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Research article

A Canadian experience of palliative advanced practice radiation therapy TIPS: Training, implementation, practice and sustainability

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ABSTRACT

The concept of the Advanced Practice Radiation Therapist (APRT) was created in 2004, in response to pressures on the radiation treatment sector in Ontario. This led to development, piloting and integration of the Clinical Specialist Radiation Therapist (CSRT) into Ontario's cancer care framework. A national certification process, competency profile and protected title of APRT(T) were established in 2017, under the Canadian Association of Medical Radiation Technologists (CAMRT), in collaboration with Cancer Care Ontario/Ontario Health. This report describes the approach to development, validation and measuring impact of the CSRT role in Ontario, specifically in palliative care (pCSRT). It also presents information to assist jurisdictions interested in developing a pCSRT position, describing competency development, assessment, and assumption of practice, and providing some keys to success. This is foundational for consistent expansion of the pCSRT role to other regions to continue to increase system capacity while improving the quality of cancer care.

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Introduction

In Canada, the concept of the Advanced Practice Radiation Therapist (APRT) was created in 2004, as a feasibility project at Cancer Care Ontario (CCO) in response to increased pressures on the radiation treatment (RT) sector [1,2]. The project, funded by the Ministry of Health and Long-Term Care (MOHLTC), successfully laid the foundation for a 10-year project series. In 2006, the title of Clinical Specialist Radiation Therapist (CSRT) was coined to describe radiation therapists (RT(T)) working in advanced practice (AP) roles in Ontario [1]. Of the 23 CSRTs currently practicing in Ontario, nine CSRTs specialize in palliative care (pCSRT). As the management of palliative disease shifts towards a chronic disease approach [3], the pCSRTs are strategically deployed to alleviate burdens along the palliative radiotherapy (pRT) pathway. This increase in utilization of pRT is expected to continue, particularly as we strive to improve access to care. In Ontario, it is estimated that "...one-third of patients who die of cancer in Ontario need palliative radiotherapy, but many of them are never treated" [4].

By incorporating the pCSRT role into current pRT framework, a pCSRT-facilitated model of care can be tailored locally to improve the quality of and access to pRT [5–7].

Following the success of Ontario's CSRT initiative, a national certification process was developed in 2017 by the Canadian Association of Medical Radiation Technologists (CAMRT) in collaboration with CCO, whereby successful candidates are granted the protected title of APRT(T) (Advanced Practice Registered Technologist, Radiation Therapy) [8].

Background

It was hypothesized, and since proven, that creating a pCSRT-facilitated model of care would have a positive impact on system capacity, quality of care, and the ability to innovate and translate knowledge into practice. This has been achieved by **redistribution of activities** and use of the pCSRTs' unique knowledge, skills and judgement to **identify new activities that would add effectiveness and efficiency to the system**.

The redistribution of activities amongst interdisciplinary team members, known as "task shifting", was coined by the World Health Organization (WHO) [9]. In their research leading to

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recommendations for global health human resource (HHR) issues, they identify task shifting as an “established, effective and well-documented strategy” for addressing HHR shortages impacting access to health care.

Shared activities between pCSRTs and Radiation Oncologists (ROs) is one of the greatest advantages of an APRT role. Through the development of advanced competencies, pCSRTs can share and assume activities that were previously the sole responsibility of the RO [10]. The time saved by redistributing these tasks, referred to as “time savings”, allows the RO to complete more complex work that cannot be delegated thus increasing capacity and quality of care.

This report is set out as a guide for the training, piloting, implementation, practice, and sustainability of a pCSRT role based on the experiences of the CSRT Projects in Ontario, under the following headings:

1. **ROLE DEVELOPMENT PROCESS:** the work required to develop, pilot and implement roles
2. **METRICS AND MEASURES:** the approaches to validate the impact of and sustain the pCSRT role
3. **DISCUSSION:** information that could serve as a starting point for jurisdictions wanting to develop a pCSRT role.

Role development process

pCSRTs were encouraged to complete three distinct steps (competency development, assessment, and assumption of practice) to create a pCSRT-facilitated model of care. Resources to support competency development and assessment, and assumption of practice were created and have been compiled and further developed by CCO, the CAMRT and the CSRT Community of Practice (CoP). These include a ‘Request for Proposals Package’ to help develop valid and appropriate CSRT positions, as well as a ‘Standardized Measures Package and Protocols’ [11] which provided both qualitative (e.g. surveys and interviews) as well as quantitative (e.g. wait times) tools for evaluating new roles and providing mechanisms for reporting progress to administrative/monitoring bodies [2]. These resources continue to help foster further consistent expansion of APRT(T) roles and are adaptable to a wide variety of settings within the healthcare sector.

The three distinct steps in the role development process of a pCSRT position were:

- (1) Competency development
- (2) Competency assessment
- (3) Assumption of practice

Competency development

As new pCSRT positions were developed, desired competencies were identified and embedded into job descriptions to align with the local departmental needs. Prior to initiation of the CAMRT’s formal APRT(T) program, pCSRTs were guided by a competency profile created by CCO during the CSRT Project series (which served as the template for the nationally validated profile) (Fig. 1). This project based profile was replaced in 2017, when the CAMRT published its validated competency profile, establishing a national standard for advanced competencies in the areas of clinical and technical practice, research, education and leadership (Fig. 1; [11]).

Once a new position was defined, a pilot phase would be implemented whereby a pCSRT would step into the role to ascertain it’s feasibility and any potential impact. Each pCSRT developed a learning plan outlining how they would acquire the new knowledge, skills and judgement required; describing how they would develop competence, outlining the resources and support required; and

describing how competence would be evaluated. Timelines, agreed upon by the pCSRT, Manager and Clinical Supervisor (typically a RO), were attached to the learning plan. Progress was monitored over time and adjustments to learning plans were made if/when deemed necessary based on experiences in the pilot role.

In the absence of a formal training program for APRT practice, pCSRTs drew from a variety of learning resources to develop their competence [12]. One-on-one clinical supervision and teaching from ROs and physicists were key components of this phase. Education and training topics included (but were not limited to): advanced clinical oncology, advanced radiation biophysics, advanced physics, advanced patient assessment and care, and Pharmacology [12]. In addition, many of the pCSRTs gained theoretical and practical knowledge through graduate programs, and other learning opportunities such as journal readings, conference attendance, and self-directed learning.

“Time to competence” was variable, and was related to factors such as complexity of competencies, availability of learning resources, patient volumes, and supervisor availability. Once it was evident that a pCSRT had developed the required knowledge, skills and judgement, the evaluation processes would be initiated. Overall, time to competence was one to two years amongst the pCSRTs.

Competency assessment

Once the local team felt the pilot pCSRT had reached an acceptable level of competence in a given area, evaluation of competence began as articulated in the learning plan. For clinical and technical competencies, the performance of a pCSRT was compared with the one/multiple RO(s), deemed to be the ‘gold standard’. Where concordance studies were used, metrics for evaluation were drawn from the literature where available and developed de novo where necessary. From this, concordance data has been collected to demonstrate pCSRTs can work in an advanced capacity and match the quality of ROs in target delineation, field placement for bone, brain and lung metastases; recommendation of treatment prescription dose and fractionation [13], and symptom management [14].

Since 2017 in Canada, with a formal APRT(T) credentialing process in place under the CAMRT, eligible candidates enter and move through a three-phase credentialing process. Utilizing the APRT(T) competency portfolio as a framework, this sequential process includes the submission of a prior learning assessment and recognition portfolio, patient case studies demonstrating competence, and a competency-based oral examination in the individual’s area of specialty. Once a pass is achieved in each section, the candidate is awarded the title of APRT(T). This formal certification process is recognized across Canada and upholds standards of practice for APRT(T)s across the country [8]. At this time, the APRT(T) certification is not mandated for pCSRTs to work in Ontario, and local validation of specific competencies continues for those who have not obtained this certification.

Assumption of practice (task shifting)

The goal of pCSRT is to provide efficient, safe, high quality care for patients receiving pRT. pCSRTs achieve this using advanced competencies to facilitate “task shifting” within the interprofessional team (Fig. 2); better addressing the identified needs of local RT programs, while working with a defined patient population.

There are many activities normally completed by an RO that pCSRTs can complete with additional training and education which fall within the clinical and technical competencies outlined in the CAMRT profile. The assumption of these autonomous activities

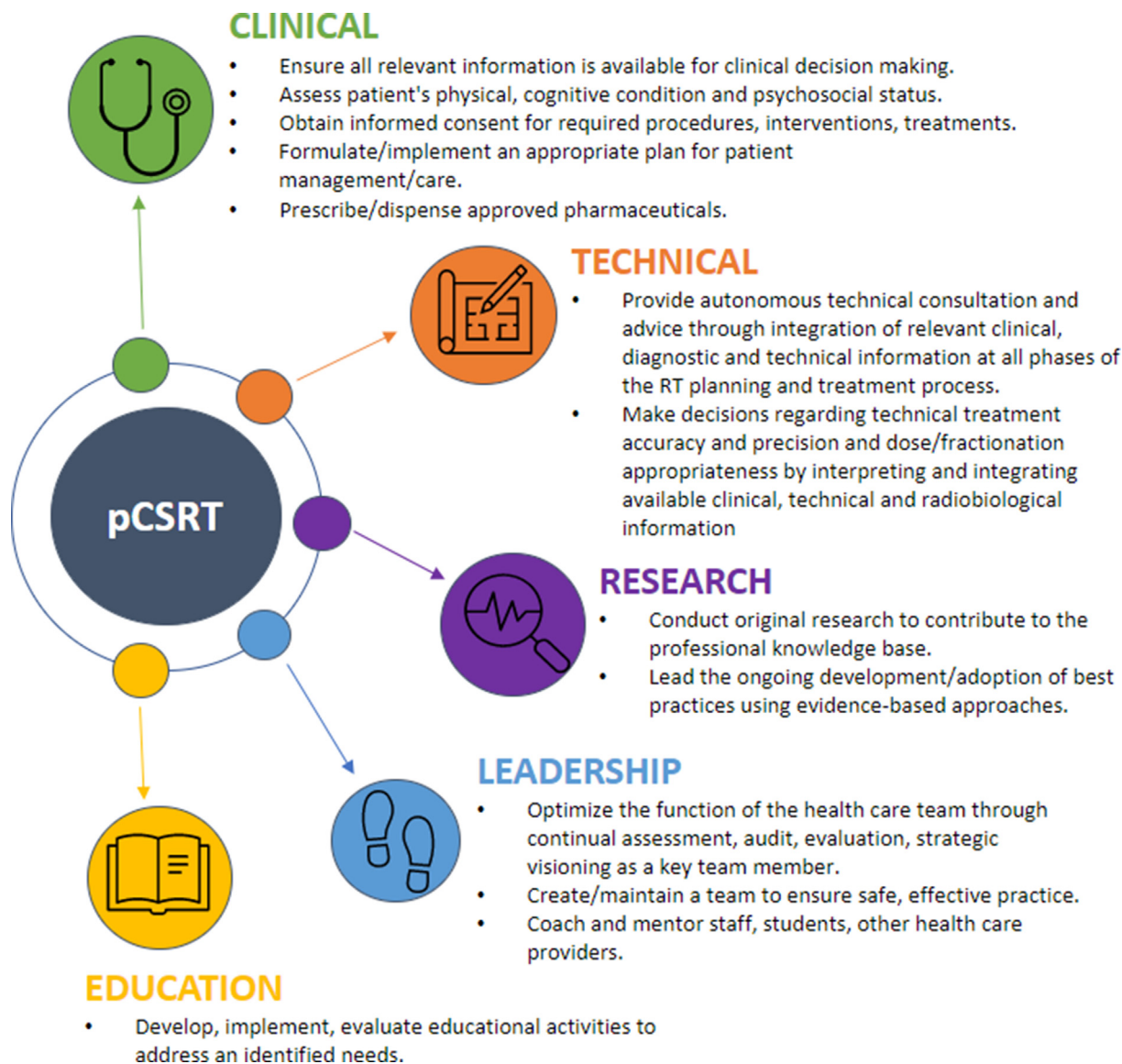


Fig. 1. APRT(T) Competency Profile [11].

results in both direct (at the point of entry into the system) and indirect (ad hoc, downstream) time savings (Fig. 3).

Once competence has been established, many factors must be taken into consideration before “task-shifting” can take place. The pCSRT and their supervisory team must ensure compliance that all legislative and regulatory requirements. Medico-legal requirements must also be fulfilled to comply with local practice standards. All of these vary by region and require different mechanisms to comply. It is the responsibility of the pCSRT and their department to investigate and address these requirements. In Ontario, for example, activities can be delegated to a pCSRT using two mechanisms – delegation and medical directives. Directives and delegation are authorizing mechanisms used to sanction and enable performance of those procedures identified by the local department for delegation after competence has been demonstrated where such sanctioning is required by law, practice convention or circumstances [16]. They can also be compiled into a collaborative practice agreement document, signed by the advanced practitioner and physician(s), to outline the rights and responsibilities of all parties listed [18,19]. In addition, in Ontario, professional liability insurance coverage is a requirement of the

College of Medical Radiation Technologists of Ontario (CMRTO) for licensed MRT(T)s. As a result, many MRT(T)s hold a full practice membership with the CAMRT, which includes comprehensive professional liability insurance.

Measuring impact of a newly implemented role over time is imperative to ensuring the effectiveness and sustainability of the role. In the sections below, examples of data that can be collected are provided along with the mechanisms and sources of such data. These metrics can be curated to gather relevant information about the impact of a new or changing AP position. Across the province, this data has been reported to CCO and the MOHLTC, demonstrating the many positive impacts of pCSRT involvement in patient care [17].

Metrics and measures

Utilizing a variety of metrics to evaluate their impact, results demonstrate pCSRTs, working within a pCSRT-facilitated model of care, have positive impacts on the existing pRT system in the following areas:

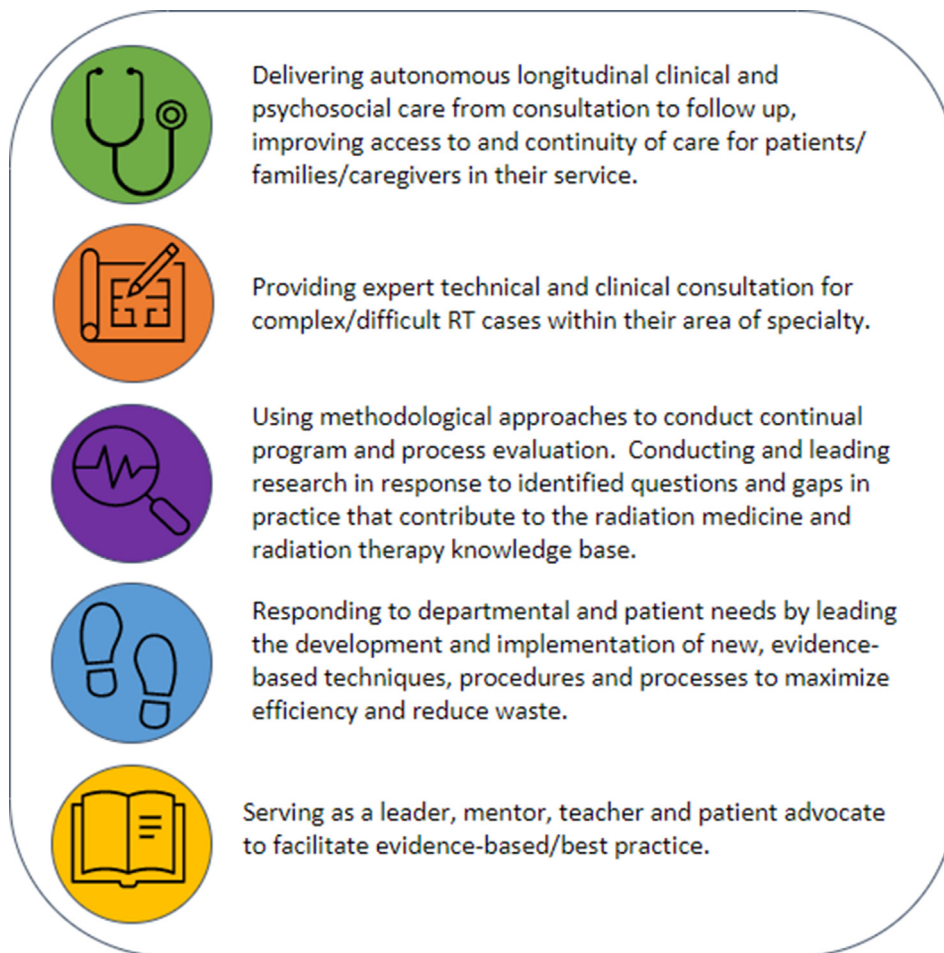


Fig. 2. pCSRTs engage in a combination of activities, utilizing their unique, advanced competencies to facilitate task shifting [15].

- 3.1. Increased System Capacity,
- 3.2. Improved Quality of Care, and
- 3.3. Influence.

Increased system capacity

pCSRTs increase the number of patients accessing pRT by taking on clinical and technical tasks (Fig. 2), at the point of entry to the system and further along the patient care pathway. This results in increased efficiency for the system, and directly improves the ability to expedite patient care throughout a patient’s journey. In the pRT domain, the impact of a pCSRT on increasing capacity is seen through expedited care, downstream time-savings, and enhanced access to care with tele-oncology [4,5,14,18–25].

Table 1 summarizes the metrics utilized by pCSRTs to prove their ability to increase system capacity, and the methodology used to collect data.

Improved quality of care

As RT experts on their interprofessional pRT team, pCSRTs improve the quality of care in several ways. Using their advanced competencies, they incorporate evidence-based practice into RT to benefit patients and maximize the functioning of interprofessional teams. The data demonstrating pCSRTs’ improvement on the quality of patient care were collected (Table 2) and can be sum-

marized under system improvement, quality and safety of treatment, technical innovation and implementation, and patient satisfaction[1,5,6,12,13,17,25–32].

Influence

As recognized leaders on the pRT team and beyond, pCSRTs can influence jurisdictions to achieve necessary changes and improvements in practice/processes, as demonstrated by pCSRTs’ research and knowledge translation, academic contribution, and stakeholder experiences [6,12,14,18,21,27–29,31–49]. Table 3 summarizes the metrics used by pCSRTs to illustrate their influence, along with the methodology used to gather information.

Discussion

Many keys to success have been identified from the development, training, and implementation of pCSRT roles in Ontario.

Although each pCSRT’s role is tailored to a meet specific departmental needs, these identified keys to success, are generalizable across specialties and geographic location:

- (1) Role Definition and Clarity
- (2) Role Implementation
- (3) Education, Training, and Mentorship

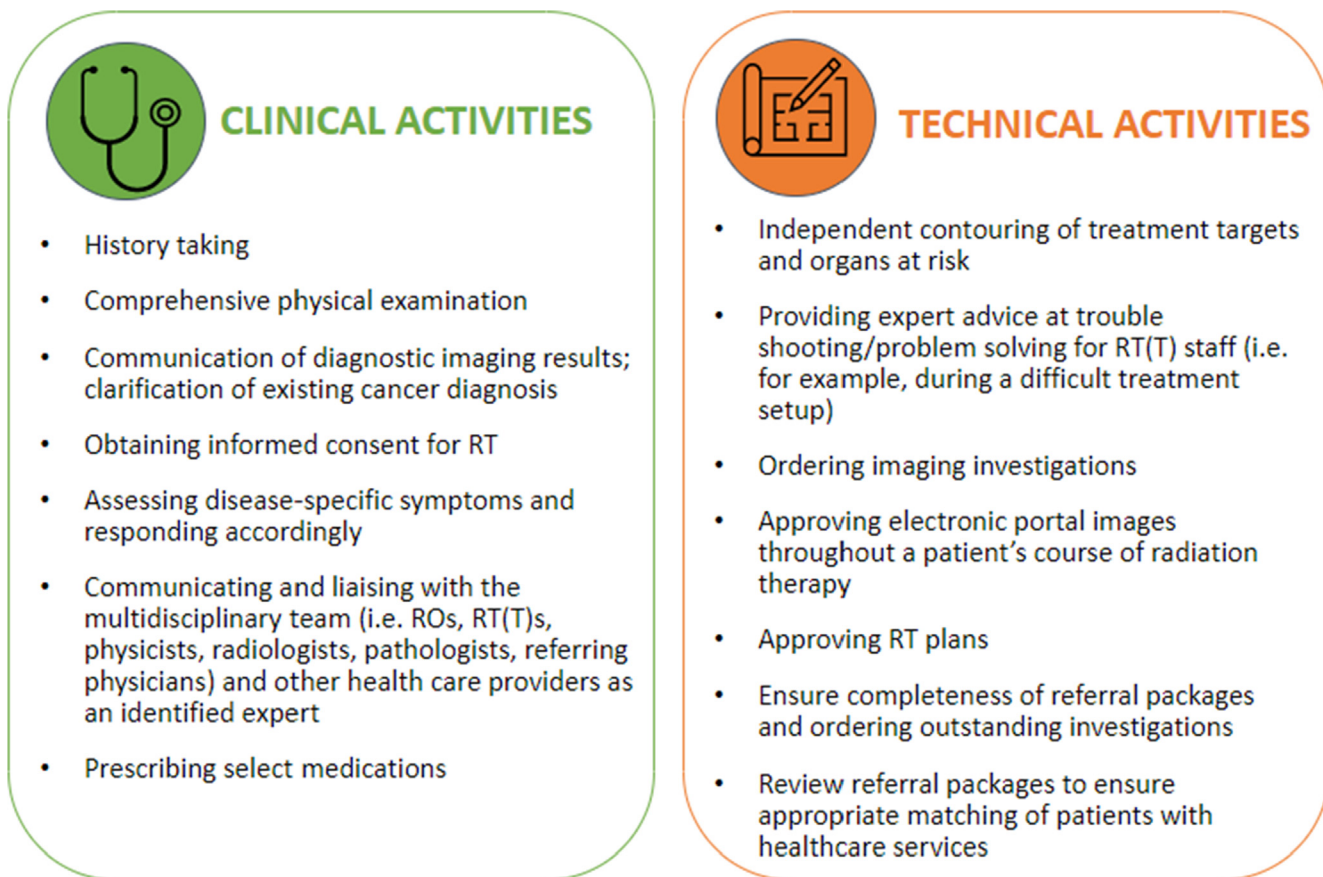


Fig. 3. Examples of activities that pCSRTs undertake, typically completed by ROs.

Role definition & clarity

Addressing service gaps or process bottlenecks while aligning with an organization’s strategic plan/direction is an important focus when implementing a new pCSRT role. These gaps can be identified by examining local RT program data. The nine Ontario pCSRTs all have unique roles that address needs/bottlenecks within specific departments. Some are involved in a structured rapid response clinic, while others deal with ad hoc, unplanned palliative patients. Regardless of local focus, each role is built atop the APRT(T) competency profile, ensuring the role is grounded in the APRT domain.

In the literature, a commonly encountered barrier to implementation of a new role/technique/system is lack of clear communication with team members [53]. Successful implementation of a pCSRT role requires early and frequent engagement of many stakeholder groups. One strategy to improve communication during this process is creating a map of all stakeholder groups including a timeline and methodology for communication. Meeting with these groups as the pCSRT role develops can help provide different perspectives and avoid roadblocks. Communication should occur regularly with these groups over the course of implementation, for example, at meetings, newsletters, a regularly scheduled report or presentation, etc. A mechanism to receive feedback/questions/concerns from these groups should also be created to encourage continued discussion and engagement.

Role implementation

As mentioned above, it is often beneficial to begin role implementation with a “pilot phase” or “pilot project”. This phase is

designed to provide the necessary time to collect evidence that the role has the potential to work and identify areas requiring modification/changes. There should be clear outcomes set that are measurable and relevant to the service gap identified. Several resources can help enhance the chance of success of a pilot project. The CSRT Projects utilized the PEPPA Framework when initially developing these roles. The PEPPA framework defines nine key steps for effectively addressing the need for an AP role, and for developing and implementing this role within the practice setting [54]. Additionally, the WHO has published a document that provides an excellent framework for building a pilot project including a checklist to monitor progress [55].

Education, training, and mentorship

In the absence of a formal education, training or mentorship program, it is very important that there is departmental support for the pCSRT role to be successful. A dedicated mentor, who is usually a RO, can be paired with the new pCSRT to help facilitate practice supervision, coaching and teaching, and both professional and personal support. Identifying an RO who understands the benefits of the pCSRT role for a specific patient population and is willing to take on a mentorship position is crucial. In addition, it is hoped that this RO will champion the role with colleagues and communicate successes and possibilities.

Mentorship amongst other pCSRTs is also very valuable. While positions in each site are unique, many experiences are common, allowing the pCSRTs to share and learn from each other. This opportunity for networking can alleviate the feeling of isolation that single pCSRTs may feel, much like health care practitioners who practice in rural or remote locations [56].

Table 1

Summary of methodology to demonstrate pCSRTs' ability to increase system capacity [7]. Suggested pre/post study timelines to involve "pre" timelines of three months prior to pCSRT's start, and "post" timelines to begin at least two months after pCSRT start.

Domain	Metric Definition	Methodology used to Collect Data
Increased System Capacity	Wait Times Impact on specific patient wait experience at various points along the care path (e.g., initial consultation)	<ul style="list-style-type: none"> ■ Data collected by pCSRT from timestamps in electronic patient record
	Patient Volumes Overall patient capacity in a specific clinic (# of patients per clinic)	<ul style="list-style-type: none"> ■ Data collected by pCSRT from reports generated in electronic scheduling system ■ A pre/post study by pCSRT ■ Control/experimental method (pCSRT's compared their group to a similar group outside of the pCSRT's influence)
	Patient Throughput Time it takes for patients to move from point X to point Y on the care path (e.g., from referral to consultation)	<ul style="list-style-type: none"> ■ Data collected by pCSRT from electronic patient record with timestamp to track time points ■ A pre/post study done by pCSRT ■ Control/experimental method (pCSRTs compared their group to a similar group outside of the pCSRTs influence)
	Time savings Time saved by RO on activities delegated to/shared with the pCSRT	<ul style="list-style-type: none"> ■ A calculation of the time saved by RO for the pCSRT to complete specific activities using baseline values documented by pCSRT during initial project phases, (# cases/period × time for RO to complete task)

Table 2

Summary of methodology to demonstrate pCSRTs' abilities to improve quality of care [7]. Suggested pre/post study timelines to involve "pre" timelines of three months prior to pCSRT's start, and "post" timelines to begin at least two months after pCSRT start.

Domain	Metric Definition	Methodology used to Collect Data
Improved Quality of Care	Quality Initiatives Projects that resolve identified gaps/bottlenecks in the RT workflow	<ul style="list-style-type: none"> ■ Data self-reported by pCSRT in annual CCO reports
	Innovation Development/incorporation of new techniques and procedures	<ul style="list-style-type: none"> ■ Data self-reported by pCSRT in annual CCO reports
	Patient Satisfaction Patient's satisfaction with the health care they receive from a pCSRT	<ul style="list-style-type: none"> ■ Pre/post modified patient satisfaction survey - originally 46 questions scored on a 5-point Likert scale (REB approved) - revised to accommodate the cancer/palliative population (6 questions for non-CSRT cohort; 10 for CSRT cohort) (REB approved)

Table 3

Summary of methodology to demonstrate pCSRT's areas of influence [7].

Domain	Metric Definition	Methodology used to Collect Data
Influence	Research Principal investigator, co- principal investigator or collaborator	<ul style="list-style-type: none"> ■ Data self-reported by CSRT in annual CCO reports
	Academic productivity and awards Peer reviewed papers and presentations, books/chapters, etc.	<ul style="list-style-type: none"> ■ Data self-reported by CSRT in annual CCO reports ■ Publication databases
	RT(T) Satisfaction Gauge RT(T)'s support for the pCSRT role and guide how it could shape career ladder increasing retention	<ul style="list-style-type: none"> ■ Internally developed survey (REB approved) - originally 7 questions on a 5-point Likert scale ■ Revised to include 3 additional questions on a 5-point Likert scale (total of 10 questions)
	Frontline/Second-line Stakeholder Gathering feedback from the frontline and second line team members about the impact of the pCSRT role	<ul style="list-style-type: none"> Validated survey tools: <ul style="list-style-type: none"> ● Maslach's burnout inventory [50] ● Physician work-life balance survey [51] ● Minnesota Satisfaction Questionnaire [52] ● Internally developed Direct supervisor and manager surveys

The Ontario pCSRTs have formed a Community of Practice (CoP) under the auspices of CCO's CoP network [57]. Having a venue to share experiences with colleagues in similar positions is an important strategy to ensure maximum functioning of the pCSRTs. Some pCSRTs have collaborated on small group educational opportunities from physicians. Others have collaborated on projects, reports, papers, and presentations. In addition, several of the pCSRTs have joined the International CoP to foster broader collaborations, projects and studies.

Conclusion

The current group of pCSRTs working in Ontario have clearly demonstrated their ability to increase system capacity and

improve quality of care for patients. As such, the pCSRTs are viewed as experts in their field, which has created opportunities for further mentorship, influence, and leadership within their respective departments as well as at provincial, national, and international levels.

As APRT continues to evolve in Ontario, the pCSRT role continues to be one of the most generalizable and adaptable roles affecting care. The unique knowledge and skills set of the pCSRT can be used to form new models of care at both urban and rural centres, alleviating bottlenecks in patient and service delivery pathways. Several 'Keys to Success' for implementation of the pCSRT role have been identified emphasizing the importance of role definition and clarity, systematic implementation, and education, mentorship, and training in establishing these positions.

Overall, the process for developing sustainable pCSRT roles has been well-documented and found to have significant positive impacts on the pRT system. Using existing tools and expertise can help establish new, consistent positions and new models of care. By presenting the process and work completed to develop APRT in Ontario, it is hoped that a useful foundation has been laid for expansion of the pCSRT role to other jurisdictions to continue to improve the quality and safety of pRT.

Declaration of Competing Interest

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

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