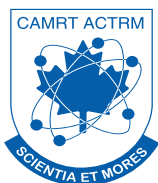


Advanced Practice in Medical Radiation Technology



A Canadian Framework



Canadian Association of
Medical Radiation Technologists
Association canadienne des
technologues en radiation médicale

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Introduction

As the healthcare system evolves to meet the changing needs of the Canadian public, significant shifts are taking place in the way patient care is delivered. One of the more notable evolutions is the redistribution of traditional roles amongst healthcare professionals, specifically the rise of advanced practice.

Advanced practice has been tested and embraced in many countries, including Canada. Advanced medical radiation technology (MRT) practice in particular has grown to the point of formal recognition around the world; however, in Canada it is still in its infancy. Although the scope of Canadian medical radiation technology practice has extended over the years, with many instances of individuals performing tasks that extend beyond the principal expectations of practice, what distinguishes Canada from other countries is the lack of a formal definition for advanced MRT practice and, hence, the lack of formal recognition for those practicing in an advanced capacity.

The Canadian Association of Medical Radiation Technologists (CAMRT) firmly believes that there is a place for advanced MRT practice in Canada. The CAMRT has been working towards the development of advanced MRT practice for years. From discussions beginning more than a decade ago, the CAMRT has continued to collaborate with its provincial partner organizations towards this goal, with the support of the Canadian Association of Radiologists (CAR), the Canadian Association of Radiation Oncologists (CARO) and other groups. This Advanced Practice Framework initiative is the culmination of these efforts. It was launched with a broad-based multidisciplinary symposium in November 2010, which established a consensus working definition for advanced MRT practice. Since that time, an Advanced Practice Working Group, made up of a national panel of experts, has been working to hone that definition and elaborate on a vision for advanced MRT practice in Canada.

The goal of this framework is to consolidate support for the forays already underway and establish a common understanding of “advanced practice” as it relates to MRT professions within the Canadian healthcare system. In its exploration of advanced practice experiences in other countries and other healthcare professions, it is hoped that the framework will extend a vision of advanced MRT practice and help Canadian MRTs to begin building the advanced practice roles of the future. The structure it provides should help those interested in advanced MRT practice across the country find a common language and a conceptual frame to advance discussions at the institutional, educational and/or governmental levels.



The document itself is expected to evolve with developments in the field. Beginning as a discussion of high-level concepts (drawing on examples from outside Canada and the MRT profession) it is expected that once advanced MRT practice in Canada becomes widespread, concrete examples will be incorporated and reflected in an evolving definition. In addition, every attempt has been made to maintain a level of discourse that can be applied to every Canadian centre with minimal need for adaptation. As more provinces move to investigate and develop advanced MRT practice, this aspect of the document will need to be updated as well.

Feedback on the framework and its concepts is appreciated and can be directed to **ctopham@camrt.ca**.



Evolution of advanced MRT practice

Although healthcare providers have been practicing at varying levels for centuries, the beginnings of formal advanced practice came about in the 1960s.¹ Physician shortages, together with increased demand for affordable, quality primary healthcare, prompted an examination of new models for the delivery of patient care, and eventually the genesis of the advanced practice nurse in the United States.² Not long afterwards, the same changes were occurring in Canada and around the world.³

In the 1970s, workforce shortages, growing workloads, and increasing complexity of procedures led radiologists and MRTs (radiographers) in the United Kingdom to find new ways of working together in diagnostic imaging.^{4,5} Eventually this led to the Red Dot initiative, a system where MRTs flag abnormal results for the attention of radiologists (using Red Dots) in their image review and reporting. Following extensive experience and study over many years in clinical settings, the Royal College of Radiologists (RCR) and the Society and College of Radiographers (SOR) released a combined statement formally recognizing and supporting the practice of Red Dot.⁶

Legitimacy for this new level of collaboration between the MRT and radiologist professions provided the groundwork for moving forward. Eventually, the system that is present in the UK today emerged—a system that spans four tiers with advanced and consultant practice roles at the top tier where many advanced activities are performed.⁷ Today, reports show that more than half of UK hospitals employ radiographers in these advanced tiers to report on radiographic images.^{4,8} Furthermore, there is widespread acceptance for their performance of invasive procedures, a variety of diagnostic exams, ultrasound reporting, and reporting on a number of plain film exams of the skeletal system.^{4,8}

A similar set of circumstances in the United States also produced an advanced practice stream for medical radiation technology. 2001 saw the creation of the radiologist assistant role through a collaboration of the American College of Radiologists (ACR) and the American Society of Radiologic Technologists (ASRT).⁹ Since its inception, this role has evolved, with radiologist assistants now working in many clinical settings. This role has also led to the creation of educational programs.

Other parts of the world are investigating the possibility of advanced MRT practice as well.¹⁰ The Australian Institute of Radiography's (AIR) Advanced Practice Advisory Panel was assembled to implement recent recommendations and move advanced MRT practice forward in Australia.¹¹ Meanwhile, the Australian government has allocated funds to the Department of Medical Imaging and Radiation Sciences at Monash University for the development of a national



education program for postgraduate radiation therapists to become advanced practitioners as part of a pilot study for the role.¹² Both Australia and New Zealand have also put effort into investigating the merits of advanced practice in radiography, and have put out position statements on their findings.^{13,14}

Many in Canada have also participated in the investigation of advanced MRT practices as well. Facility-led efforts have led to roles with extended, expanded and enhanced practices, but for the most part these efforts have been contained to their sites of origin. Provincially-led mandates have also led to establishment of educational programs for the performance of skills and duties beyond traditional scope— these too are generally considered to reflect extensions or enhancements of Canadian MRT practice.

Most recently, there has been notable progress on advanced practice in the province of Ontario, where there is now formal recognition for advanced practice radiation therapists working with Cancer Care Ontario (CCO).¹⁵ A pilot study, which began in 2004 with a feasibility study, has become a success story for advanced practice in Canada. Data collected from the initiative showed that the advanced practice radiation therapist roles enhanced patient care by improving access to radiation therapy treatments, improving patient satisfaction. It also demonstrated wide acceptance of the advanced practice role.¹⁵ Based on this success, the government of Ontario and CCO have committed to expanding the project and allocating financial resources for new positions.

The many lessons from the experiences of these and other examples of advanced practice development and implementation have been studied and used to help shape the CAMRT's position. Examples of advanced roles in the MRT and other professions are used throughout to substantiate the positions taken.



Benefits of advanced practice

The goal of successful and efficient healthcare systems is to deliver safe, effective and efficient care to patients. Challenges and opportunities that arise over time lead healthcare systems to evolve by finding new and innovative ways to deliver the best care. Healthcare decision-makers through the years have been prompted to explore new and non-traditional models of offering care to make the same systems more efficient and ensure patients receive the care they expect and desire.

Advanced practice in the healthcare professions grew out of such an evolution and has taken hold and grown in multiple milieus because of the many direct benefits it has been shown to offer patients and healthcare systems. Realization of these benefits has whet the appetite for innovative care models to improve care and services, and therefore the propagation of advanced practice, across traditional professional boundaries.

The most successful examples of advanced practice are those that emerged from real patient need and are sustained by providing tangible patient benefits. Examples from the literature show how advanced practice can improve patient care in a variety of ways. The primary mechanisms for progress have come through improvements in access to care, and enhancements to the quality of care. These in turn have led to secondary benefits in patient cost containment and system innovation that have cemented the case for advanced practice solutions.

Access to care

Experience with advanced practice shows that one of the foremost ways it can impact patient care is by improving access to care. In many examples of success, advanced practitioners function as a new intermediate tier of professionals, collaborating to alleviate workloads and wait times by focusing on tasks that relieve a backlog for the system.

Access to care has been improved by the introduction of advanced practitioners in different professions.¹⁶⁻¹⁸ Studies of advanced practice from nursing,¹⁶ midwifery,¹⁷ and physiotherapy¹⁸ all show that patient wait times are reduced with the introduction of advanced practice roles. In addition, improved teamwork and team climate have been shown to be associated with better continuity of care, access to care, flow of patients, and patient satisfaction.^{19,20}



This is corroborated by research on advanced practice in the MRT professions. Studies of advanced radiographer practice from the UK demonstrated that radiologists could report substantially greater numbers of diagnostic images when other procedures (e.g., barium enemas) were performed by non-radiologist professionals. Ultimately, patient access to radiology services is enhanced with the increase in imaging procedures and reporting.²¹ The findings of the initial phase of the Clinical Specialist Radiation Therapist Initiative in Ontario revealed that the advanced practice therapists can improve the efficiency of the system by improving patient wait times across the patient care pathway, increasing patient throughput and facilitating time efficiencies for team members.²²

Quality of care

Quality of care in healthcare can be measured in many different ways. To date, the majority of studies looking at quality of care in advanced MRT practice settings have focused on the quality provided by advanced practitioners compared to those who have traditionally performed the same tasks. The contention of critics of advanced MRT practice was that despite gains in radiologist time, quality would be lost if MRTs took on radiologist roles like review, reporting and specialized procedures. In fact, studies show that quality is maintained, not compromised.^{5, 23-26}

Furthermore, broad meta-analyses of the UK Red Dot reporting system show that there is a strong correlation between MRT Red Dot results and radiologist reports. The benefit of the “double read” (when MRT observations are reported and viewed in conjunction with radiologist interpretations), is actually greater continuity of appropriate patient care.^{5,23} Studies of double-contrast barium enemas show similar results, demonstrating that MRTs maintained the high accuracy and sensitivity for diagnosis that radiologists provide in the same role.²⁴⁻²⁶

A report from the Canadian Institute of Health Information (CIHI) refers to the emergence of radiologist assistants in the US, which has provided radiologists with more time and opportunity to focus on complex radiological procedures.^{21,27}

In addition, the effects of reducing patient wait-times for assessment, improving timeliness of image review, and identifying the need for intervention earlier, all enhance patient management and care.^{4,28,29} Studies addressing these and other aspects of quality of care show that areas where advanced practitioners are deployed demonstrate improvements.^{4,22,28,29}



Patient satisfaction

Patient satisfaction is linked to quality and to expectation about the care received. In countries like Canada, with publicly-funded universal healthcare, there is an expectation of good quality, accessible care when patients need to call upon the system.³⁰ As such, improvements to access and quality of care are tied to overall patient satisfaction.³¹

Studies of advanced practice have generally been consistent in showing that the introduction of advanced practice roles into healthcare pathways has led to increased patient satisfaction.^{16,17,19,20,32,33} This includes the Clinical Specialist Radiation Therapist (CSRT) initiative, where patients reported high levels of satisfaction with the care received from the advanced practitioners, equal to or in excess of satisfaction reported for other healthcare service providers.²²

System innovation

Another outcome of advanced practice has been better efficiency for the healthcare system and the ability to deliver the same care at a lower cost.^{34,35} Containing cost and maintaining an efficient system in response to evolving demands may not be the direct concern of those wishing to develop advanced practice positions across Canada, but it is a real-world consideration that relates directly to access, quality of care and ultimately patient satisfaction in a public-funded healthcare system.

Many studies have been undertaken to investigate this aspect of advanced practice, but as yet few, if any, offer definitive proof one way or the other. Though it has been difficult to prove through research studies to date, it is still believed advanced practice roles can offer an important option for system innovation overall because of the potential to provide cost savings to the system.³⁶ As advanced practice is further developed and integrated, it is suggested that more efficient systems will arise, within which cost savings are expected to be achieved over time.³⁶



Definition of advanced practice

Advanced practice in Medical Radiation Technology is defined as a higher level of practice wherein clinical responsibilities routinely exceed the current principal expectations of practice. Advanced practice roles require analytical skills to synthesize evidence-based knowledge to autonomously work towards optimal patient outcomes.

The Advanced Practice MRT is able to practice in these roles due to their advanced clinical and theoretical knowledge, skill and judgment acquired through a relevant graduate level education program or equivalent.

Research has shown clarity in terminology and definitions is important in overcoming the confusion and hesitation that emerge when people are faced with decisions about advanced practice. For the purposes of defining the difficult concept of advanced practice, a rigorous approach was taken. The above definition was reached through the participation of a broad panel of MRTs and other professionals from across Canada, and it serves now as a natural starting point for a description of advanced practice for MRTs in Canada. The descriptions that follow in the subsequent sections have been developed to help to put the short definition into the context of MRT practice in Canada.



Principles of advanced practice

To extend the definition and differentiate advanced practice from other forms of practice, we have identified and elaborated on the key principles that define advanced practice roles. These are principles that recur throughout the literature concerning advanced practice,³⁵⁻³⁷ representing distinct elements that set advanced practice apart from entry-level, expanded or extended practice.³⁷⁻³⁹

Though the principles are described below as individual and distinct concepts, they are inter-related and complementary. It is the weaving together of all these principles that would elevate a role to the “higher level” we describe, and set advanced practice apart from entry-level, expanded or extended practice.

Improving patient outcomes

The purpose of advanced practice is to improve outcomes for patients, whether through enhanced access, quality of care or satisfaction with the care received. This principle is central to advanced practice and its successful uptake and implementation in any profession. Indeed, the most successful examples of role development, implementation and sustained uptake have come from instances where advanced practice roles enhance the previous multidisciplinary model of care to address patient needs, fill existing gaps, enhance care, or improve outcomes for patients as they navigate the system.

Critical thinking

Critical thinking is a core element of any advanced role. It can be divided into two very important components:⁴⁰

1. A set of information—and belief-generating and processing skills; and
2. The predisposition, based on intellectual commitment, of using those skills to guide behaviour

The first component encompasses elements of critical thinking: interpretation, analysis, synthesis, evaluation, inference and reflection. These cognitive abilities are all important for the advanced practitioner as they allow the practitioner to explore and analyze evidence and



situations in clinical practice to enable a high level of judgment and decision making. The first component of critical thinking is strongly referenced in the definition laid out in this framework—it describes the synthesis of knowledge through skills of analysis and cites advanced clinical and theoretical knowledge, skill and judgment.⁴¹

The second component is often overlooked, but is essential to our definition of critical thinking in the context of advanced practice. The predisposition that the literature speaks of is the intellectual rigour that guides a professional to put these skills through incorporation of analysis and synthesis of multiple sources of information as well as a deliberate, structured and reflective use of in-depth knowledge, research and expertise in decision making. Whereas all professionals are capable of critical thinking, it is the requirement of rigorous adherence to these practices that makes advanced roles advanced in this regard.

Complex decision making

Complex decision making is characterized by the need to integrate information from a variety of sources and to balance different priorities. It requires healthcare professionals to view problems from different perspectives, considering all possible outcomes and to address incomplete information and ambiguity.

The greater the complexity of the decision, the greater the responsibility bestowed, as the patient entrusts their care and safety to the care provider in the decision-making role. With the ability to tackle increasingly complex clinical decisions, the advanced practice MRT will be able to take responsibility for directions in patient management and enhance the patient-centred experience.⁴¹

The ability to make decisions about increasingly complex scenarios is both a key enabler and a key requirement for advanced practice. It allows practitioners to truly advance the scope of their responsibilities and function with increased levels of autonomy. Like critical thinking, complex decision making is a principle that is common to most, if not all, examples of advanced practice across the healthcare professions.



Autonomy of role

Advanced practice roles are characterized by an increased level of autonomy, defined by a broader set of responsibilities within the workings of the interdisciplinary team. The increased autonomy of role, with a greater independent contribution to the multidisciplinary care of the patient is a key feature of these roles.

Autonomy is closely tied to education and training, and the critical thinking skills those help develop. With expanded knowledge, skills and judgment a professional is equipped to take on increasingly complex tasks and ready to accept greater accountability for actions together with greater responsibility in patient care. Formal recognition of these new capabilities (in the form of medical directives, new regulation and/or legislation) follows with the creation of roles that allow practitioners the opportunity to work at an advanced level within the care delivery model.

Autonomy is also of critical importance to the acceptance of advanced roles and lays the groundwork for successful implementation of roles that can be sustained. It has been a big factor in the expansion of advanced practice in other professions like nursing, because it has allowed new models of care to develop where activities, once the exclusive domain of physicians, could be shared with a new group to achieve greater efficiency. It is also an enabler for clinical leadership and is identified as one of the core dimensions of job enrichment.^{42,43}

Leadership

Leadership is a fundamental principle of advanced practice in nearly all professions in which it has been implemented. Through leadership activities, such as research, mentoring, education and advocacy, the spirit of advancement is extended beyond the clinical realm to the advanced practice MRTs themselves. In this way, the positive changes that result from advanced practices are extended to the broader healthcare team.



Advanced roles in practice

The definition and principles described in the previous sections provide a theoretical foundation for advanced practice roles. In practice, these principles can take on many forms as they are translated into real-world activities and roles. Below, a discussion on the more practical elements of the definition of advanced practice is presented.

Based on MRT practice

With all the focus on what makes a role “advanced”, it is important to remember that advanced MRT practice comes from MRT practice. Advanced MRT roles of the future will be clearly identifiable as MRT roles, with evolution from MRT practice of today. Advanced MRTs will still be part of the larger MRT profession, working under the same basic Code of Ethics and professional expectations, and will be governed and regulated by the provincial laws and regulations that govern all MRT practice. The basis in the MRT profession extends to individuals aspiring to these roles—all of whom will be expected to hold certification in one of the four MRT disciplines and experience working as MRTs in the field.

Higher level of practice

In Canada, there have already been numerous forays beyond scope of practice under different headings. Some of these practices have been recognized as being extended or enhanced, whereas others were deemed to form part of the natural evolution of MRT practice. With little agreement on the meaning of these terms, new terminology was chosen to form the basis for common understanding moving forward.

As we state in our definition: Advanced Practice in Medical Radiation Technology is defined as a “higher level of practice”. These words “level of practice” were carefully chosen to set a new vision for advanced MRT roles in the future.

To elevate advanced roles to the higher level envisioned will require careful planning. These higher-level roles will need to be built around activities that not only exceed the principle expectations of MRT practice in Canada, but also incorporate the principles of advanced practice, such as critical thinking and complex decision making, in a fundamental way.



Although there is no prescription as to how many advanced activities would elevate a role to this higher level, experience with other advanced roles in healthcare has shown that advanced capacity in several key areas is common to roles that thrive. In addition, it is critical that the activities that make up the core of a new advanced role are incorporated into a practitioner's primary day-to-day work.

Examples of implementation of these types of advanced roles in practice vary across the jurisdictions in which they are found. On examination, it is evident that common core principles are shared, yet the way these principles and competencies are manifested within specific positions and situations is highly variable and dependent on local scopes and standards. In the UK, advanced MRT roles have emerged largely with a focus on advancement in specialist clinical areas, whereas advanced practice in the US, for example, is applied much more generally across tasks.

Furthermore, advanced practice must be built with consideration for a continually evolving practice throughout the MRT professions. Over time, technological advances and shifts in priorities lead to evolution within the profession—pushing the boundaries of the profession to new limits. The challenge in developing an advanced role is to ensure roles are not exclusively tied to activities that will be absorbed into standard practice.

The decision was made in drafting this framework to stay away from identifying specific activities that would be considered advanced in the Canadian context. The continual evolution of MRT practice and differences in practice across Canadian provincial jurisdictions make it difficult to find examples that can be applied nationally and fixed in time. Table 1 provides an example of advanced activities in practice that is considered reflective of this framework's definition of advanced practice. It has been included to help illustrate how the principles laid out might apply to a clinical setting.

Autonomy and collaboration

Despite the considerable focus on increasing autonomy of an advanced practice role, it must also be emphasized that any advanced role would continue to function within a larger inter-professional model of care, where numerous practitioners with varying degrees of decision-making autonomy continually collaborate to deliver the best outcomes for patients. In fact, in keeping with the principles of *Optimal patient outcomes* and *Leadership*, it would be expected that advanced practice MRTs strive to broaden and deepen collaboration by sharing their knowledge and expertise within the multidisciplinary healthcare team.



Current examples of advanced MRT practice demonstrate how professionals can collaborate at an advanced level with adaptations to the traditional models of care. It is expected that advanced practice MRTs in Canadian roles would mirror this collaborative approach by continuing to work with radiologists, oncologists, physicists and other MRTs and healthcare professionals to improve services and care.

Active leadership

In addition to finding ways to advance clinical practice, advanced practitioners are expected to use their advanced knowledge and understanding to act as transformational leaders in their facilities. Active leadership in the workplace, in research and in education, is central to this component of advanced practice.

In the history of advanced practice, research has typically formed an important component of new roles in development. Even if the conduct of formal research does not form a core element of every future advanced MRT role in Canada, it is believed that reflective practice based on an understanding of the principles and basis of good research and aimed at optimizing clinical services, should be considered a core and fundamental element of any advanced practice role. With a basis in evidence-based practice, advanced practitioners continually evaluate and reflect on the care being delivered and stay attuned with innovations in the field. These practices allow advanced practitioners to continually develop the frontiers of their own roles and the profession as a whole.

The Canadian healthcare landscape

The realities of the Canadian healthcare landscape are sure to present challenges along the way for those who wish to pursue this national vision. Much of the power to enact decisions at the level required to create new tiers of practice (such as advanced MRT practice) rest at the provincial level. It is the provincial, and not the federal, government that bears responsibility for administration, planning and funding for healthcare facilities and professionals. Changes as fundamental to the MRT profession as establishing a new advanced tier would be reliant on provincial support, which could vary from province to province.

MRT scopes of practice across Canada can vary substantially at the provincial level. Though all MRTs are certified at a national level, differences emerge through variations in provincial law and provincial regulation (if present). This presents a challenge for those seeking to pursue a national



standard for advanced practice, because many of the activities that are being considered in these discussions are subject to different interpretations across provincial lines.

Currently, there is also a wide variation in what is considered to be extended, enhanced or expanded from one provincial jurisdiction to the next. In some provinces this kind of activity outside the traditional scope of practice is commonplace and even formalized, whereas a framework for such activities in other provinces does not exist under the legislation in effect.

It is with consideration for all these elements of the Canadian landscape that the CAMRT considers an agreement on principles and ideas about advanced practice at this highest level to be so important moving forward.

**Table 1. Example of AP principles in practice⁴⁴**

Consultant Breast Radiographer (UK)
<p>The four-tier service delivery model for radiography has seen the addition of two tiers of practice over and above the traditional role of radiographer in the UK National Health Service (NHS). The position of consultant radiographer is the highest clinical grade a radiographer can attain within the service model, offering professionals the possibility of great autonomy and freedom of practice within the bounds of the profession (e.g., within professional scope of practice and local protocols). It provides an example of the principles we have identified in the real world.</p>
<p>Critical thinking and complex decision making</p> <p>The consultant breast radiographer can manage an entire ‘episode of imaging care’ at a patient attendance without the radiologist—taking steps to ensure the optimal clinical outcome for the patient. This entails ensuring all appropriate imaging and interventional tests are performed, making decisions based on the results and producing a comprehensive radiological report received by the requesting clinician.</p> <p>Consultant breast radiographers are also key members of breast multidisciplinary team meetings where many complex cases are discussed, and they make significant contributions to the decision-making process.</p>
<p>Autonomy of role</p> <p>The consultant breast radiographer enjoys an unprecedented level of autonomy in radiographic professional practice. Each consultant radiographer manages their own case loads and is responsible for the delivery of a full range of breast imaging studies and associated procedures, including mammography, ultrasound, biopsy and tumour marking, cyst/seroma/abscess aspirations, fine needle aspiration for cytology, and image-guided localization procedures for impalpable lesions. Consultants make adjustments based on the results they get back and report on diagnostic images.</p>
<p>Leadership</p> <p>Consultant breast radiographers are clinical and professional leaders in their field. They drive research into practice developments and take a lead on active dissemination of findings and integration (where appropriate) of change in local practice. In addition, they make significant contributions to the profession through extra-clinical duties, such as teaching assignments, contributing to scientific journals and taking prominent roles on relevant professional bodies.</p> <p>For a more comprehensive description of the activities performed by the Consultant Breast Radiographer, as well as a description of advanced clinical, technical and professional practices in established roles found in the UK, US and Canada please refer to the Appendix.</p>



Educational preparation for advanced practice roles

The CAMRT definition of advanced practice envisions roles in which there are increased demands on critical thinking and complex decision making with a greater degree of autonomy. In order to successfully practice at this advanced level, a thorough education with a focus on advanced clinical and theoretical knowledge, skill, judgment, and the other principles of advanced practice is essential. To lay such a foundation, MRTs would need to obtain training and education beyond their entry-level qualification, including the knowledge, skills and judgment acquired in their experiential learning. In order to meet this need and the requirements of the advanced practice MRTs of the future it is believed that such an educational preparation should be thorough, accessible and standardized.

Thorough

It is believed that preparation for advanced practice roles must be thorough and comprehensive. In practical terms this means that candidates for advanced practice will be prepared with advanced clinical and technical knowledge to operate in their new roles and will receive education that helps them develop critical thinking and complex decision-making abilities.

The specific elements of such education will eventually be determined by the specific demands that individual advanced practice roles present. Specific roles can be characterized by specific competency profiles, which can in turn be matched to requirements for advanced education.

Accessible

It is important that education for advanced MRT roles is accessible to Canadian MRTs. The MRT profession as it currently exists in Canada is a complex mix of professionals with diverse educational backgrounds. It is believed that requirements for entry into courses/programs and/or standards for certification should take this strongly into consideration. An advanced practice candidate who is able to demonstrate the acquisition of knowledge, skills and judgment should be afforded the opportunity to pursue this path. Of course, the entry criteria for any programs developed would be determined by individual educational institutions and the onus for proving equivalency would always rest with the candidate.

Standardized

The value of standardization of education is a corresponding standard in expectation and recognition across centres and jurisdictions. Because the reliability of one individual training



regime is hard to judge against the next, formal education is strongly encouraged. This will benefit the profession as a whole, as it strives to create a credible and trustworthy foray into new areas.

Level of education

It is not for the CAMRT to dictate the level of education that is provided, nor the regulatory/legal standards that would permit licensure to such advanced roles. Such decisions are made at the provincial level in Canada, and educational standards for advanced MRT practice would be set by provincial regulators/legislators.

It is, however, the role of the CAMRT to present recommendations it believes are consistent with the best practice experiences of others and the best evidence available. In the case of advanced practice, experience of other advanced healthcare providers in Canada and abroad provide important lessons for decision makers today.

For example, the Canadian Nursing Association recently elevated their recommendation for entry into advanced practice roles to a graduate education. They cite that the decision was based on the expertise such an education provides in research, knowledge synthesis and transfer skills. Based on their own experiences working in the Ontario healthcare system, and considering the entry-level norms for education in radiation therapy in the province, the leaders of the Clinical Specialist Radiation Therapist (CSRT) initiative also recently recommended a graduate level education for entry into CSRT roles in the future.²² Reasons cited include the need to broaden knowledge in the realms of leadership, professional communication and healthcare policy; to deepen understanding of foundational radiation medicine concepts (essential for the clinical decision making the roles demand); and to develop skills required in the chosen specialized domain of radiation therapy practice.²²

These recommendations are echoed across the advanced practice literature.

Considering this, and the advanced knowledge and attributes recommended for advanced MRT roles, the CAMRT suggests that the thorough education required for these future roles would most commonly be achieved through educational preparation at the graduate level. The combination of advanced studies and independent research typically pursued in graduate education provides both the structure and latitude for an individual to develop an understanding and comfort with the complex subject matter central to advanced practice. Additional advantages of a graduate education include the track record in delivering this kind of education in a variety of fields.



Looking to the future

As stated, it is the CAMRT's firm belief that advanced MRT practice has a place in shaping the Canadian healthcare landscape of the future. As healthcare requirements in Canada evolve, it is expected that the dynamics of the system designed to fulfil those requirements will evolve as well. Advanced practice is an innovation that has proven worth for healthcare providers that seek to adapt and create new efficiencies.

Role of the CAMRT

With the publication of this framework, the CAMRT envisions taking on a role for advanced practice that mirrors its role in all levels of MRT practice. To serve the interest of its MRT members, the CAMRT will work as an advocate and in other capacities where appropriate to support the cause of advanced practice for the profession in Canada.

Advocacy

This framework forms the basis for the CAMRT's advocacy. As a position statement, it communicates the view of the professional association on the nature of advanced practice for the MRT profession in Canada. The CAMRT considers the communication of a clear and consistent national vision for advanced practice as core to its responsibilities to members, and will work to maintain and adapt this framework into the future to ensure this goal is met.

The role of advocate will also entail the engagement of other professional bodies or healthcare decision makers from across the provinces in the important discussions that need to take place to move advanced practice in the MRT professions closer to reality.

Facilitation

The CAMRT expects to act as a facilitator for development of roles at the local level by providing its members with access to tools and preparing the ground through advocacy. In its role as national body, the CAMRT will help all members across the country find opportunity to collaborate and share. This is especially vital in new areas like advanced practice where development and research is likely to take place in pockets across the country. The association is already fulfilling this role in relation to the work with advanced practice in radiation therapy in Ontario. Several working groups and meetings have been organized by the CAMRT, and it continues to facilitate the interactions suggested by its national stakeholders on these important issues.



As the national body, the CAMRT will also be uniquely placed to advance the cause and discourse about developments in advanced practice in the MRT professions with other stakeholders around the globe. Not only will the CAMRT promote the progress made by Canadians abroad, but it will also seek to connect key Canadian MRT decision makers to expertise, learning and CAMRT contacts from countries with experience in advanced practice.

Certification

The CAMRT's interest in and commitment to certification is to ensure a standard set in one jurisdiction in Canada can be applied across the country, just as it is with the four entry-to-practice standards now. The vision of national certification is proposed to benefit CAMRT members by providing standards for each role, leading to credibility and recognition across centres, provinces and healthcare professions. Furthermore, a certification process provides the opportunity to assess and validate candidates from diverse experiences and educational backgrounds and award a credential certifying those who obtain the standard for advanced practice as set out by the CAMRT.

The CAMRT is currently involved in the investigation of a certification process for the advanced practice radiation therapists already working throughout Ontario. This process would potentially form the structure on which certification across all MRT disciplines could be based. The recommendations from this investigation will be incorporated into an update of this report when they become available.

Future of advanced MRT roles in Canada

Despite the unique challenges presented by the structure and diversity of the Canadian healthcare landscape, it is believed that advanced practice is attainable across jurisdictions.

The CSRT initiative in Ontario has recently been expanded and represents a model on which to innovate advanced practice in radiation therapy across all provinces. In addition, innovative ventures already underway suggest there is potential for advanced MRT roles that mirror and extend beyond what has been developed internationally, within all the disciplines. It is not for the CAMRT to speculate on ways these roles might specifically evolve in the future, but rather to support members in the ways described above in preparation for innovations as they arrive.



For the immediate future, it is important to acknowledge that with the reality of implementation at the provincial level, advanced MRT practice built on the same principles may vary in implementation from one provincial jurisdiction to another.

This framework represents an important first step in the advanced practice discussion for both MRTs and the CAMRT. We hope that the publication of this document will stimulate interest around advanced practice in the MRT community and provide the common language and starting point regarding advanced MRT practice and its place in the evolving Canadian healthcare model.



Glossary

Advanced activities

Activities that not only exceed the principle expectations of MRT practice in Canada, but that incorporate the principles of advanced practice, such as critical thinking and complex decision making, in a fundamental way.

Advanced roles

Roles that incorporate advanced activities into a practitioner's primary day-to-day work and that reflect all the principles of advanced practice. A role reflects a full job description, as opposed to the description of a single activity.

Analytical skills

A cluster of common skills that are used to analyze and develop solutions to problems.

Autonomy

Full autonomy means that a professional is independent and reasonably self-governing in making decisions in practice. In our discussion, we adopt the concept that autonomy can be expressed in degrees or on a spectrum where full autonomy lies at one end and full dependence at the other end. The advanced practice MRT would not be fully autonomous in the healthcare system, but would make a greater number of autonomous decisions relative to other MRTs and be said to possess a greater degree of overall autonomy as a result.⁴⁵

Enhanced practice / Expanded practice / Extended practice

Extended practice refers to practices or roles that extend beyond the principal expectations of practice. Individual provinces have developed formal definitions for these roles, but because principal expectations of practice may differ across the country, so too does the use of this terminology.

As they relate to advanced practice, it is possible that some of these practices would form one element of advanced practice. The relationship of enhanced/expanded/extended practice to advanced practice is discussed in the *Advanced roles in practice* chapter.



Equivalency

A level of achievement that is considered to be on the same level as finishing a course of study.

Expert practice

MRT practice can be characterized along a continuum from novice to expert, progressive with time and experience. Unlike advanced practice, there is no formal requirement for expert practice. In fact, the same construct would exist in an advanced tier of practice where professionals would enter as novice advanced practice MRTs and progress over time to expert advanced practice MRTs.⁴⁶

Framework

A document used to create common understanding of the basic elements of a position, and which provides a frame for future endeavours in this topic area.

Graduate level education

Graduate level education refers to post-university degree programs for students. This includes the Master's and Doctorate level degrees, together with the possibility of a variety of post-graduate certificates.

Medical radiation technologist / technology (MRT)

The terminology used in Canada to discuss the professions of radiologic technology/radiography, nuclear medicine, magnetic resonance imaging and radiation therapy.

Patient outcomes

General terminology for the results of healthcare interventions or processes.



Principal expectations of practice (PEOP)

PEOP is defined as “principal expectations of practice” and refers to those services and procedures that fall within the scope of practice for MRTs. It includes those taught in medical radiation technology entry-level programs, plus any additional clinical experience or training that one must undertake in order to maintain competency to provide standard practice.

Principle

A fundamental component of our advanced practice definition.

Radiographer

Radiographer is used in this framework to explain examples in the context of the UK healthcare system, where the term radiographer refers to the same professionals as those encompassed by the term MRT in Canada.

Red Dot initiative

A system introduced in the UK, whereby radiographers (MRTs) used “red dots” to signal potential abnormalities on plain radiographs prior to the by radiologists’ review and reporting.

Routinely

In our definition of advanced practice, the word routinely is used to suggest practices/activities that a professional would undertake on a daily basis in their role. The concept is reflected in the discussion of the *Advanced roles in practice*.



Abbreviations

ACR: American College of Radiology

AIR: Australian Institute of Radiography

AP4RT: Advanced Practice for Radiation Therapy
(Former name for Ontario advanced practice initiative in advanced practice radiation therapy)

APN: Advanced practice nurse/nursing

APRT: Advanced Practice Radiation Therapist

ASRT: American Society of Radiologic Technologists

CAMRT: Canadian Association of Medical Radiation Technologists

CAR: Canadian Association of Radiologists

CARO: Canadian Association of Radiation Oncology

CCO: Cancer Care Ontario

CIHI: Canadian Institute for Health Information

CNA: Canadian Nurses Association

CSRT: Clinical Specialist Radiation Therapist
(Current name for advanced practice radiation therapist in Ontario)

GI: Gastrointestinal

MRT: Medical radiation technologist/technology

NHS: National Health Service (UK)

PDSA: Plan, Do, Study, Act (Planning tool)

PEPPA: Participatory, Evidence-informed, Patient-centred Process for Advanced-practice nurse role development, implementation and evaluation (Planning framework and tool)

RA: Radiologist assistant (Advanced practice position in the US)

RCR: Royal College of Radiologists (UK)

SOR: Society of Radiographers (also known as the Society and College of Radiographers) (UK)



Appendix. Examples of Advanced MRT Roles

Gastrointestinal Consultant Radiographer (UK)⁴⁷	
Description	The GI Consultant radiographer practices autonomously to deliver a full range of radiographic services to patients. Advanced practice is focused in the specialist area of GI imaging
Advanced elements	<ul style="list-style-type: none"> • Audit own practice to ensure their continuing competence • Greater autonomy and responsibility for patient care: <ul style="list-style-type: none"> ○ Independently carrying out many GI diagnostic tests ○ Contributing to the reporting process ○ Managing case loads ○ Little reference to radiologists • Likely to be seen as the lead for the GI services across the hospitals • Work across disciplines (e.g., with endoscopy)
Examples of advanced clinical activities	<ul style="list-style-type: none"> • Pre-interventional counselling and follow-up • Independent delivery of a wide range of GI studies: <ul style="list-style-type: none"> ○ Double contrast barium enema (DCBE) and variants (e.g., contrast enemas, etc.) ○ Barium swallow ○ Videofluoroscopic swallowing study (VFSS) (often with speech therapy) ○ CT colonography ○ Proctography ○ Non-GI fluoroscopic studies (e.g., hysterosalpingography; cystography) ○ Small bowel studies ○ Interventional work ○ Sigmoidoscopy • Increased contribution to the reporting process • Offering a formal report as part of a double reporting system • Issuing the definitive report for most examinations • Management of fluoroscopy suite
Examples of evidence-based activities	<ul style="list-style-type: none"> • Involvement in multi-disciplinary research and audit, resulting in peer-reviewed publications and presentations • Auditing of the GI imaging service against the evidence base and reconfiguring to improve the patient (and referrer) experience • Participation in research
Examples of leadership	<ul style="list-style-type: none"> • Clinical leadership • Collaboration with multiple professionals • Extra-clinical activities: <ul style="list-style-type: none"> ○ Regular attendance at relevant clinico-radiological meetings ○ Teaching and providing mentorship to different professional groups in the clinical environment and local universities ○ Involvement in national associations and scientific journals ○ Membership on relevant professional bodies and committees
Resultant improvements to service	<ul style="list-style-type: none"> • Reduced waiting lists • New services introduced for patients as a result of staffing efficiencies (videofluoroscopy for speech and language therapy, 'same day' endoscopy, radiology clinics) • Dedicated lists for particular examinations • Flexible appointments for patients (e.g., longer exam times for patients who require it, evening appointments, etc.)



Consultant Breast Imaging Radiographer (UK)⁴⁴	
Description	The Breast Imaging Consultant radiographer practices autonomously to deliver a full range of radiographic services to patients. Advanced practice is focused in the specialist area of breast imaging
Advanced elements	<ul style="list-style-type: none"> • Audit own practice to ensure their continuing competence • Greater autonomy and responsibility for patient care: <ul style="list-style-type: none"> ○ Taking responsibility for completion of breast imaging diagnostic tests and procedures ○ Reporting on diagnostic images ○ Managing case loads
Examples of advanced clinical activities	<ul style="list-style-type: none"> • Manages the diagnostic decision-making pathway for breast imaging studies: <ul style="list-style-type: none"> ○ Review of patient history ○ Informed decisions regarding which diagnostic tools are appropriate • Independent delivery of a wide range of breast imaging studies and procedures: <ul style="list-style-type: none"> ○ Ultrasound-guided biopsy ○ Cyst/seroma/abscess aspirations ○ Fine needle aspiration for cytology ○ Vacuum-assisted biopsies ○ Biopsy or tumour marking ○ Image-guided localization procedures for impalpable lesions • Image interpretation and communication of the result: <ul style="list-style-type: none"> ○ Immediate reports on the mammograms and ultrasound scans to referring physicians from ‘fast track diagnostic clinics’ for symptomatic patients ○ Communication of results to patients ○ Reports for routine post surgical follow-up and family history surveillance mammograms ○ Indicates a description of the imaging appearances; the exact location and size of any significant abnormalities; a differential diagnosis, where possible; further imaging/biopsy in the management of a particular breast abnormality, if appropriate and possible • Breast clinical examination
Examples of evidence-based activities	<ul style="list-style-type: none"> • Participation in a regular educational self-assessment scheme (PERFORMS—PERsonal perFORmance in Mammographic Screening)⁴⁸ • Self-audit of interventional work • Participation in research
Examples of leadership	<ul style="list-style-type: none"> • Clinical leadership • Collaboration with multiple professionals • Introduction of new innovations into practice (e.g., new vacuum biopsy approach) • Dissemination of breast imaging knowledge • Extra-clinical roles: <ul style="list-style-type: none"> ○ Teaching and providing mentorship to different professional groups in the clinical environment and local universities ○ Supervision of undergraduate student radiographer dissertations ○ Publication and presentation of work at conferences ○ Speaking to the general public and breast cancer support groups regarding the role of breast imaging in diagnosing breast disease ○ Involvement in national associations and scientific journals ○ Membership on relevant professional bodies and committees
Resultant improvements to service	<ul style="list-style-type: none"> • Reduced waiting lists



Clinical Specialist Radiation Therapist (Ontario)—Palliative Radiation Therapy⁴⁹	
Description	Clinical Specialist Radiation Therapists in Ontario practice autonomously to deliver a full range of services to patients in a variety of specialist areas. In this example, advanced practice is focused in the specialist area of palliative patients
Advanced elements	<ul style="list-style-type: none"> • Primary responsibility for patient triage, review and interpretation of results and establishing care plans • Assumes a patient case load in each clinic • Coordination of resources • On-treatment and end of treatment patient review
Examples of advanced clinical activities	<ul style="list-style-type: none"> • Leadership in palliative patient assessment: <ul style="list-style-type: none"> ○ Conduct patient interviews ○ Comprehensive physical examinations. ○ Document patient history and physical assessment data • Formulate care plans for palliative patients • Provide technical and dosimetric consultation: <ul style="list-style-type: none"> ○ Interpretation of diagnostic information and patient condition to establish a plan for radiation therapy ○ Identification and order of required diagnostic tests (CT, MRI, X-rays) and procedures, within scope of practice and medical directives/protocols and practice guidelines ○ Liaison and consultation with other healthcare facilities, services and team members ○ Assignment of patient priority for therapy ○ Assignment of dose/fractionation according to disease site, target volume and dose limiting structures ○ Determination of gross, clinical and planning target volumes ○ Prescription of treatment regimen ○ Obtain informed consent ○ Reviews patient set up on the first day of treatment • Respond to a variety of unusual clinical situations, adverse or unusual reactions • Review of referrals for appropriateness • First point of contact for patients receiving palliative radiotherapy, and for those who have completed treatment and been discharged • Patient education • Pain management • Provision of patient support (psycho-social) in palliative radiation therapy
Examples of evidence-based activities	<ul style="list-style-type: none"> • Active involvement in research projects: <ul style="list-style-type: none"> ○ Clinically relevant research work ○ Work on patient- and treatment-related outcomes ○ Patient recruitment ○ Involvement in practice guidelines, treatment protocol development ○ Supervise/mentor health-related professionals in research/ clinical activities
Examples of leadership	<ul style="list-style-type: none"> • Patient, professional and community education • Strategic planning in workplace • Supervision of residents and fellows in project work
Resultant improvements to service	<ul style="list-style-type: none"> • Decreased patient wait times • Increased patient throughput • Improved efficiency of cancer care in Ontario



Radiologist Assistant (USA)⁵⁰⁻⁵²	
Description	<p>The radiologist assistant works under the supervision of a radiologist to enhance patient care by assisting in the diagnostic imaging environment.</p> <p>In practice, the clinical roles and responsibilities of each RA are tailored to the needs of the patient population, practice setting, state licensure laws and regulations, institutional credentialing requirements and federal reimbursement policies. As a result, RA practice varies from facility to facility</p>
Advanced elements	<ul style="list-style-type: none"> • Lead role in patient management and assessment • Performance of selected radiology examinations and procedures under the supervision of a radiologist – the level of radiologist supervision varies, depending on the type of examination • Initial image observations (not diagnosis) to be forwarded to the supervising radiologist
Restrictions on practice	<ul style="list-style-type: none"> • The RA cannot: <ul style="list-style-type: none"> ○ Substitute for the radiologist ○ Act independently ○ Prescribe medications, treatments or therapies ○ Provide an official interpretation of the imaging findings ○ Prepare a final written report ○ Independently bill for services
Examples of advanced clinical activities	<ul style="list-style-type: none"> • Patient assessment: <ul style="list-style-type: none"> ○ Patient interview to verify and update medical history ○ Radiology-focused physical examination ○ Patient anxiety and pain levels ○ Analysis of data (e.g., signs and symptoms, laboratory values, vital signs, and significant abnormalities) ○ Report of findings to the delegating radiologist • Assistance with invasive or complex radiology procedures • Performance of selected procedures under the supervision of the radiologist: <ul style="list-style-type: none"> ○ Fluoroscopy ○ Non-invasive procedures ○ Feeding tube placements ○ Venous diagnostic exams • Moderate sedation procedures <ul style="list-style-type: none"> ○ Administration of moderate sedation ○ Observation and assessment of moderately sedated patients • Obtaining and documentation of patient consent: <ul style="list-style-type: none"> ○ Explanation of procedure to the patient or significant others, including a description of risks, benefits, alternatives and follow-up ○ Referral of questions about diagnosis, treatment or prognosis to the delegating radiologist • Communicates initial observations: <ul style="list-style-type: none"> ○ Evaluates images for image and diagnostic quality ○ Reviews the images for initial observations ○ Report of initial observations to delegating radiologist • Communication of delegating radiologist’s report to the appropriate healthcare provider • Provision of patient discharge, procedure and post-care instructions summary for review and co-signature by the delegating radiologist: <ul style="list-style-type: none"> ○ Post-care instructions to patient as ordered by the delegating radiologist



Radiologist Assistant (USA)⁵⁰⁻⁵²	
Examples of evidence-based activities	<ul style="list-style-type: none">• Collection of data for clinical research
Examples of leadership	<ul style="list-style-type: none">• Involvement in evaluation and maintenance of patient safety programs and initiatives• Education of other healthcare providers regarding area of expertise
Resultant improvements to service	<ul style="list-style-type: none">• Continuity of care for the patient (i.e., one person remains with the patient throughout the entire radiologic procedure)• Improved departmental efficiency:<ul style="list-style-type: none">○ Radiologists free to perform more complex procedures and for interpretation



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