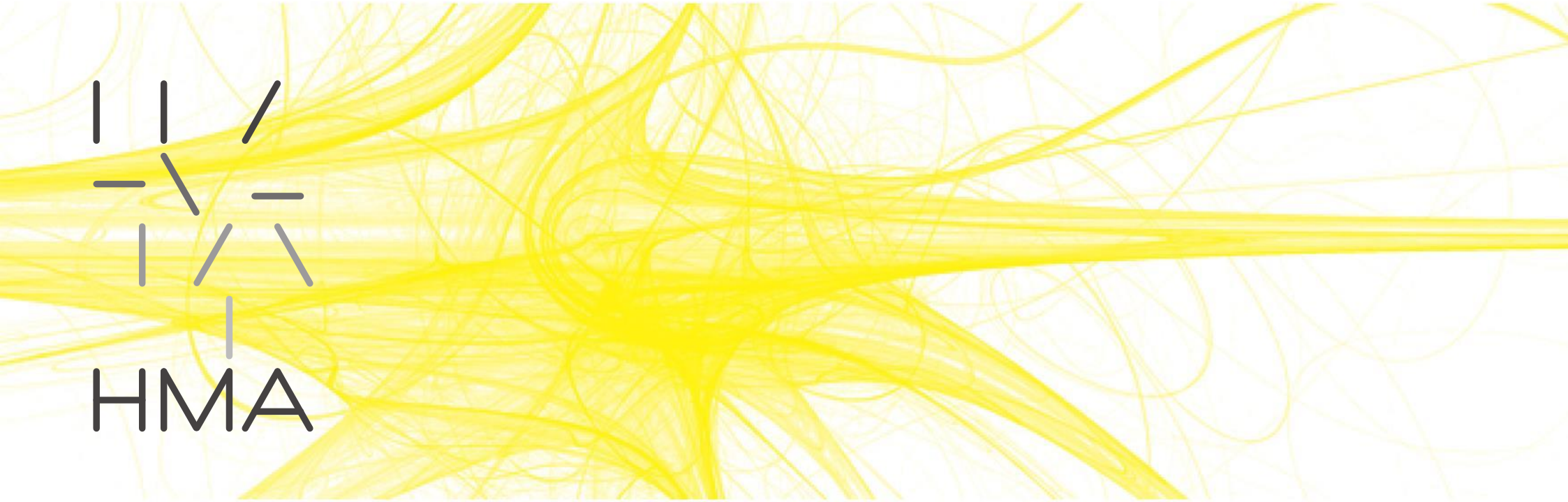
HMA

AUSTRALIAN GOVERNMENT DEPARTMENT OF HEALTH

Review of the Radiation Oncology Health Program Grant Scheme

FINAL REPORT

18 DECEMBER 2020



OUR VISION

To positively impact people's lives by helping create better health services

OUR MISSION

To use our management consulting skills to provide expert advice and support to health funders, service providers and users

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ABBREVIATIONS

ACDS	Australian Clinical Dosimetry Service
AIHW	Australian Institute of Health and Welfare
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
ASR	Age Standardised Incidence Rate
CCORE	Collaboration for Cancer Outcomes Research and Evaluation
CHHHS	Cairns and Hinterland Hospital and Health Service
DVA	Department of Veterans' Affairs
EBRT	External Beam Radiation Therapy
GP	General Practitioner / General Practice
HDR	High dose-rate
HMA	Healthcare Management Advisors
IGRT	Image-Guided Radiation Therapy
IMRT	Intensity-Modulated Radiation Therapy
KRA	Key Review Area
Linac	Linear accelerator
MBS	Medicare Benefits Schedule
MM1	Major city
MM2	Regional area
MM3	Rural area
MMM	Modified Monash Model (of remoteness classification)
MRI	Magnetic resonance imaging
NHA	National Healthcare Agreement
OUR	Optimal (Radiotherapy) Utilisation Rate
QoL	Quality of Life
RANZCR	The Royal Australian and New Zealand College of Radiologists
ROHPG	Radiation Oncology Health Program Grant Scheme
RT	Radiotherapy
SBRT	Stereotactic Body Radiation Therapy
SRS	Stereotactic Radiosurgery
The Department	The Australian Government Department of Health
TVM	Time value of money
UR	Utilisation rate

EXECUTIVE SUMMARY

The Radiation Oncology Health Program Grant (ROHPG) is an atypical funding mechanism that exists in the context of the prevalence of cancer in Australia, the importance of radiotherapy for cancer treatment, the impact of access to radiotherapy equipment on utilisation of radiotherapy as a treatment, and the relative high cost of associated equipment used in the delivery of radiotherapy.

Of contextual relevance too, is the recognition through this Scheme of the combined importance of the public and private segments of the health sector in provision of radiotherapy treatments to Australian patients.

Under a more typical scenario, state or territory government would be responsible for capital expenditure for public facilities within their jurisdiction. These arrangements are facilitated through National Healthcare Agreements between state or territory governments and the Australian Government. Private facilities would determine the commercial viability of establishing a service through capital investment, based on subsequent reimbursement on activity.

However, the disproportionate cost of radiotherapy equipment compared to reimbursement available creates a perverse incentive to maximise radiotherapy throughput to create a sustainable service model. This goes against emerging trends in radiotherapy, which are moving to a 'hypofractionation' model of fewer but higher doses of radiotherapy to minimise damage to healthy tissue. Hypofractionation is made possible with linear accelerator and imaging technology advances. Although hypofractionation is reducing the timeframes required for radiotherapy courses, courses of treatment still range from an average of two to six weeks.

Lengthy treatment courses present challenges for regional and rural patients if they have to travel for treatment for weeks at a time. This is a driver for making radiotherapy available closer to home for all Australians. However, this desire needs to be balanced with pragmatic considerations of the workforce implications and the ability of radiotherapy services to integrate with broader cancer care.

When the ROHPG commenced in 1988 there were only 46 linear accelerators in Australia, with very few in regional and rural areas, resulting in access inequities, lengthy wait time and underutilisation of radiotherapy as a treatment modality. Today Australia has a fleet of approximately 200 linear accelerators in metropolitan and regional areas as well as a selection of key rural areas, and radiotherapy utilisation rates continue to rise.

Given the changing context of radiotherapy in Australia, the Australian Government Department of Health (the Department) sought to review the ongoing relevance and need for the ROHPG Scheme and the impacts of recent changes to the Scheme's funding and administration arrangements that occurred in 2017.

The Department engaged Healthcare Management Advisors (HMA) to:

> *'assess the effectiveness of the Radiation Oncology Health Program Grants (ROHPG) Scheme against the objectives of the program, including the impact of revised arrangements introduced in 2017.'*

The review process was undertaken from August to November 2020 and focused on four key review areas (KRA):

- KRA-A: the ongoing appropriateness of the ROHPG
- KRA-B: the effectiveness of the Scheme in meeting the program's objectives
- KRA-C: the efficient and effective administration of the ROHPG Scheme, and
- KRA-D: appropriate accountability for ROHPG Scheme funds.

The review included consultation with public and private radiotherapy facilities that receive ROHPG funding, the Department, jurisdictional departments of health (or equivalent), peak bodies and colleges, safety and quality agencies, consumer advocacy groups, and linear accelerator vendors. In addition, the review process considered published literature and policy and program documentation, analysis of ROHPG funding and equipment data, Australian Institute of Health and Welfare cancer incidence and radiotherapy data, and Medicare service and benefits paid data.

SUMMARY OF REVIEW FINDINGS AND RECOMMENDATIONS

KRA-A: the ongoing appropriateness of the ROHPG

The review found the objectives of the ROHPG remain relevant, as radiotherapy continues to be a major component of cancer treatment, contributing to favourable outcomes in a range of high prevalence cancers. Many factors contribute to developing a radiotherapy service and providing high-quality care for patients, including workforce, support services and integration into multidisciplinary teams. It is appropriate for these factors to be considered in assessing ROHPG funding applications. However, the review found that the process of setting priority areas by jurisdictions is not operating as intended and needs further consideration. In addition, there is a misalignment between Australian Government funding commitments for regional radiotherapy infrastructure and ROHPG priority areas.

A trade-off analysis assessed the relative advantage of the current ROHPG Scheme (status quo) against other potential funding options. The analysis did not find any of the alternative mechanisms to be more advantageous in their entirety. However, additional administrative efficiency is suggested through a more traditional grant program mechanism, or funding via state/territory jurisdictions.

Recommendation 1. The Department should continue to support the capital costs of high-cost RT equipment. However, steps should be taken to further integrate the Scheme with jurisdiction RT planning.

Recommendation 2. Steps to better integrate the ROHPG with national and state/territory RT planning are required to prevent ongoing misalignment of cancer planning agendas.

KRA-B: the effectiveness of the Scheme in meeting the program's objectives

The review found that the ROHPG made a significant financial contribution to the fleet of linear accelerators in Australia, supported growth in linear accelerator numbers, and promoted timely turnover of linear accelerators in the fleet. However, there was no evidence that private facilities have a higher throughput average than public facilities (per linear accelerator per annum). We therefore recommend that ROHPG payments be made in equal timeframes for all facilities, which should be over a period of no more than 10 years.

The review also found that the radiotherapy community looks to the ROHPG to drive consistency and best practice in the absence of national regulation and planning. As such, there is possibility to expand the conditions of funding to promote broader quality and safety aspects of radiotherapy as they emerge.

Recommendation 3. The ROHPG should be offered with subsidy timeframes that do not differentiate between public and private facilities. The timeframe should be no longer than 10 years. The Department may wish to consider shorter timeframes on a case-by-case basis if suitable evidence of very high throughput can be demonstrated.

Recommendation 4. The Department may wish to consider the inclusion of additional safety monitoring measures into the ROHPG funding conditions in future as they emerge or are mandated by jurisdictions (e.g. the Australian Radiation Incident Registry or Radiation Oncology Standards). However, it is not the place of a capital grants scheme to enforce quality standards for the radiation oncology sector.

KRA-C: the efficient and effective administration of the ROHPG Scheme

The review found that the $3 million contribution to linear accelerator capital costs is a significant contribution to the current costs of base level linacs but does not cover the full costs of add-ons required for newer treatment regimes, or advanced equipment. The full impact of the changes to ROHPG funding (including no longer

funding non-linear accelerator equipment) may not be evident until equipment funded under the transition period arrangements and linear accelerators funded under the new arrangements require replacement. The removal of brachytherapy from the ROHPG Scheme could result in fewer facilities providing this treatment option in future. However, the ROHPG Scheme only provides a contribution to high-cost equipment and alternative funding options will need to be sourced by radiotherapy facilities.

The streamlined administrative process for the ROHPG and the annual payments are preferred by stakeholders. However de-linking payments from MBS service use created a loss of visibility for the Department about utilisation of funded equipment. The Department has implemented a suitable strategy to address this.

However, the setting of priority areas and set timeframes for new applications in priority area locations has not worked as intended. At a minimum, more transparency is required about how the priority areas are identified, with a longer-term view of upcoming priority areas. If there is a greater appetite for restructure among stakeholders, priority area setting could become integrated with greater national planning for radiotherapy that takes into consideration other necessary factors such as workforce, service integration and referral pathways.

A two-year timeframe for the establishing of new radiotherapy facilities was considered adequate and welcomed by stakeholders to prevent 'warehousing' of ROHPG locations.

Recommendation 5. $3 million makes a significant contribution to the current costs of a base level linac. The capital contribution should be reviewed periodically (nominally every four years) to ensure it remains an appropriate value.

Recommendation 6. The formula used for setting priority areas in each jurisdiction should be made available, along with the estimated demand (including both met and unmet need) for each planning region. Longer-term projections should also be presented (e.g. upcoming five years), even if these areas cannot be applied for until future years. This will enable forward planning by providers.

Recommendation 7. The Department, in conjunction with jurisdictional departments of health, could consider establishment of a national register of all linacs to support planning processes.

Recommendation 8. The Department may wish to consider expanding the setting of priority areas to include broader radiotherapy planning at a national level, with input from jurisdictions and facilities.

Recommendation 9. The Department should maintain the two-year timeframe for establishing new facilities. New timeframes (no longer than two years) should be negotiated with the grandfathered non-operational facilities.

Recommendation 10. The Department should maintain the inclusion of dosimetry monitoring.

KRA-D: appropriate accountability for ROHPG Scheme funds

The review noted several areas where the ROHPG Scheme administration could be strengthened to increase transparency and provide assurance of the appropriate use of Australian Government funds.

Recommendation 11. The Department should strengthen the ROHPG application process by:
1. Making the ROHPG guidelines and/or application form more explicit about what information should be presented for the patient access criterion, even in priority area locations.
2. For the affordable service criterion, seeking additional information about the proximity of facilities that have 100% bulk-billing processes (e.g. public facilities) and include a description of how additional billing information (e.g. fee schedules) will be scored and compared.
3. Requesting the provision of evidence (letters or email exchange) of stated relationships for the multidisciplinary and patient centred care criterion.
4. Including a scoring matrix for all criteria to enable a transparent assessment process.

Recommendation 12. The ROHPG instrument should be updated to reflect all relevant assessment criteria and the facility declaration expanded to include additional conditions.

Recommendation 13. The Department should continue pausing ROHPG payments if necessary certificates of currency have not been provided and could consider pausing payments if equipment has not been used within a financial year. Similarly, additional penalties could be considered such as reduced payments if other funding conditions are not met. However, the exact nature of appropriate penalties would need to be developed in consultation with the sector to ensure patients would not be adversely affected.

FUTURE DIRECTIONS

The review outlines two implementation options for the recommendations, depending on the appetite for change among stakeholders.

Option 1: Adjustments to strengthen the existing ROHPG Scheme

ROHPG Scheme remains in its current form but is strengthened with recommended adjustments to payment timeframes, application process and conditions of funding. In addition, the process for setting priority areas is strengthened with greater transparency and longer prediction timeframes to allow for future planning and consideration of statewide radiotherapy planning needs.

Option 2: Development of a national body with input from all jurisdictions, colleagues, peak bodies and public and private facilities for radiotherapy planning that includes capital funding for high-cost equipment.

Development of a national body with responsibility for radiotherapy planning comprising representation from all jurisdictions (including the Australian Government), public and private facilities, colleges, and peak bodies.

This option provides a platform to include the features of Option 1 to strengthen the capital funding aspects but promote better integration of capital funding with radiotherapy planning. This option would also enable alignment of capital funding with planning agendas at the Australian Government and state and territory levels.

1 INTRODUCTION

1.1 BACKGROUND AND REVIEW OBJECTIVES

The Australian Government Department of Health (the Department) has engaged Healthcare Management Advisors (HMA) to:

> *'assess the effectiveness of the Radiation Oncology Health Program Grants (ROHPG) Scheme against the objectives of the program, including the impact of revised arrangements introduced in 2017.'*

Recognising the importance of radiation oncology services in the treatment of cancer patients, the objectives of the ROHPG Scheme are to assist in:

- improving health outcomes for cancer patients
- ensuring adequate and equitable access to radiation oncology services for Australian cancer patients
- improving equity of access for cancer patients, and
- maintaining the quality and safety of radiation oncology equipment.

The ROHPG was first introduced in 1988 under the *Health Insurance Act 1973* (the Act) in response to the significant discrepancy throughout the 1980s between actual radiotherapy (RT) treatment rates and the estimated optimal utilisation rate. The Australian Government established the ROHPG as a mechanism to expand radiation oncology services by providing dedicated funding for capital equipment costs associated with RT [1].

In 2016, the Scheme was reviewed and updated to ensure currency and to streamline administration processes for both the Department and radiotherapy facilities. Key changes made to the Scheme implemented in 2017 are summarised in Table 1.1.

Table 1.1 Changes made to the ROHPG from 2017

Major area of change	Pre-2017 program features	2017 onwards
Set grant value of $3 million	Multiple applications for actual costs of radiotherapy equipment (external beam radiotherapy and brachytherapy), plus supporting infrastructure such as simulators and software. Resulting in varying grant amounts for recipients.	Set contribution of $3 million for all high-value capital equipment (linear accelerators) associated with providing external beam radiation therapy accessed through a single grant application.
Timing of payments	Payments made by Dept of Human services were made monthly based on actual service provision as recorded by the volume of relevant Medicare services provided.	Set annual payments made by the Department of Health (conditional on provision of a valid dosimetry audit certificate) – $300,000 per annum for 10 years for public facilities, $375,000 per year for 8 years for private facilities.
Processing time	Lengthier application process with varying approval times.	A streamlined application process for replacement equipment.
New facility applications	New facilities or expansion assessed in an ongoing process which limited the ability to compare multiple applications for the same area and unfairly advantaged early applications.	Applications for new facilities or expansion assessed based on national needs analysis informed by stakeholders within jurisdictional government. Set application period for newly identified priority areas to enable comparative assessment of applications.

1 INTRODUCTION

The purpose of this review is to assess the effectiveness of the ROHPG against its stated objectives. The review also has a specific focus on the impact of revised arrangements introduced in 2017.

1.2 PROJECT METHODOLOGY

The ROHPG Review is being undertaken in six project stages:

- Stage 1: Project initiation
- Stage 2: Develop review framework and consultation strategy
- Stage 3: Situation analysis, to provide background and context to the ROHPG as well as examine the underlying assumptions of the Scheme for their ongoing relevance
- Stage 4: Stakeholder consultation to gain qualitative input into the review and quantitative data analysis
- Stage 5: Triangulation of information and trade-off analysis (Draft Report)
- Stage 6: Final report.

We provide commentary on two specific features of this methodology below: stakeholder consultations and data sources.

1.2.1 Stakeholder consultation

Stakeholder consultation included:

- public and private radiotherapy facilities that receive ROHPG funding
- radiation oncologists/radiation therapists
- jurisdictional departments of health (or equivalent)
- peak bodies
- safety and quality agencies
- consumer advocacy groups
- linear accelerator (linac) vendors, and
- the Australian Government Department of Health.

A full list of stakeholders consulted is provided at Appendix A.

1.2.2 Data sources

A desktop review was undertaken as part of the situation analysis to provide context for the review. In addition, quantitative data from publicly available data sources as well as ROHPG Scheme and Medical Benefit Schedule (MBS) radiotherapy data was analysed as part of the review process.

Publicly available information was sourced from relevant websites including:

- published literature on radiotherapy as relevant
- media releases from the Department of Health, the Prime Minister, and Minister of Health
- reports and data tables produced by the Australian Institute of Health and Welfare (AIHW)
- websites of radiotherapy service providers, and
- websites containing information on the cost of linacs.

Non-publicly available data and documentation was provided by the Department, including:

- ROHPG payment and equipment reports
- administrative documents:
  - service applications
  - instruments of funding
  - dosimetry audit reports, and
- Medical Benefit Schedule (MBS) radiotherapy data.

1.3 PURPOSE OF THIS DOCUMENT

This document (the draft final report) provides a summary of the information gathered during the review and the analysis we undertook to assess the appropriateness, effectiveness, efficiency and accountability of the ROHPG Scheme.

1 INTRODUCTION

The analysis includes a trade-off analysis of alternative funding mechanisms for high-cost radiotherapy equipment.

The remainder of this document is structured as follows:

Context

- Chapter 2: Situation analysis that describes the policy and operational setting in which the ROHPG functions
- Chapter 3: Review framework that guided the approach to the program review

Review findings

This section of the report provides analysis and findings against each of the Key Review Areas (KRA) specified in the review terms of reference:

- Chapter 4: KRA-A: the ongoing appropriateness of the ROHPG
- Chapter 5: KRA-B: the effectiveness of the Scheme in meeting the program's objectives
- Chapter 6: KRA-C: the efficient and effective administration of the ROHPG Scheme
- Chapter 7: KRA-D: appropriate accountability for ROHPG Scheme funds

Future directions

- Chapter 8: suggests future directions for refining the ROHPG, based on the review findings.

PART A

CONTEXT

2 SITUATION ANALYSIS

2.1 RADIOTHERAPY

Radiation therapy, also referred to as radiotherapy (RT), is an important treatment for many cancers; it can be applied for both curative and palliative reasons.

There are two main modes of delivery: internal radiation therapy known as brachytherapy, and external beam radiation therapy [2].

Several types of external radiation therapy are currently used to treat cancers, including:

- conventional external beam radiation therapy (EBRT)
- intensity-modulated radiation therapy (IMRT)
- image-guided radiation therapy (IGRT)
- stereotactic radiosurgery (SRS), and
- stereotactic body radiation therapy (SBRT) [3].

Each of these treatments uses X-ray radiation (photons) delivered through a medical linear accelerator (linac)[1]. A linac is a large piece of equipment used to deliver the photons to the patient's cancer site. Linacs are operated by a radiation oncologist. Magnetic resonance imaging (MRI) and computed tomography (CT) scanning equipment can be mounted onto a linac to enable delivery of IGRT, SRS and SBRT, although newer models may have built-in imaging capacity [3].

SRS and SBRT are primarily used in the treatment of primary and secondary brain cancers but are increasingly being used in the treatment of other types of tumours such as lung and breast cancers [4, 5].

Many Australian cancer services with linacs and imaging equipment have the capacity to provide all of these therapies, as their modes of delivery are enabled by differing software programs and procedures rather than different types of linac [6].

The ROHPG focuses on the funding of linacs to deliver external beam radiotherapy. Therefore, reference to RT throughout this report will refer to external beam radiotherapy, unless otherwise specified.

To deliver RT, facilities must also have a bunker. A bunker is constructed with concrete and lead to protect clinicians and others within the building from radiation exposure [7]. Bunkers and other aspects of physical infrastructure needed to deliver RT require significant time and financial investment. It is likely that a newly established facility that has not previously delivered RT will need to make substantial changes to building structures to support the construction of bunkers. There is also an extensive set-up time required to recruit highly specialised staff to plan and deliver services. Therefore, in establishing a new RT service, the facility must not only consider the high cost of linacs but also the costs associated with developing bunker facilities and recruiting the necessary staff.

2.1.1 Innovations in RT provision

Innovations in software and imaging technology have the capacity to support the existing RT workforce to increase service volume as well as improve the safety and quality of treatment [8].

[1] Although the vast majority of RT provided uses photons delivered by a linac, some RT available in Australia uses gamma rays to delivery high dose RT for stereotactic radiosurgery – the Gamma Knife (Elekta).

Increased patient throughput and more efficient use of clinician time can be aided by:

- automated treatment planning, decreasing the time spent by radiation oncologists/therapists on planning treatment delivery, and increasing their capacity to provide service to more patients
- real-time adaptive image-guided RT; this decreases the need for patient readjustment and measurement during treatment sessions and therefore time required by individual treatments, allowing a greater number of patients to be treated within the same timeframe.

Further, the ability to share treatment information through cloud-based collaboration gives clinicians access to case conferencing and second opinions from expert peers, even if they are in regional locations or different states, significantly increasing the quality and safety of care. This mechanism can also support increased patient participation in clinical trials by increasing the number of sites able to participate with supervision, known to contribute to improved survival outcomes [8].

2.2 PROVISION OF RADIOTHERAPY IN AUSTRALIA

In Australia, the majority of radiotherapy is provided as an outpatient service and can be provided by a public or private facility.

Levels of public RT service provision vary by jurisdiction and local health service districts. There are 42 public radiotherapy facilities across Australia with the majority in New South Wales (17), Victoria (10) and Queensland (7). Tasmania has three public facilities, South Australia has two public facilities, while all other jurisdictions (Western Australia, Australian Capital Territory and Northern Territory) have one public facility. ROHPG provides funding to all but one of these facilities (98%).

There are 63 private RT facilities in Australia[2], 81% of which are provided by one of two main organisations, ICON and GenesisCare. Together ICON and GenesisCare have facilities in all jurisdictions with the exception of the Northern Territory. There are a small number of other private RT providers, as follows:

- Cancer Care Associates, which has two centres in New South Wales – one in Wagga Wagga and one in Northern Beaches, Sydney
- Chris O'Brien Lifehouse in Sydney, New South Wales
- Northern Territory Radiation Oncology which are in a public-private partnership at the Alan Walker Cancer Care Centre in Darwin, and
- 5D Clinic in Perth, Western Australia (which does not currently receive ROHPG funding).

Eighty-nine per cent of private facilities receive ROHPG funding (n=56 of 63).

In total there were 105 operational RT facilities at the time of this report, 93% of which (n= 97) received ROHPG funding. Further, over half the ROHPG funded facilities (58%) were private facilities (n= 56 of 97).

In addition to currently operational facilities, a further nine facilities are planned with approved ROHPG funding, eight of which are private and one is public.

2.3 ROHPG FUNDING MODELS

2.3.1 ROHPG prior to 2017

When the ROHPG commenced in 1988, approved health service facilities received an ROHPG payment for every RT service recorded as an MBS service[3]. This payment was supplementary to the MBS fee received, which does not compensate for capital equipment costs.

In 2008, payment changes were introduced to better align the funding provided to actual costs of RT equipment purchased, and to encourage replacement of old equipment. At this time, the ROHPG payments were available for all necessary equipment for RT services including linacs, brachytherapy, CT scanners for

[2] Does not include public-private partnerships that have been counted as public facilities.

[3] Radiotherapy services are typically performed as an outpatient service, and as such attract an MBS rebate for services provided.

simulation, and software including treatment planning software and networking software.

The ROHPG payment levels were based on a derived capital balance for each piece of equipment purchased by RT facilities. The value of ROHPG payments were then calculated based on the estimated volume of services for the life of the equipment, and paid monthly based on actual MBS services provided [1]. Payments were made on each piece of equipment until the capital balance reached zero or until the piece of equipment was decommissioned.

The amended funding formula introduced in 2008 aimed to encourage both public and private facilities to replace ageing equipment, contributing to the overall safety of RT.

In 2016, a review of the ROHPG Scheme found that significant disparities in funding levels continued to exist between public and private facilities. These primarily stemmed from private facilities being able to claim the cost of borrowing funds to purchase a machine. Although this was available on application to public facilities which borrowed funds for capital purchases, public facilities did not claim for this additional expense.

2.3.2 Changes to the ROHPG funding model introduced 1 July 2017

Based on the 2016 review, the ROHPG funding formula was amended further in 2017, as discussed below.

Removing payments from the Medicare Benefits Schedule

For the first time since the Scheme commencement, the link between ROHPG funding and MBS service volume was removed. Prior to 2017 changes, ROHPG payments were calculated based on the volume of eligible MBS claims associated with RT service delivery. ROHPG payments were made in addition to the MBS claim value and paid monthly to approved facilities.

This system meant that larger services received higher rates of funding per month than lower throughput services. Removing the link between ROHPG payments and MBS service claims aimed to reduce the disadvantage for facilities with lower-throughput capability [1]. Due to this change, facilities are now no longer required to submit monthly service delivery data to the Department, substantially reducing the administrative burden associated with the ROHPG, especially for private facilities (public facility data was supplied directly from MBS data) [1].

A set contribution of up to $3 million for linacs

Under the 2017 funding formula, approved facilities receive annual payments of $300,000 over 10 years for public facilities or $375,000 over eight years for private facilities, to the value of $3 million per linac. The difference for payment timeframes (eight or 10 years) was based on estimated higher throughput of RT services by private facilities. The funding formula also aimed to encourage both public and private facilities to replace ageing equipment, contributing to the overall safety of RT.

A linac is estimated to be capable of delivering approximately 82,800 services across its lifespan [1]. Implicit in the funding formula is the assumption that public facilities are estimated to reach this threshold in 10 years, while private facilities are expected to reach this level of services in eight years. The effect of this is that private facilities receive higher payments per annum, and private facilities are able to replace linacs every eight years and still receive full ROHPG funding.

Funding contributions only for linacs

Another significant change that occurred in 2017 was that from 1 July 2017 ROHPG payments became a set contribution toward the cost of high-value linacs only. Previously, facilities also received funding for other equipment used in the delivery of RT services, including brachytherapy, as well as software for treatment planning, simulation and dosimetry [1]. The move to focus ROHPG funding on high-cost capital equipment (i.e. linacs) was considered by the 2016 review of the Scheme to have several benefits, including:

- increasing its efficiency and transparency, and
- repositioning the Australian Government's role to give greater responsibility to state/territory governments, which are generally obligated to provide funding to public health services for capital equipment costs [1].

Non-linac RT equipment approved for funding prior to 2017 was grandfathered from the impact of the new arrangements. Pre-approved non-linac equipment continues to be funded at 2017 activity levels and replacement equipment is not eligible for ROHPG funding.

2.3.3 Transition period

The introduction of ROHPG changes in 2017 created a transition period, whereby equipment approved prior to 1 July 2017 may still be receiving ROHPG payments. Transition period arrangements are:

- at 30 June 2017, all approved equipment with a capital balance greater than zero will continue to be funded
- payments will be annual (in line with introduced changes)
- the value of each 'service' will continue as under previous arrangements
- value of annual ROHPG payments will be set at the estimated annual 'service' volume (based on the previous year's usage) multiplied by the set 'service' value, and
- payments will continue until the capital balance reaches zero or until the equipment is decommissioned.

As equipment up to and including 30 June 2017 will be funded using the previous ROHPG formula under transition arrangements, the transition period will last for 10 years and beyond for some pieces of equipment.

Grandfathered funding arrangements – linacs

There are 140 linacs with grandfathered funding arrangement, 34% of which (n=48) will have a capital balance of $0 before or at 10 years of age, and a further 21% (n=30) by 12 years of age. By the current annual payments, the remaining 62 linacs (45%) would range from 13 years to 126 years of age by the time the capital balance reached $0, with a median age of 16 years.

It is anticipated that many if not all of the 62 linacs that will not reach a capital balance of $0 by the age of 10–12 years would be replaced by the facility before the capital balance reached $0, to maintain currency with technology. This would afford facilities the ability to replace linacs under the new funding arrangements, which would be more financially beneficial for the majority (only two of the 62 linacs (both private) receive an annual payment of more than $375,000 per annum).

Further detail on linac age is provided in section 5.2.2.

Grandfathered funding arrangements – other equipment

Other equipment no longer funded by the ROHPG Scheme has also been grandfathered under the transition period. This includes brachytherapy equipment, planning equipment and simulators, as follows:

- **Brachytherapy:** There are 25 brachytherapy units with grandfathered funding arrangements, 52% of which (n=13) will reach a balance of $0 within 10 years' time at the current payment value. The median timeframe to reach a capital balance of $0 for grandfathered brachytherapy equipment is nine years.
- **Planning equipment:** There are 70 planning units with grandfathered funding arrangements, 80% of which (n=56) will reach a balance of $0 within 10 years' time at the current payment value. The median timeframe to reach a capital balance of $0 for grandfathered planning equipment is three years.
- **Simulators:** There are 87 simulators with grandfathered funding arrangements, 64% of which (n=55) will reach a balance of $0 within 10 years' time at the current payment value. The median timeframe to reach a capital balance of $0 for grandfathered simulators is eight years.

Of the 181 non-linac pieces of equipment funded under grandfathered arrangements, 68.5% (n=124) will be paid off within 10 years' time. It is anticipated that many if not all of the grandfathered equipment that will not reach a capital balance of $0 in 10 years' time would be replaced by the facility within this timeframe to maintain currency with technology.

2.3.4 ROHPG expenditure

In 2019–20 the ROHPG provided $76.6 million to 95 facilities for capital RT equipment.[4] Within this funding, almost 80% was dedicated to external beam RT equipment (linacs) at 95 facilities ($60.3 million), while 2% was provided for brachytherapy equipment at 23 facilities ($1.5 million).

Table 2.1 displays the annual expenditure of the ROHPG Scheme from 2014–15 to 2019–20 (for all equipment). ROHPG expenditure has increased from $68.5 million across 78 facilities in 2014–15 to $76.6 million across 95 facilities in 2019–20. Although the total costs for the Scheme have increased, the average cost per facility has decreased from approximately $878,000 in 2014–15 down to $807,000 in 2019–20.

Table 2.1 ROHPG expenditure ($m), 2014–2020

	All equipment	External beam RT	Brachytherapy
2014–15	68.5	-	-
2015–16	66.0	-	-
2016–17	71.3	-	-
2017–18	66.5	52.1	1.6
2018–19	70.9	54.2	1.7
2019–20	76.6	60.3	1.5

Source: Departmental ROHPG payment data and ROHPG Review 2016 (MP Consulting)

2.4 RADIOTHERAPY PLANNING

Planning for cancer services including RT services occurs at the jurisdiction level and varies depending on the jurisdiction. For example, planning in New South Wales occurs largely at the local health district (LHD) level (of which there are 17), while in Victoria a statewide approach is typically applied across the eight integrated cancer service regions.

In planning for radiotherapy services, it is important to consider the integration of the service with other cancer services (including medical oncology and surgical oncology) and allied health support teams. However, the main consideration used for estimating the number of linacs required in Australia for RT is based on population cancer incidence and optimal utilisation rates of RT.

2.4.1 Optimal utilisation rates

The optimal radiotherapy utilisation rate (OUR) is defined as the proportion of patients who should receive a radiotherapy treatment at least once during their illness [9]. This indicator is used for planning and monitoring of radiotherapy services. The national OUR in Australia is calculated using data collected on:

- cancer incidence rates, and
- the proportion of these new cases where radiotherapy is clinically indicated including cancer type, and staging distribution [10].

The OUR for all cancers was last updated in 2016, which set the rate at 48.4% (a decrease of four percentage points from 2003 calculations) [11]. The OUR for individual cancer types varies significantly. Cancers such as vagina, brain, and breast have an OUR at 80% or more, while leukaemia, ovary, colon, thyroid and liver have an OUR of 4% or less [12].

In addition to the OUR, planning for RT must consider the cancer incidence rate. For example, prostate cancer has an OUR of 58%, but with an incidence rate of approximately 19,000 in 2016, the expected cases requiring RT was approximately 11,000 [11] [13]. This represents a significant percentage of radiotherapy demand. Breast and lung cancer (with an approximate 15,000 and 9,500 cases respectively requiring RT in 2016) are also cancers that place large demands on RT service provision. Combined, prostate, breast and lung cancer represent approximately 55% of the estimated number of cancer cases requiring RT [11] [13].

[4] At the time of this report (December 2020) there were 97 facilities receiving ROHPG funding.

AIHW data indicates that, although incidence of all cancers (number of new cases) increased from 2008 to 2016, the age standardised incidence rate (ASR) per 100,000 decreased. Additionally, both the incidence and incidence rate of prostate cancer fell significantly over this period [13]. These trends will have a significant impact on future cancer care needs and radiotherapy service provision.

2.4.2 Actual radiotherapy utilisation rates

Despite the proven benefits of RT and evidence supporting an OUR of 48.4%, actual utilisation rates (URs) are inconsistently monitored across Australia. Several published studies from New South Wales indicate that the actual UR is still well below the optimal, ranging from 26% in Western New South Wales to 33% for all of New South Wales [14, 15, 16].

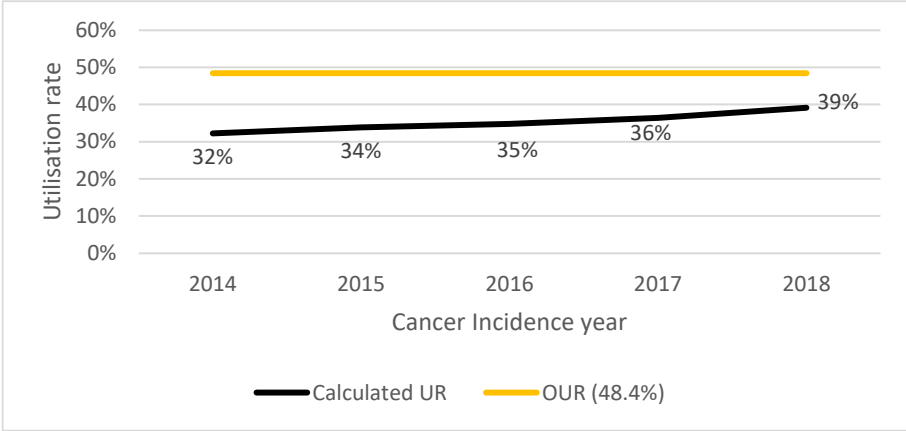
Actual URs are calculated from the number of radiotherapy courses delivered as a percentage of the cancer incidence rate. A course of radiotherapy is the series of treatments (referred to as fractions) delivered to a patient for a specified treatment regimen. A patient may undergo more than one course of radiotherapy if, for example, their cancer recurs and further treatment is required.

Australian RT utilisation rates

RT course data from AIHW was used to calculate crude estimate URs for Australia based on cancer incidence rates published on the AIHW website [17] [18]. Figure 2.1 shows the calculated UR for all cancers including all RT treatment courses across Australia. The calculations include an adjustment of 25% for re-treatment and 10% for non-cancer related RT[5]. The data show that URs have been increasing over the five-year timeframe from 32% in 2014 to 39% in 2018. Despite these improvements, the latest calculated UR is still below the most recent OUR recommendation of 48.4% [11].

The limitations of the data associated with these estimates must be noted. The data does not allow for the case mix of cancer types or stages, nor does it show a breakdown by geographic area such as remoteness. In addition, the RT course number data is known to be less robust in 2014–15 (underrepresentation from privates and some states), which was only the second year of its collection. It is noteworthy that these limitations equally apply to the OUR used in ROHPG planning.

Figure 2.1 Number of RT courses provided as a proportion of incident cases, 2014–2018



Sources: AIHW (2019) 'Radiotherapy in Australia 2017–18' and AIHW Cancer Data in Australia website https://www.aihw.gov.au/reports/cancer/cancer-data-in-australia/contents/cancer-summary-data-visualisation

2.5 ACCESS TO SERVICES

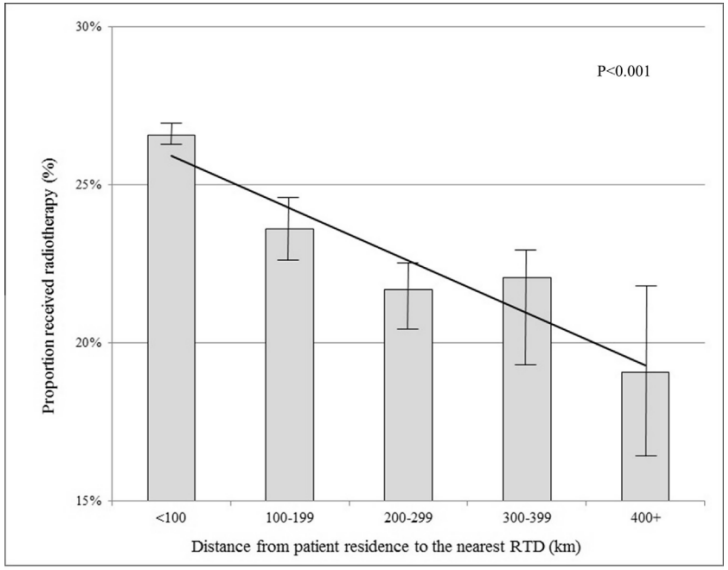
Access to ROHPG linacs differs between jurisdictions and considerably between metropolitan and regional or remote areas across and within jurisdictions. However, aside from the availability and placement of linacs, issues such as specialist workforce shortages, consumer preference and clinician referral behaviours are all identified issues contributing to below optimal national utilisation rates.

[5] Based on linac planning formula from the Queensland Linear Accelerator Services Planning Guideline 2019

2.5.1 Rurality and distance to nearest facility

Geographic barriers have a significant impact on patient access to RT services. Data from New South Wales and the Australian Capital Territory shows that the distance patients must travel to the nearest RT service is inversely related to UR (displayed in Figure 2.2). That is, patients required to travel longer distances to the nearest RT facility are less likely to receive services [19].

Figure 2.2 Proportion of patients receiving RT by distance from nearest facility in NSW



*: The upper and lower bands of 95% CI are represented by the whiskers

Source: Gabriel et al. (2015) 'The effect of travel distance on radiotherapy utilization in NSW and ACT'

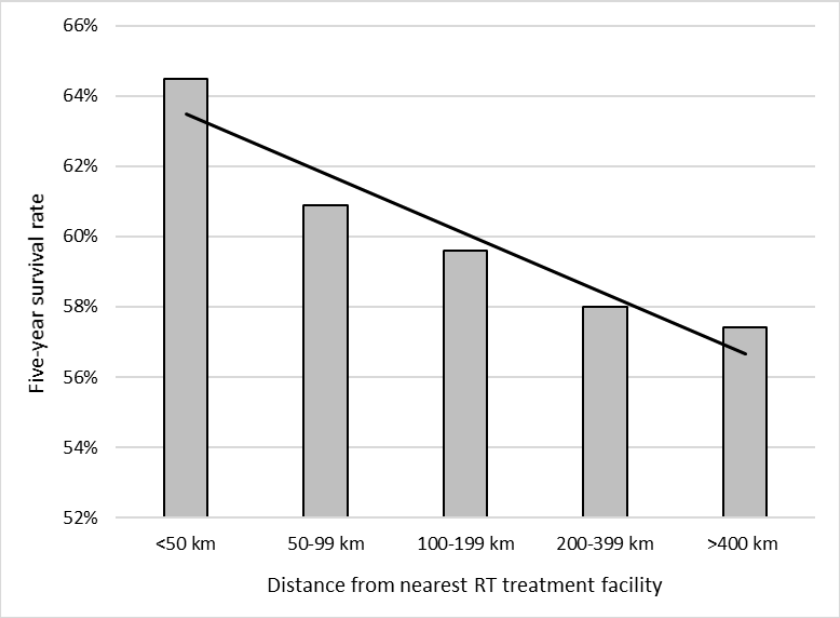
These findings were supported by Henry et al. (2014) who also found that URs decreased with increased distance from the nearest cancer centre in the Barwon South-West region of Victoria, where participants in outer regional areas lived up to 137 minutes' drive from their nearest treatment centre. Differences in UR between study participants living in the regional city of Geelong (n=997) and participants in the outer regional areas (n=781) were most pronounced in individuals with bladder, rectal, and prostate cancers, and lymphoma [16]. This data is particularly concerning when compared against OUR by cancer type. Utilisation rates for the rural population were compared in the study, and the results were as follows:

- 5% for bladder cancer, compared to 21.2% in Geelong and a 47% OUR
- 32.8% for rectal cancer, compared to 44.7% in Geelong and a 60% OUR
- 15.7% for prostate cancer, compared to 25.8% in Geelong and a 58% OUR, and
- 9.4% for lymphoma, compared to 26.2% in Geelong and a 73% OUR [16] [11].

A finding of the study was that men were significantly less likely than women to undergo RT. This is an important issue given that prostate cancer continues to be the highest incidence cancer nationally and has a high OUR [13, 16].

Similar geographic usage patterns were found in patients with rectal cancer in rural and regional Queensland. Baade et al. (2011) in a study of 6,848 patients found geographical barriers to have a direct impact on patient cancer outcomes, with the relationship between survival rates and distance to nearest RT facility being more linear (see Figure 2.3) than the relationship between distance and utilisation rate reported in the NSW and ACT study (see Figure 2.2) [20].

Figure 2.3 Rectal cancer five-year survival rate by distance from nearest RT treatment facility (QLD)



Data source: Baade et al. (2011) 'Distance to the closest radiotherapy facility and survival after a diagnosis of rectal cancer in Queensland'

2.5.2 Health professional perspectives of RT and referral practices

Shortages in the medical oncology workforce in rural areas has been identified as a barrier to achieving OURs in regional populations [16, 8].

Another significant barrier to utilisation identified in the literature was health professionals' perceptions of RT. Among a group of referring doctors surveyed in New South Wales (n=253), several issues were highlighted as having a 'moderate' or 'significant' impact on their clinical decisions about recommending RT usage, with the highest proportion of impacting factors attributed to:

- concern of acute side-effects and ability of patients to continue daily commitments
- travel to attend treatment appointments
- patient fear/anxiety about having RT
- cost and inconvenience of managing treatment toxicity
- requirement to be away from home for treatment, and
- concern about long-term side effects of RT [21].

These findings highlight the potential biases of referring clinicians who act as 'gatekeepers' to services and potentially contribute to lower than optimal URs [21].

Efforts undertaken to increase URs in Belgium have pointed to the importance of clinician perceptions of need, as it was found that lack of discussion around RT during multidisciplinary team (MDT) meetings corresponded to lower utilisation rates [22].

Waiting times for initial consultations and referring clinicians' perspectives on RT have been identified as potential barriers to increasing URs in Australia.

Researchers from the NSW study also indicated that there is a need for an intervention to reduce waiting times for the first RT consultation. This was of particular relevance in regional and rural areas where it continues to deter patients and result in sub-optimal utilisation rates [21]. Recent data from the AIHW (2017–18) suggests that the average waiting time to access RT nationally is 17.3 days, which has increased from 16.4 days in 2015–16 and 2016–17 but decreased from an average of 21 days reported in 2013–14. Data on waiting times was not available based on metropolitan or regional/rural service location.

3 REVIEW FRAMEWORK

The key objective of the 2020 ROHPG review is to assess the **impact of the changes made to the Scheme in 2017**, including unintended consequences and the differing levels of funding between public and private facilities.

The four key review areas (KRAs) for the 2020 ROHPG review, as specified in the project Terms of Reference, are to assess:

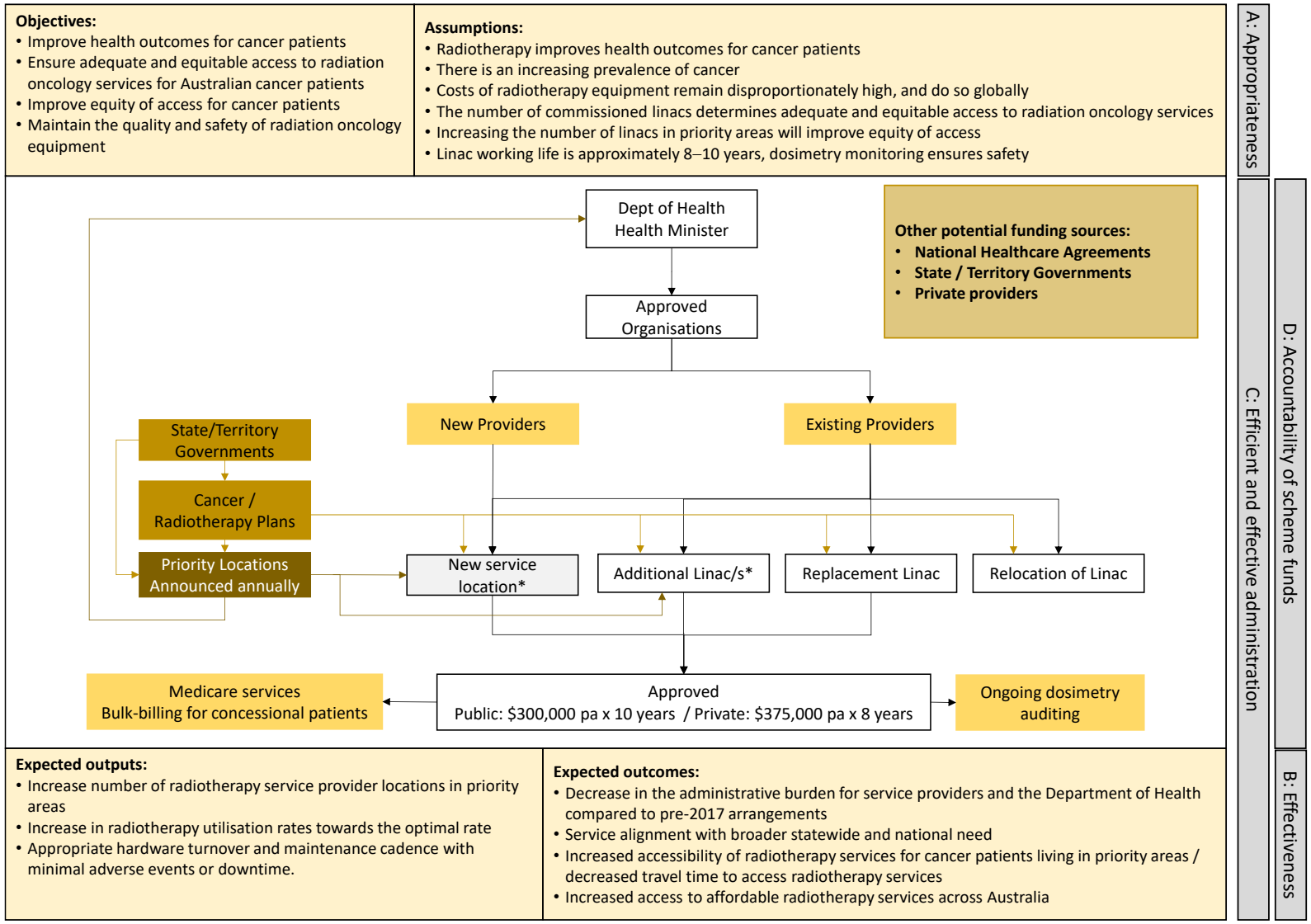
- **KRA-A: the ongoing appropriateness of the ROHPG**
- **KRA-B: the effectiveness of the Scheme in meeting the program's objectives**
- **KRA-C: the efficient and effective administration of the ROHPG Scheme, and**
- **KRA-D: appropriate accountability for ROHPG Scheme funds.**

A program logic for the ROHPG Scheme is shown in Figure 3.1 on the following page. The program logic displays the relationship between ROHPG key review areas, objectives, inputs, expected outputs and outcomes.

The analysis of each KRA is presented in the following part of the report (Part B: Review Findings). The findings for each KRA are presented in a separate chapter, and each chapter commences with a summary of the key review questions addressed.

3 REVIEW FRAMEWORK

Figure 3.1: Program logic for the review of the ROHPG Scheme 2020, showing relationship to broad review areas (grey boxes A–D), as specified in the review Terms of Reference



*Applications for new service locations or additional linacs in new priority areas open for set period of time after priority areas announced. Applications for ongoing priority areas can occur at any time.

PART B

REVIEW FINDINGS

4 KEY REVIEW AREA A: ONGOING APPROPRIATENESS

SUMMARY OF RECOMMENDATIONS

Recommendation 1. The Department should continue to support the capital costs of high-cost RT equipment. However, steps should be taken to further integrate the Scheme with jurisdiction RT planning.

Recommendation 2. Steps to better integrate the ROHPG with national and state/territory RT planning are required to prevent ongoing misalignment of cancer planning agendas.

REVIEW QUESTIONS

The ROHPG Review sought to assess the ongoing appropriateness of the Scheme, given the current context in which it sits, and if the underlying assumptions of the Scheme are still relevant. The key review questions for ongoing appropriateness were:

1: Are the objectives of the Scheme still relevant?

2: Is a capital grants scheme the most appropriate way to facilitate access, and quality and safety of radiation oncology services in Australia?

3: How does the program intersect with other Commonwealth/State funding arrangements?

The following more detailed review questions were considered:

- To what extent does radiotherapy remain a key treatment option for cancer treatment?
- What improvements have been made towards the optimal utilisation rate of radiotherapy?
- What factors other than availability of linacs influence patient access to radiotherapy in Australia?
- Are there alternative options for ensuring access to safe, high-quality radiotherapy services, including, for example, the National Healthcare Agreements or rolling funding into MBS?
- Does a $3 million set contribution incentivise service providers to establish or expand radiotherapy service delivery? Does this occur in areas where there is a high unmet need?
- To what extent does the ROHPG Scheme promote alignment with state/territory or national service planning for delivery of cancer services?
- To what extent are other Australian Government and jurisdiction funding sources available for radiotherapy equipment?

ANALYSIS AND FINDINGS

4.1 ONGOING RELEVANCE OF THE ROHPG SCHEME OBJECTIVES

The review analysis identified that the objectives of the ROHPG remain relevant.

RT continues to be a major component of cancer treatment, contributing to favourable outcomes in a range of high prevalence cancers including prostate, breast and lung cancers [23, 24]. RT is commonly used in combination with other treatment options including surgery and chemotherapy [9] and there is evidence to suggest that some early stage cancers can be cured by RT alone [24].

Compared to other cancer treatments such as surgery and chemotherapy, RT is considered highly cost-effective as a single modality treatment, accounting for

4 KEY REVIEW AREA A: ONGOING APPROPRIATENESS

approximately 5% of the cost of cancer care [24]. RT is also used in palliative care to reduce the impact of cancer patient's symptoms and increase their quality of life (QoL) [24, 25]. Additionally, advances in software, imaging and linacs have allowed RT to become increasingly targeted, sparing healthy tissue surrounding the tumour [24, 25] thus reducing side effects.

All stakeholders considered external beam RT to be an essential option in the ongoing delivery of quality cancer care in Australia with continuing significance as a curative or adjunct treatment, as well as part of palliative care for most cancer types.

Finding 1:	The use of RT to improve health outcomes for cancer patients remains a relevant objective of the ROHPG.

Given the ongoing relevance of RT in the provision of cancer care, it is important to ensure adequate and equitable access to the modality.

In particular, ensuring access for people in regional and rural communities is important as studies have shown that patients required to travel longer distances to the nearest RT facility are less likely to receive services [19] [16], and have poorer survival rates [20].

In addition, AIHW data on RT waiting times indicated that people from the lowest socio-economic areas have to wait an average of four days longer than those in the highest socio-economic areas (50% of patients in the lowest quintile commenced treatment in 12 days, compared to 8 days for patients in the highest quintile)[6] [17].

During consultation, jurisdictional departments and public RT facilities identified several other factors influencing RT access including:

- knowledge of RT applicability and availability by general practitioners and other referrers
- inability or unwillingness to travel for treatment (e.g. if the patient has work or carer responsibilities)
- travel and accommodation costs during treatment, and
- out-of-pocket costs for patients.

In the Northern Territory, access by Aboriginal and Torres Strait Islander people was noted as an important consideration. The RT facility in the Northern Territory (a private provider working in a public-private partnership) said:

> *'We work hard with Aboriginal Medical Services and Aboriginal Controlled Community Health Organisations to incentivise Aboriginal and Torres Strait Islander people to attend RT and to complete treatment. We provide an education program to Aboriginal Health Workers (Certificate IV) who can then educate their patients. Compliance rates have increased from 83% to 95% for completion of treatment.'*

Finding 2:	Promoting adequate and equitable access to radiation oncology services is an important objective for the ROHPG.

In 2002, an inquiry into radiotherapy (the Baume Inquiry) identified a number of concerns with radiation oncology at a national level, including quality and safety issues. In response to this finding it was recommended that a 'quality program' be developed and implemented as a priority, encompassing:

- facility accreditation
- participation in a dosimetry program, and
- participation in an incident monitoring system for radiation oncology.

The Radiation Oncology Tripartite Committee[7] has developed Radiation Oncology Practice Standards (last updated in 2018) that address the above issues and seek to incorporate a more comprehensive assessment of RT risk management issues [26] [27].

[6] Average waiting times do not account for case complexity or type of cancer.
[7] The Tripartite committee has representation from the Royal Australian and New Zealand College of Radiologists (RANZCR), the Australian Society of Medical Imaging and Radiation Therapy (ASMIRT), and the Australasian College of Physical Scientists and Engineers in Medicine (ACPSEM).

4 KEY REVIEW AREA A: ONGOING APPROPRIATENESS

Regarding the maintenance of linacs specifically, dosimetry monitoring is a key safety consideration to ensure linacs deliver and patients receive the required dose of radiotherapy.

In response to two RT incidents, the Australian Clinical Dosimetry Service (ACDS) was established as a national independent dosimetry auditing program in 2010 (managed under the auspices of the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA)). The ACDS received federal government funding for four years to pilot the program, then an additional two years of funding to transition to a sustainable program. Since 2017, ACDS has been running as a fee-for-service model paid for by facilities (facilities subscribe to ADCS for a four-year cycle of audits).

Application of the Tripartite standards and ACDS is at the discretion of the individual jurisdictions and varies across Australia. Despite this, most jurisdictions recommend their use, and their application is mandatory in Queensland. Despite the different regulatory rules across the country, stakeholder consultation with facilities and the ACDS indicated that most facilities are guided by the standards and use the ACDS program. Undergoing annual independent dosimetry audits is a condition of funding under the ROHPG Scheme.

One stakeholder made comments observing the importance of the ACDS standards:

'Linking [ACDS] to the ROHPG is a good thing. It provides a huge incentive to sign up to [the program]. We are aware of only two non-ROHPG funded linacs that are not signed up to it.' – ACDS representative

Finding 3:	In the absence of a national regulatory program for RT, it is appropriate for the ROHPG to consider the quality and safety of funded linacs via dosimetry monitoring services.

4.2 ANALYSIS OF RADIOTHERAPY FUNDING

Although stakeholders expressed disappointment that the 2017 changes to the ROHPG removed funding for non-linac RT equipment and reduced the funding available for linacs, the $3 million contribution to linac costs is appreciated by consulted facilities.

Public facilities said there is little to no other funding source for capital equipment for RT. Most jurisdictions have a medical equipment replacement fund or similar. However, these funds consider the statewide needs for equipment; and in some jurisdictions, radiotherapy equipment is specifically excluded (e.g. Victoria).

Most capital expenditure for public hospitals and health services is provided through state and territory arrangements with the Australian Government through the National Healthcare Agreements (NHA) [28]. Under the NHA, the Australian Government is a major funder of public hospitals. However, responsibility for management of service delivery in public hospitals rests with state and territory governments [28]. On average, public hospital spending on capital (approximately $9 billion) represented 5% of NHA funding in 2017–18.

However, the NHA as an instrument for funding is becoming increasingly flexible and less specific to individual program inputs, to allow jurisdictions to allocate funding as best meets their jurisdiction needs. Funding through the NHA does not allow for RT funds to be quarantined (i.e. set aside for a specific purpose as ROHPG funding is currently), unless individual jurisdictions choose to do so.

Public RT facilities raised concerns that the competing priorities of the other health services program areas could result in delays to replacement of RT equipment in future, especially equipment no longer covered by the ROHPG.

'As we need to pay for all Radiation Oncology equipment from the ROHPG funding, we won't be able to make up the short fall in future. This will mean we have to keep machines longer. We will be penalised for it. More patients will go to private.' – Comment by public facility

Finding 4:	The ROHPG Scheme only provides a contribution to high-cost RT equipment (linacs). At present, public facilities have limited alternative funding options for RT equipment. The transition time (when grandfathered funding arrangements are available) provides time for alternative funding sources to be identified.

4 KEY REVIEW AREA A: ONGOING APPROPRIATENESS

Private facilities indicated that reduced ROHPG contributions could result in increased out-of-pocket costs for consumers. However, a handful of private facilities have established services without ROHPG funding, (estimated to be approximately seven facilities (13 linacs), based on analysis of MBS and ROHPG data). The majority of non-ROHPG funded linacs (94%) are in major cities (as defined by the Modified Monash Model classification MM1).

Funding elements that contribute to private facility revenue for RT services are MBS rebates for each service provided (including Medicare Safety Net and Extended Safety Net contributions), patient contribution (gap fee) and any public hospital payments for public-private partnership arrangements. As a consequence of this funding mix, patient throughput is a key factor in determining RT revenue. It is impossible to know the self-sustainability potential of individual private facilities without undertaking a financial analysis of the funding mix at an individual facility level. However, analysis of MBS data indicated that in 2019–20, MBS revenue (including safety net and extended safety net revenue) within that financial year ranged from less than $300,000 per linac in one facility, to over $5 million per linac in another, with an average of close to $800,000 per linac per facility.

Finding 5:	The breadth of MBS revenue per facility (per linac) demonstrates the considerable variation of RT throughput at a program level. Reliance of individual facilities on ROHPG funding for sustainability needs to be examined at a facility level.

It is important not to look at the ROHPG in isolation. There are other factors that influence the ability to provide a RT service and/or the uptake of RT and hence the objectives of the Scheme.

Delivering RT requires not only a linac but a significant amount of supporting infrastructure. Feain et al. consider the basic facility infrastructure to comprise of at least an external beam RT unit, a brachytherapy unit, a simulator, a mould room[8] and dosimetry quality assurance equipment [8].

All stakeholders commented on the importance of equipment other than linacs for RT provision, including:

- patient planning software and associated IT infrastructure
- networking software
- CT or MRI scanners for simulation

> *'A linac does not stand alone. Without planning you're not going to be able to deliver a quality service' – consumer comment*

Both public facilities and jurisdictions commented during consultations that setting up new RT services needed to include consideration of:

- workforce availability
- access to multidisciplinary team cancer care, and
- access to allied health and/or GPs capable of managing RT side effects.

Shortages in the medical and radiation oncology workforce continue to contribute to a reduced capacity to deliver RT, especially in regional areas [8, 16]. Staff must undergo extensive training and education to deliver RT [29]. Feain et al. describe a minimum staffing required to support an RT service annually as being:

- one treatment planner per 300 patients, and
- one radiation physicist per 400 patients.

Access to this level of resourcing may be difficult in outer regional or rural areas where shortages are experienced with medical staff and particularly with specialist clinicians [16].

Public facilities and peak bodies commented on the need to consider the above factors in planning for new RT services and supported the inclusion of these criteria in the ROHPG assessment process.

In planning for radiotherapy services, it is also important to consider the integration for the service with other cancer services (including medical oncology and surgical oncology) and allied health support teams.

[8] Mould rooms are where customised equipment such as masks for treatment are made.

All stakeholders noted the need for appropriate workforce groups including radiation oncology, radiation therapy, medical physics, and nursing, along with ongoing professional development and training to upskill the workforce in the emerging technologies.

Finding 6:	Many factors contribute to developing an RT service and providing high-quality care for patients, including workforce, support services and integration into multidisciplinary teams. It is appropriate for these factors to be considered in assessing ROHPG funding applications.

4.3 TRADE-OFF ANALYSIS OF ALTERNATIVE FUNDING MODELS

A trade-off analysis was conducted to determine if a Capital Grant Scheme (the current ROHPG funding mechanism) is still the most appropriate mechanism to fund the purchase of high-cost radiotherapy equipment such as linacs.

A trade-off analysis is a comparison exercise, which looks at the *relative* advantage (or disadvantage) of different funding mechanisms against a set of defined comparison criteria. Each alternative mechanism is compared to a specified benchmark, in this case the status quo – the ROHPG Scheme – for its relative advantage.

The trade-off analysis compared the following funding options:

(1) **ROHPG Capital Grant Scheme:** the current funding mechanism as described in Chapter 2. This is the benchmark for the analysis.

(2) **Traditional grant program:** a traditional grant funding program where funding proposal submissions are sought for comparative assessment, and where funded, form part of conditional funding agreements with grant instalment payments based on fulfillment of pre-established criteria.

(3) **Incorporation or linkage to the MBS:** a contribution to capital equipment costs as a bundled element of the MBS schedule fee for associated activity items.

(4) **Funding via state and territory jurisdictions:** an arrangement through existing Australian Government and jurisdiction funding agreements, whereby capital funding is provided directly to states and territories for distribution in line with service and infrastructure planning cycles. Many such agreements exist under the National Health Reform Agreement to public facilities, including the NHA.

(5) **Traditional lending arrangement:** a funding contribution through the provision of either interest bearing, or non-interest bearing lending instruments such as a cash loan to be paid back based on fixed terms agreed on a standardised basis. It is further conceivable that the terms of repayment be varied based on regional equity requirements, meeting of quality benchmarks, or other practical incentivising considerations based on assessment of need.

(6) **Market based subsidy:** a funding arrangement whereby the manufacturer, research institute, or adjacent entity (servicing agent, software production entity, cloud hosting environment provider, etc.) partly subsidises the ROHPG contribution as part of licensing agreements or market access. Such subsidy may then attract a rebate through activity or quality-based payments.

(7) **Hybrid model of funding:** several options exist for the combination of elements of the previously described funding mechanisms. In this review, the hybrid mechanism under consideration is the segmentation of grant funding into two sections, with the first being a lump sum capital contribution (e.g. $3 million over 10 years), and the second attracting a contingent quality associated funding incentive, or penalty, to incentivise quality. Here, the criteria that determine a successful application at offset are used throughout the lifecycle of funding as value-based milestones to release additional payments.

Funding options were compared against seven criteria:

- alignment with government priority and policy objectives
- alignment with future trends
- indicative expenditure
- access /equity
- quality

4 KEY REVIEW AREA A: ONGOING APPROPRIATENESS

- administrative efficiency, and
- feasibility and sentiment.

Trade-off analysis results

The advantages and disadvantages of alternative funding options relative to the benchmark status quo are presented in Table 4.1. Further detail on the trade-off analysis is provided in Appendix B.

Table 4.1: Trade-off analysis: advantages and disadvantages of alternative funding models, relative to status quo benchmark

Benchmark: the existing ROHPG Capital Grant Scheme is an atypical funding mechanism that exists in the context of the prevalence of cancer in Australia, importance of radiotherapy for cancer treatment, the impact of access to radiotherapy equipment on utilisation rates, and the relative high cost of this associated equipment. The Scheme also recognises the combined importance of the public and private segments of the health sector in provision of radiotherapy treatments to Australian patients.

Funding option	Advantages	Disadvantages
Traditional grant program	• Grant administration would likely be more seamlessly and efficiently manageable through existing centralised grant maintenance and oversight functions • Potential for opportunities to introduce outcome-based milestones for funding to increase accountability • Potential to provide an additional lever to ensure quality, and provide greater flexibility to government	• Greater need for parallel administrative process to capture the existing funding that would be required, reducing administrative gains in the lead in time (up to 10 years) • Unlikely to match the funding cycle predictability of the ROHPG Scheme • Chance of lesser alignment with future industry trends and technological advances
Incorporation or linkage to the MBS	• Administrative efficiencies • Provides greater visibility of funded equipment usage	• Considerable additional forecasting and administrative burden for funding recipients • Inadequate funding to some facilities due to rebate proportions and unpredictable cashflow • Disadvantageous impact on low-throughput facilities and public facilities that have a small proportion of RT not claimed through MBS • Disparity of timing between site-specific replacement cycles and timing of funding receipt • Potential for additional costs over time, given the non-capped nature of the mechanism
Funding via state and territory jurisdictions	• Administrative efficiencies • Increased ability to align RT capital funding with jurisdictional planning	• Shift of administrative burden to the states/territories • Service provision inequity given the implicit loss of funding to private facilities, unless this was achieved through a separate parallel mechanism (thereby losing the administrative efficiency gained) • Potential greater variation in service provision and baseline linac age across Australia as a result of jurisdictional variation in capital and service planning

4 KEY REVIEW AREA A: ONGOING APPROPRIATENESS

Funding option	Advantages	Disadvantages
Traditional lending arrangement	• Reduction in overall expenditure • Ability to introduce more contingent conditions to funding or interest rate concessions based on factors such as quality, efficiency or other desired outcomes	• Additional administrative burden • Mechanism would be considerably disruptive and unlikely to be supported by facilities or other industry stakeholders • Potential risk to quality, equity, and misalignment with broader government priorities
Market based subsidy	• Expenditure benefit based on the time value of money (TVM) and greater initial private/other contribution to up-front costs • Potential to enhance international competitiveness from the perspective of preventing market distortion	• This hypothesis has not been tested in detail in this review • Complex administration arrangements • Disincentives to manufacturers, which may be detrimental to the ability to keep up with novel technologies and treatment paradigms. • High potential for inequity given that partnerships with research institutes are not currently evenly distributed • Appetite for market stakeholders to participate will vary based on the commercial circumstances of individual treatment sites • Unlikely that stakeholder sentiment would be favourable towards this more complex and market driven mechanism
Hybrid model of funding	• Increased accountability ensuring facilities comply with stipulations of funding	• Additional administrative burden • Potential additional cost to government, net of any penalty cash inflow • Additional costs to facilities to cover shortfalls through borrowing • Milestone based payments may disadvantage some facilities more over others, or create perverse incentives

Finding 7: The trade-off analysis did not find any of the alternative mechanisms to be more advantageous than the status quo, in their entirety. However, additional administrative efficiency is suggested through a more traditional grant program mechanism, or funding via state/territory jurisdiction. Both of these funding mechanisms offer further potential benefit in terms of quality.

4.4 ALIGNMENT WITH STATE/TERRITORY AND NATIONAL FUNDING ARRANGEMENTS

4.4.1 States/territories

Previous to changes made in 2017, priority areas for ROHPG funding were identified by the Department using regional cancer incidence projections provided by the AIHW and comparing these rates with service delivery capacity based on existing linacs in these regions. This analysis was done on a case-by-case basis for each application made to the Scheme and was a considerable administrative burden on the Department.

In 2017, the responsibility of setting of priority areas for additional linacs was shifted to the individual states/territories, which have responsibility for statewide cancer and RT planning. Although the intent of this change was to promote a greater alignment to state/territory RT planning, there have been several unintended consequences resulting in a sub-optimal process.

Two of the main challenges with this approach are the perceived conflict of interest of states/territories in setting priority areas and providing services, and the lack of consistency among state/territory RT planning, where it occurs (not all jurisdictions routinely plan RT services).

The process for setting priority areas is seen as flawed by many stakeholders, especially private facilities.

> *'The idea was probably supposed to promote private and public to talk and work together with a broader view about state planning. But it's not working and not reciprocated. State governments have cancer master plans that stretch out over many years…but they may never do it. Meanwhile they won't support privates coming into the space.' – Comment by private provider*

The publishing of priority areas on the Department's website was considered beneficial by stakeholders who were aware of it. However, the process in which priority areas were determined by jurisdictions is not published nor transparent and differs across the country.

Further discussion on the setting of priority areas is presented in section 6.4.

Finding 8:	The activities involved in setting priority areas by jurisdictions is not operating as intended and processes that could enhance the priority setting need further consideration.

4.4.2 National considerations

Radiotherapy and cancer planning at the health service level is generally considered the responsibility of the individual states and territories, but the Australian Government provides periodic funding opportunities to support development of regional cancer services such as the recent competitive grant process for a combined total of $45 million to improve access to radiotherapy included in the 2020 budget for 10 regional areas. The investment is aimed to reduce the need to travel outside the region and allow patients to access all of their cancer treatment services in one place [30].

However, none of the 10 identified regions are recognised as priority areas under the ROHPG (where that assessment is informed by commentary from jurisdictions), creating a potential misalignment between agendas of different Australian Government initiatives.

Similarly, in 2016 the Australian Government funded a linac for Burnie in Tasmania through the Health and Hospital Fund – Regional Cancer Centres Initiative. Australian Government funding for a second linac for Burnie has also been approved under the Community Health and Hospitals Program (Tasmania's 2018–2019 Initiatives). As Burnie is not listed as a priority area for ROHPG funding, neither of these linacs are currently eligible for ROHPG funding for replacement in future.

Finding 9:	Misalignment of federal funding for linacs not through the ROHPG can create services without clear sustainability plans for RT equipment replacement.

4.5 CONCLUSION

The review found the objectives of the ROHPG remain relevant, as RT continues to be a major component of cancer treatment, contributing to favourable outcomes in a range of high prevalence cancers.

AIHW data on RT waiting times indicated that people from the low socio-economic areas wait an average of four days longer for RT than people from high socio-economic areas and distance of travel to RT has been shown to be inversely correlated with RT utilisation rates. This demonstrates the ongoing need to make RT service more equitably accessible for disadvantaged populations.

Unlike other outpatient treatments, RT has significantly high capital costs, which can become a barrier to service provision, especially if throughput is expected to be lower than average, thus necessitating the need for public funded capital assistance

4 KEY REVIEW AREA A: ONGOING APPROPRIATENESS

in both the public and private sectors. However, capital costs for RT cannot be considered in isolation. Many other factors are essential to providing optimal RT care, including workforce, integration with other cancer services, and access to allied health and other support providers.

Recommendation 1:	The Department should continue to support the capital costs of high-cost RT equipment. However, steps should be taken to further integrate the Scheme with jurisdiction RT planning.

A trade-off analysis assessed the relative advantage of the current ROHPG Scheme (status quo) against other potential funding options. The analysis did not find any of the alternative mechanisms to be more advantageous in their entirety. However, additional administrative efficiency is suggested through a more traditional grant program mechanism, or funding via state/territory jurisdictions.

The shift of responsibility to state and territory governments for the setting of geographic priority areas has not promoted greater integration of the ROHPG with RT planning as intended. Misalignment between Australian Government funding commitments and ROHPG priority areas may result in RT facilities without clear replacement plans for linacs.

Recommendation 2:	Steps to better integrate the ROHPG with national and state/territory RT planning are required to prevent ongoing misalignment of cancer planning agendas.

5 KEY REVIEW AREA B: EFFECTIVENESS

SUMMARY OF RECOMMENDATIONS

Recommendation 3. The ROHPG should be offered with subsidy timeframes that do not differentiate between public and private facilities. The timeframe should be no longer than 10 years. The Department may wish to consider shorter timeframes on a case-by-case basis if suitable evidence of very high throughput can be demonstrated.

Recommendation 4. The Department may wish to consider the inclusion of additional safety monitoring measures into the ROHPG funding conditions in future as they emerge or are mandated by jurisdictions (e.g. the Australian Radiation Incident Registry or Radiation Oncology Standards). However, it is not the place of a capital grants scheme to enforce quality standards for the radiation oncology sector.

REVIEW QUESTIONS

The ROHPG Review sought to assess the effectiveness of the Scheme at meeting its objectives to:

- improve health outcomes for cancer patients
- ensure adequate and equitable access to radiation oncology services
- improve equity of access, and
- maintain the quality and safety of radiation oncology equipment.

The key review questions for effectiveness were:

1. Is the ROHPG ensuring adequate equitable access to radiation oncology services across Australia?

2. Is the ROHPG assisting to maintain safety and quality of radiation oncology equipment?

The following more detailed review questions were considered:

- Are there geographic or other service gaps not being met by the Scheme or has it resulted in areas of over-servicing?
- Is the current approach for identifying geographic areas of need accurate and transparent and does it enable appropriate targeting of funding to facilitate access to radiotherapy services?
- Is there evidence to support different funding rates for public and private facilities for linacs beyond the intended expiry date of 30 June 2021?
- Is the program supporting timely and appropriate replacement of equipment?
- Are there sufficient safeguards in place to provide assurance that adequate safety and quality standards are being met in relation to the ROHPG funded equipment?

ANALYSIS AND FINDINGS

5.1 ADEQUATE AND EQUITABLE ACCESS

5.1.1 Geographic distribution and accessibility

In 2019–20, there were an estimated 200 active linacs across Australia, 101 in the public system and 99 in the private sector. This represents a growth of 41 linacs (26%) since 2013–14 when there were an estimated 159 linacs.

The majority of the growth in this timeframe occurred in the private sector, which saw an overall increase of 39 linacs, compared to a net addition of two linacs in the

public sector. Analysis by geographic remoteness showed that growth in the private sector has occurred predominately in major cities and regional areas (as defined by the Modified Monash Model). The public sector distribution has remained relatively constant, with the small growth in linac numbers occurring in major cities. For further detail see Appendix C.

Of the 200 active linacs in 2019–20, 93% (n=186) were currently or previously funded under the ROHPG Scheme. Six of the 186 ROHPG funded active linacs had a capital balance of $0, but had not yet been decommissioned by the facility. There were an additional 13 linacs that had been decommissioned in 2019–20 and another 3 linacs that had been approved for ROHPG funding but were not yet operational in 2019–20. These 16 linacs (decommissioned or not yet in operation) were not included in the count of active linacs and subsequent data analysis. For further detail see Appendix C.

Finding 10:	The ROHPG makes a significant financial contribution to the fleet of linacs in Australia and supports growth in linac numbers.

Analysis of linac availability by remoteness (using the Modified Monash Model classification (MMM)) showed that the majority of the 200 active linacs (80%, n=160) were located in major cities, 13% (n=26) were located in regional areas and 7% (n=14) in rural areas. Of the non-ROHPG funded linacs, the vast majority (93%, n=13 of 14) were located in major cities.

Finding 11:	Growth in linac numbers from 2013–14 to 2019–20 occurred predominately in the private sector in major cities and regional areas. The ROHPG Scheme contributed to 93% of active linacs in 2019–20.

RT waiting time data collected by the AIHW in 2018–19 indicated little differences in waiting time to start treatment between major cities (50% commence treatment in 10 days), regional areas (50% commence in 11 days) or remote areas (50% commence in 10 days, or 9 days in very remote areas). See Appendix D for further detail (or visit https://www.aihw.gov.au/reports/radiotherapy/radiotherapy-in-australia-2018-19/contents/introduction for AIHW data). This suggests that there is currently equitable availability of RT services across the country for those who are accessing services. However, RT utilisation rates (UR) indicate that not all people who could benefit from RT are accessing services. As discussed in section 2.4.2, actual RT utilisation rates in Australia are estimated to be 39%, remaining below the optimal utilisation rate (OUR) of 48.4% [14, 15, 16].

From consultation feedback, jurisdictions did not feel there were any specific geographic areas of need for RT equipment.

'More machines is not the answer.' – jurisdiction

Other factors that affect OUR noted by stakeholders included:

- referral patterns
- education and support for patients to come to services, and
- workforce availability.

Jurisdictions also noted that travel support and accommodation can be significant barriers for regional people to access RT services. They supported investment in improving accommodation for regional patients more so than investing in new RT services in regional areas if the services could not be well integrated with other cancer services and supports.

'If time away from home is an issue…cyber knife can treat patients in two weeks (seven weeks on a basic machine). If you were a farmer from the Pilbara, this would be a great advantage.' – clinician in public service

Finding 12:	Increasing linac numbers alone is insufficient to address sub-optimal RT utilisation rates in Australia.

Analysis of MBS service data by linac number showed that there has been a small decrease in the average number of services per linac from 6,400 services per linac in 2013–14 down to 6,100 services per linac in 2019–20. From the data available, it is not possible to conclude if this decrease is a result of over servicing in some areas, new linacs requiring time to build up service throughput, or changing trends in RT service delivery such as higher dose treatments that take longer planning time per patient, reducing overall throughput.

Finding 13: From the data available, it was not possible to determine if the growth in linac numbers has resulted in over servicing of certain geographic areas.

However, public facilities raised concerns over the number of new linacs approved in major cities in close proximity to one another, or private facilities opening at a time when the public service was planning to extend. The change introduced in 2017 that lists priority areas was intended to prevent such situations and provide a transparent and equitable method for all interested facilities to apply for new linac funding where warranted. However, since many new linacs were approved prior to the 2017 changes coming into effect, the effectiveness of this process has not been able to be tested to date.

In addition, there are currently five priority areas listed on the Department's website that have not yet been awarded approval for funding under the program, but they have been listed for over 12 months. These are the Midwest Region, Wheatbelt Region and South Metro Region in Western Australia; and Central Adelaide and Northern Adelaide in South Australia [31].

This suggests that on its own, identifying the priority areas may be insufficient to generate interest in service provision, depending on the location of the area. Further discussion on the setting of priority areas is provided in section 6.4.

5.1.2 Service throughput by public and private facilities

After the 2017 ROHPG changes came into effect, different ROHPG funding timeframes for public facilities (10 years) and private facilities (eight years) were introduced based on the rationale that private facilities had a higher throughput of services that necessitated a shorter turnover time. The review has sought to examine evidence in support of these differential funding timeframes.

Analysis of MBS service data was undertaken to ascertain if there were differences between service throughput between public and private facilities. MBS service data per facility was standardised to an activity level per linac. The data showed that there was a breadth of service volume per linac in both private and public facilities ranging from as low as 1,000 services per linac to over 10,000 services per linac per annum.

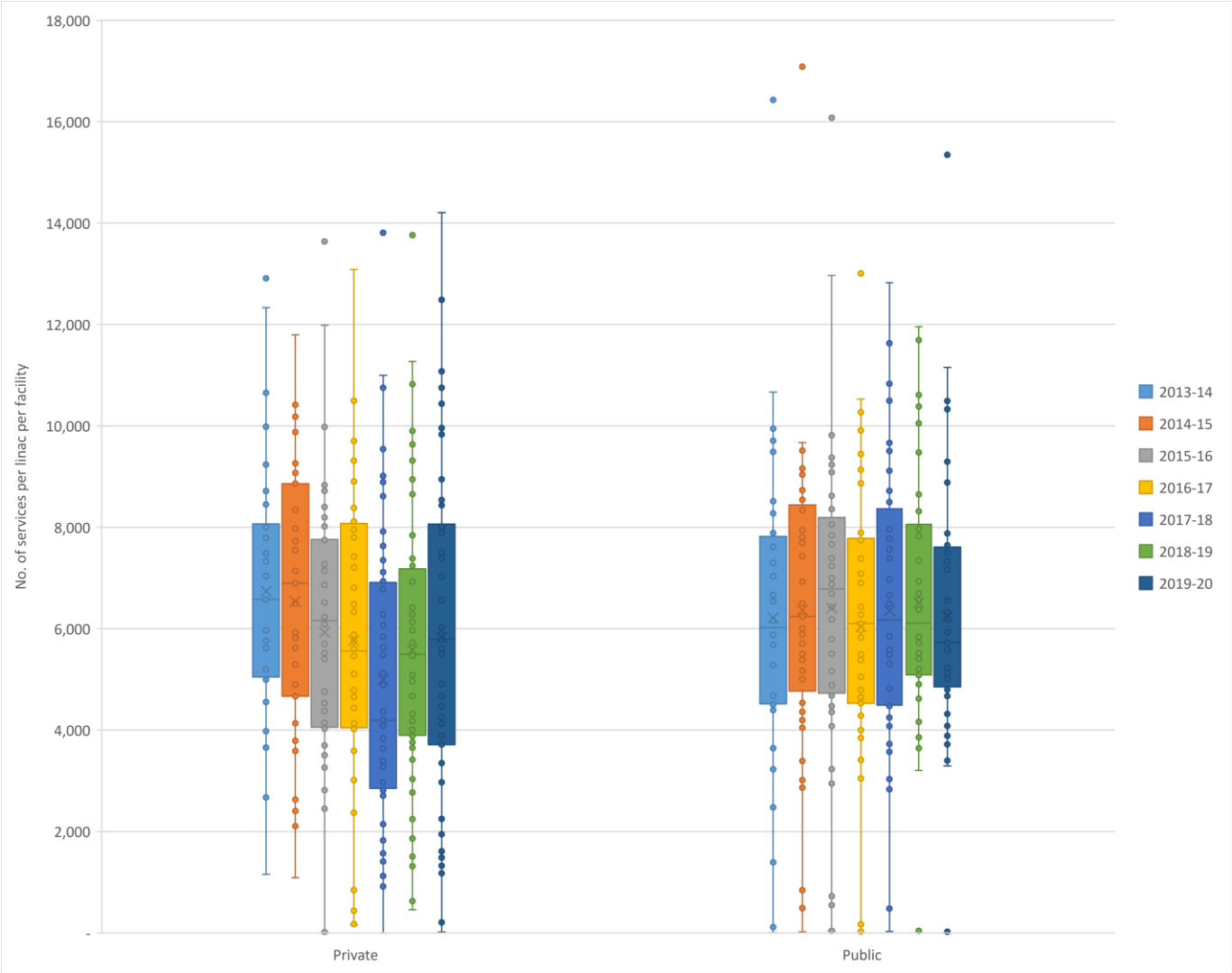
However, caution must be used in interpreting the very low or very high service volumes; they may be an artifact of the data (e.g. incorrect number of linacs used in the calculation, or provision of services for a partial year only). The majority of private facilities averaged between 4,000 to 8,000 services per annum per linac. The equivalent metric was between 5,000 and 8,000 services per annum per linac in public facilities, as shown in Figure 5.1 on the following page.

Analysis of the average (mean) number of services per linac per annum indicated relatively consistent averages from 2013–14 to 2019–20 at approximately 6,000 services per linac per annum in both public and private facilities. Despite consistent averages, the service volume throughput at individual sites varied greatly in both public and private facilities. In 2019–20, there were 17 private and eight public facilities that had an annual service usage of 8,000 or more per linac. Conversely, there were 19 private and six public facilities with fewer than 3,000 services per linac per annum.

Several limitations of the data analysis need to be noted. First, the number of linacs per facility was estimated based on ROHPG equipment funding data, publicly available information, and MBS service data. Linac numbers operated by an individual facility could not be verified with facilities and could be subject to error. Additionally, jurisdictions indicated that some RT services in the public system are not claimed through MBS, and therefore public data will be underrepresented for these volumes. Finally, the data analysis has not taken the case mix of individual facilities into consideration, which can greatly affect volume of throughput. Further detail on the data analysis is provided in Appendix E.

5 KEY REVIEW AREA B: EFFECTIVENESS

Figure 5.1 Distribution of annual services per linac 2013–14 to 2019–20 by facility type



X = mean, – = median, box = upper and lower quartiles, ⊥ = lowest (or highest) value, dots = values, dots beyond ⊥ = outliers not used in calculations for mean, median or quartiles.
Source: Calculated from MBS data and ROHPG Equipment reports

5 KEY REVIEW AREA B: EFFECTIVENESS

Finding 14:	There is no evidence from the MBS service data to indicate that all private facilities have a higher service per linac throughput per annum, or that private facilities average higher service throughput per linac per annum than public facilities.
Finding 15:	MBS service data analysis showed that there were instances in both the public and private sector of individual facilities averaging more than 8,000 services per linac per annum.

Stakeholders had mixed views about the different ROHPG timeframes for public and private facilities, with most public facilities and jurisdictions consulted of the view that public and private facilities should have the same timeframe to enable an 'equal playing field'.

Advances in technology was another factor that stakeholders raised in support of equal timeframes for all facilities. Public facilities felt that the eight-year timeframe for private facilities provided an unfair advantage to be able to uptake new technology faster. Other stakeholders felt that the eight- and 10-year difference was inconsequential and that the overarching aim of the program to promote linac turnover should be the focus.

> *'The driver of the Scheme should be ensuring equipment is appropriately modern, doesn't always have to be cutting-edge. [The Scheme] should prevent 15- to 20-year-old machines. The distinction between eight or 10 years is low risk.' – Comment made by peak body*

Linac vendors indicated that, within an eight- to 10-year timeframe, RT technologies and techniques will progress to enable more precise and accurate treatment delivery, resulting in the ability to deliver higher treatment doses with reduced patient side effects. To ensure machine currency within this timeframe, linacs may require upgrades to various hardware or software to enable more effective and efficient delivery of RT.

For example, hardware upgrades may include multi-leaf collimator[9] improvements (e.g. finer leaf width or faster leaf motion) to enable more precise delivery, 'flattening filter free' beams[10] for faster, high-dose treatment delivery (used in hypo-fractionated treatment courses) and advanced 'couch systems'[11] that together with IGRT enable more accurate setup of the patient to match the initial treatment plan. Many hardware upgrades will also require associated upgrades to treatment planning systems and oncology information systems to maintain compatibility.

Linac vendors indicated that eight to 10 years was a suitable timeframe for linac turnover, so long as a mid-way upgrade was performed to ensure currency of the machines in line with technology advances.

Although not recently reviewed, nominal lifetimes for linacs for the basis of planning is often set at 10 years in many European and United Kingdom countries as well as New Zealand [32] [33] [34].

Finding 16:	Internationally, a nominal lifetime of 10 years is commonly used for linacs. This nominal timeframe was supported by most stakeholders, other than private facilities, consulted during the project.

5.2 SAFETY AND QUALITY OF EQUIPMENT

The ROHPG seeks to ensure safety and quality of RT in two ways: a) ensuring the quality of machines that are in service through dosimetry monitoring, and b)

[9] A multi-leaf collimator is a device that helps shape the RT beam to enable precision targeting of the therapy.

[10] Flattening filters are used to make RT beam dose uniform, which also reduces the dosage. Advances in treatment planning technology now enables higher doses to be delivered with flattening free filters.

[11] The 'couch system' is the bed on which the patient lies for treatment, which needs to be aligned accurately with the linac for precise delivery of treatment.

ensuring appropriate turnover of linacs within a nominal lifetime. The effectiveness of the ROHPG at achieving these objectives is discussed below.

5.2.1 Dosimetry monitoring

The 2017 changes to the ROHPG Scheme introduced a requirement for all funded facilities to undergo dosimetry monitoring from an independent organisation with suitable National Association of Testing Authorities (NATA) accreditation [35]. The ROHPG guidelines indicate that the dosimetry audit should be consistent with the four-year audit cycle with different audit levels across the cycle used by the ACDS.

The Australian Government funded an initial pilot of the ACDS for approximately four years. This initiative was then given a further two years of funding to transition to a self-sustainable model. The ACDS has been operating as a user pay fee-for-subscription model now for approximately four years and within six months there had been almost 100% sign-up of RT facilities (ROHPG funded and non-funded).

All stakeholders consulted felt the inclusion of dosimetry monitoring in the ROHPG requirements was beneficial. All stakeholders commented on the quality of the services provided by ACDS.

Stakeholders said that prior to the introduction of formal audit requirements, RT facilities would routinely audit one another in reciprocal fashion, which did not incur financial expense (other than time). In this context, some facilities (both public and private) felt the costs of the ACDS audits were prohibitive. ACDS audits cost $12,000 per annum per linac, over a four-year audit cycle. Notwithstanding the accumulation of costs for facilities with multiple linacs, ACDS costs represent only 3.2% (private) to 4% (public) of ROHPG payments.

ACDS indicated that all facilities with ROHPG funded linacs subscribed to the audit cycle, and most facilities without ROHPG funding also subscribed (only two non-ROHPG funded linacs had not subscribed).

One facility commented that having only one independent dosimetry audit provider presented its own risk. Conversely, because ACDS is the only national provider, they are able to compare and benchmark services to themselves and national averages, and monitor trends and outliers.

Finding 17: Dosimetry monitoring is a beneficial and respected addition to the ROHPG funding conditions.

5.2.2 Linac turnover

ROHPG equipment data was analysed to determine linac turnover for ROHPG funded linacs. As shown in Table 5.1, the analysis found that 92.5% of ROHPG funded linacs (currently active) are 10 years old or less. However, linacs in public facilities were more likely to be over 10 years of age (n=10) compared to private facility linacs (n=4), although only one linac (in a private facility) was currently aged greater than 12 years. The median age of ROHPG funded linacs (currently active) is five years (six for public linacs and four for private linacs).

Table 5.1: Operational years of active linacs funded or previously funded by ROHPG

No. of years	Private	Public	Total (n)	%
0–10	81	91	172	92.5%
11–12	3	10	13	7.0%
12+	1	0	1	0.5%
TOTAL	**85**	**101**	**186**	**100%**

Additionally, data on 40 linacs decommissioned from January 2018 to June 2020 was analysed, which indicated that 72.5% of linacs were decommissioned at or before 10 years of age, and 25% were decommissioned between 11 to 12 years of age. Only one linac (2.5%) was decommissioned at an age greater than 12 years (see Table 5.2). The median age of decommissioned linacs was 10 years (10 years for public and nine years for private).

5 KEY REVIEW AREA B: EFFECTIVENESS

Table 5.2: Operational years of decommissioned linacs funded by ROHPG

No. of years	Private	Public	Total (n)	%
0–10	15	14	29	72.5%
11–12	4	6	10	25.0%
12+	1	0	1	2.5%
TOTAL	**20**	**20**	**40**	**100%**

Finding 18: The ROHPG promotes turnover of linacs in an appropriate timeframe. Very few active linacs are aged more than 10 years (7.5%), and only one active linac is aged more than 12 years. Almost three quarters of decommissioned linacs were aged 10 years or less at the time of decommissioning, and only one was aged more than 12 years at the time of decommissioning.

Age itself does not determine the safety of a linac, but increased age is often reflective of increased maintenance needs, wearing of parts and downtime for repairs. In addition, ageing linacs are less likely to be able to deliver newer high-dose RT techniques such as hypo-fractionation, and may therefore be more limited in their clinical capacity. In 2002, the Baume Inquiry recommended that linacs should be decommissioned before they reach the age of 12 years [27].

As discussed in section 2.3.3, there are a number of linacs currently funded under the grandfathered ROHPG arrangements that will not reach a capital balance of $0 by the time the linac is aged 12 years (62 linacs). Although facilities are likely to turnover these linacs before that time, extending ROHPG beyond a 10-year timeframe is counter to the intended objectives of the ROHPG.

To maintain consistency with the intended objectives of the ROHPG, an age cap for grandfathered equipment could be introduced to ensure currency of equipment, the ability to deliver newer techniques and hence the quality services delivered for patients. However, analysis of current linac age and linac age at decommissioning indicated that very few linacs are active or decommissioned after 12 years.

Finding 19: Despite the potential for grandfathered equipment to extend well beyond 10 or 12 years of age, analysis of linac age at decommissioning suggests that the majority of linacs are likely to be turned-over at or before this age.

5.2.3 Other safety and quality considerations

When asked to consider other safety and quality considerations, facilities, clinicians, jurisdictions, peak bodies and safety agencies all referenced the Radiation Oncology Practice Standards. Stakeholders commented that other safety considerations were:

- routine maintenance of equipment
- education and training of the workforce, and
- access to a suitable qualified workforce.

ARPANSA is developing a national Australian Radiation Incident Registry based on models used in the US and Europe. Once established, participation in the registry would incur subscription fees. ARPANSA suggested that participation in the registry could be built into the ROHPG requirements.

These considerations, together with a range of other issues, are covered under the 16 standards of the Radiation Oncology Practice Standards, as follows:

- Facility Management
  - Staff
  - Workforce Profile
  - Management of Radiation Oncology Patient Records
  - Data Management
  - Facility Infrastructure
  - Facility Process Management
  - Radiation Therapy Equipment
- Treatment Planning and Delivery
  - Radiation Treatment Prescription

  - Planning Procedures
  - Dosimetry
  - Radiation Treatment Delivery
- Safety and Quality Management
  - Safety, Quality and Improvement Processes
  - Radiation Safety
  - Incident Monitoring Program
  - Dosimetric Intercomparison
  - Clinical Trials Participation [26].

At present, the Radiation Oncology Practice Standards are voluntary and only one jurisdiction (Queensland) has mandated the use of the standards in order to maintain an RT licence in the state.

In the absence of national regulation for RT, the Royal Australian and New Zealand College of Radiologists (RANZCR) advocated for the inclusion of the standards into the ROHPG funding, i.e. that RT facilities provide a certificate of currency for meeting the standards in order to receive ROHPG payments, similar to the mechanism used for dosimetry monitoring. RANZCR indicated that the system being used in Queensland, whereby reciprocal assessments are undertaken by other services, could be used as a template for the remainder of the country. However, mandatory enforcement of the Radiation Oncology Standards is at the discretion of the individual jurisdictions.

> *'In the absence of anything else the ROHPG is really the only lever that exists [as a control of safety and quality]' – jurisdiction*

Finding 20:	The RT community looks to the ROHPG Scheme to drive consistency and best practice in the absence of national regulation and planning.

5.3 CONCLUSION

The ROHPG makes a significant financial contribution to the fleet of linacs in Australia and supports growth in linac numbers. The majority of recent growth in linac numbers has been in the private sector, demonstrating the important contribution made by this sector to overall RT provision, and the need for ongoing dialogue between the public and private sector.

The recent growth in regional areas (especially by private facilities) will support increased geographic access to RT services. Further to this, there are increasing numbers of public-private partnerships or shared care arrangements emerging in regional areas.

However, increasing linac numbers alone is insufficient to address sub-optimal RT utilisation rates in Australia. Other factors that affect utilisation rates include referral patterns, clinician and patient education, support for patients to come to services (e.g. access to accommodation where patients are from regional areas), and workforce availability. Integration of the ROHPG Scheme design features with broader RT planning considerations will provide a more holistic and less disjointed approach for the sector.

Service throughput by public and private facilities

Analysis of MBS data did not provide evidence of increased service throughput by private facilities compared to public facilities, although it was noted that some facilities (both public and private) have higher than average throughput and exceed the nominal annual usage estimates of 8,200 services. A 10-year lifecycle is felt to be appropriate given the current structure and priorities of funding, but the timeframe should be reviewed as part of adopting any of the forward options, and periodically.

Recommendation 3:	The ROHPG should be offered with subsidy timeframes that do not differentiate between public and private facilities. The timeframe should be no longer than 10 years. The Department may wish to consider shorter timeframes on a case-by-case basis if suitable evidence of very high throughput can be demonstrated.

5 KEY REVIEW AREA B: EFFECTIVENESS

Safety and quality

The ROHPG promotes turnover of linacs in an appropriate timeframe. The dosimetry monitoring ensures quality and safety of the funded linacs.

The varying regulatory rules among individual jurisdictions and lack of a national regulatory body for RT leave the ROHPG one of the only mechanisms to drive national consistency and best practice in RT. Despite this, it is not the place of a capital grants scheme such as the ROHPG to enforce quality standards for the radiation oncology sector.

Recommendation 4:	The Department may wish to consider the inclusion of additional safety monitoring measures into the ROHPG funding conditions in future as they emerge or are mandated by jurisdictions (e.g. the Australian Radiation Incident Registry or Radiation Oncology Standards). However, it is not the place of a capital grants scheme to enforce quality standards for the radiation oncology sector.

6 KEY REVIEW AREA C: EFFICIENT AND EFFECTIVE ADMINISTRATION

SUMMARY OF RECOMMENDATIONS

Recommendation 5. $3 million makes a significant contribution to the current costs of a base level linac. The capital contribution should be reviewed periodically (nominally every four years) to ensure it remains an appropriate value.

Recommendation 6. The formula used for setting priority areas in each jurisdiction should be made available, along with the estimated demand (including both met and unmet need) for each planning region. Longer-term projections should also be presented (e.g. upcoming five years), even if these areas cannot be applied for until future years. This will enable forward planning by providers.

Recommendation 7. The Department, in conjunction with jurisdictional departments of health, could consider establishment of a national register of all linacs to support planning processes.

Recommendation 8. The Department may wish to consider expanding the setting of priority areas to include broader radiotherapy planning at a national level, with input from jurisdictions and facilities.

Recommendation 9. The Department should maintain the two-year timeframe for establishing new facilities. New timeframes (no longer than two years) should be negotiated with the grandfathered non-operational facilities.

Recommendation 10. The Department should maintain the inclusion of dosimetry monitoring.

REVIEW QUESTIONS

The ROHPG Review sought to assess the efficient and effective administration of the Scheme, specifically the efficiency and effectiveness of the 2017 changes to administration processes and if there have been any unintended consequences from these changes. The key review questions were:

1. To what extent is paying a set capital contribution for high-cost equipment effective?

2. To what extent is making annual capital payments over a 10-year (or 8-year) period effective?

3. What has been the effect of removing the link for capital reimbursement to MBS service volume?

4. What has been the impact of identifying priority areas annually in conjunction with state / territory governments?

5. What has been the impact of the new process for applications in newly identified priority areas?

6. To what extent have approved new facilities been operational within two years of approval?

7. What has been the impact of publishing ROHPG funded facilities on the Department of Health website?

8. What has been the impact of the required dosimetry audits of funded facilities?

6 KEY REVIEW AREA C: EFFICIENT AND EFFECTIVE ADMINISTRATION

The following more detailed review questions were considered:

- What has been the impact for service providers in general and have there been any unintended consequences of the recent changes to the ROHPG on service provision or clinical practice?
- To what extent is there cross-subsidisation with funds from other Australian Government agencies or state/territory governments?
- To what extent do public and private facilities borrow funding for linacs they purchase?
- To what extent has publication of priority areas on the Department of Health website increased transparency about planning decisions for the location of subsidised linacs?
- Is the annual update of priority areas a suitable timeframe?
- Is there an ongoing need for the current requirement for applicants to notify the relevant state/territory government of their application? Does this create a potential conflict of interest for the state/territory government?
- Is two years an adequate timeframe to commence operational services for (a) new facilities, or (b) new linacs at existing facilities?
- What has been the impact of the dosimetry audits on funded facility operations?

ANALYSIS AND FINDINGS

6.1 EFFECTIVENESS OF THE CAPITAL CONTRIBUTION

6.1.1 External beam radiotherapy

The ROHPG contribution of $3 million for linacs was considered helpful and welcomed by all stakeholders consulted throughout the project. However, stakeholders raised concerns that the reduced ROHPG funding for linacs and ceased funding of other RT equipment may impact on linac turnover times in future.

Consultation with linac vendors and RT facilities indicated that in Australia a base model linac ranged from $3 million to $4 million and increased, depending on the additional features required. More advanced linacs with features such as adaptive radiotherapy (adjusting to the anatomy of the patient) or stereotactic radio surgery ranged from $5 million to $6 million. Emerging technology such as MR linacs ranged from $10 million to $11 million.

Private facilities said that their ability to bulk-purchase linacs helped to keep linac costs down. This is obviously more challenging for public facilities, although some larger jurisdictions have established group purchasing arrangements where they negotiate linac prices to around $3 million for a standard base model machine.

This suggests that the $3 million contribution from the ROHPG is in keeping with current base model prices for linacs but does not cover the costs of add-ons required to provide the latest advancement in RT treatment. However, it can be argued that the ROHPG should be available to ensure RT equipment is suitably modern to enable best practice, not necessarily cutting-edge service use.

The question then is 'do base level linacs still provide best practice treatment?' The answer to this will inevitably depend on the type and stage of cancer to be treated. Other considerations include the need for versatility of equipment for facilities, and the business model of the facility (e.g. high throughput 'standard' treatments, versus specialised (but slower) complex treatment).

Finding 21:	$3 million makes a significant contribution to the current costs of a base level linac but does not cover the full costs of add-ons required for newer treatment regimes, or advanced equipment. The capital contribution should be reviewed periodically (nominally every four years) to ensure it remains an appropriate value.

Public facilities indicated that, if insufficient funding is available from their ROHPG accounts to cover the full cost of linac replacement, it may take longer to source requisite funds from elsewhere, thus delaying the turnover of ageing linacs in future,

6 KEY REVIEW AREA C: EFFICIENT AND EFFECTIVE ADMINISTRATION

or necessitate opting for base models initially and upgrading with add-ons at a later date. However, the ROHPG Scheme only provides a contribution to high-cost equipment and alternative funding options will need to be sourced by public facilities.

However, stakeholders generally felt it was too early to determine the full impact of the changes to the ROHPG funding amounts. This is because the existing ROHPG funds used by public facilities come from the pre-2017 grandfathered system. For some facilities, it will not be until newly purchased linacs or grandfathered equipment require replacement that the full impact will be realised.

Finding 22: The full impact of the changes to ROHPG funding will not be realised for some time in the public sector. This time could be used by public facilities to identify alternative funding sources and mitigate the risks of insufficient funds for linac replacement.

The review process did not identify any routine subsidy sources or sources for replacement of ageing RT equipment from other Australian Government agencies or state/territory governments.

Jurisdictions indicated that the states/territories, through hospitals/health services, were responsible for the initial upfront costs of linac development, such as bunker development, refurbishment costs, and staffing, although a small number of facilities have received upfront ROHPG payments to enable the purchase of a linac.

Public facilities said that hospitals/health services typically funded the ongoing maintenance of RT machines and staff salaries. Some public facilities had trust fund or facility fee arrangements that were funded by clinicians from MBS revenue, which could be accessed to fund other less expensive equipment and software.

6.1.2 Brachytherapy

Concerns were raised by all stakeholders about the removal of brachytherapy funding from the ROHPG Scheme.

Brachytherapy is also used for a small number of cancers including cervical cancer, prostate cancer, vaginal cancer, uterine cancer, and some non-melanoma skin cancers. The OUR for brachytherapy is 3.3% of all new cancers but ranges for specific cancer types from 10% to 80% as shown in Table 6.1 [6].

Table 6.1: Cancer incidence and brachytherapy optimal utilisation rate for selected cancers

	Cervical cancer	Prostate cancer	Uterine cancer	Vaginal cancer	Total
Projected incidence (2020)	933	16,741	3,224	98	20,996
OUR	53%	10%	39%	80%	
Estimated patient demand	494	1,641	1,257	78	3,470

Source: AIHW cancer incidence data and Collaboration for Cancer Outcomes Research and Evaluation (CCORE) radiotherapy optimal utilisation rate estimates 2013.

Brachytherapy is considered best practice treatment for cervical cancers. External beam radiotherapy for cervical cancer has been shown to have poorer outcomes [36] [37] [38].

In 2019–20, there were 2,793 MBS services for brachytherapy, representing 12 services per 100,000 population, although this is likely to underestimate brachytherapy usage, as much cervical cancer use is performed as an inpatient procedure and therefore not recorded as an MBS item.

Analysis of MBS data indicated that brachytherapy usage had increased dramatically from 1994–95 when it was two services per 100,000 population to 12 services per 100,000 population in 2019–20. However, this was a slight decrease from a peak of 19 services per 100,000 population in 2008–09.

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The incidence rate of cervical cancer has declined since the introduction of the HPV[12] vaccine. However, the decline has plateaued and a small number of cases still occur each year. It is predicted that in 2020 there will have been 933 cases of cervical cancer and 238 deaths, mostly among women between 35 and 50 years of age [18].

In 2019–20 there were 23 facilities receiving ROHPG funding for brachytherapy equipment, 20 of which were funded for high dose-rate (HDR) brachytherapy equipment, six of these being private facilities.

However, not all facilities providing brachytherapy will treat gynaecological cancers and within those facilities that do treat gynaecological cancers, only a few treat cervical cancers (due to the level of expertise required).

Brachytherapy equipment is not as expensive as external beam RT, but does have ongoing costs that accumulate, such as:

- the brachytherapy unit (after-loader), approximately $250,000 to $400,000 with an estimated 10-year lifespan
- applicator, approximately $75,000 to $275,000 outlay with an estimated three-year lifespan
- cancer specific accessories, e.g. prostate stepper (approximately $5,500), breast CT/MRI template (approximately $48,000) and skin applicator set (approximately $19,000) each with an estimated lifespan of three-years
- ongoing maintenance replacement of RT source (approximately $125,000 per annum), and
- other consumables, e.g. needles (approximately $50,000 per annum).

Brachytherapy was noted as a treatment that is not very profitable due to the time required compared to the MBS rebate available. This, combined with the equipment and consumable costs listed, suggest there is little financial incentive to offer this treatment option.

There was concern among stakeholders, including clinicians, that removal of ROHPG funding for brachytherapy equipment will cause facilities to stop offering this treatment option.

'There's no incentive to provide it anymore.' – private provider

'If capital costs are covered by ROHPG, it is easier for states to chip in for maintenance.' – peak body representative and clinician (public and private)

Finding 23:	The removal of brachytherapy from the ROHPG Scheme may unintentionally result in fewer facilities offering this type of treatment in future. However, the transition time (when grandfathered funding arrangements are available) provides time for alternative funding sources to be identified for public facilities.

6.2 EFFECTIVENESS OF ANNUAL PAYMENT CYCLES

Changes introduced to the ROHPG in 2017 resulted in a move from monthly payments based on service use (determined by MBS claims) to annual payments of a set value.

Both public and private facilities viewed the streamlined administrative processes for annual payments as beneficial. Stakeholders appreciated the reduced administrative burden and the set value of payments for planning purposes. The annual system was also considered more transparent and easier to verify compared to the varied monthly payments.

Finding 24:	Introduction of an annual payment structure of set value per equipment piece was positively received by public and private facilities.

[12] HPV: Human Papilloma Virus known to cause 70% of cervical cancers (https://www.who.int/news-room/fact-sheets/detail/human-papillomavirus-(hpv)-and-cervical-cancer)

6.3 IMPACT OF REMOVING THE LINK TO MBS SERVICE VOLUME

One of the most significant changes introduced to the ROHPG in 2017 was the removal of the linkage of payments to equipment use based on MBS service data.

The result of the de-linking from the MBS has streamlined the administrative processes considerably, especially for private facilities. Prior to the change, private providers would have to submit MBS claims data to the Department of Human Services monthly on a 'floppy disk'. Public facility data was extracted from MBS data directly.

The administrative burden of this arrangement for the Department of Human Services was also large, with monthly analysis of MBS claim data required for each facility to determine the value of ROHPG payments. The complicated nature of the funding model left it more subject to error and reduced transparency.

'Linking back to occasions of service would be a mistake.' – private provider

De-linking from MBS claim data was also valued by low-throughput facilities that were disadvantaged by linking to service throughput.

'For low throughput services [de-linking from MBS] is really good. But it will not have made a change in high throughput centres.' – private provider

As linac lifespan is dependent on technology advances as well as actual wear and tear on the machine, low throughput centres were more at risk of not being able to turnover linacs in a timely fashion. Prior to the 2017 changes, some low throughput centres were already on a different payment process, adding further complexity to the previous funding model.

Finding 25:	All stakeholders consulted viewed the de-linking of ROHPG claims from MBS to be beneficial.

However, it was noted by facilities and the Department that removal of MBS linkage also removed the only mechanism to monitor whether the funded equipment was actually in use.

When the changes were introduced, it was unknown to what degree funded equipment was being utilised to optimal capacity. The Department has mitigated this by introducing an annual declaration from facilities about which ROHPG funded equipment is still in use. This provides the Department with visibility about which equipment is still operational. If grandfathered equipment is no longer operational, the Department can then stop funding it (even if the capital balance has not yet reached zero dollars).

It is important for the Department to monitor operational equipment to ensure ROHPG funds are being used appropriately. The annual declaration is a useful mechanism for this assessment that does not place undue burden on either party. However, in its current format the declaration could be open to misrepresentation by funding recipients.

Finding 26:	De-linking ROHPG payments from MBS service data created a loss of visibility over utilisation of funded equipment. Measures to address this have subsequently been implemented.

6.4 SETTING OF PRIORITY AREAS

Priority areas for linac services are submitted by jurisdiction departments of health to the Department annually. Applications for a given priority area are open for eight weeks and then closed so all applications can be assessed and compared against each other. Prior to 2017, an undefined application period limited the Department's capacity to assess the merit of each application against the other, making it difficult to prioritise based on localised need [1].

Applications for the replacement of existing linacs continue to be submitted on a rolling basis. Additionally, facilities applying for new linacs outside of the identified priority areas may still do so. However, these applications are less likely to be successful than those from within ROHPG priority areas.

Prior to changes made in 2017, when assessing funding applications for new facilities or additional linacs, the Department assessed the need for RT in the proposed location of the application based on cancer incidence, projected

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population data, OURs and the notional life and throughput capacity of the existing fleet of linacs. This information was used to calculate the estimated shortfall (or oversupply) of linacs in a given area.

Priority areas are now identified by relevant state and territory governments. The exact processes for this prioritisation, including the funding formula used, vary between jurisdictions and are not transparent.

The revised process for setting priority areas was seen as flawed by many stakeholders, especially private facilities. Although publishing of priority areas on the Department's website was considered beneficial by those who were aware of this, the process in which priority areas were determined by jurisdictions was not considered transparent and differed across the country.

> *'The idea was probably supposed to promote private and public to talk and work together with a broader view about state planning. But it's not working and not reciprocated. State governments have cancer master plans that stretch out over many years…but they may never do [implement the plan]. Meanwhile they won't support privates coming into the space.' – private provider*

Finding 27: The setting of priority areas is not working optimally and would benefit from refinements.

The consultation process identified that in larger states, RT planning occurred more systematically and the setting of priority areas for the ROHPG was the responsibility of the state government. In smaller jurisdictions however, RT planning was less structured, and assessment of priority areas largely fell to individual public facilities to determine.

All jurisdictions said they used cancer incidence projections, radiotherapy utilisation rates and nominal rates of re-treatment and non-cancer related radiotherapy to determine a population-based demand for linacs by area. However, the utilisation rates, and percentages of re-treatment and non-cancer relative activity, varied across jurisdictions for which this information was made available, as shown in Table 6.2.

Table 6.2: Radiotherapy planning formula variations used by jurisdictions (where available)

Jurisdiction	Utilisation rate	Re-treatment rate	Non cancer treatment rate
NSW	48.3%	25%	-
QLD	45.9%	25%	10%
VIC	38.0%	20%	6%
WA	49.2%	25%	6%

Planning of future RT facilities requires an understanding of the current linac availability and locations of the linacs. This information is not available in the public domain and relies on sector / industry knowledge of individuals. The Department maintains information on all ROHPG funded linacs, but information on non-ROHPG funded linacs is not routinely collected. Collection of this information would rely on the good-will of facilities with non-ROHPG funded equipment and could be collected via an annual survey, managed at the individual jurisdiction level. At minimum, this should include the number of linacs and commencement date if possible. The information, along with relevant ROHPG information, could be made available on the Departmental website to facilitate planning processes.

Finding 28: There is limited publicly accessible information on the number of existing linacs and bunker capacity across Australia for RT planning purposes.

In planning for RT, each jurisdiction needs to take into consideration their local needs and projected case mix, so it is appropriate that the formula may vary. However, there is no transparency in the current process of how priority areas are set within jurisdictions, and what (if any) other considerations are made by jurisdictions.

Finding 29: There is a need for greater transparency of jurisdiction-based formulae used to set priority areas for the ROHPG.

The shift in determining priority areas from the Australian Government Department of Health to the states and territories has created the potential for conflict of interest for public facilities. Private facilities were cautious of the potential conflict and felt

the responsibility should be shifted back to the Australian Government. In contrast, jurisdiction consultees felt they were well placed to indicate priority areas given their responsibility for RT planning.

The set timeframe for new applications within priority areas (eight weeks) has also had some unintended consequences. The new process has highlighted the different approaches taken by public and private facilities in submitting applications.

Before an application can be made, public facilities need to get approval from multiple levels of governance, secure additional funding required for non-funded RT equipment/shortfall for the linac and be granted approval to submit the application. Conversely, private facilities are perceived to be more agile and can prepare a business case/application for funding in the allocated timeframe.

It has been suggested that some jurisdictions may withhold announcing priority areas until such time as they are ready to submit an application for funding. The lack of transparency on how priority areas are selected prevents scrutiny of this.

Finding 30:	The current lack of transparency on how priority areas are set has created a perceived conflict of interest for jurisdictions.

It was also suggested that priority areas need to be able to take in several years of planning, not just the immediate year.

'It takes years to set up a service so it should take into account future service need rather than the time window provided by the ROHPG.' – jurisdiction

Finding 31:	The one-year timeframe for priority area setting does not allow sufficient forward planning.

Although private facilities can submit applications for non-priority areas, these are unlikely to be funded if the need has not been demonstrated (by not being listed as a priority area) and because other facilities will not have had opportunity to bid.

Finding 32:	The option to apply for non-priority areas has created confusion among facilities and jurisdictions. This option provides conflicting messages to facilities and its removal should be considered to avoid confusion.

6.5 TIMEFRAMES FOR NEW SERVICES TO BECOME OPERATIONAL

Under the new funding structure of ROHPG, approved new facilities (or additional linacs) need to be operational within two years of approval.

The need for the time-limit for new or additional linacs arose when a number of approved linacs were taking many years to become operational. This is referred to as 'warehousing' of locations that prevents other facilities from accessing ROHPG funding to establish a service in a location that is also not yet being serviced. An example of this was an application approved in 2013 that is still not operational at the time of reporting.

Finding 33:	There are currently seven approved locations that have taken more than two years to become operational.

Stakeholders did not raise concerns with the two-year timeframe to establish a new centre and peak bodies felt this was an appropriate timeframe. One jurisdiction also commented that establishing a new linac in an existing bunker is relatively quick to do. Conversely, concerns were raised by public facilities and jurisdictions about the delays in the opening of new centres under the old Scheme rules.

'There was a big issue with private providers "warehousing" locations where they applied for and had a facility approved but have not yet developed the service.' – jurisdiction

To date, only two new facilities have been approved since the two-year rule was applicable. Both of these facilities were approved in 2020 and are scheduled for opening in 2021. This suggests that a two-year timeframe is sufficient, although the

effectiveness of the new rule in preventing warehousing of locations has not had sufficient time to be tested.

Finding 34: Two years was considered adequate time to establish a new facility.

6.6 TRANSPARENCY OF NEW APPROVED ROHPG SERVICE LOCATIONS

Stakeholders were supportive of the Department listing the approved facilities on their website. Some stakeholders felt this process would be improved if it included up-to-date timeframes for when new centres would open.

Although stakeholders generally approved of the application criteria for new facilities, the transparency on how the applications were assessed was considered limited. This is discussed further in section 7.2.

6.7 IMPACT OF THE DOSIMETRY AUDITS

As discussed earlier, stakeholders were supportive of the inclusion of dosimetry monitoring as a condition of funding under the ROHPG, as the national provider, the ACDS, has a large database of information that allows participating services to monitor themselves and benchmark against national averages.

ACDS audits are able to identify various types of issues relating to ageing equipment, to equipment usage, and planning issues. The extent to which dosimetry auditing resulted in facilities making adjustments to their operations was not considered in the review. However, without submission of a certificate of currency, ROHPG payments will not be made. This provides a valid 'topline' measure of the safety of the linac (because a facility should be accountable for this representation), and hence goes some way to providing a degree of accountability for the safety of the RT delivered.

Finding 35: Dosimetry monitoring ensures linacs deliver the expected dose of RT, which is one important aspect in ensuring safety and quality in RT service delivery.

6.8 CONCLUSION

Effectiveness of capital contributions

The ROHPG provides a mechanism to assist the increased provision of RT across Australia. The high upfront costs of RT that are not reimbursed through the main funding source (MBS) can be a barrier to establishing RT services, especially in areas where throughput is expected to be low. Provision of a capital contribution to the high-cost equipment provides incentives for facilities to establish new facilities and to ensure concessional patients are bulk-billed, thus ensuring greater access for at-risk population groups.

However, stakeholders raised concerns about the capping of funding for linacs and removal of funding for other RT equipment from the ROHPG. The ROHPG Scheme has been in place for over 30 years and this has probably contributed to the situation where there are limited capital funding streams available to public facilities. Hospitals and health services have not historically had to fund RT equipment, and public facilities are concerned that without quarantined funding, the need for replacement equipment will be lost in the mix of competing priorities.

The impact of the revised ROHPG funding will not be evident until linacs funded under the new arrangements require replacement. This lead-in time provides an opportunity for jurisdictions to understand the upcoming impacts and prepare accordingly, including negotiating additional provisions in future NHAs to accommodate the additional cost for capital that will be required.

One area of concern among all stakeholders was the loss of ROHPG funding for brachytherapy equipment. This type of radiotherapy is best practice for treatment of cervical cancers and recommended for a selection of other cancers including vaginal cancer, uterine cancer and prostate cancer. As a non-profitable treatment modality, loss of ROHPG funding may unintentionally result in facilities that currently

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provide brachytherapy services (n=23) opting to not continue this treatment modality in future.

Recommendation 5:	$3 million makes a significant contribution to the current costs of a base level linac. The capital contribution should be reviewed periodically (nominally every four years) to ensure it remains an appropriate value.

Unintended consequences

The annual payments for the ROHPG are preferred by stakeholders. However, de-linking payments from MBS service use created a loss of visibility for the Department about utilisation of funded equipment. The Department has implemented a suitable strategy to address this. Further discussion on administrative processes is provided in section 7.1.

Effectiveness of setting priority areas

The setting of priority areas and a set timeframe for new applications in priority area locations has not worked as intended. Instead of promoting dialogue between public and private facilities it has created more competition and a perception of conflict of interests. The different approaches to business development of the public and private sectors creates uneven playing fields under the current arrangements.

At a minimum, more transparency is required about how the priority areas are identified by jurisdictions, with a longer-term view of upcoming priority areas.

If there is an appetite for significant adjustment to radiotherapy planning by the sector, restructuring the priority setting process could be integrated with greater national planning for radiotherapy. This would take into consideration other necessary factors that affect take-up of RT such as workforce availability, service integration and referral pathways. See Chapter 8 for further detail.

Recommendation 6:	The formula used for setting priority areas in each jurisdiction should be made available, along with the estimated demand (including both met and unmet need) for each planning region. Longer-term projections should also be presented (e.g. upcoming five years), even if these areas cannot be applied for until future years. This will enable forward planning by providers.
Recommendation 7:	The Department, in conjunction with jurisdictional departments of health, could consider establishment of a national register of all linacs to support planning processes.
Recommendation 8:	The Department may wish to consider expanding the setting of priority areas to include broader radiotherapy planning at a national level, with input from jurisdictions and facilities.

Effectiveness of other changes

A two-year timeframe for the establishing of new RT facilities was considered adequate and welcomed by stakeholders to prevent 'warehousing' of ROHPG approved locations. However, there are still seven facilities with ROHPG funds approved prior to the 2017 changes that are not yet operational.

Recommendation 9:	The Department should maintain the two-year timeframe for establishing new facilities. New timeframes (no longer than two years) should be negotiated with the grandfathered non-operational facilities.

The inclusion of dosimetry monitoring as a condition of ROHPG funding was considered beneficial and supported by stakeholders.

Recommendation 10:	The Department should maintain the inclusion of dosimetry monitoring.

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SUMMARY OF RECOMMENDATIONS

Recommendation 11. The Department should strengthen the ROHPG application process by:
1. Making the ROHPG guidelines and/or application form more explicit about what information should be presented for the patient access criterion, even in priority area locations.
2. For the affordable service criterion, seeking additional information about the proximity of facilities that have 100% bulk-billing processes (e.g. public facilities) and include a description of how additional billing information (e.g. fee schedules) will be scored and compared.
3. Requesting the provision of evidence (letters or email exchange) of stated relationships for the multidisciplinary and patient centred care criterion.
4. Including a scoring matrix for all criteria to enable a transparent assessment process.

Recommendation 12. The ROHPG instrument should be updated to reflect all relevant assessment criteria and the facility declaration expanded to include additional conditions.

Recommendation 13. The Department should continue pausing ROHPG payments if necessary certificates of currency have not been provided and could consider pausing payments if equipment has not been used within a financial year. Similarly, additional penalties could be considered such as reduced payments if other funding conditions are not met. However, the exact nature of appropriate penalties would need to be developed in consultation with the sector to ensure patients would not be adversely affected.

REVIEW QUESTIONS

The ROHPG Review sought to assess if the Scheme funding has been appropriately and transparently allocated, given the program's objectives and grant criteria. Key review questions were:

1. Are program administration arrangements effective in ensuring appropriate safeguards, accountability, and transparency of decision-making of grant funds?

2. Do the conditions of funding promote the objectives of the ROHPG Scheme and provide assurance of probity?

3. What performance indicators should be used to assess the Scheme against its objectives?

The following more detailed review questions were considered:

- Are the assessment criteria for applications appropriate?
- Are the processes and criteria to compare and assess competing applications adequate and transparent?
- Are there additional considerations for comparison of public and private applications?
- What are the processes for facility payment and are these appropriate?
- To what extent are the Department of Health records of application and approval processes adequate?
- To what extent are the Department of Health records of facility compliance adequate?
- How does non-compliance impact on payments?

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ANALYSIS AND FINDINGS

7.1 PROGRAM ADMINISTRATION ARRANGEMENTS

The ROHPG Scheme requires RT facilities to complete an application form when seeking Australian Government funding towards the capital cost of high-cost equipment (linacs). Applications can be for:

- a new health service (facility)
- expansion in capacity of an existing facility
- relocation of an existing health service, or
- replacement of existing equipment.

The application form is supported by the ROHPG Scheme administrative guidelines, which detail information on the Scheme and the five criteria that need to be addressed. The five criteria (as described in more detail in Table 7.1) are:

(1) Eligible equipment
(2) Patient access
(3) Services must be affordable
(4) Multidisciplinary and patient centred care, and
(5) Commencement date.

Table 7.1: ROHPG criteria and application requirements

Criterion	Application requirements
Criterion 1: Eligible equipment	
The Minister will consider whether the equipment covered by the application is within the scope of the ROHPG Scheme. This means: • it must be a linac; and • it must not have been funded through other Commonwealth budget measures for external beam radiotherapy.	Linac manufacturer, model, serial number, and Location Specific Practice Number (LSPN) of premises at which the linac is, or will be, located.
Criterion 2: Patient access	
The Minister will consider whether the service locations covered by the application are consistent with supporting patient access to radiation oncology services, based on identified priority areas. Applications for a new health service, expansion of service or relocation where the health service will not be located in an identified priority area may be considered but must provide evidence of need and have the support of the relevant state/territory.	Information that demonstrates notification of the relevant state and/or territory governments, and that the proposed service locations are consistent with supporting patient access based on identified priority areas.
Criterion 3: Services must be affordable	
The Minister will consider whether the services which will constitute the approved health service are affordable, having regard to billing practices and the extent of out-of-pocket costs. The minimum requirement under ROHPG conditions of funding is that the approved organisation must offer Medicare bulk-billing arrangements for concessional patients. To support their application, applicants are required to provide information demonstrating that the fees charged for services that form part of the approved health service will not result in substantial out-of-pocket costs that may affect patient access to radiation oncology services.	Information to show that the intended fees for services will not result in out-of-pocket costs that may affect patient access. This should include information about offering Medicare bulk-billing arrangements for concessional patients.

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Criterion	Application requirements
Criterion 4: Multidisciplinary and patient-centred care	
The Minister will consider whether the radiation oncology services to be provided as part of the approved health service are integrated with other cancer treatments and other medical services. This will help ensure the best possible treatment for patients. Applicants will be required to provide information demonstrating that the proposed approved health service will form part of an integrated cancer management system including, but not limited to, medical oncology, surgery and allied health services, i.e. multidisciplinary care. This includes information regarding: • arrangements and referral basis, if any, with the relevant specialists; • clinical oncologists and surgeons networked into services; • details of links to other centres, particularly for on-referral or discussion on complex cases; • access to in-patient care; and • access to other associated follow-up care for patients.	Information to demonstrate that the proposed service will form part of an integrated cancer management system, including, but not limited to, medical oncology, surgery and allied health services, i.e. multidisciplinary care.
Criterion 5: Commencement date	
The Minister will consider the proposed commencement date for treating patients under the approved health service, and whether this timeframe is realistic and reasonable. The maximum period within which the Department would expect facilities and equipment which form part of an approved health service to become operational is within two years from the date of the approval under Part IV of the Act. The Minister may revoke an approval of a facility or equipment if it does not become operational within two years.	Proposed date by which service locations and specified equipment will be operational. For a new facility, this should be no later than two years from the date of approval.

In general, stakeholders felt the application criteria were necessary and suitable. No concerns were raised with criterion 1 (eligible equipment information) or criterion 5 (commencement date).

Comments on the remaining criteria were as follows:

- **Criterion 2 (patient access):** Public facilities/jurisdictions felt that in areas where services already exist, the number of existing but not used bunkers should also be taken into consideration. In addition, patient travel time was raised by many stakeholders and is an important consideration for access.
- **Criterion 3 (affordable services):** Public facilities and jurisdictions raised concerns over the out-of-pocket costs to patients in the private setting.
- **Criterion 4 (multidisciplinary care):** Public facilities emphasised the importance for integration with cancer care services and multidisciplinary teams as well as the availability of support services in the community, including allied health providers and GPs capable of managing RT side-effects. Peak bodies / Colleges commented that networking was especially important so that centres were not isolated. Stand-alone centres need to be connected for professional development and quality and safety purposes.

Finding 36:	ROHPG assessment criteria are appropriate but could be strengthened in several areas relating to patient access, affordability and ensuring multidisciplinary care.

The review sought to assess the suitability of information provided in ROHPG applications and the transparency of the Department's assessment for approval (or otherwise). To do so, HMA reviewed example application forms submitted by two different providers (one for a new facility and one for a replacement linac), and examples of Departmental letters of approval. The analysis is presented below.

Criterion 1: Eligible equipment

The information provided for this criterion is adequate. Since the funding amounts for linacs are now set at $3 million regardless of actual machine cost, this information is mainly collected for record keeping purposes.

However, there is no process with which to compare one type of linac to another should competing applications be submitted. The difference in treatment capabilities of different linacs is not requested. Nor does the application request information on

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the necessity of more advanced treatments for the cancer incidence of the cohort population, or the existing availability of these treatments within the region.

Criterion 2: Patient access

Acknowledging that the review only analysed two applications, it appeared that the replacement application provided more detail about RT demand/need in the region compared to the new application. The new application was in an identified priority area, which was the extent of information provided about patient need or access.

Listing as a priority area demonstrates the need for RT services based on cancer incidence rates and OURs. However, it does not factor-in patient in/out flow to the region for health services, the impact on patient travel times expected as a result of implementation, or the case mix of the patient cohort. In addition, priority areas are large geographic regions, and the placement of a new service within the priority area should be considered.

Although no competing applications for an identified priority area have been received to date, the Department will need to be prepared for this occurrence in future. At present, the existing approval process does not have a mechanism to score the relative merits of competing applications.

In addition, it is plausible that within a priority area one application may be for a new facility, and another for expansion of an existing service. The Department will need to introduce a transparent scoring matrix to weigh up the pros and cons of competing applications such as:

- expansion and existing efficiencies versus a new facility and patient choice of provider, and
- public services versus private service and potential out-of-pocket costs for some patients.

Additional information that would encourage transparency includes:

- current patient throughput per month (last 12 months) for existing services to determine if enhanced patient access could be achieved through efficiency gains (e.g. increased operational hours), and
- demonstration that any new location is in an optimal geographic area to enhance access and reduce patient travel times.

Finding 37: The level of detail for patient access in priority area locations is insufficient for comprehensive comparison of applications. The ROHPG guidelines should be more explicit about what information is presented in this criterion, even in priority area locations.

Criterion 3: Services must be affordable

The phrasing of the criterion is vague and left up to interpretation by respondents. It currently states that applications

> *'…will not result in out-of-pocket costs that may affect patient access to radiation oncology services.'*

Our review of two applications found that private providers provided mixed levels of information about out-of-pocket costs. Private providers indicated that the concessional patients will be bulk-billed, which is the minimum requested by the ROHPG.

Other information provided included:

- bulk-billing options for Department of Veterans' Affairs (DVA) patients or palliative treatments
- capping of fees at a set proportion of the Medicare schedule fee, or
- availability of payment plans.

This information is not explicitly sought from the ROHPG application and the impact on the assessment process is not transparent.

For example, for two competing applications:

- would the indication of 100% bulk-billing score more favourably than bulk-billing only concessional patients? or
- would a capped service fee for non-concessional patients score more favourably than a payment plan or a higher capped fee?

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The additional context of the proposed location for services is not considered within the criterion. For example, the availability of bulk-billed services to non-concessional patients could be considered of more importance in areas with no public alternatives nearby.

Finding 38:	An indication of bulk-billing for concessional patients is essential.
Finding 39:	The criterion should also seek additional information about the proximity of 100% bulk-billed services (e.g. public facilities).
Finding 40:	The criterion should include a description of how additional billing information (e.g. fee schedules) will be scored and compared.

Public facilities raised concerns about out-of-pocket costs to patients in the private system. However, analysis of MBS bulk-billing data showed that in 2019–20 an average of 66% of private patients were bulk-billed. Bulk-billing rates were higher in regional areas (an average of 74%) and rural areas (an average of 73%) compared to major cities (an average of 54%). Rates of bulk-billing also varied depending on the type of treatment, with IMRT treatments showing the lowest bulk-billing rate in major cities (36%) and rural areas (54%). Further detail is provided in Appendix F.

Criterion 4: Multidisciplinary and patient centred care

Within this criterion, applicants are asked to provide details regarding:

- arrangements and referral basis, if any, with the relevant specialists
- clinical oncologists and surgeons networked into services
- details of links to other centres, particularly for on-referral or discussion on complex cases
- access to in-patient care, and
- access to other associated follow-up care for patients.

Providers in the applications we reviewed included substantive detail of local arrangements and relationships. However, a more structured template that specifically requests information on each of the itemised considerations could provide better guidance for applicants and more consistency in the type of information provided, which will assist the comparison of applications.

Although detailed information was provided from applications, evidence of the stated relationships was not sought nor provided. Assessment of this criterion could be strengthened with provision of such evidence by applicants. Evidentiary requirements should be kept simple to minimise administrative burden but could include a letter of support or email correspondence.

For new services, this criterion could also be expanded to include information on how the facility will connect with other facilities, especially those to be located in regional/rural areas.

Finding 41:	Integration of RT with other cancer services and allied health is extremely important. The criterion could be strengthened through provision of evidence of stated relationships.

Criterion 5. Commencement date

The inclusion of a specified timeframe for new facilities is beneficial and will prevent providers from 'warehousing' locations. This criterion was supported by all stakeholders and could be further strengthened in new facility applications through inclusion of a Gantt chart of activities to be undertaken.

Comparison between competing applications

The ROHPG guidelines do not include a scoring matrix for included criteria. A scoring matrix would enable a transparent mechanism to determine application eligibility and compare competing applications. As an example, a score for each criterion could be:

- 0 = Criterion not met
- 1 = Criterion partially met
- 2 = Criterion met
- 3 = Criterion met and exceeded.

7 KEY REVIEW AREA D: APPROPRIATE ACCOUNTABILITY

Further information on the scoring matrix with suggested scoring rationale is provided in Appendix G.

Finding 42:	ROHPG guidelines should introduce a scoring matrix for all listed assessment criteria.

7.2 CONDITIONS OF FUNDING

ROHPG funding to providers is authorised by legal instrument that lists the conditions of funding and specifies all ROHPG funded equipment of the provider by location.

Review of the instrument highlighted that not all assessment criteria are reflected in the conditions of instrument. Included conditions are:

- use of funded equipment in the financial year for which payments are being made
- bulk-billing of concessional patients, and
- participation in a dosimetry monitoring Scheme.

The instrument does not currently include:

- specifications of the two-year timeframe to establish new facilities, or
- commitment to provide an integrated service with other cancer care/multidisciplinary team care.

In addition, with the exception of the dosimetry auditing certificate of currency, there is no requirement for facilities to supply evidence of conditions of funding.

The introduction of the declaration of equipment use by the Department is appropriate to increase accountability of the Scheme. The declaration could be extended to include other criteria such as an indication of the number of patients bulk-billed (as a percentage of concessional patients and all patients).

To verify the declarations, facilities could be requested to periodically provide evidence of equipment usage in the previous year and accounting information regarding patient billing.

Regarding the timing of commencement for new facilities, annual updates on the expected commencement date with updated implementation Gantt charts to document progress should be supplied by facilities.

Other conditions of funding that could be considered to enhance the quality and safety of RT are:

- participation in the incident and near-miss register once operational, and
- certificate of compliance with the Radiation Oncology Standards.

The appetite for facilities to participate in the above programs, as well as the financial impacts of participation, should be investigated through stakeholder consultation before being implemented.

Compliance

The ROHPG instrument states that failure to meet any of the ROHPG conditions could result in cessation of funding.

In practice, only failure to comply with the ACDS audit is monitored and payments paused if the certificate of currency is not provided annually.

In order to provide good accountability and probity, it is essential that the ROHPG monitors the conditions of funding and ceases or pauses funding for non-compliance. However, non-payment also potentially impacts treatment for cancer patients. A pause to payments should be adhered to if equipment has not been used in the previous financial year or if necessary certificates of currency have not been provided. A grace period of one month may alleviate administrative stress in having audits undertaken by external parties (the availability of audits is at the discretion of the external party, not the facility).

Failure to meet other conditions of funding, e.g. bulk-billing of concessional patients, integration with cancer services and multidisciplinary team, could incur other penalties depending on the severity and circumstance. Consequences of non-compliance could include reduced payment for minor offences or ban from renewal of ROHPG funding for major breeches. In setting any penalties, due care must be taken to ensure that the impact will not have adverse effects on patients or the ability of patients to pay for services. Therefore, specific details of any such penalties should be developed in consultation with public and private facilities, jurisdictions,

colleges, and peak bodies to ensure the penalty matches the level of non-compliance, patients will not be adversely affected and that the routine provision of evidence for compliance is not unduly burdensome on facilities.

7.3 PERFORMANCE INDICATORS

The ROHPG Scheme provides capital contributions for high-cost RT equipment. Changes to radiotherapy utilisation cannot solely be attributed to the ROHPG, but it is obviously a key component of increasing RT use in Australia. As such, key performance indicators that should be routinely monitored to assess the ROHPG Scheme against its objectives are:

- trends in RT utilisation rates by jurisdiction and by remoteness (MMM)
- number and distribution of external beam RT (e.g. linacs) across Australia, both ROHPG funded and non-ROHPG funded
- median age of external beam RT across Australia, both ROHPG funded and non-ROHPG funded
- trends in radiotherapy waiting times, and
- proportion of bulk-billed radiotherapy provided by jurisdiction and by remoteness (MMM).

7.4 CONCLUSION

There are several areas where the ROHPG Scheme administration could be strengthened to increase transparency and provide assurance of the appropriate use of Australian Government funds.

Recommendation 11:	The Department should strengthen the ROHPG application process by: 1. Making the ROHPG guidelines and/or application form more explicit about what information should be presented for the patient access criterion, even in priority area locations. 2. For the affordable service criterion, seeking additional information about the proximity of facilities that have 100% bulk-billing processes (e.g. public facilities) and include a description of how additional billing information (e.g. fee schedules) will be scored and compared. 3. Requesting the provision of evidence (letters or email exchange) of stated relationships for the multidisciplinary and patient centred care criterion. 4. Including a scoring matrix for all criteria to enable a transparent assessment process.
Recommendation 12:	The ROHPG instrument should be updated to reflect all relevant assessment criteria and the facility declaration expanded to include additional conditions.
Recommendation 13:	The Department should continue pausing ROHPG payments if necessary certificates of currency have not been provided and could consider pausing payments if equipment has not been used within a financial year. Similarly, additional penalties could be considered, such as reduced payments if other funding conditions are not met. However, the exact nature of appropriate penalties would need to be developed in consultation with the sector to ensure patients would not be adversely affected.

PART C

FUTURE DIRECTIONS

8 FUTURE DIRECTIONS

Based on the assessment of the appropriateness, effectiveness, effective and efficient administration and appropriate accountability of the ROHPG Scheme (as discussed in Part B), HMA identified mechanisms to strengthen the Scheme in the future.

8.1 ISSUE AND RATIONALE

When the ROHPG commenced in 1988, there were approximately 46 linacs in Australia. Today there are approximately 200 linacs available across Australia in a mix of major cities, regional areas and rural areas.

The exponential growth in the number of linacs in Australia over the last three decades cannot solely be attributed to the capital contributions from the ROHPG Scheme. But considering the large initial outlay required to establish an RT facility (i.e. development of the concrete bunker, expensive equipment, and software), it is reasonable to assume ROHPG has made a significant contribution to the overall increase in RT availability.

However, increasing radiotherapy utilisation rates across Australia is not simply a matter of placing more linacs in areas of unmet met. Radiotherapy planning requires a complex assessment of demand, workforce planning, linkage with other cancer services, and safety and quality considerations. Adding to the challenge is the high costs of radiotherapy equipment, regular turnover of equipment required (nominally every 10 years), and expensive building set-up and refurbishment requirements.

There is a conflict between the policy objective of seeking to provide treatment close to patients' primary residence and the practical challenges presented by sophisticated treatment regimens required by radiotherapy.

In 2002 the Baume Inquiry into radiation oncology indicated that there should be a national body mandated to:

- draw together state and territory plans to establish and maintain a national plan for radiation therapy, including the location of new facilities and equipment upgrading and replacement
- approving new or expanded facilities for capital reimbursement
- overseeing technology and other standards such as minimum equipment requirements or staffing benchmarks in conjunction with the appropriate professional organisations
- establishing and disseminating best-practice guidelines, including the promotion of multidisciplinary team care and oncology
- developing measures of productivity and benchmarking facilities against them
- monitoring the radiation therapy workforces and undertaking forward planning to ensure sufficient numbers, in conjunction with appropriate bodies
- establishing a national dataset for planning which unites data collected on the different streams of care
- overseeing a national accreditation program, including a dosimetry program and an adverse incident monitoring program, in consultation with the professions, and
- horizon scanning and referring new technology to the Medical Services Advisory Committee for timely assessment [27].

In 2020 such a body does not exist and many of the challenges highlighted in the Baume Inquiry remain. For example:

- there is a disconnection between state and territory planning and national contributions to radiotherapy investment
- Radiation Oncology Standards are not universally mandated across Australia
- there is no uniform method for estimated radiotherapy demand and number of linacs required

- advances in RT technology and trends in best practice are not routinely nor consistently monitored by Australian or state/territory governments, and
- in the absence of other mechanisms, a capital funding program is used to drive consistency and best practice in radiotherapy across Australia.

Admittedly, the issues raised above go well beyond the scope of the existing ROHPG Scheme. Arguably it is inappropriate for a capital funding scheme to be the sole driver of change in radiotherapy. However, without change, there are limitations to what a capital funding scheme can do to rectify misalignment with state/territory plans for RT or promote discussion and collaboration among the public and private facilities.

The role of private facilities in radiotherapy is significant, representing approximately half the linac fleet. Public facilities cannot and should not expect to be the sole RT facilities in Australia and the increasing instances of public-private partnerships or shared care relationships demonstrates the importance of this type of collaboration. While the existing ROHPG does not prevent this relationship from occurring, it also does not facilitate dialogue.

To maximise the benefit of capital investment in radiotherapy, there needs to be a more transparent approach to selection of priority areas, together with expanded scope to include all factors that influence utilisation rates (e.g. workforce and referral pathways) and improved dialogue between the public and private sectors.

One way to achieve this is the establishment of a national body that has input from all jurisdictions, colleagues, peak bodies and public and private facilities. Such a body could be formed as a Collective Impact Initiative, whereby long-term commitments by key players of different sectors work towards a common agenda to solve a specific problem [39].

Collective Impact Initiative

The five conditions of collective success are:

A common agenda – all participants have a shared understanding of the problem and a joint approach to solving it through agreed upon actions.

Shared measurement systems – collecting data and measuring results consistently across all the participants ensures alignment and accountability.

Mutually reinforcing activities – participants undertake activities that play to their strengths in a coordinated manner that contributes to the shared goals.

Continuous communication – open and continuous communication builds trust, assures mutual objectives, and creates common motivation.

Backbone support organisation – requires a dedicated staff separate from the participating organisations who can plan, manage, and support the initiative through ongoing facilitation, technology and communications support, data collection and reporting, and logistical and administrative detail [39].

8.2 OPTIONS

Potential options for future enhancement of RT include:

(1) Adjustment to strengthen the existing ROHPG Scheme.
(2) Development of a national body with input from all jurisdictions, colleagues, peak bodies and public and private facilities for radiotherapy planning that includes capital funding for high-cost equipment.

Benefits and challenges of these options are discussed below.

8 FUTURE DIRECTIONS

Option 1: Adjustments to strengthen the existing ROHPG Scheme

Key features: ROHPG Scheme remains in its current form but is strengthened with the following adjustments:

(1) Equal timeframes for payment between public and private facilities, set at no longer than 10 years.

(2) Increased transparency for priority area setting through provision of jurisdiction planning formulae, as well as current (one-year projected) and future (up to five-year projected) demand, need and unmet need.

(3) Extension of the two-year timeframe for new facilities to become operational to the seven facilities approved before 2017. This will stop the warehousing of these locations. Facilities that do not comply within the two-year timeframe could have their funding revoked.

(4) Updating the wording of application criteria to be more explicit about required information and include additional points of evidence for established or planned relationships with other cancer services.

(5) Update wording of the Guidelines to include a transparent scoring matrix for all criteria. This will allow more transparent process of approval and assist with comparison between two competing applications.

(6) Updating the wording of the Instrument to reflect all assessment criteria.

(7) Inclusion of participation in the Radiation Oncology Incident and Near-miss Register (when operational) as a condition of funding. The registry is being developed in conjunction with stakeholder input and will provide a mechanism to monitor incidents to further improve safety and quality of RT provision. The nature of the incidents and near-misses will go beyond that which results from funded equipment. But ROHPG is a useful lever to drive changes in the absence of national regulation for radiation oncology.

(8) Expanding the annual declaration form to include equipment usage and patient bulk-billing information. Information to be verified periodically (e.g. every three to five years, or a random selection of facilities annually) through provision of evidence from facilities.

(9) Inclusion of a Gantt chart for monitoring the timeframes of new facility applications.

(10) ROHPG payments to continue to be withheld until certificates of currency and annual declarations are provided.

Under this option, recommendations 1, 3, 4, 5, 6, 7, 9, 10, 11, 12, and 13 would be addressed.

Benefits	Challenges
• Equal playing field between public and private facilities. • Increased transparency for priorities area setting. • Availability of all information removes perceived conflict of interest of jurisdictions. • Increased ability to plan future priorities. • Increased access to services through establishment of the current warehoused locations or revoking the funding so that the location can be opened up to transparent bidding again (if still considered a priority area). • Strengthened guidelines and application criteria will increase transparency and improve comparison between applications. • Additional assurances of safety and quality of radiotherapy services in Australia through incident registry participation • Improved accountability over all specified conditions of funding.	• Private facilities will receive reduced annual payments (same funding amount but over a longer timeframe). • Increased burden on facilities to provide additional information and evidence in the application process. • Increased burden on facilities to provide certificates of currency and declarations of compliance, with periodic validation of information. • Increased administrative burden for jurisdictions to provide additional information for setting priority areas. • Increased administrative burden to the Department and jurisdictions for national register of linacs (including non-ROHPG funded). This will also require a level of good-will from non-ROHPG funded facilities. • Potential increased administrative burden and/or costs to facilities to participate in the incident registry. • Does not promote alignment with national radiotherapy planning.

8 FUTURE DIRECTIONS

Option 2: Development of a national body with input from all jurisdictions, colleagues, peak bodies and public and private facilities for radiotherapy planning that includes capital funding for high-cost equipment

Key features: development of a national body with responsibility for radiotherapy planning. This body should comprise representation from all jurisdictions (including the Australian Government), public and private facilities, colleges, and peak bodies. It could be established as a Collective Impact Initiative that ensures long-term commitments by representatives from different sectors working towards a common goal.

The advantage of this model over Options 1 is that the scope can sensibly be broadened to encompass a holistic approach to radiotherapy planning that includes consideration of workforce, integration of care, and referral pathways. The strengthened relationships between players could promote greater dialogue between public and private facilities, which could improve planning for regional and rural areas encompassing public-private partnerships and shared care arrangements.

This option should include the features of Options 1 to strengthen the capital funding aspects but promote better integration of capital funding with radiotherapy planning. It would align capital funding with planning agendas at the Australian Government and state and territory levels.

In addition, the national planning body would form a platform to regulate radiation oncology in line with the Radiation Oncology Standards (until such time as they are integrated into healthcare accreditation standards).

In addition, address recommendations as for Option 1 plus: 2 and 8.

Benefits	Challenges
• As for Option 1. • Holistic approach to radiotherapy planning. • Aligning capital funding with broader planning considerations such as workforce and referral pathways. • Strengthened relationships between public and private facilities. • Platform for greater regulation of radiation oncology through the Radiation Oncology Standards.	• As for Option 1. • Increased costs and responsibility to all jurisdictions and other stakeholders. • Increased administrative burden for colleges and jurisdictions for regulation of the Radiation Oncology Standards.

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APPENDIX A CONSULTED STAKEHOLDERS

Stakeholder group	Organisation/facility	Participants
Public radiotherapy facilities	Blacktown Cancer Centre, NSW	• Verity Ahern, Director of Radiation Oncology • Anne Caboche, Cancer Services Operations Manager
	Prince of Wales Hospital, NSW	• Michael Jackson, Director of Radiation Oncology
	Royal North Shore Hospital, NSW	• Jeremy Booth, Chief Radiation Oncologist • Brian Porter, Chief Radiation Therapist • Steven Brown, Business Manager
	Nepean Cancer Centre, NSW	• Shan Yu, Director of Medical Physics • Tania Shaw, ROHPG administrator
	Peter MacCallum Cancer Centre, VIC	• Nilgun Touma, Director of Radiation Therapy Services • Gerry Hanna, Director of Radiation Oncology • Rachel Wang, Radiation Oncology Business Manager
	Olivia Newton John Cancer & Wellness Centre – Austin Health, VIC	• Katy Francis, Radiation Therapy Manager • Eddy Zupan, Deputy Radiation Therapy Manager
	Ballarat Health Service, VIC (consulted as part of Austin Health)	• Mervin Quai-Hoi, Radiation Therapist Site Manager
	Cairns Hospital, QLD (public-private partnership with ICON)	• Lisa Capelle, Radiation Oncologist • Brock Ditton, Site Manager
	Princess Alexandra Hospital, QLD (consulted as part of QLD health)	• Lisa Roberts, Director of Radiotherapy
	Sir Charles Gairdner Hospital, WA	Ed Bailey, Director of Radiation Oncology
	• Royal Adelaide Hospital, SA • Lyell McEwin, SA	• Marianne Hercus, Radiation Therapist • Michael Penniment, Radiation Oncologist • Joanne Glover, Clinical Program Manager – Cancer Services • Sean Geoghegan, State Director Radiation Oncology, Medical Physics
	• Royal Hobart Hospital, TAS • Launceston Hospital, TAS • North West Cancer Centre, North West Regional Hospital, Burnie (non-ROHPG funded)	• David Gration, Supervision Radiation Therapist (Launceston) • Natalie Kidd, Chief Radiation Oncologist (Launceston) • Bronwyn Hilder, Chief Radiation Therapist (Royal Hobart)

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Stakeholder group	Organisation/facility	Participants
	Canberra Hospital, ACT	• Sarah Mogford, Director of Radiation Therapy
	Royal Darwin Hospital – Alan Walker Cancer Centre, NT (public-private partnership with NT Radiation Oncology)	• Kar Giam, Executive Director of Radiation Oncology
Private radiotherapy providers	ICON Group	Mark Middleton, Group CEO
	Genesis Care	• Ben Ward, Executive Manager of Oncology • Dion Forster, Radiation Oncologist • Fergus O'Rourke, Business Development • John Ketelbey, Business Development • Peter Morrison, Business Development
	Cancer Care Associates	• Tony Noun, Chair • Damien Williams, (Riverina Cancer Centre)
Clinicians	Genesis Care	• Matthew Foote, Radiation Oncologist
	Peter MacCallum	• Keen Hun Tai, Radiation Oncologist
Jurisdiction Departments of Health	Ministry of Health, NSW	• Vanessa Clements, Director of Speciality Services & Technology • Tina Ford, Project Officer
	Department of Health and Human Services, VIC	• Colin Hornby, Radiotherapy Advisor and Acting Manager • Amanda Smith, Radiotherapy Statewide Planning, Cancer Services and Information Team
	Statewide Planning, Queensland Health	• Lisa Daly, Principal Planning Officer
		• Mina Smith, Manager – Statewide Health Service Strategy and Planning • Rhiannon Walters, Principal Planning Officer • Tegan Mapp, Principal Planning Officer • Sally Marques, Principal Planning Officer
	WA Health	• Lisa Miller, Medical Advisor • Antony Monaco, Manager • Karen Taylor, WA Cancer Network • Sharyn Roger. WA Cancer and Palliative Care Network Policy Unit • Emily Howe, Development Officer • Ed Baily, Clinician SCGH
	Northern Territory Health, NT	• Kar Giam, Executive Director of Radiation Oncology, NT Radiation Oncology on behalf of NT Health
Australian Government Departmental personnel	Radiation Therapy and Medical Indemnity Section	• Louise Morgan, Director • Jane Richardson, Assistant Director • Lyndall Thomas-Sibraa, Policy Officer
	Cancer Policy and Services Branch (CPSB)	• David Meredyth, Director
Peak bodies	Radiation Therapy Advisory Group (RTAG)	• Peter O'Brien, Chair • Jason Aldworth, Secretariat
	Australian Society of Medical Imaging and	• Sally Kincaid, CEO • Bronwyn Hilder, President

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Stakeholder group	Organisation/facility	Participants
	Radiation Therapy (ASMIRT)	
	Australasian College for Physical Scientists and Engineers in Medicine (ACPSEM)	• Mario Perez, Member • Martin Carolan, Member • Gary Disher, Member
	Royal Australian and New Zealand College of Radiologists (RANZCR)	• Wendy Stamp, CEO • Madhavi Chilkuri, Dean Faculty of Radiation Oncology • Gerry Adams, clinician • Carminia Lapuz, clinician
	Cancer Nurses Australia	• Gabrielle Vigar, Director Professional Practice Nurse Unit Manager Radiation Oncology and Cancer Outpatients Departments, Royal Adelaide Hospital
Safety agencies	Australian Radiation Protection and Nuclear Safety Agency (ARPANSA)	• Rhonda Brown, Acting Director Australian Clinical Dosimetry Service • Ivan Williams, Branch Head – ACDS
Consumers	Cancer Voices	• Lee Hunter, consumer advocate
Linac suppliers	Elekta	• Joel Parrish, Government Affairs • Shaun Seery, Vice President (Asia Pacific) • Jason Bonifacio, Neuroscience products
	Varian	• Rebecca Cortiula, Senior Managing Director • Jamie Kebely. Senior Director, Government Affairs • Matt Coughlin, Head of Sales

Stakeholder group	Organisation/facility	Participants
		• Brett MacKenzie, Delivery System Sales Manager • Natalie Lockhart

APPENDIX B TRADE-OFF ANALYSIS

FUNDING MECHANISM TRADE-OFF ANALYSIS APPROACH

A trade-off analysis has been conducted to determine if a capital grant scheme is still the most appropriate mechanism to fund the purchase of high-cost radiotherapy equipment such as linacs.

A trade-off analysis is a comparison exercise, which looks at the *relative* advantage (or disadvantage) of different funding mechanisms against a set of defined comparison criteria. Each alternative mechanism is compared to a specified benchmark, in this case the status quo ROHPG Scheme, for its relative advantage. For ease of comparison, each mechanism is assigned a trade-off score for each comparison criteria between -3 and 3, (where 1–3 is likely; marginal advantage, moderate advantage, advantage). An average (mean) is then calculated such that the mechanisms that were compared can be ranked in order of overall average score if desired.

The funding mechanisms included in the analysis were agreed at project inception. Inclusion was informed by desktop analysis of mechanisms in place in other jurisdictions, stakeholder submissions to previous reviews of the ROHPG Scheme, stakeholder consultation during this review, and HMA rapid options analysis.

The comparison criteria, against which to determine advantage or disadvantage, were also developed at project inception, and based largely on the immediate and broader contextual objectives of the ROHPG Scheme. Included mechanisms and criteria are described in the description table and analysis framework depicted in Table 9.1 and Table 9.2.

Underlying assumptions and limitations to the analysis

Given the scope of this review, it is important to note that a number of assumptions have informed both the approach and outcome. The analysis compares funding mechanisms against the status quo. This assumes that the Australian Government Department of Health (the Department) continues to provide a funding contribution towards the capital cost of eligible radiotherapy equipment, and that such payments are in addition to the Medicare rebates for radiotherapy services. No scenario was tested whereby the ROHPG funding ceases to exist. The analysis further assumes that no remit exists (through this specific analysis) to provide recommendation or evidence to inform any potential shift in funding responsibility, reduction or increase to Department funding thresholds. As such, the comparison criteria are not weighted.

Trade-off scores are attributed based on hypotheses of indicative impact. Detailed studies, such as a comparison of task timings for grant administration, are not conducted, for example, for the scoring regarding 'administrative efficiency.'

A more fulsome health and economic *cost-benefit study* of funding *options and mechanisms* would provide the additional detail not presented in this limited analysis. Such a study was not undertaken within the scope of this review.

The analysis does not examine changes to scheme administration more broadly, though observations on this topic are presented elsewhere in the review.

Table 9.1: ROHPG funding trade-off analysis mechanisms (options) descriptions

Funding mechanism	Description
A. ROHPG capital grant scheme	The current funding mechanism as described in the situation analysis section of this review.
B. Traditional grant program	A traditional grant funding program where funding proposal submissions are sought for comparative assessment, and where funded, form part of conditional funding agreements with grant instalment payments based on fulfillment of pre-established criteria. Many such arrangements exist in Australia both within the health sector and beyond.
C. Incorporation or linkage to the Medicare Benefits Schedule (MBS)	A contribution to capital equipment costs as a bundled element of the MBS fee for associated activity items.

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Funding mechanism	Description
D. Funding via state and territory jurisdiction	An arrangement through existing Commonwealth and state funding agreements, whereby capital funding is provided directly to states and territories for distribution in line with state service and infrastructure planning cycles. Many such agreements exist under the National Health Reform Agreement to public facilities.
E. Traditional lending arrangement	A funding contribution through the provision of either interest bearing, or non-interest bearing lending instruments such as a cash loan to be paid back based on fixed terms agreed on a standardised basis. It is further conceivable that the terms of repayment be varied based on regional equity requirements, meeting of quality benchmarks, or other practical incentivising considerations based on assessment of need. Traditional lending arrangements exist within the Aged Care sector in Australia, have been employed in the health sector in the United Kingdom, and exist through capital project and program funding in other jurisdictions.
F. Market based subsidy	A funding arrangement whereby the manufacturer, research institute, or adjacent entity (servicing agent, software production entity, cloud hosting environment provider, etc.) partly subsidises the ROHPG contribution as part of licensing agreements or market access. Such subsidy may then attract a rebate through activity or quality-based payments. No such model has been identified (through rapid desktop analysis) to be in place for high-cost health sector technology as part of this review. Similar market-based contributions do exist on a smaller scale with respect to prostheses and the associated clinical quality registry costs.
G. Hybrid model of funding	Several options exist for the combination of elements of the previously described funding mechanisms. In this review, the hybrid mechanism under consideration is the segmentation of grant funding into two sections, with the first attracting regional loading, and the second attracting a quality associated funding incentive. No such model has been identified (through rapid desktop analysis) to be in place for high-cost health sector technology as part of this review.

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Table 9.2: ROHPG funding mechanism trade-off analysis framework

Funding mechanism	Alignment with govt. priority and policy objectives	Alignment with future trends	Indicative expenditure	Access /equity	Quality	Administrative efficiency	Feasibility and sentiment
A. ROHPG capital grant scheme B. Traditional grant program C. Incorporation or linkage to Medicare Benefits Schedule D. Funding via state/territory jurisdiction E. Traditional lending agreement F. Market based subsidy G. Hybrid model of funding	• Consistency • Transparency • Value for money • Support to both the public and private segments of the sector.	• International competitiveness • Currency fluctuation • Keeping pace with technological advances • Keeping pace with emerging treatment paradigms.	• Hypothesised high-level estimate (order of magnitude) of expenditure versus baseline.	• Impact on access and equity of access (Public/Private, Regional/ Metropolitan).	• Impact on service delivery quality compared to baseline (consistent age of multiple devices within one setting, ability to keep up with emerging best practices).	• Hypothesised efficiency (to government) to administer funding mechanism (based on high-level estimate of degree of effort).	• Measure of relative efficiency to implement at inception • Indicative stakeholder sentiment.

FUNDING MECHANISM TRADE-OFF ANALYSIS OUTPUT

The trade-off analysis indicates that, compared with the current ROHPG funding mechanism, none of the alternative mechanisms outscore the existing mechanism overall. Elements of the comparison criteria are hypothesised to be more advantageously met through alternative mechanisms, but when taken in their entirety, each has a negative mean score, and is therefore marginally disadvantaged, moderately disadvantaged or disadvantaged compared to the status quo. This is set out in Table 9.3 and Figure 9.1.

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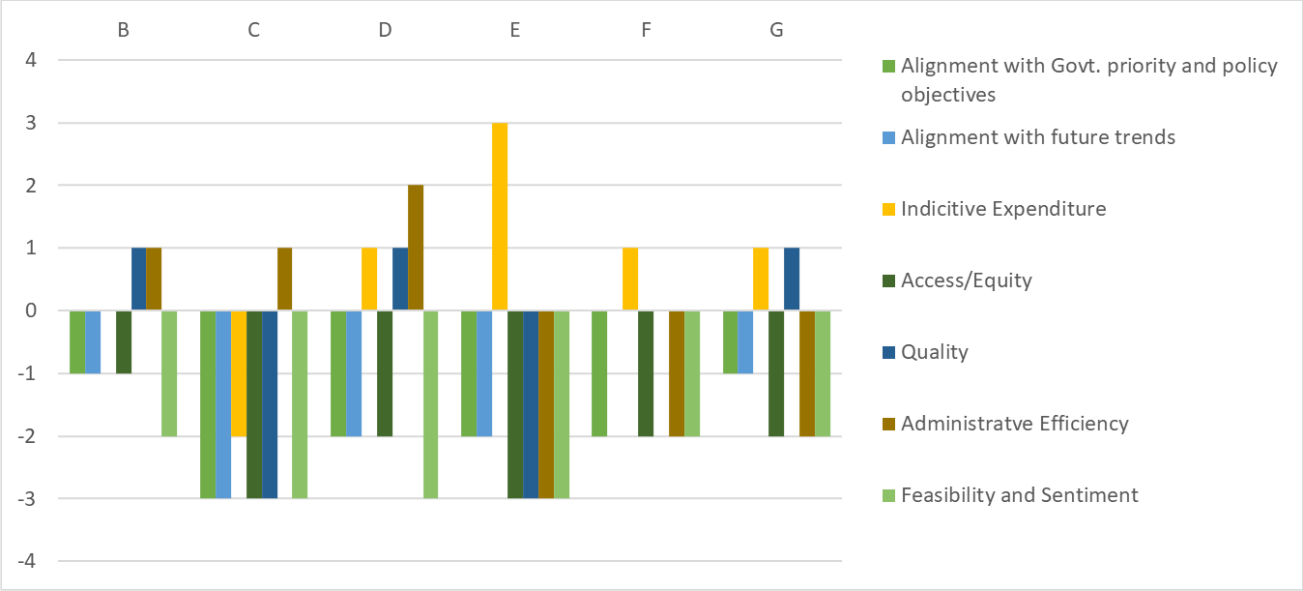
Table 9.3: ROHPG funding mechanism trade-off analysis score

Funding mechanism	*Mean score*	Alignment with govt. priority and policy objectives	Alignment with future trends	Indicative expenditure	Access/equity	Quality	Administrative efficiency	Feasibility and sentiment
A	-	Baseline – Scoring Key: -3 to 3 (where 1–3 is likely; marginal advantage, moderate advantage, advantage)						
B	-0.4	-1	-1	0	-1	1	1	-2
C	-2.3	-3	-3	-2	-3	-3	1	-3
D	-0.7	-2	-2	1	-2	1	2	-3
E	-1.9	-2	-2	3	-3	-3	-3	-3
F	-1.0	-2	0	1	-2	0	-2	-2
G	-0.9	-1	-1	1	-2	1	-2	-2

Figure 9.1: ROHPG funding mechanism trade-off analysis score



FUNDING MECHANISM TRADE-OFF ANALYSIS SCORING RATIONALE

Baseline: A. ROHPG capital grant scheme

The ROHPG is an atypical funding mechanism that exists in the context of the prevalence of cancer in Australia, the importance of radiotherapy for cancer treatment, the impact of access to radiotherapy equipment on utilisation of radiotherapy as a treatment, and the relative high cost of this associated equipment in the delivery of radiotherapy. Of contextual relevance too is the recognition through this Scheme of the combined importance of the public and private segments of the health sector in provision of radiotherapy treatments to Australian patients.

Under a more typical scenario, state or territory government would be responsible for capital expenditure for public facilities within their jurisdiction. Private facilities would follow a pathway to determine the commercial viability of establishing a service through capital investment, based on subsequent reimbursement on activity.

Based on the scope of this review, no 'removal' of funding option was tested, and the baseline for comparison for other selected mechanisms is the status quo.

B. Traditional grant program

A more traditional grant program, consistent with other capital grant programs, would include certain advantages. While value-for-money considerations are unlikely to be broadly impacted, administrative efficiency is thought to be possible. Grant maintenance would likely be more seamlessly and efficiently manageable through existing centralised grant maintenance and oversight functions. Such a mechanism could present opportunities to introduce outcome-based milestones for funding, which has been noted through this review by some stakeholders as being absent in the current arrangement. This may provide an additional lever to ensure quality and provide greater flexibility to government. Conversely, this would potentially make it more challenging for facilities/funding recipients to forecast ongoing cashflow. Due to grandfathering, there would be a need for an immediate parallel administrative process capturing the funding already provided and administered through the scheme, while any new funding under the new arrangement is capture in a separate administrative process. This would mean that any administrative efficiency gain would have a long lead time. A traditional grant program unlikely to match the funding cycle predictability of the ROHPG Scheme, and therefore there is a chance of lesser alignment with future industry trends and technological advances.

C. Incorporation or linkage to Medicare Benefits Schedule

Incorporation into the MBS would provide potential administrative efficiencies for government, but considerable additional forecasting and administrative burden for funding recipients. There is likely a disadvantageous impact on equity of service through reverting to this funding mechanism, given the connection to throughput. There would likely also be a disparity of timing between site specific replacement cycles and timing of funding receipt. There may also be additional costs to government over time, given the non-capped nature of the mechanism, at the same as inadequate funding to facilities due to rebate proportions and unpredictable cashflow.

D. Funding via state/territory jurisdiction

Provision of funding via a mechanism whereby funds are directly provided to state/territory jurisdiction would present the potential advantage of administrative efficiency to the Department, though this would likely shift administrative burden elsewhere. State/territory jurisdictions, however, would likely benefit from the ability to align radiotherapy capital funding with broader state/territory integrated cancer planning lifecycles, which are currently typically misaligned. In contrast, service provision equity may be disadvantageously impacted, given the implicit loss of funding to private facilities, unless this was achieved through a separate parallel mechanism (thereby losing the administrative efficiency gained). There may also potentially be greater variation in service provision and baseline linac age across Australia as a result of jurisdictional variation in capital and service planning.

E. Traditional lending agreement

A traditional lending agreement could be attractive to government if a reduction in overall expenditure is sought. There are added benefits of the ability to introduce more contingent conditions to funding, or interest rate concessions based on factors such as quality, efficiency or other desired outcomes. Such a mechanism would be considerably disruptive however, and unlikely to be supported by facility or other industry stakeholders. It is hypothesised that there would be risk to quality, equity, and misalignment with broader government priorities given the specific objectives of the Scheme. There would likely be considerable additional administrative burden.

F. Market based subsidy

A funding arrangement whereby the manufacturer, research institute, or adjacent entity (servicing agent, software production entity, cloud hosting environment provider, etc.) partly subsidises the ROHPG contribution, which later attracts a rebate (as is assumed in this analysis), may be complex to administer. There may be expenditure benefit for government, based on the time value of money (TVM) and greater initial private/other contribution to up-front costs. In addition, it is hypothesised that such a mechanism could enhance international competitiveness by preventing market distortion. This hypothesis has not been tested in detail in this review. There may be disincentives to manufacturers, however, which may be detrimental to the ability to keep up with novel technologies and treatment paradigms. Further disadvantages of this mechanism largely relate to preservation of equity, given that partnerships with research institutes are not currently evenly distributed. Appetite for market stakeholders to participate will vary based on the commercial circumstances of individual treatment sites. It is unlikely that stakeholder sentiment would be favourable towards this more complex and market driven mechanism, given the unpredictability and lack of influence that may accompany.

G. Hybrid model of funding

A hybrid funding mechanism whereby the existing funding is separated into two sections, with the first being a lump sum capital contribution, and the second attracting a contingent quality associated funding incentive, or penalty, may incentivise quality. Here, the criteria that determine a successful application at outset are used throughout the lifecycle of funding as value-based milestones to release additional payments. There is likely to be additional cost to government, net of any penalty cash inflow. There may be additional costs to facilities to cover shortfalls through borrowing. Removal of the current single lump sum structure is likely to disadvantage some facilities more over others, and generally be contrary to stakeholder sentiment. There would likely also be considerable additional administrative burden to the Department.

FINDINGS OF THE TRADE-OFF ANALYSIS

The trade-off analysis did not find any of the alternative mechanisms to be more advantageous than the status quo, in their entirety. Additional administrative efficiency is suggested, however, through a more traditional grant program mechanism, or funding via state/territory jurisdiction. Both of these funding mechanisms offer further potential benefit in terms of quality. The Department may wish to examine ways to enhance integration with state/territory capital funds for cancer services. This will depend on the appetite for change and desire regarding the ongoing overall funding quantum for the program.

APPENDIX C GROWTH AND DISTRIBUTION OF LINAC NUMBERS IN AUSTRALIA

In 2019–20 there were 202 linacs approved for ROHPG funding. Of these 186 were classed as active, 13 were decommissioned during the year and three were not yet operational, see Table 9.4.

Table 9.4: Linacs approved for ROHPG funding in 2019-20

Linacs status	Number
Active	186
Decommissioned	13
Not yet operational	3
Total	202

In 2019–20, there were an estimated 200 active linacs across Australia, 93% (n=186) of which were currently or previously funded under the ROHPG Scheme, see Table 9.5.

Table 9.5: No. of linacs in Australia by jurisdiction, 2019–20

State	ROHPG capital balance >$0			Previously ROHPG funded	All ROHPG	All linacs*	% of linacs funded by ROHPG
	Private	**Public**	**sub-total**				
ACT	1	3	4	0	4	4	100%
NSW	23	38	61	1	62	63	98%
NT	0	1	1	1	2	2	100%
QLD	21	19	40	2	42	48	88%
SA	7	5	12	0	12	13	92%
TAS	1	3	4	0	4	5	80%
VIC	17	23	40	1	41	44	93%
WA	13	5	18	1	19	21	90%
Total	**83**	**97**	**180**	**6**	**186**	**200**	**93%**

* 'All linacs' is an estimate only. Sources: calculated from MBS service data and ROHPG equipment reports.

Of the six previously ROHPG funded linacs in 2019–20 (all with a capital balance of $0), one was a public linac that was paid in advance (Northern Territory)), three were public linacs that had not yet been decommissioned and two were private linacs that had not yet been decommissioned). There were an additional 13 linacs that had previously received ROHPG funding but had subsequently been decommissioned (not included in the data analysis).

Analysis of linac availability by remoteness (using the Modified Monash Model classification (MMM)) showed that the majority of linacs (80%, n=160) are located in major cities (MM 1), as shown in Table 9.6. Thirteen per cent of linacs (n=26) are located in regional areas (MM 2) and a further 7% (n=14) in rural areas (MM 3). Of the non-ROHPG funded linacs, the vast majority (94%, n=16 of 17) are located in major cities (see Table 9.6).

Table 9.6: No. of linacs in Australia by remoteness (MMM), 2019–20

MMM	Facility type	ROHPG funded*	non-ROHPG funded	All linacs	%
MM 1 Major City	Private	69	13	82	
	Public	78	0	78	
	Sub-total	**147**	**13**	**160**	**80%**
MM 2 Regional	Private	13	0	13	
	Public	13	0	13	
	Sub-total	**26**	**0**	**26**	**13%**
MM 3 Rural	Private	3	0	3	
	Public	10	1	11	
	Sub-total	**13**	**1**	**14**	**7%**
Total		**186**	**14**	**200**	**100%**

* ROHPG funded includes currently funded and previously funded linacs
Sources: calculated from MBS service data and ROHPG equipment reports.

There has been an estimated growth in overall linac numbers of 26% (an additional 41 linacs) from 2013–14 when there were 159 linacs in Australia to 200 in 2019–20 (see Table 9.7). The majority of this growth has occurred in the private sector, which has seen an overall increase of 66% (39 linacs) in this timeframe, compared to 2% (2 linacs) in the public sector (see Table 9.7).

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Analysis by remoteness showed that the growth in major cities has been predominately in the private sector (55% growth, and additional 29 linacs), compared to 4% in the public sector (additional 3 linacs). In regional areas, the growth in private sector linacs (225%, 9 additional linacs) has been offset by a small decrease in public sector linacs (7% decrease or 1 fewer linac). In rural areas, the private sector has increased the number of linacs from two to three, but the public sector has remained constant at 11 linacs. See Table 9.7.

Table 9.7: No. of linacs* in Australia by remoteness (MMM), 2013–14 to 2019–20

MMM	Facility type	2013–14	2019–20	% growth
MM 1 Major city	Private	53	82	55%
	Public	75	78	4%
	Sub-total	***128***	***160***	25%
MM 2 Regional	Private	4	13	225%
	Public	14	13	-7%
	Sub-total	***18***	***26***	44%
MM 3 Rural	Private	2	3	50%
	Public	11	11	0%
	Sub-total	***13***	***14***	8%
Total	**Private**	**59**	**98**	66%
	Public	**100**	**102**	2%
Total all linacs		***159***	***200***	26%

*Linac numbers are an estimate only as they have not been verified with facilities. Public linacs include known public-private partnerships; Sources: calculated from MBS service data and ROHPG equipment reports.

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APPENDIX D RT WAITING TIME DATA (AIHW)

Radiotherapy waiting times by remoteness area of usual residence, Australia, 2018–19

Measure	Remoteness area	Number of courses with valid waiting times data	Waiting time (days)
50% started treatment within (days)	Major cities	47,697	10
	Inner regional	15,687	11
	Outer regional	6,005	11
	Remote	515	10
	Very remote	257	9
	RA not stated	3,606	9
90% started treatment within (days)	Major cities	47,697	27
	Inner regional	15,687	27
	Outer regional	6,005	26
	Remote	515	28
	Very remote	257	23
	RA not stated	3,606	23

Source: AIHW Radiotherapy in Australia 2018–19 data, available at https://www.aihw.gov.au/reports/radiotherapy/radiotherapy-in-australia-2018-19/contents/introduction

APPENDIX E ANALYSIS OF SERVICE PROVISION OF RADIOTHERAPY FACILITIES

COMPARISON OF PRIVATE AND PUBLIC FACILITIES

Under the current rules of the ROHPG, both public and private facilities receive a set contribution of $3 million toward the purchase of a linac. Private facilities receive this contribution on an eight-year funding cycle (equating to $375,000 per annum) compared to a ten-year cycle for public facilities (equating to $300,000 per annum). This results in a higher annual payment to private facilities and enables more frequent turnover of linacs in private facilities.

This difference in funding structure between public and private RT facilities was based on the assumption that private facilities were providing a higher number of treatment fractions (or services) per annum, and therefore would require a shorter turnover period (as linacs would reach the end of their useful life, notionally 82,800[13] services faster).

To determine the strength of the evidence behind this assumption, both MBS service data and AIHW data were used to compare the difference in service activity profiles between the public and private sectors.

MBS services

Services billed through the MBS are individual RT fractions. Patients are likely to receive several fractions as part of their treatment course. The number of fractions each patient receives varies based on the type of cancer, RT technique used and other patient care needs. There is an emerging trend in RT towards hypofractionation, i.e. use of higher doses of radiotherapy delivered more precisely to reduce the number of fractions required per treatment course. For example,

[13] 82,000 services (fraction) per linac is a planning figure based on the assumption that each linac has capacity for 410 courses of treatment per annum at an average of 20 fractions per course.

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prostate cancer used to be set at an average of 20–25 fractions per course and is now recommended an average of 15 fractions per course (information from public facility feedback).

Some public facilities indicated that a proportion of the RT services delivered through their facilities is not billed through the MBS. This is a limitation of the use of MBS data to estimate linac service throughput in public facilities and it should be noted that the figures may be underestimated.

Annual volume of services (fractions) per linac

Figure 9.2 shows the annual number of RT services claimed through the MBS (equates to fractions) divided by the number of operational linacs[14], providing the metric 'annual services per linac'. The data shows that there is a breadth of service volume in both private and public facilities ranging from as low as 1,000 services per linac to over 10,000 services per linac. However, caution must be used in interpreting the very low or very high service volumes that may be an artifact of the data (e.g. incorrect number of linacs used in the calculation, or provision of services for a partial year only). The majority of private facilities averaged between 4,000 to 8,000 services per annum per linac, and between 5,000 and 8,000 services per annum per linac in public facilities. The drop in services per annum observed in private facilities in 2017–18 (medium-blue bar) most likely reflects the introduction of new linacs during this year, which are known to take time to reach optimal throughput levels (e.g. time to establish referral pathways).

Figure 9.3 shows the average (mean) number of services per linac per annum from 2013–14 to 2019–20. This shows relatively consistent averages over the seven-year timeframe, at approximately 6,000 services per annum.

[14] Number of operational linacs has been based on the ROHPG equipment data numbers, supplemented with MBS linac numbers per facility when ROHPG information was not available. The numbers of linacs have not been verified for each facility.

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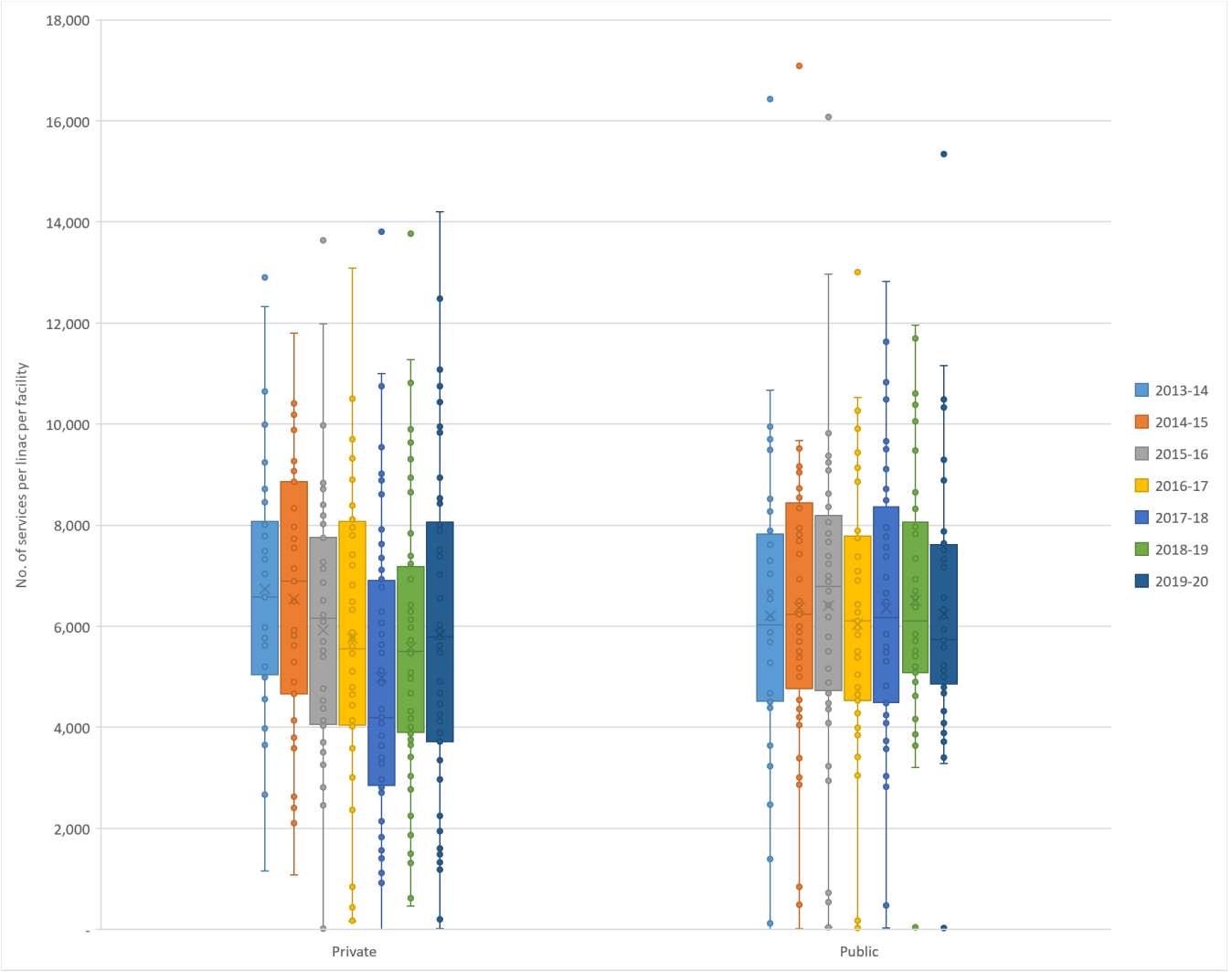
Figure 9.2 Distribution of annual services per linac 2013–14 to 2019–20 by facility type



X = mean, – = median, box = upper and lower quartiles, ⊥ = lowest (or highest) value, dots = values, dots beyond ⊥ = outliers not used in calculations for mean, median or quartiles.
Source: Calculated from MBS data and ROHPG Equipment reports

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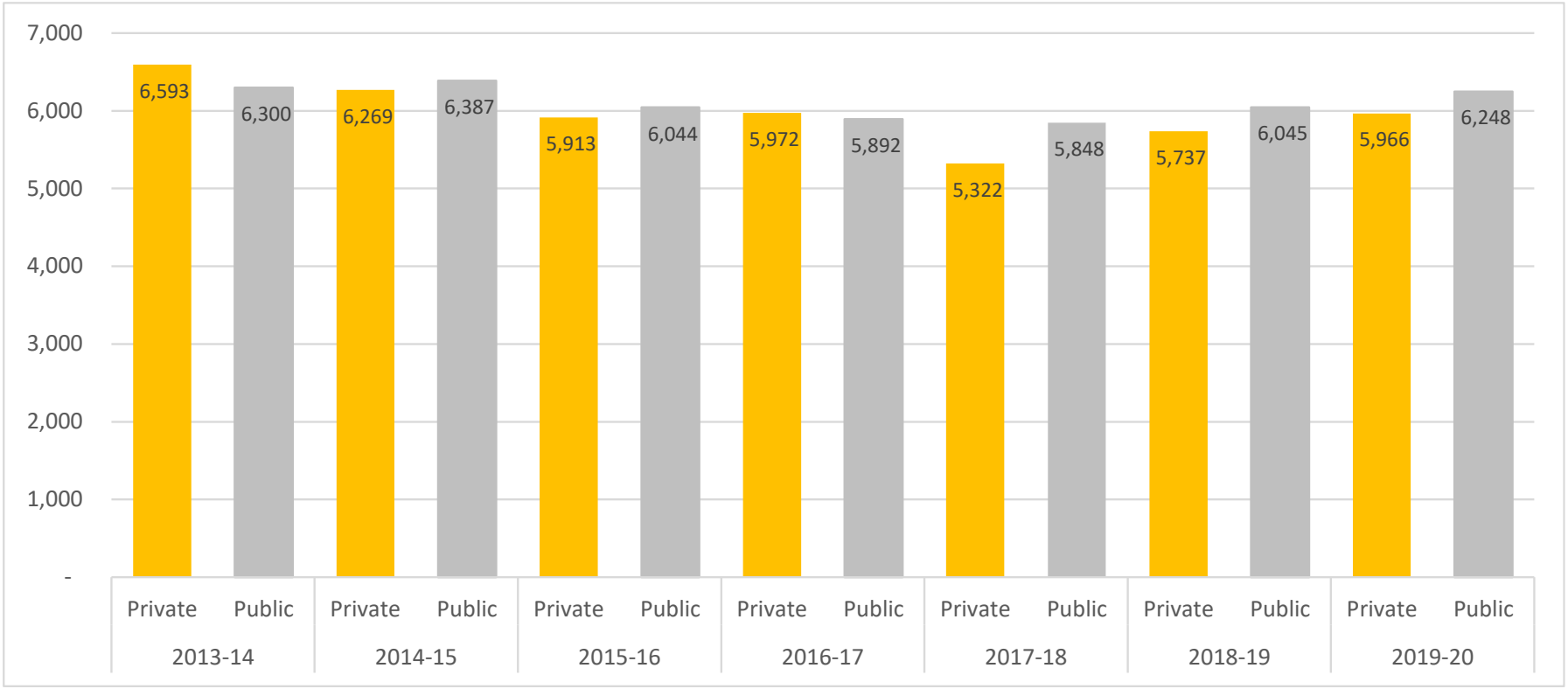
Figure 9.3: Average number of services per linac per annum –private /public



Sources: calculated from MBS service data and ROHPG equipment reports

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Service delivery by remoteness area

It is expected that rural and regional facilities will have lower throughput than metropolitan facilities. With a significant number of private facilities being located in regional areas, further segmentation of the MBS service data was undertaken to determine whether the comparatively lower volume of services being provided through private could be accounted for by their remoteness or MMM classification.

Table 9.8 show the average (mean) number of services per annum per linac by remoteness area (MMM) area. This shows that there is little difference between the average number of services per linac in private or public facilities in major cities and regional areas, and that public facilities average a higher number of services per linac per annum in rural areas. Contrary to expectation, regional facilities (private and public) had a higher average number of services per annum per linac than facilities in major cities. In rural areas, the average number of services per linac per annum decreased for private facilities in 2017–18, with moderate increases in 2018–19 and 2019–20. This is likely to reflect the increase in the number of private facilities operating in rural areas in 2017–18.

Table 9.8 Mean annual services per linac by MMM

Year	Facility type	MM1 Major city	MM2 Regional	MM3 Rural	All areas
2013–14	Private	6,607	5,677	5,198	6,483
	Public	6,550	6,580	4,837	6,363
	Total	**6,574**	**6,329**	**4,892**	**6,408**
2014–15	Private	6,260	5,852	4,668	6,178
	Public	6,630	6,514	5,258	6,451
	Total	**6,464**	**6,305**	**5,174**	**6,339**
2015–16	Private	6,111	4,331	4,534	5,835
	Public	6,005	6,812	5,975	6,101
	Total	**6,051**	**5,733**	**5,753**	**5,990**
2016–17	Private	5,898	6,135	4,654	5,897
	Public	5,892	5,820	6,477	5,946
	Total	**5,895**	**5,946**	**6,216**	**5,925**
2017–18	Private	5,286	5,570	3,515	5,266
	Public	5,687	6,358	6,391	5,848
	Total	**5,493**	**5,994**	**5,816**	**5,579**
2018–19	Private	5,720	6,204	4,491	5,737
	Public	5,906	6,166	6,913	6,045
	Total	**5,813**	**6,183**	**6,394**	**5,899**
2019–20	Private	5,961	6,245	5,920	5,966
	Public	6,109	6,569	6,497	6,248
	Total	**6,033**	**6,407**	**6,373**	**6,106**

Sources: calculated from MBS service data and ROHPG equipment reports

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Treatment courses

Consultation with facilities and clinicians indicated that the volume of MBS services may not be an accurate representation of current practices in RT cancer care. New treatment techniques have resulted in patients receiving higher doses of radiation over fewer fractions.

The volume of treatment courses as reported by the AIHW annual report on RT was also analysed to compare public and private facility throughput. Table 9.9 shows the reported RT treatment courses delivered through public and private facilities nationally between 2014–15 and 2018–19 from AIHW, averaged by the number of operational linacs based on ROHPG equipment data and MBS linac data. The analysis indicates that on a per linac basis, public facilities provide approximately two-thirds of the annual RT courses.

Table 9.9 Treatment courses delivered, number of active linacs and courses per linac

Year	Type	Courses	No. linacs	Average no. courses per linac	%
2014–15	Private	16,595	70	237	30%
	Public	39,781	101	394	70%
2015–16	Private	19,953	77	259	38%
	Public	40,627	107	380	62%
2016–17	Private	18,471	80	231	41%
	Public	45,060	111	406	59%
2017–18	Private	21,850	95	230	36%
	Public	45,923	111	414	64%
2018–19	Private	26,899	94	286	36%
	Public	47,300	106	446	64%

Sources: calculated using data from AIHW radiotherapy in 2018–19 and ROHPG equipment report

Finding

There is little evidence to suggest that there is a significant difference in the service throughput of public and private facilities to warrant different rates of ROHPG payments. However, it should be noted that the data analysed has been based on averages and has not considered the complexity of individual cases or treatments provided.

As shown in Figure 9.4, it must also be noted that, while the average number of MBS services per year is approximately 6,000 per linac in both public and private facilities, the throughput at individual sites is greatly varied and some sites did claim 8,000 or more services per year per linac. In 2019–20, there were 17 private and eight public facilities that indicated an annual service usage of 8,000 or more per linac. Conversely, there were also public and private facilities that recorded fewer than 3,000 services per linac per year. In 2019–20, there were 19 private and six public facilities with fewer than 3,000 services per linac.

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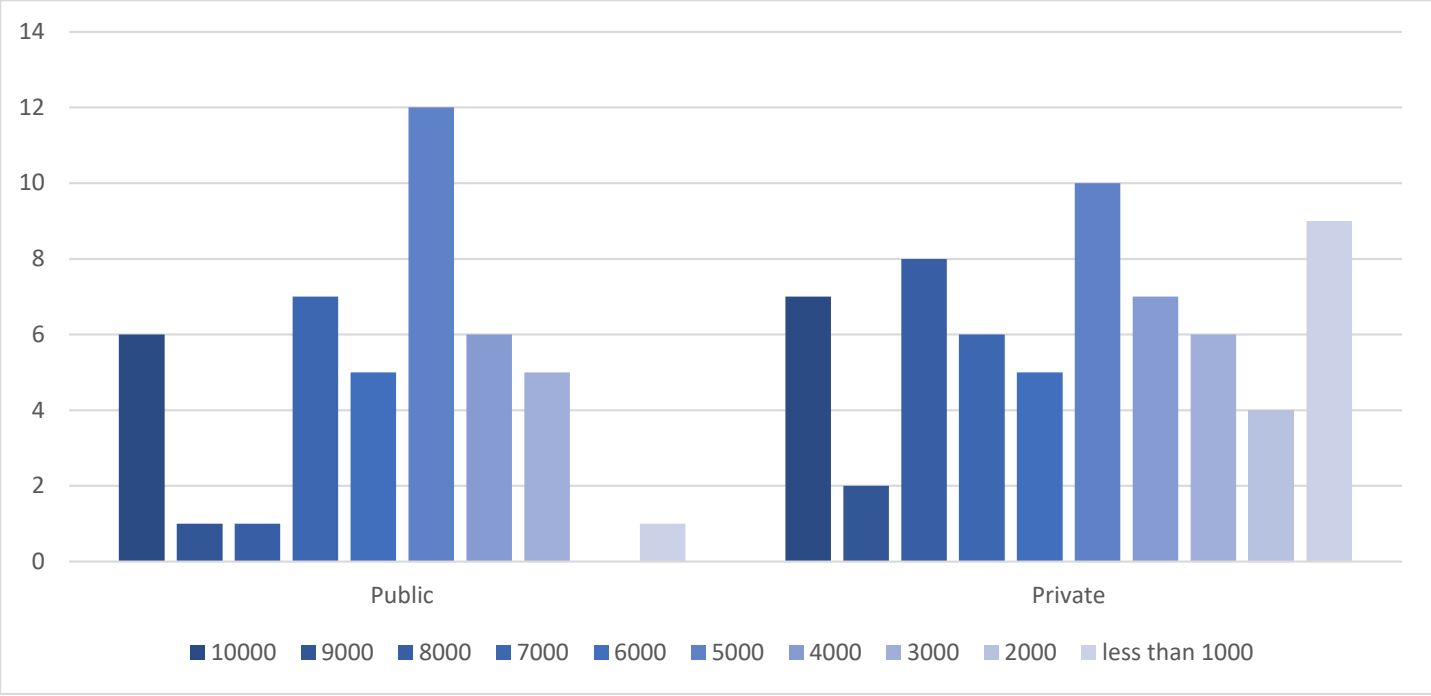
Figure 9.4: Number of facilities grouped by volume of annual services per linac, 2019–20



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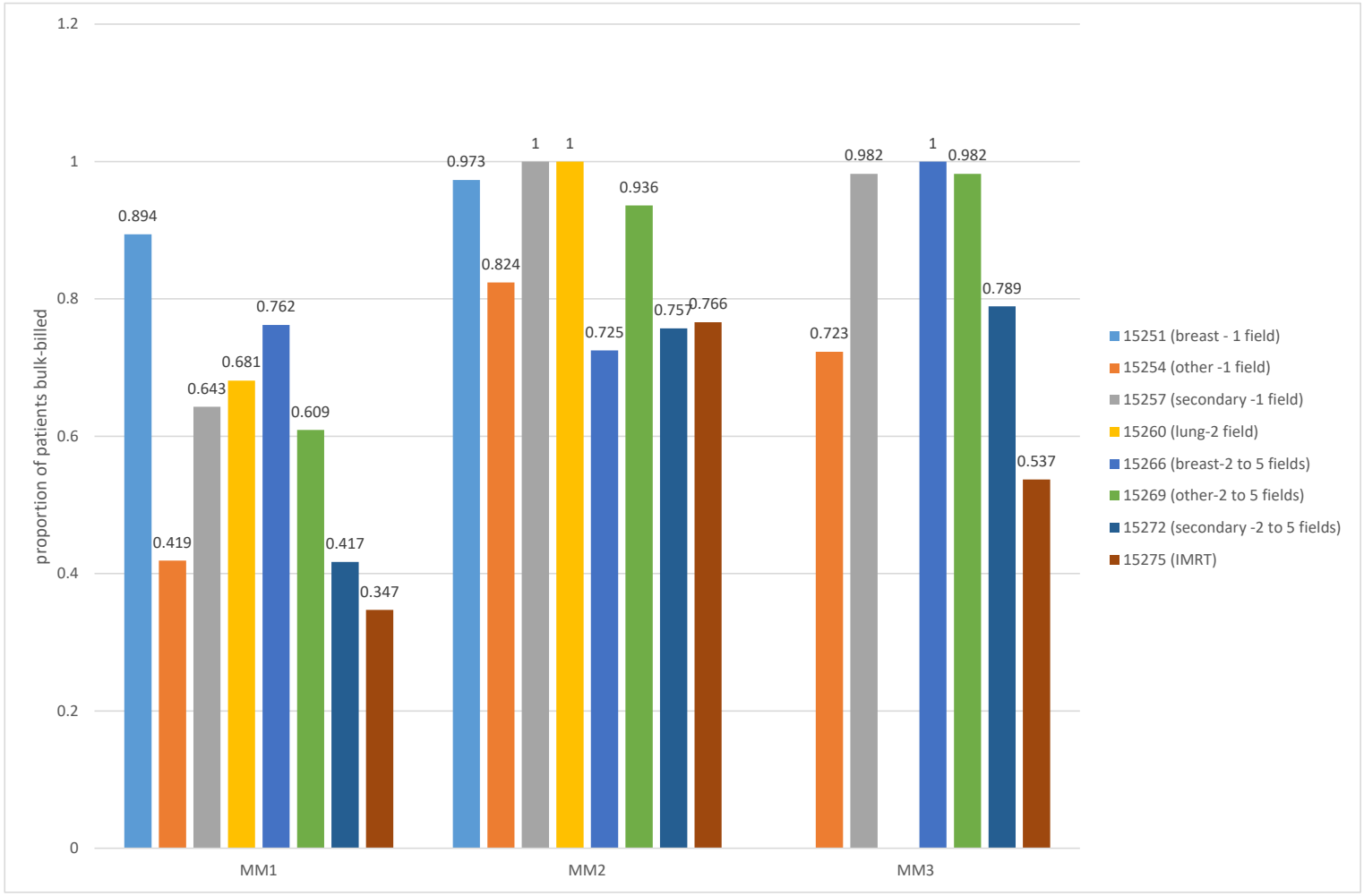
APPENDIX F BULK-BILLING RATES

Figure 9.5: Rate of bulk-billing among private facilities in 2019–20 by remoteness (MMM)*



Source: MBS bulk-billing data for RT services. MM1 = Major City, MM2 = Regional area, MM3 = Rural area

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APPENDIX G EXAMPLE SCORING MATRIX FOR APPLICATION CRITERIA

Table 9.10 shows an example scoring matrix for the ROHPG application criteria with a suggested rationale for the scoring protocol.

Table 9.10: ROHPG example scoring matrix for assessment of applications

Criterion	Score	Rationale
Criterion 1: Eligible equipment		
The Minister will consider whether the equipment covered by the application is within the scope of the ROHPG Scheme. This means: • it must be a linac; and • it must not have been funded through other Commonwealth budget measures for external beam radiotherapy.	• 0 = Criterion not met	Equipment is not a linac or has received alternative Commonwealth funding.
	• 2 = Criterion met	Equipment is a linac and has not received alternative Commonwealth funding.
Criterion 2: Patient access		
The Minister will consider whether the service locations covered by the application are consistent with supporting patient access to radiation oncology services, based on identified priority areas. Applications for a new health service, expansion of service or relocation where the health service will not be located in an identified priority area may be considered but must provide evidence of need and have the support of the relevant state/territory.	• 0 = Criterion not met	Location is not in an identified priority area, or has not been able to demonstrate demand based on cancer incidence and OURs.
	• 1 = Criterion partially met	Location is not in an identified priority area but has demonstrated demand based on current linac throughput and forecast usage rates, or represents a statewide planning need rather than geographic need.
	• 2 = Criterion met	Location is an identified priority area or has been able to demonstrate demand based on cancer incidence and OURs.
	• 3 = Criterion met and exceeded	As for *'criterion met'* plus description of proximity to other services in the region, detail of existing services/bunkers, patient in/out flow to the region for health services, the expected impact on patient travel times and expected patient case mix.
Criterion 3: Services must be affordable		
The Minister will consider whether the services which will constitute the approved health service are affordable, having regard to billing practices and the extent of out-of-pocket costs. The minimum requirement under ROHPG conditions of funding is that the approved organisation must offer Medicare bulk-billing arrangements for concessional patients. To support their application, applicants are required to provide information demonstrating that the fees charged for services that form part of the approved health service will not result in substantial out-of-pocket costs that may affect patient access to radiation oncology services.	• 0 = Criterion not met	Application did not indicate a guarantee to bulk-bill concessional patients.
	• 2 = Criterion met	Application included a guarantee to bulk-bill concessional patients.
	• 3 = Criterion met and exceeded	As for *'criterion met'* plus provision of information on capped fees for services (e.g. 1.5 times the MBS rebate), or guarantee to bulk-bill 100% of patients.

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Criterion 4: Multidisciplinary and patient-centred care		
The Minister will consider whether the radiation oncology services to be provided as part of the approved health service are integrated with other cancer treatments and other medical services. This will help ensure the best possible treatment for patients. Applicants will be required to provide information demonstrating that the proposed approved health service will form part of an integrated cancer management system, including, but not limited to, medical oncology, surgery and allied health services, i.e. multidisciplinary care. This includes information regarding: • arrangements and referral basis, if any, with the relevant specialists • clinical oncologists and surgeons networked into services • details of links to other centres, particularly for on-referral or discussion on complex cases • access to in-patient care, and • access to other associated follow-up care for patients.	• 0 = Criterion not met	Application does not provide information on how it will integrate with other cancer services.
	• 1 = Criterion partially met	Application provides information on some, but not all of the criteria requirements regarding integration with other cancer services.
	• 2 = Criterion met	Application provides an explanation of how the facility will integrate with other cancer services against all five components of the criterion.
	• 3 = Criterion met and exceeded	As for *'criterion met'* plus provision of documentation to support the claims, e.g. letters of support from local health services / oncologists.
Criterion 5: Commencement date		
The Minister will consider the proposed commencement date for treating patients under the approved health service, and whether this timeframe is realistic and reasonable. The maximum period within which the Department would expect facilities and equipment that form part of an approved health service to become operational is within two years from the date of the approval under Part IV of the Act. The Minister may revoke an approval of a facility or equipment if it does not become operational within two years.	• 0 = Criterion not met	Application does not provide information about timeframes for service commencement, or indicates timeframes are greater than two years from the (expected) approval date.
	• 1 = Criterion partially met	Application indicates that services will commence in a two-year timeframe, but this is contingent on numerous assumptions that may be beyond the control of the RT provider.
	• 2 = Criterion met	Application indicates that the services will commence in a two-year timeframe and provides a detailed implementation plan including Gantt chart with progress milestones.
	• 3 = Criterion met and exceeded	Application indicates that services will commence much sooner than two years (e.g. within one year) and provides a detailed implementation plan including Gantt chart with progress milestones.
Maximum total score	**14**	

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