unplanned disrupted service provision. Recovery actions, within the plan, will give precedence to clinical need, Māori and Pacific patients, and others underserved by the healthcare system.

3.12 All providers will ensure referral to allied health services is prioritised in line with a nationally agreed model of care for allied health provision to ensure allied health needs are met before, during and post treatment to maximise health and wellbeing throughout treatment and during recovery.

3.13 National commissioners will connect with the not-for-profit sector to ensure the essential services they provide are considered when planning sustainable national support services. This includes consideration of key not-for-profit entities in both national and regional planning, as well as ensuring information is readily accessible to healthcare staff, and patients and whānau, about the cancer support services provided by the not-for-profit sector and how to access them.

3.14 All providers will assess and address the supportive care needs of patients and whānau throughout their treatment. Providers will work collaboratively and cooperatively with relevant non-government organisations, partnering with these organisations to maximise the support available to patients and whānau.

3.15 National commissioners and service providers will ensure strong relationships with kaupapa Māori health providers, who in turn can support patients and whānau to receive services in a mana enhancing manner.

3.16 National commissioners and providers will implement strategies to ensure service provision is mana enhancing, enabling and inclusive for everyone. They will ensure the voices of Māori and those most disadvantaged by the current design of the healthcare system are integral to ongoing service delivery design and service improvement. This includes but is not limited to Māori and Pacific peoples, as well as those living in socioeconomically deprived communities, those living with mental illness, disabled people, those living in rural areas and people who are SOGIESC-diverse[2].

[2] SOGIESC stands for sexual orientation, gender identity and expression, and sex characteristics. SOGIESC-diverse encompasses, but is not limited to, people who do not identify as heterosexual, have a gender identity that does not match the sex they were assigned at birth, do not fit the typical or majority binary gender norms and/or were born with bodies that do not match common biological definitions of male or female. It includes

3.17 All providers will offer outreach clinics, either in person, or via telehealth as appropriate in line with the latest Royal Australian and New Zealand College of Radiologist (RANZCR) Radiation Oncology Telehealth standards *(described in Chapter 2: Service Distribution).*

Referral into radiation oncology service

3.18 National commissioners will establish a nationally developed, standardised process for referrals to the radiation oncology service. This will ensure referrals contain all the information required for the timely triaging, booking and communication of appointments with patients.

3.19 All providers will review patient referrals in accordance with nationally established guidelines. These referrals will be considered consistently and equitably, regardless of where the patient lives.

3.20 National commissioners will establish a national waitlist management system to ensure patients receive equitable access to timely treatment. This will include a clear, nationally developed process outlining thresholds for consideration of when services will work with other regions to reduce wait times.

3.21 All providers will adhere to the national waitlist management policy, regularly monitor their waitlists, and respond to variation in wait-times using nationally developed appropriate escalation pathways.

3.22 All providers will ensure patients are contacted prior to their FSA so the service can understand the patient's individual needs, including any travel and accommodation requirements. The information will be documented and available to all parties that require access to patient records. Providers will make sure patients and whānau arrive at their FSA knowing what to expect from the appointment.

First specialist assessment and pre-treatment

3.23 All providers will ensure the FSA is scheduled as soon as possible and as clinically indicated, after a person is referred to the radiation oncology service, following nationally agreed timeframes. Providers will ensure patients are informed and updated if there are any delays and that patients have a named contact to answer questions or concerns prior to their appointment.

3.24 All providers will prioritise the needs of patients and whānau when considering where treatment will occur. Noting that highly specialised treatments may only be available at certain centres and clinical indications and centre capacity may impact this.

people who are takatāpui, lesbian, gay, bisexual, queer, intersex, transgender, whakawahine, tangata ira tāne, māhū, vakasalewalewa, palopa, fa'afafine, akava'ine, fakaleiti, leiti, or fakafifine

3.25 All providers will offer patients the opportunity for FSA and simulation appointments to be on the same visit or in a condensed period of time to minimise travel requirements when appropriate.

3.26 All providers will assess patients' prehabilitation requirements and have established pathways to provide support around nutrition, movement and function, speech and swallowing and emotional and mental wellbeing. These interventions should start in advance of cancer treatment.

3.27 All providers will document consent and record the patient's decision if they decline treatment.

3.28 All providers will ensure that if a patient decides not to receive radiation oncology treatment, they will still have a clear understanding of the next steps and alternative care arrangements. This will include timely referral to other clinical teams if required and handover to primary care.

3.29 All providers will have mechanisms to support patients and whānau who decline treatment to have the opportunity to review that decision and to reconsider treatment as required.

3.30 All patients and whānau will receive a written summary of their FSA appointment and treatment plan in plain language they can understand. This will be created using a nationally developed template to streamline the process and avoid duplication.

Treatment

3.31 All providers will utilise nationally developed processes when patients require treatment in another region.

3.32 National commissioners will ensure there is a clear, consistent national process and support package for patients and whānau to access specialised treatment both nationally and internationally.

3.33 All providers will offer treatment commencement within established nationally agreed timeframes and targets.

3.34 All providers will ensure patients have access to acute radiation oncology care. Policies, processes and procedures will be in place across all regions to manage patients as close to home as is clinically appropriate with clear pathways to support the transport of patients and their whānau to other centres as required. This will include appropriate on call staffing to manage emergency/acute patients and provide treatment outside of standard operating hours when necessary.

3.35 All providers will have relationships with accommodation providers and non-government organisations who can tailor holistic support for patients and whānau travelling away from home for treatment.

3.36 All providers will undertake regular reviews of patient wellbeing while treatment is delivered to monitor and manage treatment side effects. These reviews will be provided by appropriately trained clinicians.

3.37 All providers will seek early involvement of, and timely referral to, other clinical services as required. This includes pathways to access palliative care services.

3.38 All providers will have established pathways that seamlessly integrate care for patients and whānau with allied health, and other cancer and primary care services. The burden of communication between services should never fall on patients or whānau.

Treatment completion and follow up

Whānau Insight: Post treatment care

"Important to recognise, once the treatment stops the problems don't stop."
"This [cancer] changed me and I need help adjusting to that."
"I'm not the person I was before treatment, but I'm expected to be that person."

There was a consistent view from whānau that the post-treatment phase of cancer care needs improvement, as the need for care doesn't stop when treatment finishes. Many whānau felt that having cancer changed them as a person, but they did not feel this was acknowledged. Some whānau talked about the sudden drop in interactions with health professionals once their specialist cancer treatments ended, saying they felt 'that safety net had been taken away'. Others spoke about having a 'before cancer' life and an 'after cancer' life. Some shared that as survivors they were grateful for a second chance at life, but the trauma of the experience hung over them and they did not know how to deal with the physical, psychosocial, and emotional consequences.

Rongohia Te Reo, Whatua He Oranga | The voices of whānau Māori affected by cancer, 2021.

3.38 All patients and whānau will receive a written summary of their treatment in plain language they can understand. This will include care provided by allied health professionals and will be saved in their hospital records, shared with the multidisciplinary team and with community and primary care services. This will be created using a nationally developed template to streamline the process and avoid duplication.

3.39 All providers will ensure patients have received, and understand, information about any ongoing or likely side effects including long term or late toxicities, how to manage them and who to contact should any concerns arise. All providers will ensure services include a post-treatment completion assessment and a subsequent post-treatment side effects check-in within nationally developed timeframes as appropriate to individual patient's circumstances.

3.40 National commissioners will provide nationally developed, consistent, evidence-based post treatment surveillance guidelines for providers to utilise.

3.41 All providers will partner with relevant groups to provide targeted education about radiation oncology to their wider networks including primary care and clinical community teams in districts remote to treatment centres. Relevant groups may include iwi, patients and whānau, NGOs, professional bodies, training providers and colleges. This will enable people and whānau to have access to primary and community care services with the information and expertise to manage appropriate ongoing care in partnership with the treating oncology team.

Contracting with private services

3.42 National commissioners will establish an appropriate standardised national contract for outsourced private provision of treatment. This will include ensuring private centres meet model of care requirements when treating publicly funded patients and will specify the minimum requirements for wraparound care to ensure patients receive the same level of cultural safety and support provided in a public centre. In addition, consideration must be given to the potential impact on the provision of public services and distribution of workforce.

3.43 National commissioners will ensure a standardised contract includes an agreed national price for each package of care delivered by private providers, including capacity, duration of contract and requirements to contribute to Radiation Oncology Collection (ROC) data (a central repository of detailed radiation oncology information across Aotearoa). The interests of patient and whānau wellbeing will also be defined in contract parameters.

3.44 When developing a standardised national process for contracting, national commissioners will consider which patients are suitable to receive treatment in private centres. There will be clear, nationally developed processes and pathways in places to support access, including nationally agreed access criteria and multi-disciplinary review process.

3.45 The development of a national contract will also allow public and private centres to manage situations where capacity limitations (such as equipment or workforce) indicate that a public cancer centre is unable to assess and/or treat patients within an acceptable timeframe.

4. WORKFORCE

The national radiation oncology service will have a workforce that is appropriately resourced to meet the needs of the New Zealand population. There will be strong, proactive planning to ensure the workforce is developed to meet forecasted future need. Radiation oncology providers will have a diverse workforce that reflects the population that it serves and staff will be well supported and valued.

Achieving equitable access to radiation oncology services across Aotearoa will require a people and whānau centred approach to workforce planning. It is acknowledged that frontline radiation oncology services are currently experiencing significant shortages across the four key workforce groups: radiation oncologists, radiation oncology medical physicists, radiation therapists and radiation oncology nurses.

Radiation oncology care is also being impacted by challenges faced in other clinical professions, including palliative care, medical oncology, primary care, and other health workforces. Allied health plays a critical role in the care of people receiving radiation therapy. Allied health professionals involved in cancer care include, but are not limited to, physiotherapists, occupational therapists, social workers, psychologists, lymphoedema practitioners, speech language therapists, dentists, dietitians, pharmacists, audiologists, laboratory technicians and medical imaging technologists. Many allied health professions are also experiencing recruitment and retention challenges to maintain a skilled workforce to respond to the needs of all patients and whānau.

Initiatives are underway, led by Health New Zealand Workforce Taskforce, to help relieve health workforce pressures in the short-term and strengthen the workforce pipeline in the longer term. This includes support for staff to work to the top of their professional scope, whilst ensuring the full team has the appropriate skill mix to perform all duties, and a focus on efficient approaches to address supply and retention of the cancer workforce.

Addressing current, and future, workforce issues will require a collective, focused effort, with a shift to finding national solutions to the current national workforce crisis, rather than each individual district trying to resolve the issue in isolation. Nationally developed approaches to the design and implementation of the service attributes described below, and across the models of care for all cancer services, will reduce burden on individual providers.

Whānau insight: The Māori cancer workforce needs growth and support

Whānau Māori working in the cancer sector all agreed that the number of Māori being trained and supported to take up specialist roles in cancer care needs to increase. This included both treatment and supportive care roles. It was often noted that most cancer services only had one or two Māori staff that whānau could access. In one case, whānau noted they had received awhi (care) and advice on rongoā (traditional Māori healing) from a cleaner.

A range of suggestions were offered to support rangatahi (young people) into health roles, including scholarships and funding, inviting Māori clinicians to talk to rangatahi at kura (school), supporting academic aspirations, expositions and work experience initiatives. There were also suggestions to support Māori already working in health roles to specialise in cancer.

Rongohia Te Reo, Whatua He Oranga | The voices of whānau Māori affected by cancer, 2021.

Attributes

All workforce

4.1. National commissioners and providers will create and maintain a safe and supportive environment for all staff. This will include agreement of workloads, provision of support for leave, flexible working arrangements where appropriate, professional and clinical supervision, and opportunities to learn and develop.

4.2. All providers will build dedicated time for continuing professional development into staff planning. This will include ongoing staff training in alignment with service requirements and as specified in collective employment agreements and regulatory authority requirements.

4.3. National commissioners will fund providers to employ directly, or have access to, an established workforce of a size, skill-mix and diversity to safely meet planned demand. This workforce establishment will reflect all roles and disciplines across the multidisciplinary team and include mechanisms to ensure the cover of staff absences.

4.4. National commissioners and providers will engage the radiation oncology workforce in service planning, ensuring the workforce is seen as a package of staff to support a patient's entire treatment journey, and that any change is clearly road mapped and transparent.

4.5. National commissioners and providers will ensure the workforce is culturally safe through mandatory cultural safety training. This will be readily available and embedded in both orientation programmes and ongoing training programmes, with acknowledgment of education

undertaken to meet professional regulation requirements where applicable.

4.6. National commissioners will work in partnership with kaupapa Māori providers, education providers, community, non-government providers and professional bodies to build the number and diversity of the radiation oncology workforce.

4.7. All providers will have clear career progression pathways and competency development structures, across different disciplines, from novice through to expert practitioners.

4.8. National commissioners and providers will support and strengthen the regional provision of services through implementing regional workforce training. They will provide opportunities for training days or short-term secondments at other sites within the region for the purpose of upskilling.

Supply, demand and forecasting

4.9. National commissioners and providers will utilise nationally developed, robust workforce models to forecast and plan for workforce needs for radiation oncologists, radiation therapists, radiation oncology medical physicists and radiation oncology nurses. Workforce models will consider the anticipated increase in cancer incidence, the increase in complexity of treatments and changes in clinical practice.

4.10. National commissioners will work with providers to ensure forecasts are acted on in a timely manner and that providers have staffing levels and skill mix to meet the needs of their population. Staffing calculations will account for essential non-patient facing time and activities including, but not limited to, clinical development, supervision, teaching, research, audit, quality assurance, radiation safety, commissioning, service planning and administration. The Appendix provides a summary of the currently available data that estimates minimum staffing requirements.

4.11. Effective processes and escalation pathways will be developed and maintained to address local/regional workforce issues in a timely way to ensure consistent care for patients and staff wellbeing.

4.12. All providers will ensure data is available to accurately understand workforce requirements and contribute to national workforce modelling.

4.13. National commissioners will ensure sufficient investment and innovation is made in training, recruitment, and retention efforts to meet future demand for services, in line with forecasting.

4.14. As part of workforce planning, national commissioners and providers will develop succession planning strategies for specialised roles.

4.15. When undertaking workforce planning, national commissioners and providers will take into account:

i. skill flexibility (identifying and describing the specific circumstances where one health professional may substitute for another, and enabling this to happen)
ii. skill development
iii. development of new roles to meet the needs of the population
iv. prevention of de-skilling.

Training, recruitment, and scope of practice

To increase the sustainability of the workforce, more people need to be trained to join the radiation oncology workforce. This will require each centre to have an increase in the number of training positions and associated funding.

4.16. National commissioners and providers will proactively and innovatively build for the future by identifying roles and opportunities for trainees, new graduates, radiation therapy assistants and other workforces' entry schemes.

4.17. National commissioners will work proactively to enact an intentional workforce recruitment and development strategy to increase the Māori and Pacific workforce at all levels of leadership, training and service provision.

4.18. All providers will fully support staff who are precepting and mentoring students and graduates. They will provide preceptorship training and allocated time to undertake this critical role.

4.19. National commissioners will work collaboratively with clinical providers, training providers and professional bodies to reconsider training models in Aotearoa. Considerations may include on-the-job training or earn as you learn models or financial support for students on clinical placements. They may also consider bonding schemes for new graduates and improved retraining and development pathways for people with health science qualifications as appropriate for different professions.

4.20. National commissioners will work collaboratively with clinical providers, training providers and professional bodies on a nationally organised, cohesive recruitment strategy, with a focus on meeting recruitment requirements of centres with the greatest need first. This will include both national and international recruitment strategies to fill vacant positions, such as improved immigration and relocation processes and support, sound and appropriate incentive packages and fellowship opportunities.

4.21. National commissioners and providers will support internationally qualified professionals to be trained to provide culturally safe care in Aotearoa and to feel supported and valued when working in the New Zealand health system.

4.22. National commissioners will develop and implement a strategy to support registered nurses in radiation oncology. This will include a nationally consistent development pathway and job description for radiation oncology

nurses, as well as clear educational pathways for advanced nursing roles such as nurse practitioner, clinical nurse specialist and registered nurse prescriber. National educational pathways will be developed in collaboration with educational providers that meet the New Zealand Nursing Council standards and scope of practice.

4.23. All providers will support and invest in a national advanced practitioner development strategy for radiation therapists and nurses, and the development of defined advanced scope of practice for radiation therapists. Advanced scope of practice will be based on an agreed set of core skills and responsibilities and will include a formalised pathway and nationally consistent requirements to transition to advanced practice roles. Support structures for advanced practitioners will be in place and consistently applied and monitored across the professions.

Allied health workforce

Allied health services are an essential component of cancer care and provide a critical role in improving cancer outcomes. Some allied health professionals are critically involved in the delivery of cancer treatment (eg pharmacists, radiation therapists, medical physicists)[3] and other allied health professionals provide clinical services required for cancer diagnosis, treatment and supportive care (eg medical imaging technologists, dieticians, lymphoedema practitioners).

He Mahere Ratonga Mate Pukupuku, Cancer Services Planning made a strong recommendation for strengthening the allied health workforce for people with cancer (Te Aho o Te Kahu, 2022). Many people who receive radiation oncology treatment will require a package of care that includes input from a broad range of allied health staff.

4.24 All providers will support patients to have access to appropriate allied health support and wraparound services, to enhance care provision, positive clinical outcomes and patient/whānau experience. This will include access to dedicated allied health roles, with appropriate training and education to support those receiving radiation oncology services before, during and after treatment. The number and type of allied health roles will be appropriately calculated and will be adequate for the size and complexity of the care provided.

4.25 National commissioners will work collaboratively with providers and training providers to increase training numbers in allied health professions.

4.26 All providers will support entry into the radiation oncology workforce from allied health services, through proactively providing student and registrar clinical placements in outpatient and inpatient areas.

[3] Radiation therapists and medical physicists are part of the allied health workforce but are addressed separately in this document due to specificity of their role in the provision of radiation treatment.

Other workforce requirements

Whānau Insight: Many whānau need cancer navigation services

Navigation support for cancer patients and whānau was repeatedly raised as a potential solution to several issues within the cancer treatment system, including feeling lost and being unable to understand key information. High praise was given for treatment services, hospitals and health districts that have Māori cancer navigators to support whānau through the complex cancer system. Where navigators were in place, they were described as 'the link, the constant' for whānau.

Rongohia Te Reo, Whatua He Oranga | The voices of whānau Māori affected by cancer, 2021.

4.27 National commissioners and providers will ensure cancer navigators in both clinical and non-clinical roles as part of a team approach, are available to support and guide patients and whānau through the system.

4.28 Providers will ensure the number of cancer nurse specialist and cancer nurse coordinator roles sufficiently meets the needs of their population.

4.29 All providers will have dedicated and sufficient administrative staff to ensure the patient's flow through all aspects of the treatment pathway is not disrupted and ensure the timely scheduling of appointments.

4.30 All providers will have dedicated and sufficient administrative staff to support clinical staff and the operational leadership in their duties.

4.31 All providers will have suitable training and development pathways for cancer service managers.

4.32 All providers will include relevant priorities and opportunities outlined in the Kaiāwhina Workforce Plan 2020-2025 to develop, connect, and accelerate new ways of working for kaiāwhina (people within health and disability sectors who support people to live well) (Ministry of Health and Toitū te Wairoa, 2021).

4.33 All providers will include relevant priorities and opportunities outlined in the He Anga Whakaahuru, the Supportive Care Framework, to develop, connect and accelerate new ways of working for kaiāwhina (Central Cancer Network, 2016).

4.34 All providers will employ a dedicated and sufficient kaiāwhina carer workforce to support the delivery of inpatient and outpatient services, such as health care assistants, care assistants and support workers.

4.35 All providers will have access to kaitiaki, and equivalent cultural support workers, including mātauranga Māori and rongoā practitioners, to support the cultural needs of patients and whānau receiving radiation therapy.

4.36 All providers will have access to spiritual care staff, to support the spiritual and/or religious needs of patients and whānau receiving radiation therapy.

4.37 All providers will ensure patients and whānau have access to appropriate psychosocial support.

4.38 All providers will have a dedicated and sufficient housekeeping workforce to ensure the environment is free from infection risk and safe for people, whānau and staff.

5. FACILITIES, INFRASTRUCTURE AND TECHNOLOGY

The planning, procurement and commissioning of radiation oncology facilities will occur nationally to maximise cost efficiencies, minimise duplication of effort and ensure all people have equitable access to high quality radiation oncology treatment.

Radiation therapy relies on substantial dedicated and specialised physical infrastructure. This requires significant upfront capital investment and ongoing investment, maintenance, and replacement. When planning the commissioning and procurement of radiation oncology services, opportunities must be taken to achieve economies of scale and align service delivery. This requires collaborative national efforts and standardised approaches.

Effective, proactive planning is also required to ensure adequate LINAC capacity, as there is a long lead time for LINACs to be replaced and for new LINACs to become fully operational. LINACs also require large investment for suitable infrastructure such as treatment bunkers to house LINACs, technology such as treatment planning and oncology information systems, and access to quality assurance equipment.

For patients in Aotearoa to continue to have access to the highest quality of care, infrastructure planning must adjust to evidence-based changes to clinical care and innovative approaches to treatment. The following attributes are designed to ensure patients, whānau and staff can all access safe care in a supportive physical environment.

Whānau Insights: The use of telehealth

"*If we can get telehealth right, it will be great.*"

Although kanohi ki te kanohi (face to face) is a critical component of engagement with whānau Māori, many had a positive opinion of telehealth. Throughout the hui people discussed how telehealth reduced the need to travel and its associated costs (petrol, accommodation, hospital parking). Many also liked that whānau who live remotely or who could not attend in person were still able to participate in appointments via telehealth.

People also discussed the barriers to successful utilisation of telehealth. These included addressing digital poverty, whānau accessibility to devices, and ensuring reliable and affordable internet connections are available for both whānau and service providers.

Rongohia Te Reo, Whatua He Oranga | The voices of whānau Māori affected by cancer, 2021.

Attributes

Commissioning and procurement

5.1 Commissioning of LINACs, and associated technology required for radiation oncology treatment planning and delivery, will be planned nationally and supported regionally. Commissioning will be supported by a centralised multidisciplinary team with radiation oncology expertise. This national planning of radiation oncology services will streamline procurement, allow for standardisation, and reduce commissioning time for individual facilities, as well as take advantage of economies of scale for purchasing and procurement.

Note: Decisions around the location of new LINACs are described in Chapter 2: Service Distribution.

5.2 National commissioners will undertake proactive modelling to understand LINAC capacity and future requirements.

5.3 National commissioners will work collaboratively with providers on a national work programme to ensure that prioritisation and business planning processes support the timely procurement and installation of replacement and additional LINACs and supporting equipment, technology, and service contracts. This will minimise service disruption and ensure timely access to treatment for the population of Aotearoa.

5.4 National commissioners will take a national approach when considering LINAC capacity and requirements. This includes a utilisation assessment of the existing and potential LINAC usage, suitable infrastructure and physical space availability, workforce capacity, access to associated technology including treatment planning and oncology information systems, and the capacity of computed tomography (CT) scanners and other critical imaging technology.

5.5 National commissioners will consider the need for additional LINACs alongside robust workforce planning. This will include evaluation of the current state and options to expand capability and capacity of the radiation oncology workforce to match the planned future state for service delivery and future state radiation oncology workforce requirements *(described in Chapter 4: Workforce).*

5.6 National commissioners will prioritise equipment and information technology (IT) system compatibility. They will consult with a centralised multidisciplinary team with radiation oncology expertise and consider IT systems to support sharing of clinical information and consistency of treatment delivery, particularly within each region. They will also consider interconnectivity of patient information data and planning between public and private providers across cancer services. This will facilitate patient

transfer between sites and will also enhance the ability of staff to work in different locations across the country.

Infrastructure design

5.7 National commissioners and providers will ensure that the latest Australasian Health Facility Guidelines (AusHFG) document and Te Whatu Ora – Health New Zealand Facility Design Guidance Note are used when planning a new radiation oncology building or site (Australasian Health Infrastructure Alliance, 2021; Te Whatu Ora - Health New Zealand, 2022)[4].

5.8 National commissioners and providers will ensure sites are accessible for all people and particularly considering the needs of disabled people.

5.9 National commissioners and providers will recognise Te Tiriti o Waitangi and will work to incorporate the identities, histories, narratives, and aspirations of tāngata whenua in any planned refurbishment or new build of facilities. All providers will ensure there is early and active engagement with local iwi and hapū to incorporate and embed their cultural values, principles and aspirations to help shape the radiation oncology facility environment and create distinctive outcomes.

5.10 National commissioners and providers will have mechanisms that ensure the voices of whānau are integral within facility design and ongoing facility improvement. This includes incorporating insights and opinions from kaupapa Māori health providers, Māori health professionals and Māori whānau to understand cultural sensitivity and opportunities for improvement.

5.11 National commissioners will standardise the technical design and build of additional radiation oncology facilities as much as practicable. This will maximise efficiency of resources and minimise duplication of effort, whilst still facilitating locally appropriate design features.

5.12 National commissioners and providers will have mechanisms that ensure the voices of the local workforce are integral within facility design and ongoing facility improvement.

5.13 National commissioners and providers will offer staff well-maintained and practical work areas and facilities, including adequate spaces for non-patient facing administration work and breaks. These will be expanded as staffing numbers increase.

[4] *The AusHFG provides information to assist health services and design teams to plan and design health facilities. Specific to radiation oncology, AusHFG Health Facility Briefing and Planning - Radiation Oncology Health Planning Unit (HPU 600) describes operational, functional and design requirements for radiation oncology units. Te Whatu Ora - Health New Zealand has released a revised version of the Facility Design Guidance Note, designed to be read as a supplement to the Australasian Health Facility Guidelines. This has a focus on specific design guidance for Aotearoa, such as kaupapa Māori, environmental sustainability, universal design and co-design.*

Information technology and data management

5.14 All providers will have access to fit-for-purpose, integrated IT solutions to support clinical decision making, referrals, treatment planning, documentation, emergency management, audit and monitoring. There will be a national approach to ensuring technology compatibility and connectivity to allow for seamless delivery of treatment across different campuses and sites, as required.

5.15 All providers will have designated outpatient consulting areas with appropriate space to meet regional service requirements. This includes ensuring that outpatient areas:

i. provide for private consultation and physical examination of people, with adequate space for support people or extended whānau to be present.

ii. have adequate space to meet additional equipment or environmental needs for disabled people.

iii. provide acoustic privacy, ensuring conversations cannot be heard outside of the room, to support confidentiality.

iv. are enabled for telehealth.

v. have access to technology to review patient data and dictate and document the consultation.

5.16 National commissioners will work collaboratively with providers to ensure there are clear pathways to allow patient data transfer and sharing using Digital Imaging and Communications in Medicine (DICOM). This will enable consistent bi-directional communication between referring regions and centres undertaking radiation oncology treatment.

5.17 All providers will continue to support the ROC and upgrades to allow data to be sourced and shared in a timely way.

5.18 All providers will support the collection of outcome data for acute and late toxicity as well as control rates. National commissioners will provide support for analysing outcome data.

Radiation Oncology Collection

The Radiation Oncology Collection (ROC) is a central repository of detailed national radiation oncology information. It is a crucial tool for clinical benchmarking, LINAC capacity and workforce planning, enabling health equity analysis and tracking quality improvement across Aotearoa.

Innovative technology and techniques

5.18 National commissioners will work collaboratively with multidisciplinary teams that include radiation oncology expertise to ensure new technologies and techniques are assessed and introduced in a timely, consistent and equitable manner across Aotearoa. This includes a national approach to horizon scanning for new and emerging technologies and assessing their potential value, and to inform implementation of upcoming services and technology in Aotearoa.

5.19 National commissioners will ensure the expansion of new technologies in radiation oncology practice to improve consistency and quality of care, and to make a positive impact on workflow and time efficiency in a safe and equitable way. An example of this is artificial intelligence (AI) technologies (see below). This will involve central coordination, strong governance, assessment, and investment across all radiation oncology services.

Artificial Intelligence in Radiation Oncology

The utilisation and impact of artificial intelligence (AI) in radiation oncology is increasing. AI applications already exist within radiation oncology, such as auto-contouring programs, image reconstruction and image classification. The increasing sophistication of AI in the form of machine learning and neural networking is likely to expand the ability of radiation oncology to improve the delivery of radiation oncology services. This will require strong governance to ensure it is utilised in a safe and ethical way.

5.20 National commissioners will undertake technology assessments when new LINACs are proposed to ensure new radiation oncology infrastructure is assessed against national population need and service requirements.

5.21 National commissioners will support planning on how new technology or new techniques are rolled out. This includes consideration of 'lead sites' for trialling new treatments, where staff from these sites are subsequently able to share knowledge, experience and support the roll out to other centres with a clear process as innovation becomes part of routine care.

5.22 All providers will ensure that telehealth is available to support patients and whānau to access care closer to home when clinically appropriate. Providers will utilise the telehealth principles endorsed by RANZCR (*described in Chapter 2: Service Distribution).*

6. SERVICE PERFORMANCE, QUALITY AND SAFETY

Patients receiving radiation oncology treatment will receive high-quality and safe care, from service providers with fit-for-purpose technology systems, and a strong commitment to quality improvement.

The attributes described throughout this document aim to create a high-quality, safe radiation oncology treatment service for patients. This can be further supported through the development, implementation and maintenance of fit-for-purpose national policies, procedures and guidelines, including data standards.

To enable a resilient national radiation oncology service and allow seamless delivery of treatment across different sites, staff need easy access to patient medical records from any centre across the country. Critical medical records include clinic letters, imaging results and radiation oncology treatment plans. Integrated IT systems are essential to support clinical decision-making and ensure a smooth pathway for patients through services across the country.

Access to timely, accurate data is also a critical component of ongoing quality improvement through consistent monitoring of service performance and the utilisation of data to learn and improve.

Whānau Insight: Lack of data integration

"*Telling our story over and over again, is really draining, and traumatic for some people.*"

During the hui, whānau shared frustrations at the lack of data integration, noting that information did not seem to move with people as they shifted between treatment providers. This meant that patients and whānau were often required to endlessly repeat information about their condition to new clinical or care teams, which many saw as traumatising. Some people shared experiences of keeping their own journal because they felt there was no other way to keep track of who they had seen or what treatment they had received, and because the information was not readily available to them otherwise.

Rongohia Te Reo, Whatua He Oranga | The voices of whānau Māori affected by cancer, 2021.

Attributes

6.1. Alongside this document, national commissioners will resource providers to utilise RANZCR *Radiation Oncology Practice Standards (Part A and Part B) (Royal Australian and New Zealand College of Radiologists (RANZCR),*

2022a, 2022b) in the establishment and delivery of radiation oncology treatment services. This will result in consistency in the establishment and management of facilities and will support the provision of consistent therapy, common data collection, and participation in national and international trials.

6.2. All providers will use evidence-based and nationally endorsed prescriptions. The United Kingdom's Royal College of Radiologists guidelines are endorsed for use in Aotearoa and support the standardisation of prescriptions, allowing for the review of unwarranted variation where necessary (The Royal College of Radiologists, 2024).

6.3. National commissioners will establish a nationally defined process and system for providers to report radiation incidents, treatment injuries and near misses. This will allow incident trends to be addressed within and across services to improve service delivery and patient care.

6.4. National commissioners will provide reviews of Accident Compensation Corporation (ACC) annual reports on radiation treatment injury claims and Health and Disability Commission investigations, to support learning and service improvement.

6.5. National commissioners will procure services and support providers who comply with Radiation Safety Act 2016 and the Radiation Safety Regulations 2016, administered by the Ministry of Health's Office of Radiation Safety on behalf of the New Zealand Government.

Monitoring and reporting

6.6 All providers will support nationally agreed quality measures to enable routine monitoring and reporting. This will provide a mechanism to minimise unwarranted variation and highlight areas of focus for service improvement.

6.7 All providers will have a system to collect and provide accurate and consistent clinical and service data.

6.8 National commissioners will establish a national waitlist process and all providers will contribute to provide clarity around unit demand and capacity. There will be national oversight of the waitlist to ensure patients get equitable access to timely treatment. The waitlist will take into account the recommended timeframe for FSAs and treatment dependent on tumour type, treatment intent and whether or not the patient is having combined treatments eg, radiation oncology and surgery (*described in Chapter 3: Service Delivery).*

6.9 All providers will implement regular nationally defined audit and service evaluation to ensure all key performance attributes are operating as

intended. Clinical staff will have allocated non patient facing time to participate in quality and safety activities.

6.10. National commissioners will establish a system to enable the reporting and monitoring of intervention rates.

6.11. National commissioners will develop national demand and capacity modelling to inform future growth and guide business cases for expansion of provider services.

6.12. All providers will have established mechanisms for developing, strengthening and monitoring staff cultural safety. This includes the examining unconscious bias and implementing reflective practice.

6.13. All providers will align with data capturing and reporting mechanisms that meet Māori data sovereignty requirements and support Māori needs and aspirations.

6.14. All providers will ensure their health information systems capture high quality ethnicity data using latest ethnicity data protocols for Aotearoa.

6.15. National commissioners will work collaboratively with providers to establish monitoring mechanisms that ensure care is being provided equitably. All providers will have the capability to interpret the information, respond decisively and implement solutions in a timely manner.

Resilience engineering/service continuance

The distribution of radiation oncology services (*described in Chapter 2: Service Distribution*) will contribute to the establishment of a resilient radiation oncology service that can maintain critical patient care in the event of major disruption.

6.16 All providers will adhere to nationally developed business continuity planning guidance that proactively and promptly acts on adverse performance, or unexpected threats, that constrain access to treatment (*described in Chapter 3: Service Delivery).*

6.17 Should critical systems fail, all providers will have service continuity processes, including pre-emptive training and testing.

6.18 National commissioners and providers will review the extent to which any interruption or constraint of expected service delivery will impact Māori, Pacific peoples and others underserved by the health care system and will act promptly to remedy these inequities.

6.19 National commissioners and providers will ensure clear communication lines are in place regionally and nationally for fast, efficient, and effective

redirection of patients and staff in the event of major disruption, minimising significant impact to people and whānau.

6.20. National commissioners will enable all providers to utilise cloud-based IT systems to archive, restore, and manage complex radiation oncology data in a secure but easy to access manner.

6.21. National commissioners will support providers to develop cyber security strategies to ensure the safe management of radiation oncology data.

7. RESEARCH AND CLINICAL TRIALS

In order to provide equitable access to innovative treatment and to ensure patients receive the benefits of advances in care, research and clinical trials will be embedded within radiation oncology services. New evidence to support practice will be incorporated into routine standard of care in a timely and equitable way.

Clinical trials are an important part of cancer research. Clinical trials also provide a pathway for patients to access treatments that would not otherwise be publicly available.

Research and clinical trials need to be embedded in all centres across Aotearoa as a fundamental part of patient care. They will require equitable access across the country and clear processes in place to enable participation. A strong culture that values innovation, research and clinical trials can also enhance clinicians' professional satisfaction by enabling opportunities for professional development.

Attributes

7.1 All patients will have access to quality clinical trials, regardless of where they live.

7.2 All providers will promote participant diversity within clinical trials and research including Māori and Pacific peoples, older people, disabled people and those living in smaller centres.

7.3 All providers will have access to nationally developed processes and mechanisms to ensure that people participating in clinical research or trials are not disadvantaged by incurring costs related to the study.

7.4 All providers will be able to see which clinical trials are open for recruitment via a single, nationally developed, web-based platform available across Aotearoa. Information will be stored for both patients and radiation oncology services to easily access.

7.5 All providers will have fit for purpose clinical trial technology and infrastructure, including the ability to run in-house research. This includes ensuring staff have dedicated research time in job size calculations.

7.6 Patient participation in clinical trials will be readily visible in a patient's record, with details of the principal investigator for the trial readily accessible.

7.7 All providers will collect data on clinical trials and research participation to assess access and up take.

7.8 National commissioners and providers will have clear processes to incorporate and integrate high quality research and trials into standard practice.

APPENDIX: RADIATION ONCOLOGY MINIMUM STAFF REQUIREMENTS

There have been several pieces of work to estimate the workforce requirements for radiation therapy and how this relates to the current supply of staff. The information collated here is based on calculations done in 2023, using the most up to date data available at that time.

There are limitations to some of these calculations, most notably that they are based around the current model of service provision, and so may not represent workforce requirements to deliver a new model of care. Some of these calculations are also based on international estimates, which may now be out of date. However, these estimates provide a starting point from which to strengthen workforce modelling and forecasting *(described in Chapter 4: Workforce - Supply, demand and forecasting*).

Radiation oncologists

International guidance on the optimal level of radiation oncologist staffing varies, depending on differences in cancer incidence and socioeconomic factors in the population, adoption of technology within services and the distribution of professional roles and responsibilities (Lievens et al., 2014). Some international centres model radiation oncologist workforce numbers and service size by number of LINACs and others by the number of first specialised appointments a radiation oncologist provides each year.

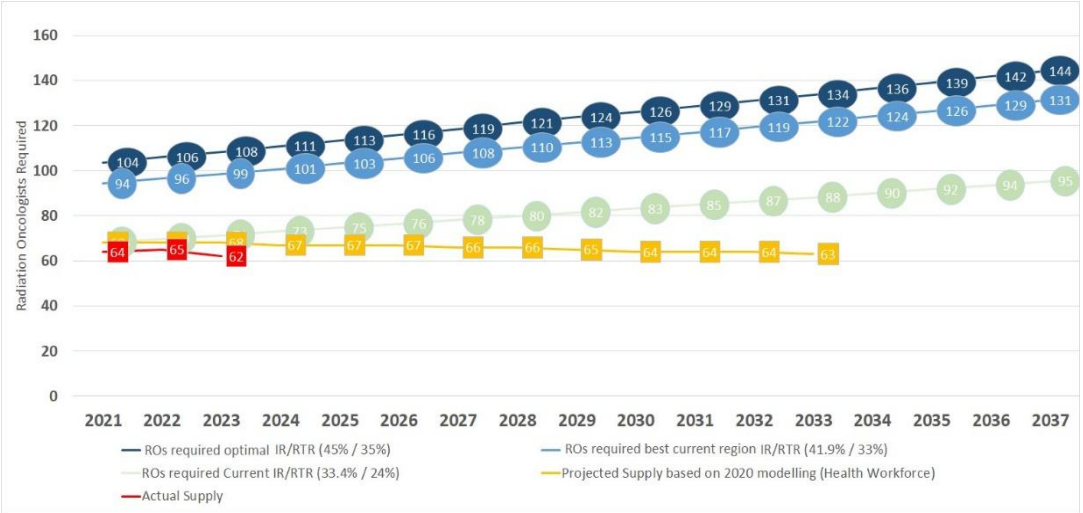
In 2020, Te Aho o Te Kahu developed a model that uses data from the ROC alongside survey data on the real-life work experiences of radiation oncologists. A workforce demand model was developed that could account for different complexities of treatment, non-patient facing activities and clinical activities of radiation oncologists, and actual hours worked rather than estimates. Results from this new model can be compared to radiation oncologist 'supply' modelling undertaken by the Ministry of Health, which predicts the number of practising radiation oncologists in future years, based on current work patterns (Jo et al., 2017).

Figure 5 below shows results from the demand model for 10 years (2021–2031), based on current radiation therapy intervention rate (IR)[5] and re-treatment rate (RTR)[6], the best IR/RTR and the international IR/RTR (Barton et al., 2014).

[5] The intervention rate (IR) is the proportion of all registered cancers that are treated with at least one course of radiation therapy.

[6] The re-treatment rate (RTR) is the proportion of all courses delivered to people with cancer who have already had at least one course for that cancer.

Figure 6: Radiation oncologists required with different intervention rates and retreatment rates, with supply model estimates.



The results reveal a significant shortfall of radiation oncologists, predicting that we will have fewer in 2031 than in 2023. The forecast numbers would be unable to meet demand for radiation oncology even if current IR/RTRs continued. Around double the current workforce would be needed to meet demand with higher IR/RTRs (Dunn et al., 2022).

To maintain the current IR/RTR, Aotearoa needs 71 full-time equivalent (FTE) radiation oncologists in 2023 and 85 by 2031. If all public cancer centres achieved the highest rates recorded regionally in Aotearoa, we would need 99 in 2023 and 117 in 2031. If Aotearoa wants to achieve an IR and RTRs comparable to Australia and elsewhere, 108 radiation oncologists are needed in 2023 and 129 in 2031.

Radiation oncology medical physicists

The Australasian College of Physical Scientists and Engineers in Medicine (ACPSEM) initiated a workforce modelling project in October 2020 to look at practices in Australia and Aotearoa and to develop a workforce model. It produced two outcomes: a snapshot of the radiation oncology medical physicist (ROMP) workforce and the development of an activity-based workforce calculator based on the International Atomic Energy Agency (IAEA) model (Crowe et al., 2021).

This model calculates staffing requirements that are reflective of current ROMP practices in Australia and Aotearoa (Table 3).

This new model estimates at least 2 ROMPs are required per LINAC with variation due to training responsibilities, the complexity of the patient caseload, the equipment profile (eg, if brachytherapy is provided). It is also important to note that this work is now four years old, in which time there has been a significant increase in treatment complexity and therefore increased physics resource required, meaning this may be an under representation of current requirements and future demand.

Table 3: Estimated radiation oncology medical physicist (ROMP) equivalent FTE per LINAC.

Department size	**ARW *(ACPSEM ROMP Workforce)***	**F2000 (previous workforce model)**	**IAEA (International Atomic Energy Agency)**	**COMP (Ontario model)**
Large (6) LINACs	11.0 (1.8/LINAC)	23.1 (3.9/LINAC)	19.4 (3.2/LINAC)	9.4 (1.6/LINAC)
Small, standalone (2) LINACs	3.4 (1.7/LINAC)	8.3 (4.2/LINAC)	5.4 (2.7/LINAC)	2.8 (1.4/LINAC)
Small, networked (2) LINACs	2.1 (1.1/LINAC)	8.3 (4.2/LINAC)	5.4 (2.7/LINAC)	2.8 (1.4/LINAC)

(Crowe et al., 2021)

Radiation therapists

In 2014, the Australian Society of Medical Imaging and Radiation Therapy (ASMIRT) produced a revised workforce modelling tool (Table 4) for radiation therapists in Australia. This tool provides the flexibility for radiation oncology services to best design staffing establishments according to their particular needs and reflecting the diverse needs of the sector (Smith et al., 2016).

Table 4: Australian Basic Radiation Therapist Staffing Model

	Number of linacs					
Staffing functions	1	2	3	4	5	6
Management (add 1 per satellite)	1	1.5	2	2	2	2 (3)
Head of sections (add 2 per satellite)	1	2	2	2	2	2 (4)
Information systems management	0.5	1	1	2	2	2
Education & training	0.75	1.5	2.25	3	3.75	4.5
Research and development	0.5	1	1.5	2	2	2
Quality and safety	0.5	0.5	1	1	2	2
Simulation	0.43	0.9	1.3	1.7	2.2	2.6
Planning	1.5	3.0	4.5	6.0	7.5	9.0
Treatment	3.42	6.8	10.3	13.7	17.1	20.5
Base FTE	9.6	18.2	25.8	33.4	40.5	46.6
FTE with leave relief	11.14	21.11	29.93	38.74	46.98	54.06
RTs per linac operating hour	1.39	1.32	1.25	1.21	1.17	1.13 (1.20)

FTE, full-time equivalent.

Radiation oncology centres in Aotearoa have revised and adapted the Australian workforce model to ensure it is applicable to the clinical environment and staffing requirements in Aotearoa. As with the ROMP estimates, it is important to note that this is based on work that is now 10 years old and will need to be updated to reflect current practices.

Radiation oncology nurses

By the year 2035, it is projected that Aotearoa will have a deficit of 15,000 nurses.[7] Within the cancer nursing workforce, there will be a 12% deficit (percent change in FTE) in nurses relevant to the population. There is a need to develop and implement a nationally consistent strategy to support registered nurses in radiation oncology as outlined in attribute 4.22.

Aotearoa can currently provide data on supply, but not demand for cancer nursing, therefore more work is needed in this area to inform and plan for the future.

[7] Data provided by Workforce Team, Health New Zealand.

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