2025

ASMIRT

Position Statement

Particle Therapy

Your profession. Your future.

Australian Society of Medical Imaging and Radiation Therapy
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There are a number of protected titles for medical radiation practice. They include:

Medical Radiation Practitioner (MRP)

Diagnostic Radiographer (DR)

Medical Imaging Technologist (MIT)

Radiographer

Nuclear Medicine Scientist (NMS)

Nuclear Medicine Technologist (NMT)

Radiation Therapist (RT).

For the purposes of our documentation we use the broad descriptor Medical Radiation Practitioner (MRP) recognising that it covers a range of areas of practice.

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ASMIRT position statement on particle therapy

Objective

This paper presents ASMIRT's stance on particle therapy (PT) in Australia and provides Australian medical radiation professionals with information on the current state of PT in the country.

About ASMIRT

The Australian Society of Medical Imaging and Radiation Therapy (ASMIRT) is the peak body representing medical radiation practitioners in Australia. Our aims are to promote, encourage, cultivate, and maintain the highest principles of practice and proficiency of medical radiation science.

The ASMIRT Particle Therapy Reference Group (PTRG) was established in 2018, initially as a working party, in response to the pending arrival of Australia’s first proton beam therapy (PBT) centre. The PTRG includes ten members, working as radiation therapists (RTs) across Australian clinical departments and academic institutions. The group's purpose is to advise the ASMIRT Board on all aspects of PT, including recommendations regarding the education, training, and licensing requirements for RTs to work in PBT. ASMIRT collaborates closely with the Royal Australian and New Zealand College of Radiologists (RANZCR) and the Australasian College of Physical Scientists and Engineers in Medicine (ACPSEM) to ensure the safe implementation of PBT in Australia. We advocate for RTs and patients, promoting high standards of care and optimal treatment outcomes.

What is particle therapy?

Radiation Therapy involves the use of high energy X-rays or charged particles to treat cancers. PT is a type of external beam radiation therapy in which accelerated heavy particles, such as protons or carbon ions are used instead of X-rays or electrons[1]. The particles may be neutral (neutrons) or charged (protons and carbon ions)[1]. Protons and other heavy particles travel through tissue with minimal deposition of dose until they reach the end of their paths, where the highest portion of the dose, known as the Bragg peak, is deposited[1]. Beyond the Bragg peak, the dose rapidly falls to zero over a very short distance[1]. Consequently, PT can provide superior dose conformality when compared to X-ray radiation therapy, reducing the volume of low and intermediate doses received by surrounding critical organs[2]. This reduction in integral dose has the potential to minimise treatment-related side effects, reduce the risk of secondary cancer induction, and improve patients' quality of life[3, 4]. Additionally, the sharp distal dose fall-off of PT can enable dose escalation, important for treatment of aggressive and radioresistant tumours (*e.g.,* spine and skull base chondrosarcoma)[5, 6].

International context

PT has been clinically available for many decades. Over 400,000 patients have been treated with PT since the early 1950s[7]. Historically, clinical implementation has been slow. However, due to the reduction in capital costs, enhanced dose computational modelling, technical advances, and a growing evidence base, PT service provision has rapidly expanded globally in recent years. In June 2024, there were 136 clinically operational PT facilities around the world, including 121 providing PBT and 15 providing carbon ion therapy, with many more under construction or in the planning phase [8]. The operational centres span both developed and developing nations, with most located in United States (n=51), Japan (n=26) and Europe (n=33) [8].

As patient access to PT has increased, it has become the preferred radiation treatment for certain specific anatomical sites. For instance, PBT is frequently recommended for paediatric, adolescent and young adult (AYA) patients. However, there is variability in the approved clinical indications and patient selection criteria, both nationally and across institutions worldwide.

Currently, there are no mandatory training requirements for RTs to work in PT facilities. Decades of regulation in conventional x-ray treatment practice suggests that comprehensive training and credentialing of staff are crucial for patient safety. This is particularly applicable during the early stages of PT implementation[9, 10].

Particle therapy in Australia

PT is not currently available in Australia; however, Australia's first PBT centre is under development at the Australian Bragg Centre for Proton Therapy and Research in South Australia, with a second centre in the planning phase at the Queensland Cancer Centre in Brisbane.

A collaborative, multidisciplinary approach has ensured that the necessary requirements for patient referral and selection are being assessed in anticipation of the first centre opening[11].

Given the additional costs associated with PT it will remain a treatment option for some, but not all patients. Patient selection criteria have been developed and approved by the MBS (Medicare Benefits Schedule) and an indication list has been created[12].

Currently, eligible patients can receive treatment abroad through the Federal Government's Medical Treatment Overseas Program (MTOP) or by self-funding. However, challenges such as travel, coordination of concurrent treatments, financial strain, and separation from support networks limit access to PT overseas[13]. These factors reduce the number of Australians receiving PT. ASMIRT recognizes the importance of timely implementation of PBT in Australia to ensure equitable access for all Australian patients who could benefit from it.

Cancer Australia were commissioned by the federal government in March 2023 to produce a strategy for PBT[11]. Various factors were considered including location, cost, population and future demand. The overall findings were indicative that at least one or two additional centres would be required to meet future demand[11].

Therefore, it is essential that the RT workforce is suitably prepared to adopt and adapt to this cutting-edge technology in the clinical environment prior to implementation.

Role and requirement of Australian RTs

RTs are crucial members of the radiation oncology team, making up the majority of the tripartite multi-disciplinary group alongside radiation oncologists and medical physicists. RTs

in Australia are uniquely qualified to perform localisation and simulation, treatment planning, and deliver treatment - a trifecta of knowledge that creates a broad and holistic understanding of the radiation therapy process end-to-end. Training and skills in all of these areas contribute to accuracy and precision, efficiency, enhanced problem-solving abilities, and quality improvements that benefit both patients and staff. RTs must be actively involved in the design, build and operational processes of establishing a PT centre. Involvement of RTs, along with all members of the multidisciplinary team, in these crucial stages will ensure that facilities are optimised for both patient care and staff efficiency, ultimately leading to improved clinical outcomes. RTs working in PT require robust training and education that comprises of a mix of training programs and PT experience. This is explored further in the 'Minimum requirements to work in particle (proton) therapy' document authored by the ASMIRT PTRG.

ASMIRT position on particle therapy

ASMIRT maintains that patients in Australia must have timely and equitable access to PT within Australia. Furthermore, it supports the establishment and development of PT facilities in Australia and maintains that a collaborative, interprofessional approach to the provision of PT is required to ensure the highest level of safety and quality of this new service[14].

PT is complex and thus has a higher risk profile compared with conventional X-ray radiation therapy. Accordingly, staffing levels should be boosted to account for the implementation of new technology and techniques, allow for succession planning and to future proof this new service delivery model until PT is considered 'business as usual'. Furthermore, consideration should be given to the staffing mix, ensuring a high level of expertise and support for those with less proton experience. While anecdotal evidence suggests that there are no mandatory training requirements in other countries delivering PT, ASMIRT advocates for Australian RTs to complete a comprehensive training and education program. This is essential to reduce the risks associated with the introduction of new, complex technologies and techniques like PT. Further details can be found in the "Minimum Requirements to Work in Particle (Proton) Therapy" document authored by the ASMIRT Particle Therapy Reference Group (PTRG).

Conclusion

The ASMIRT concludes that Australians who would benefit from PT should have access to this treatment in a timely and equitable manner within Australia.

ASMIRT acknowledges that preparation is necessary in terms of training and education of RTs, provision of leadership, and guidance on quality and safety in the delivery of service. RTs have an integral role to play, as members of the interprofessional team in the simulation, planning and treatment of patients receiving PT, and as such it is essential that ASMIRT ensures the profession is represented at all forums and participates in the planning of the introduction and subsequent expansion of PT in Australia.

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Document Details

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Version History

Version	Amendment Notes
1	Created September 2024, updating the original 2019 document, revised May 2025