Transition to Practice in Radiation Oncology: Mind the Gap

By

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Thesis

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Dedication

This thesis is dedicated to the teachers both formal and informal that have supported and pushed me to be a better teacher, doctor and person. I also want to dedicate this to my family, who have been unerringly supportive of my pursuit of a Masters of Education. Thank-you to my fellow Masters of Education classmates, and teachers, whose insights and dialogue provided many transformative moments. Finally, I would not be here without the guidance and probing questions provided by my supervisors Dr. R. J. L. Murphy and Dr. J. Sargeant.

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Abstract

Introduction: Physicians entering independent practice often express apprehension in managing the non-clinical aspects of practice. Thus, this study examined the perceived preparedness for independent practice of Radiation Oncology (RO) residents and attempted to determine how any deficiencies could be addressed.

Methods: Focus groups with senior RO residents, RO fellows, new ROs, RO residency program directors and the RO specialty committee Competence by Design (CBD) working group were conducted. Data was coded using the Canadian Medical Education Directives for Specialists (CanMEDS) competencies, and thematic analysis.

Results: Commonly reported gaps in the TtP for ROs were lack of experience with: practice management, understanding the health care system, financial planning, effective collaboration and communication, career planning, and the totality of the radiation therapy planning process. Suggestions to address these challenges included use of: mentorship, educational resources, courses, simulation, improved graded responsibility, resident longitudinal clinics and curricular blocks for radiation therapy planning. Emergent data demonstrated that there are perceived roadblocks to the implementation of TtP curricula.

Conclusions: There are gaps in the TtP for RO residents, with opportunities for enrichment with CBD. A socio-materiality perspective suggests that the limitations of the radiotherapy planning software may be causing exclusion of residents at social, cognitive and pedagogical levels. The data is informative for the development of a TtP curricula.

Abbreviations

AAMC: Association of American Medical Colleges

ACGME: Accreditation Council for Graduate Medical Education, 6 competency domains (2016):

ACMPE: American College of Medical Practice Executives

ACS: American College of Surgery

AFC: Area of Focused Competence

AFP: Area of Focused Competence

AMAC: Australian Medical Assessment Collaboration

AMEE: Association for Medical Education in Europe

ARRO: Association of Residents in Radiation Oncology

ASTRO: American Society for Radiation Oncology

CanMEDS: Canadian Medical Education Directives for Specialists

CaRMS: Canadian Residency Matching Service

CBD: Competence by Design

CBME: Competency Based Medical Education

CIHR: Canadian Institutes of Health Research

CMA: Canadian Medical Association

CME: Continuing Medical Education

CPD: Continuing Professional Development

CILPs: Critically Intensive Learning Periods

CT scan: Computed Tomography scan

CV: Curriculum Vitae

EPAs: Entrustable Professional Activities

ESTRO: European Society for Radiotherapy & Oncology

GP: General Practitioner (family doctor)

MGMA: Medical Group Management Association (USA)

NHS: National Health Service

NSERC: Natural Sciences and Engineering Research Council of Canada

PBSGL: Practice-Based Small Group Learning

PGME: Post-Graduate Medical Education

PGY: Post-Graduate Year

> Refers to the post-graduate year of study of residents. Ie: a resident in their first year of post-graduate training is considered PGY1

PMC: Practice Management Curriculum

Royal College: Royal College of Physicians and Surgeons of Canada

REB: Research Ethics Board

RLC: Resident Longitudinal Clinic

RO: Radiation Oncology

ROs: Radiation Oncologists

SSHRC: Social Sciences and Humanities Research Council of Canada

TCPS: Tri-Council Policy Statement: ethical conduct for research involving humans

TPS: Treatment Planning System

XRT: radiation therapy / radiotherapy

Definitions

CaRMS: Organization that is responsible for matching medical students to residency training programs in Canada.

Contouring (in Radiation therapy treatment planning): the process of defining the volume to be treated with radiation therapy, and outlining the normal anatomical structures for which one wants to limit the radiation dose received.

EPAs: Entrustable professional activities

> Within the context of CBME, an EPA is a 'task in the clinical setting that a supervisor can delegate to a resident who has demonstrated sufficient competence. Typically, an EPA integrates multiple milestones. EPAs are used for overall assessment. They are tasks that must be accomplished, whereas milestones refer to an individual's abilities.' (Royal College 2017c).

Exploratory sequential mixed methods research: The research begins with a qualitative phase to explore the views of participants. The data is analyzed and then informs the development of the second quantitative phase. Often, the qualitative phase is used to build an instrument (i.e.: survey) that is then used in the quantitative phase. (Creswell 2014).

Fellow: Medical doctor who has successfully completed their specialty certification, who is pursuing additional focused specialized post-residency training, prior to working as an independent specialist.

Focus group: A qualitative method for gathering data, in which several participants discuss topics selected and facilitated by a researcher (Morgan 1984).

Locum: A physician who has successfully completed residency training, and is working as an independent practitioner, usually on a short-term, contractual basis.

Members of the Royal College RO specialty committee CBD working group: group of RO physicians who work with the Royal College of Physicians and Surgeons of Canada to devise the curriculum for CBD. Members include both RO residency program directors, and experts in the field of medical education, who are also ROs.

Milestone: Within the context of CBME, a milestone is an observable marker of someone's ability along a developmental continuum. Milestones are used for planning and teaching (Royal College 2017c).

Mentorship (in medicine): 'the process whereby an experienced, highly regarded, empathetic person (the mentor), guides another individual (the mentee) in the development and re-examination of their own ideas, learning, and personal and professional development' (SCOPME, 1998).

Mixed methods research: Involves the combination of elements from both qualitative and quantitative research approaches. This includes the use of viewpoints, data collection and analysis and inference techniques. It is employed to increase the breadth and depth of understanding and corroboration (Johnson 2007).

Reliability: The extent to which the scores produced by a particular measurement procedure or instrument are consistent and reproducible (Artino 2014).

Validity: The degree to which an instrument measures what it purports to measure (McKenzie 1999).

Chapter 1: Introduction

1.1 Statement of the problem

The process of becoming an independent medical specialist is long, incorporating multiple years of medical school followed by 2 – 7 further years of specialty or residency training, culminating in a certification examination. The process should lead one to be able to function independently in all aspects of one's specialty. During this process, there are times of significant stress due to change in responsibility, which correspond to the transition from medical school into residency, and from residency into independent practice (Shiner 2013, Teunissen 2011, Westerman 2010, Yardley 2018). These transitions also tend to occur over both time and geography which adds further stress (Westerman 2010).

Given the increasing complexity of patient care requiring more collaboration and communication amongst health care providers and the need to provide cost effective care, there is concern not just about new specialists' clinical acumen, but also other competencies which were previously not included in residency specialty training. In Canada, the Royal College is the professional body which sets the standards for resident education and assessment of competence and certification within each specialty. The Royal College developed, through a public consultation process the Canadian Medical Education Directives for Specialists (CanMEDS) core competencies to help address the breadth of competencies a successful medical specialist must demonstrate, with the most recent revision being released in 2015 (Frank 2015, Appendix A). The six different

competency domains outside of the Medical Expert core competency (clinical skill set), include Communicator, Collaborator, Leader, Health Advocate, Scholar and Professional (Appendix A). Since its introduction, other countries around the world have either adopted CanMEDS or formulated similar frameworks that incorporate non-clinical skills as competencies that specialist physicians must acquire, and hence are incorporated into their post-graduate medical programs (AGCME 2016, AMAC 2012, Hamad Al Bu Ali 2013, NHS 2010).

The Royal College has since developed milestones for the CanMEDS core competencies, which are applicable to all specialties (Frank 2015). A milestone is 'an observable marker of someone's ability along a developmental continuum… they are used for planning and teaching' (Royal College 2017c). The introduction of milestones corresponds to a movement towards Competency Based Medical Education (CBME) which in the Canadian context is called Competence by Design (CBD). This framework represents a movement from the previous time-based residency curriculum to one that requires demonstration of competence to progress. A new concept in CBD is the introduction of phases of training. The CBD phases include entry to residency, transition to discipline, foundations of discipline, core discipline and transition to practice (Royal College 2015a). Each phase requires demonstration of competency of the phase specific entrustable professional activities (EPAs) prior to moving to the next phase. An EPA is a task in the clinical setting that a supervisor can delegate to a resident who has demonstrated sufficient competence. Typically, an EPA integrates multiple milestones. They are tasks that must be accomplished, whereas milestones refer to an individual's abilities (Royal College 2017c).

In addition to demonstrating competence of all EPAs for a specific discipline, candidates must also pass a certification examination in order to receive a license to practice in their specialty. One of the most notable changes with CBD and the associated milestone/EPA framework is the addition of the transition to practice (TtP) phase. This has not historically been incorporated in Canadian residency training, and is in its infancy in other locales.

The TtP phase has the potential to improve the transition of senior residents to independent specialists, which is currently fraught with feelings of fear of failure and/or incompetence, isolation and emotive stress (Brown 2009, Dijkstra 2015, Griffin 2010, Teunissen 2011, Westerman 2010, Yardley 2018). These stressors, among others, have led to a high level of burnout, approximately 10% in the first 3 years of practice, with another 20% demonstrating symptoms of burnout in at least one domain (Westerman 2013a). This raises a significant concern as burnout can negatively impact not just the new specialist, but also the quality of patient care administered (Westerman 2013a). Thus, there is a need to improve the TtP phase, however how to do this remains unclear.

Since TtP is a new phase of residency training being introduced with the CBD framework, there is currently limited literature available to guide what skills or competencies should be included. There is even less information regarding how a TtP curriculum should be integrated into the current curricula, how it should be evaluated, or how much time should be devoted to it. Thus, the first step to creating an effective TtP curriculum is understanding what skills/competencies are needed for a new specialist to feel optimally prepared for independent practice, but are currently not adequately

developed by the end of residency. This would then be followed by steps to develop and evaluate curricula to include in this phase of training.

1.2 Perceptions of the Transition to Practice

The word ‘preparedness’ is often used to describe the result of transitioning from resident to independent specialist, however it is not well defined. A qualitative interpretive study from Scotland using semi-structured interviews of senior general practitioner (GP) trainees and new to practice GPs was used to examine this construct (Wiener-Ogilvie 2014). They found that both confidence and adaptability were used to help define preparedness. Specifically, preparedness incorporates the ‘ability to carry out particular skills and adapt to future work’ (Wiener-Ogilvie 2014). Many factors that were found to affect adaptability and confidence could be combined under the concept of an inclusive and supportive working environment. These included: the ability to manage workload; teaching effective consultation skills; availability of diverse, complex patients; positive feedback from the trainer and other doctors; trainer providing balance between support and challenge, and respect for trainees values; trainer-trainee relationship based on honesty, trust and conflict management; appropriate supervision allowing independent work with guided decision making; support with errors; inclusive training environments; active involvement in business and management; and exposure to various approaches to clinical management (Wiener-Ogilvie 2014).

Westerman (2010) used a qualitative grounded theory approach involving interviews of new to practice obstetrician/gynecologists to develop a framework to better

understand the TtP. Their conceptual framework involved three themes (novel disruptive elements, perceptions and coping, and personal development and outcome). These themes were further categorized by 3 recurring categories (task, role, context). Participants reiterated the challenges of the TtP including the significant difference in the level of work and responsibility between a senior resident and new specialist. These were associated with feelings of both achievement for completing their training, and apprehension especially around non-clinical skills which respondents reported were often not included in residency training. These non-clinical skills included supervision of learners, management tasks, financial and business management. Many of the challenges dissipated over time as mastery in each of the competency domains increased. This work adds to the concept of preparedness being multi-factorial as it was non-clinical skills (supervision, final responsibility of patients and learners) that provided the most concern. It also supports the concept that interventions like peer support and mentoring are seen as helpful, and that transitions do not occur at a specific moment in time but are progressive and protracted.

A UK group focused specifically on how new specialists (GPs) experience professional learning in the post-TtP period (Shiner 2013). The findings mirrored those of Westerman in that support that emphasized inclusion, validation and effective feedback were perceived as beneficial during the transitional period.

Griffin (2010) completed a similar qualitative study in the UK looking specifically at the educational support of new to practice GPs. The findings are similar to Shiner in that the most commonly reported concerns were isolation, and difficulty

accessing educational opportunities. There was also alignment with the Westerman (2010) study in that respondents reported a sense of isolation and emotive stress associated with the TtP. The respondents voiced a need for an environment of support, with mentorship or peer groups being highly regarded. This study also demonstrated some of the themes that are noted in much of the quantitative research in the field of TtP, specifically how new specialists feel less prepared in the non-clinical competencies such as practice management (finances, administration, information technology) and negotiation skills.

Taken together, these studies suggest there is a need for a specific curriculum within residency training, to address the perceived areas of lack of preparedness for the TtP of physicians. They also suggest that one needs to consider the context in which learning occurs (i.e. workplace, culture and support). To achieve this, one must consider factors outside of curriculum and assessment development, including the context in which the learning will occur, the conditions for learning (content, instructional materials, faculty involvement, system involvement), and the individual competencies and roles of the involved residents (Bordage 2011).

Another consideration is to maintain the awareness that the TtP does not occur in a moment, but over a period of time (Yardley 2018). Providing optimal preparation prior to the transition, can aid in coping with the transition, recognizing learning opportunities inherent in the process and taking responsibility for one's own outcomes (Teunissen 2011). Likewise, numerous studies have demonstrated the benefit of providing support to new specialists, which could include mentorship, peer support, onboarding programs, or

courses related to practice management, administration and/or leadership (Brown 2009, Griffen 2010, Harrison 2014, Kite 2006, MacMillan 2016, Sachdeva 2014, Shiner 2013, Westerman 2010, Yardley 2018).

1.3 Purpose of the Study

The overall goal of this study is to define an evidence-based curriculum to address the current void in the Radiation Oncology (RO) residency curriculum, the TtP phase, within Canada. To achieve this, the current study examined the perceived preparedness for independent practice that the current residency training programs provide RO residents and attempted to understand the competencies perceived as lacking in new ROs. These results will guide the future development of a pan-Canadian questionnaire by the primary investigator, to gain a broader understanding of the TtP, and finally lead to an informed curriculum available to all RO residency training programs to address these concerns.

1.4 Significance of the Study

This study is the first to examine the TtP for ROs. It is also the first to use multiple stakeholders to comprehensively examine all the CanMEDS competencies for perceived gaps in practice by physicians who are transitioning to independent practice. Previous studies that examined the TtP for medical doctors either did not include all seven CanMEDS core competencies in their study or only covered them in a broad

overview (Brouns 2010, Card 2006, Haji 2014, Lister 2010). Thus, this study will fill a void in the current literature by providing a more comprehensive view of the concerns surrounding the TtP from the perspective of the CanMEDS core competencies. This is important as the CanMEDS competencies play a central role in the intended teaching and development of physicians in Canada.

This is also the first study that will simultaneously examine the TtP from the perspectives of multiple stakeholders including senior RO residents, RO fellows, new to practice ROs, Canadian RO residency program directors and members of the RO specialty committee CBD working group. Previous papers that examined TtP included only one or two of these groups (Beckett 2006, Brouns 2010, Brown 2009, Card 2006, Crosson 2011, Dahn 2018, Dijkstra 2015, Fakhry 2007, Haji 2014, Kite 2006, Lynch 2003, McDonnell 2007, McKinstry 2005, Morrow 2009, Morrow 2012, Wichman 2009). Thus, this study will provide the opportunity to obtain a more comprehensive perspective on the process.

This study also discusses participants' suggestions and perceptions regarding interventions to address competencies perceived as lacking in residency training. Given the inclusion of Canadian RO residency program directors and members of the RO specialty committee CBD working group, we are able to incorporate a unique perspective on how to best develop a TtP curriculum from those with the greatest influence and insight into the politics and conundrums associated with the development, introduction and proper implementation of new curricula. The gathered data will be to used to develop a pan-Canadian questionnaire to gain a broader understanding of the TtP, and then devise

a curriculum to address the perceived competency gaps for transitioning ROs and meet the requirements of the Royal College CBD TtP phase.

1.6 Reasoning for Examining TtP in Radiation Oncology

The upcoming implementation of CBD across Canada has caused a significant amount of apprehension, as competency-based education is a new concept to many physicians. It lies in contrast to the time-based model in which many have participated over years to decades. On top of this, the concept of incorporating a TtP phase is novel, and even more challenging as there are few programs that have already engaged in this practice and minimal data is available on how to implement a TtP curriculum.

Given this backdrop, and the other issues described above, the RO residency committee at Dalhousie University, of which I am a member, decided to start a TtP curriculum ahead of the implementation of CBD, however we were unsure how to go about this. Given my own experiences as a new to practice RO, this topic resonated with me. Further, the idea of completing a needs assessment was fully supported at the national level by the members of the Royal College of Physicians and Surgeons of Canada RO specialty committee CBD working group. Thus, given my own interest in this topic, a perceived need to examine this topic and the support at the national level, this project was borne.

1.5 Summary

The transition from residency to a full specialist role is associated with a sense of achievement, but also increased stress and negative emotions. Most new graduates report a high feeling of competency in the clinical domains, but cite concern in other areas of practice. These include a sense of being inadequately prepared for the Medical Expert (non-clinical) demands of being a specialist physician, including practice management skills, financial management, supervising learners and having a teaching role (Beckett 2006, Morrow 2012, Westerman 2010). These concerns have been recognized by the Royal College (2015a) who as part of the mandated CBD framework, have included a TtP phase as the last stage of residency. However, there has been minimal guidance as to what should be included in this phase, beyond higher-order CanMEDS milestones and EPAs. Thus, the goal of this project is to examine the perceived preparedness for independent practice that the current residency training programs have provided for RO residents and attempt to determine the competencies perceived as lacking in new ROs.

Chapter 2: Literature Review

The literature review was used as the starting point to identify perceived deficiencies in competence during the TtP for new specialists. The literature search was conducted using PubMed, Google Scholar, PsycINFO and EMBASE. Articles that included data on perceived competence, gaps in competence or areas of perceived need for successful TtP of new physicians were included. Similar document suggestions and article reference lists were examined to find pertinent articles. The CanMEDS Royal College website was examined to determine essential competencies expected of residency program graduates (Frank 2015). A list of competencies that are either expected of new graduates, or felt to be under-developed in new graduates was generated from the articles gathered. These were subdivided under the CanMEDS seven core competencies (Royal College 2015a, Appendix A) to provide a general overview of what CanMEDS competences have been reported as deficient in new medical specialists.

2.1 General Transition to Practice Studies

Most articles examining preparedness for independent practice agree that new specialists feel prepared with respect to clinical competencies (Beckett 2006, Brown 2009, Card 2006, Crosson 2011, Dijkstra 2015, Griffin 2010, Li 2017, Lynch 2003, McDonnel 2007, Morrow 2009, Morrow 2012, Westerman 2010). This is not surprising, as the end result of residency training is a certification examination focused almost exclusively on clinical competencies, and thus the main focus of residency training is

preparation to meet the clinical demands of independent practice. The corollary is that there tends to be a lack of perceived preparedness for the non-clinical competencies commonly encountered in independent practice.

Eleven articles examined the perceptions of either senior residents and/or new to practice specialists, of which seven involved a survey, one used data from the results of milestone reporting, and three involved semi-structured qualitative interviews (Beckett 2006, Card 2006, Crosson 2011, Dijkstra 2015, Kite 2006, Li 2017, Lynch 2003, McDonnell 2007, Morrow 2009, Morrow 2012, Westerman 2010). Only one study used the CanMEDS domains to assess preparedness in their respondents (Card 2006). The results were categorized under the CanMEDS 2015 domain headings (Medical Expert, Communicator, Collaborator, Leader, Health Advocate, Scholar, Professional) as accurately as possible for ease of comparison (Royal College 2015a). The commonly reported deficiencies with respect to non-clinical competences, fall within the CanMEDS Leader, Scholar and Professional domains (Table 1).

Table 1: Summary of reported deficiencies in CanMEDS core competencies (from 11 studies)

Article	Method	Med Exp	Comm	Collab	Lead	Health Adv	Schol	Profess
Beckett 2006	Survey	Y		Y	Y		Y	Y
Card 2006	Survey	N	N	N	Y	Y	Y	Y
Crosson 2011	Quali	N	N	Y	Y	Y	Y	Y
Dijkstra 2015	Survey	N	Y	N	Y		Y	Y
Kite 2006	Survey	Y		Y				
Li 2017	Mile	N	N	N	N	N	N	Y^
Lynch 2003	Survey	N	N	N	Y	Y	Y	Y
McDonnell 2007	Survey	N		N	Y			
Morrow 2009	Quali	N			Y		Y	Y
Morrow 2012	Survey	N	N	N	Y		Y	Y
Westerman 2010	Quali	Y			Y		Y	n/a
Studies with deficiencies		3	1	3	9	3	8	8

^Competency to have the lowest average score at graduation, but still meeting a minimum level of competence

Y: reported deficiency N: no significant deficiency reported

blank: data not available Quali: Qualitative (semi-structured interviews)

Med Exp: Medical Expert Comm: Communicator

Collab: Collaborator Lead: Leader

Health Adv: Health Advocate Schol: Sholar

Profess: Professional

Mile (milestone): study involving a cohort of pediatric residents that used milestone assessments to determine reasonable expectations at time of graduation from residency

Not all of the CanMEDS domains were represented in each study, with Medical Expert, Collaborator, Leader, Scholar and Professional being well represented, while there was a paucity of data for the competencies associated with the Communicator and Health Advocate domains (Table 1). This may be partly due to not being raised as a concern in two of the three qualitative studies and being under-represented in the survey-based studies. The reported deficiencies in preparedness for transition to independent practice and their frequency, are presented in Table 2, categorized by the associated CanMEDS competency domain. The most commonly reported deficiencies are found within the Leader domain, however this domain is over-represented in the literature (Brown 2009, Brouns 2010, Busari 2011, Blumenthal 2012, Fakhry 2007, Gill 2007, Jones 2008). It is difficult to ascertain the denominator for Table 2 to determine a percentage of studies that found deficiencies in each competency, as a lack of mention of a specific competency may reflect no perceived deficit, or that it was not adequately addressed within that study.

Table 2: Reported deficiencies in CanMEDS core competencies (from 19 studies)

CanMEDS Domain	Total # studies mentioned
Medical Expert (11 general studies)	
Final medical responsibility is a major novel experience	4
No/minimal experience meeting set targets	2
Concern around having the final medical responsibility on call	1
Collaborator (9 general studies)	
No/minimal experience with specialist partnerships	3
No/minimal experience with conflict resolution with other health care workers	3
Communicator (6 general studies)	
No/minimal experience with negotiation skills	3
No/minimal experience with discussing ethics, or compliance issues	1
No/minimal experience discussing medical errors	1
No/minimal experience discussing end of life care	2
Health Advocate (4 general studies)	
No/minimal experience in health advocacy	2
Leader (10 general studies)	
No/minimal managerial experience	11
No/minimal financial experience	9
No/minimal experience writing business plans	5
No/minimal leadership experience	7
No/minimal administrative experience	7
No/minimal experience navigating the health care system	5
No/minimal experience with managing care in a cost effective way and/or managing resources	4
No/minimal experience in quality assurance	4
No/minimal experience with billing/coding	3
No/minimal experience with maintaining a program of quality	2

improvement in one's own practice	
Professional (8 general studies)	
No/minimal experience leading change in department/ward	3
No/minimal experience meeting a work/life balance	2
No/minimal experience dealing with difficult ethical issues	1
No/minimal receptivity to using information technology	1
Scholar (9 general studies)	
No/minimal experience supervising learners	4
No/minimal experience in critical appraisal	2
No/minimal experience in research (grants, writing, participating)	1
No/minimal experience giving feedback	3
No/minimal experience receiving feedback	2

*Beckett 2006, **Brouns 2010, **Brown 2009, **Busari 2011, **Blumenthal 2012, *Card 2006, *Crosson 2011, *Dijkstra 2015, ^Fakhry 2007, ^Gill 2007, *Griffin 2010, ~Higgins 2005, *Kite 20067, *Li 2017, *Lynch 2003, *McDonnell 2007, *Morrow 2009, *Morrow 2012, *Westerman 2010. (*general competency papers, ^ documentation and billing papers, **leadership/management papers, ~literature review)

All studies reported that their respondents felt prepared to fulfill their clinical duties after their TtP. The studies that reported a lack of preparedness in the Medical Expert (clinical competencies) domain identified specific areas of concern. Beckett (2006) completed a questionnaire study of new to practice emergency room physicians, who overall reported adequate preparedness for clinical practice, but 26% reported challenges dealing with psychiatric patients or other specific clinical issues. A survey of senior residents and new specialists in palliative care reported that knowledge of specific processes and skills caused stress (Kite 2006). Finally, a qualitative study involving new

specialists, aimed at developing a framework for TtP, found that the TtP was associated with stress around assuming the final responsibility for patient care (Westerman 2010).

The other well reported area where there is concern surrounding clinical acumen of new specialists is with surgeons and procedural skills. This issue has been raised more recently given the changes in duty hours and curtailed autonomy with respect to completion of procedures independent of supervision (Hashimoto 2016, Mattar 2013, McDonnell 2007, McKinstry 2005, Nadler 2015, Odell 2015, Patel 2015, Richardson 2013). Given that RO is a medical specialty with few procedural skills, this consideration is outside the scope of the current project. However, it should be noted that brachytherapy shares similarities with surgery. It involves the placement of radioactive seeds or catheters into a patient using surgical technique. It has been recognized that there is a need for additional training post-residency for those pursuing brachytherapy as part of their RO practice. As such, an Area of Focused Competence (AFP) diploma program (post-residency training), has been developed to ensure acquisition of specialist level competence in this procedural skill (Royal College 2015b).

Many studies do not provide enough specificity about the competencies for which they are asking respondents about preparedness for TtP. Card (2006) adminstered a survey for new to practice internal medicine physicians between 1993 and 2001. The study asked about preparedness and perceived importance of 31 competencies that were categorized under the 7 CanMEDS domains. These competencies were vague including ‘communication skills’ and ‘consultation skills' under the Communicator domain. Thus, it is difficult to interpret the result that these were ranked highly for importance and

perceived level of preparedness during the TtP. This is in contrast to the survey developed by Dijkstra (2013, 2015) for which skills under communication included 'discussing medical errors with patients and their family members', 'being actively involved in end-of-life decisions…' and 'discussing palliative care…' and all of which respondents reported feeling less prepared for during the TtP. There was also an over representation of Medical Expert questions (12/31) in the Card (2006) survey. Despite these limitations, the authors found the largest gaps in perceived importance and level of preparedness were in the manager (Leader) domain (administration skills and setting up an office), Health Advocate (choose cost-effective treatments, counsel regarding: smoking, exercise, HIV testing, domestic violence and substance abuse), Scholar (critical appraisal and participating in quality assurance) and Professional (end-of-life issues, ethics, and compliance issues).

Beckett (2006) examined preparedness for independent practice utilizing a questionnaire sent to new emergency medicine physicians in the United Kingdom (UK). The salient findings align with the literature in that the areas associated with the highest stress and least confidence in new specialists were managing conflict resolution, meeting treatment targets, and handling management issues. The article did not provide information on all possible responses, thus it is unclear for the questions 'in which area do you feel least confident' and 'what do you find most stressful at work?' what the answer options were. In particular it is unclear whether the competency domains of Communicator, Collaborator, and Health Advocate were included. There was also a lack of information on the method for survey development, and steps taken to ensure validity and reliability. Similar to the article by Card (2006), the competencies listed are very

broad and could incorporate numerous competencies or interpretations by respondents. For example, 'handling management issues' can encompass personal practice, departmental practice, systems, and/or dealing with colleagues, learners or other health care professionals.

The article by Kite (2006) was a letter to the editor, thus much of the methodological process and details were not provided, nor was the publication peer reviewed. It is an important addition to the literature as it supports the findings of Beckett (2006) that new specialists experience a significant level of stress related to communication and the relationships with other health professionals, especially conflict resolution. The study population in this case was new palliative care physicians and senior residents. This report also raised concerns about the current lack of support for new specialists.

An ophthalmology group from the United States used a 4-page questionnaire of new to practice physicians to gauge perceived preparedness for different skills used in independent practice (McDonnell 2007). The methodology for the survey development was not provided, thus the steps to ensure reliability and validity were not included. There was an over-representation of questions regarding clinical and business management skills. There was no mention of competencies in health advocacy, scholarship, or professionalism, thus it is unclear whether these were included. The areas for which respondents felt the least prepared were in financial management (practice and personal), practice management and coding and reimbursement which all fit into the Leader CanMEDS competency domain. These findings align with other studies,

especially those from the United States where there is significant concern amongst new graduates about practice and money management. This may reflect their healthcare system which is only partially government sponsored, thus requiring significant business acumen to run an effective medical practice that supports both public and private practice. However, deficiencies in business related competencies were also noted in studies from the United Kingdom, and Europe (Beckett 2006, Brown 2009, Busari 2011, Crosson 2011, Dijkstra 2015, Griffin 2010, Higgins 2005).

An American group reported on a national survey of GPs assessing their perceived preparation for independent practice (Lynch 2003). The article included a literature review, medical specialty input, and a three phase field test prior to its implementation. The questionnaire was organized according to the 6 Accreditation Council for Graduate Medical Education (ACGME) competencies (Appendix B), which are similar to CanMEDS competencies (Appendix A). The questions asked were clear and well written. The results support the previous and subsequent literature with the highest level of preparedness being associated with interpersonal and communication competencies and professionalism, while the lowest scores were found in practice-based learning and improvement, and systems-based practice. Interestingly, this is one of the first studies to examine systems based practice which has an emphasis on working within, and having knowledge of, the functions and nuances of a healthcare system.

The development of a 91 task inventory survey for new to practice physicians by Dijkstra (2013) followed a rigorous research protocol, to ensure validity. It was also used on a large population both in its initial phase of task inventory development (Dijkstra

2013), and in testing for preparedness in the study population (Dijkstra 2015). The reported preparedness was lowest for: emailing with patients; negotiating with a health care insurance provider; improving one's competence in organization and management; preparing and submitting grant applications; and all tasks under the management cluster or Leader CanMEDS domain. Those with slightly higher levels of preparedness, but still sub-optimal, included: administration, leadership, research, end of life care and patient safety communication. In general, respondents felt well prepared for Medical Expert/clinical tasks. These findings are in line with other studies, demonstrating the largest deficits in management, and to a lesser extent leadership, and professionalism. This study is strengthened through the use of a validated tool, and having a list of tasks that are specific. Thus, the results are more useable when deciding exactly which competencies would provide the most benefit when incorporated into a TtP curriculum. One concern was the lack of representation from RO, thus one cannot with certainty comment on the applicability to this specialty. Also, the inventory was not validated on a medical population outside of the Netherlands, where both the medical education program and healthcare system are different from Canada.

A group from the United Kingdom also reported on a rigorously developed cross-specialty survey study (Morrow 2009). The first paper outlined the constructivist qualitative study, the purpose of which was to determine the extent to which residency training prepared physicians for independent practice. The study population included senior residents, new specialists and medical mangers across numerous specialties. The results lead to the development of a questionnaire that was distributed to new specialists (Morrow 2012). Similar to the Dijkstra task inventory study, the survey included more

questions across a larger range of competencies, with only Health Advocate not being represented. The results are exceedingly similar to the Dijkstra study, and the other studies listed above, in that the areas in which new specialists felt the least well prepared could be categorized into Leader (designing new services, managing resources effectively, making decisions about allocating resources, inputting a business plan), Scholar (role of clinical and educational supervisor, providing feedback) and Professional (managing National Health Service (NSH) targets competency domains, understanding the NHS management structure, implementing change, raising concerns about performance, managing concerns about performance, supporting a poorly performing physician).

A unique qualitative, single open-ended question study was completed by a group from California to identify what department chiefs felt was the single characteristic missing from the average newly hired physician with respect to knowledge, skills and professionalism (Crosson 2011). 50% of respondents felt that new physicians were lacking in management of routine conditions or simple procedural skills. This is in contrast to most new specialists feeling secure in their medical knowledge. This discrepancy may be based on a difference in perspective, one being of self (the new specialist) versus an outside perspective (departmental leader), or the difference between the in-training versus real-life environment. Areas that were aligned with other research included perceived deficiencies in leadership and management competencies.

2.2 Studies Addressing the Leadership domain in TtP

Leadership is the most commonly reported competency domain within the TtP literature. Four studies dealt with this domain alone, two of which discussed leadership and management broadly, while the other two focused on documentation and coding. Documentation and coding refers to the ability to accurately bill for a patient interaction to ensure the specialist receives the proper payment. A patient interaction could include a consultation, a follow-up visit, a telephone call, or can be related to a procedure including the steps related to planning, quality assurance, and management of side effects. Each of these tasks is associated with a specific 'code' for which a monetary value is assigned. Thus, the process of documentation and coding includes choosing the correct code for an interaction, completing the correct paperwork associated with that interaction, and sending the documentation to the correct paying party (patient, insurance company and/or government).

Two studies published results specifically analyzing new specialists' preparedness in the leader/management domain. A United Kingdom group completed a 3 phase study investigating how to best prepare senior residents for the specialist role (Brown 2009). The second study by Brouns (2010) involved distributing a questionnaire to residents of all specialties, except family medicine, in the Netherlands to determine if there was a perceived need for training in management skills, and the preferred form of intervention to improve these competencies. For both studies, the majority of respondents reported a lack of preparedness for leadership/management roles, and a need for more training. In the Brouns study the specific skills that senior residents felt would be the most beneficial

if taught were negotiation skills, development of specialist partnerships, career opportunities and working within the health care system. The Brouns (2010) study also examined the preferred methods of training to meet these needs. They found that the preferred method of training was a workshop; however, interactive, case-based, web-based sessions and lectures were also reported. Most preferred instructors to be a medical specialist or an external expert, and the vast majority preferred the teaching to occur at the workplace.

Both documentation and coding/billing specific studies were completed within the United States. These focused specifically on the need for better documentation and coding training during residency. The first by Fakhry (2007) examined new surgical specialists' knowledge of documentation and coding for professional services. The population included 60 surgical residents and 46 specialists, who were asked to complete a survey regarding knowledge, attitudes and learning. They reported that 82% of residents, and 89% of specialists felt that they had not received adequate training on documentation and coding. This corresponded to 85% of residents and 87% of specialists feeling that teaching around this topic should be included in residency. The authors also provided documentation and coding questions as part of the survey to determine true knowledge. This is a unique paper as it allows comparison of perceived preparedness and measurable ability. This would suggest that documentation and coding could be objectively tested. The article reports that the instrument was reviewed for content validity, although the details of this and the questions asked were not provided. Also, the response rate is not reported, thus there is the potential for response bias.

The second article reviewed trends in practice management training during residency, with a focus on coding and billing in orthopaedic surgery in Texas (Gill 2007). The authors distributed an informal survey, based on a literature review. More than 90% felt that training in this area during residency was essential and only 13% reported confidence in this area. This is in line with the results of Fakhry (2007), suggesting a high perceived need for increased documentation and billing training prior to the TtP. However, further comment is limited as this article provided a paucity of information about methods or statistical analyses used. While the response rate was provided, the number of participants is unknown. Also, the American healthcare system is a mixture of private and public, while in Canada there is only a public system. Also, within Canada, the method of reimbursement varies by province, and can include salary or fee for service. To my knowledge, there are no studies specifically targeting the need for documentation and billing prior to independent practice within a public healthcare system.

2.3 Studies Suggesting Methods to Improve the TtP

Since it has been shown that there are perceived competency gaps in residents as they transition to practice, and that these are associated with emotive stress and a higher rate of burnout, the next step should be to determine how to optimally prepare learners for this transition (Brown 2009, Dijkstra 2015, Griffin 2010, Teunissen 2011, Westerman 2010, Westerman 2013a, Yardley 2018). Numerous suggestions have been put forth, which can be divided into interventions prior to, and after, graduation from residency.

Suggestions for additional teaching during residency included increased responsibility to senior residents to more closely mirror a specialist's workload (including more administrative and managerial duties and attending meetings), increased managerial experience, provision of leadership training, increased health advocacy experience and provision of mentoring (Beckett 2006, Blumenthal 2012, Brouns 2010, Busari 2011, Card 2006, Fakhry 2007, Higgins 2005, Sachdeva 2014, Westerman 2010, Wichman 2009, Yardley 2018). However, there is no consensus as to optimal timing, length, methodology or which competencies should be prioritized. The most prevalent suggestion for method is a workshop or a similar interactive environment (Blumenthal 2012, Brouns 2010, Busari 2011). The most favored location was the workplace, although off-site professional courses are available especially for leadership and managerial training (Blumenthal 2012, Brouns 2010, Higgins 2005). Another common theme is increased graduated responsibility within an authentic workplace environment (Croke 2012, Lister 2010, Sachdeva 2014, Wiener-Ogilvie 2014, Westerman 2010, Yardley 2018).

For post-TtP, mentorship is the most documented method to improve the transitional process, and is linked to improved care quality, patient safety, and increased confidence, job satisfaction and working relationships, while decreasing stress and burnout (Brown 2009, Griffin 2010, Harrison 2014, Higgins 2005, Sachdeva 2014). Other suggestions included provision of time for continuing professional development (CPD) courses, development of peer groups for discussion and provision of feedback, a handbook outlining processes within the new working environment, as well as having an onboarding program for new specialists (Brown 2009, Griffin 2010, Harrison 2014, Higgins 2005, Sachdeva 2014, Wilkie 2005).

2.4 Transition to Practice Curricula

There are a few groups that have implemented a variety of programs to improve the TtP. Three programs involved the development of peer groups for new specialists, all of which used the groups for both peer mentorship and journal reviewing (MacMillan 2016, Rial 2013, Wilkie 2005). One group enrolled two groups of seven participants who met twice prior to, and twice after, graduation from residency and TtP (Rial 2013). The groups continued to meet after the completion of the study. Rial (2013) examined the use of a journal club in which new internal medicine specialists met ten times over a 14 month period to discuss an article and a TtP topic. It was found that TtP topics dominated the discussion, suggesting that participants found the peer support helpful. Wilkie (2005) included 12 psychiatry senior residents and new specialists with 2 facilitators forming a peer support group that met once a month. This article focused on how the TtP effected their perception of professional identity, authority and leadership. Unfortunately, all three articles provided minimal information on the impact of the program on the participants perceived level of preparedness for practice, nor whether they helped to alleviate any of the negative emotions associated with the transition (MacMillan 2016, Rial 2013, Wilkie 2005). MacMillan and Rial both reported that the participants continued to meet regularly after each study period ended, which is the only data to overtly suggest benefit.

There is more data on the implementation of practice management curriculums to improve preparedness for TtP. Three American studies introduced practice management specific teaching, of which the first involved a series of monthly billing and coding teaching sessions for surgical residents and real-time practice of management of clinical

coding (Jones 2008). The second study involved a 32 week practice management curriculum for senior psychiatry residents based on financial management, human resources management, planning and marketing, information management, risk management, governance and organizational dynamics, business and clinical operations and professional responsibility (Wichman 2009). The curriculum involved a mix of seminars, small group discussion and hands-on projects. The last study from Florida reported on the implementation of a practice clinic managed by final year neurosurgery residents who were responsible for the successful management of the clinic including patient care, and management of resources and personnel (Lister 2010). All three studies used surveys (Wichman also used interviews) of participants at the end of the curriculum, for which there was positive feedback. Topics that were most highly regarded included negotiating contracts, and risk management.

Jones (2008) demonstrated an increase in coding compliance after participation in the program. Interestingly, this is an area that participants in the Lister trial (final year neurosurgery residents who were responsible for the independent management of a clinic) listed as insufficiently addressed in the curriculum (Lister 2010). In both the Lister and Wichman studies participants reported an increase in confidence in managing an independent practice. Taken together, these three trials support the available literature that demonstrates a significant need for adequate training in practice management. However, there remains a lack of consensus on how to best teach these competencies. It would be compelling to acquire long-term data on each curriculum to determine if they led to changes in perceived preparedness for independent practice, and decreased medical errors, and/or what specific topics were the most beneficial.

A group from the Netherlands completed a literature review examining how the role of manager (Leader under CanMEDS) had been incorporated into residency curricula and the results of such initiatives (Busari 2011). Most of the included 40 articles were from North America and were limited to family medicine. The most commonly taught topics were financial management, management concepts, quality assurance (cost benefit, quality improvement), legal issues, organizational skills, and leadership. The overall findings were that management education should be considered essential in residency training, especially since there is currently a perceived knowledge gap in new specialists. However there continues to be a lack of consensus on the length, duration and timing of management training.

In Canada, the Canadian Medical Association (CMA) developed a Practice Management Curriculum (PMC) which is available online and involves 15 modules ranging from eight to twenty-eight pages (Cummings 2012a-c, Faloon 2012a-k, Larsen 2012). It is aimed at residents transitioning to independent practice. These cover a variety of topics including getting started as a professional, financial planning, personal and professional insurance, personal and professional accounting and taxation, legal issues for physicians, medical records management, electronic medical records, physician remuneration options, principles of negotiation, evaluating practice opportunities for family physicians and specialists, negotiating a mutually beneficial locum (physician who has successfully completed residency training, and is working as an independent practitioner, usually on a short-term basis) contract, starting your practice off on the right foot, setting up your medical or clinical office, and staffing and human resources. The

uptake and perceived usefulness of these by senior residents and/or new specialists has not been evaluated. Also, they are not mandatory reading for residents.

A literature review completed by Blumenthal (2012) included a clarification of the difference between management and leadership. The purpose was to provide evidence to support the inclusion of formal leadership training in residency. This paper is unique as it provided information regarding the best currently available corporate leadership development programs, and a framework for leadership development within healthcare which included the common barriers to leadership training. The areas that they felt were most important to include were self-reflection, self-awareness, capacity for self-regulation, leading teams, practicing 'followership', leading change, negotiating with colleagues and patients, and managing professional networks. Overall, it provides an excellent starting point for implementing a leadership specific program, with the flexibility to adapt to most medical environments. A level of program development experience and multi-disciplinary buy-in would be required to use this tool effectively.

A multi-national group reported on a modified Delphi consensus study looking specifically at creating a Leader competency profile for ROs entering independent practice that fits within the CanMEDS framework (Turner 2017). There were a total of 72 respondents from 11 countries who participated in the two rounds of online surveys. The end result was a set of 20 final RO specific Leader competencies that could be broadly categorized into three core areas; contribution to the improvement of cancer care delivery in teams and wider health system, engagement in stewardship of cancer care resources, and demonstration of elements of leadership in practice. While this provides insight into what should be included in a leadership curriculum, the specific details on how to

incorporate these into a curriculum is unclear. Interestingly, the researchers included many of the associated oncology specialties in the survey (Medical Oncology, Radiation Medical Physics, nursing, patients and educators), but focused only on leaders in the field. Thus, senior residents and new staff who are closest to the TtP were not included. The need for improved leadership competency in RO is becoming more recognized globally. The European Society for Radiotherapy & Oncology (ESTRO) started offering a course this year titled management and leadership skills for Radiation Oncology (ESTRO 2017).

2.5 Radiation Oncology and TtP

There is a paucity of literature examining the TtP for RO as the majority of the multi-specialty papers did not include respondents from this specialty. The only available literature, of which we are aware apart from the Turner (2017) article mentioned above, are: surveys of RO residents from Canada and the United States respectively, a report on outcomes from a senior RO resident continuity clinic in the United States, a Canadian survey regarding resident continuity clinics in Oncology, and a regional survey regarding the TtP in RO.

The American survey reports on the 2004 Association of Residents in Radiation Oncology (ARRO) survey which consisted of 20 questions regarding demographics, satisfaction with training and future career plans (Patel 2006). This was identical to previous, similar surveys to allow for comparison. Most (78%) respondents felt their residency program adequately prepared them for independent practice. Factors that were

felt to need the most improvement were the quality of residency education including having more lectures given by specialists (84%), more time to read during the workday (77%) and a greater availability of specialists (63%).

The most recent Canadian survey involved a 60 question survey of all Canadian RO residents in 2009 (Debenham 2012). The aim was to compare the residents' experiences and perspectives of training to those previously reported in a similar study conducted in 2003 (Yee 2005), and to similar studies in the United States (ARRO). The focus was on resident well-being, career plans and finances. Thus, it did not focus on TtP, although some of the data reported is applicable. The most commonly expressed weaknesses of the training programs were a lack of adequate preparation for the competitive job market and poor service-to-education ratio. Similar to TtP research papers, 80% of respondents felt their training adequately prepared them for independent practice.

Unfortunately, neither series of surveys in RO provide specific data on perceived adequacy of the competencies required of a new RO specialist. Even competencies associated with the Medical Expert core competency were not addressed in these studies. Neither series of surveys provided clear data on the development of the original survey nor whether they were validated or checked for reliability.

Yoo (2018) reported on the outcomes following the introduction of a resident continuity/ longitudinal clinic for 6 senior RO residents in California. The longitudinal clinic enabled the residents to complete consultations, most of the treatment planning process and follow-up appointments independently. A survey of the residents

demonstrated satisfaction in areas such as better management of treatment toxicities and evaluation of treatment outcomes. Respondents also reported increased satisfaction with patient relationships, personal well-being and confidence. An informal survey of RO specialists working with these residents reported observing more efficient workflow by the residents, fewer documentation issues and increased enthusiasm for follow-ups.

Croke (2012) completed a survey of Canadian residency program directors, residents within Medical and Radiation Oncology, and patients seen in Oncology clinics at the Ottawa hospital to determine the perceived utility of a resident driven continuity clinic. This included 17 program directors, 69 residents and 90 patients. 47% of program directors, and 36% of residents reported having a continuity clinic as part of their residency program. However, this was not sub-divided into Medical versus Radiation Oncology, so it is unclear as to the representativeness of each specialty. The perceived benefits reported by participants included improved management of complex cases, time management, graded responsibility and development of patient relationships. The main challenge encountered was related to clinic space availability. The patient survey provides new insight in the patient perspective, by demonstrating that a lower percentage of patients (37%) versus staff and residents (58%) thought it was acceptable to review a case only if the resident had concerns. The main concerns with a continuity clinic brought forth by patients were discontinuity of care, and perceived lack of experience or competence of the resident. This study highlights the need to include patients in the decision making process of curriculum development when there is a potential for impact on patient care and concern around patient acceptance of resident autonomy of practice.

Dahn (2018) conducted a regional online survey of relevant RO stakeholders to gauge what learning objectives are perceived to be the most important for inclusion in a 3-month TtP rotation. Of the 43 respondents, 30 were ROs. Objectives that were ranked as being perceived as the most important included independently assessing and managing patients seen in consultation, developing and demonstrating communication skills with patients at an advanced leve,l and independently assessing and managing follow up of patients. Those deemed least important included completing a research, administrative, educational or clinical project, health advocacy topics and working with departmental and hospital administration. Qualitative feedback included suggestions to increase exposure to managerial roles, clinical autonomy, work-life balance, professional development and communication.

2.6 Summary

In summary, most new specialists feel prepared with respect to clinical acumen, but feel less confident in other competency domains encountered in independent practice. Only one study used the CanMEDS core competencies to assess preparedness, but this study only asked in very broad terms (Card 2006). The remaining ten general studies did not examine all seven of the CanMEDS core competencies, with Medical Expert, Collaborator, Leader, Scholar and Professional being the most represented (Beckett 2006, Crosson 2011, Dijkstra 2015, Kite 2006, Li 2017, Lynch 2003, McDonnell 2007, Morrow 2009, Morrow 2012, Westerman 2010). The most commonly reported perceived

deficiencies noted in transitioning doctors were found within the Leader domain – however this areas is over represented in the lierature.

While the literature supports that there are deficiencies in core competencies in transitioning doctors, there is minimal data on how this can be best addressed. Suggestions include interventions during residency training and after transitioning to practice. A few groups have implemented and reported on, programs devised to improve the TtP for residents however, each reported program dealt with a single CanMEDS domain. For example, three papers discussed the use of peer groups for mentorship and journal reviewing, three on practice management in America with a focus of coding and billing and a literature review supporting the need for leadership training during residency (Busari 2011, Jones 2008, Lister 2010, MacMillan 2016, Rial 2013, Wichman 2009). The most prevalent suggestions for method and location were an interactive environment and the workplace respectively. Another common theme is increased graduated responsibility within an authentic workplace environment (Croke 2012, Lister 2010, Sachdeva 2014, Wiener-Ogilvie 2014, Westerman 2010, Yardley 2018).

All curricula that have been introduced were well received by senior residents and have a reported positive impact. However, the question remains as to what specific topics should be included. Also, there is a paucity of information on curricula addressing communication skills, inter-professional collaboration, scholarship, health advocacy, and professionalism. Even the above data on the competencies associated with leadership/management demonstrate benefit, but do not provide a consensus on ‘how

long', 'what methods', 'what topics', 'who should teach' and 'where should the learning occur'?

Radiation Oncology tends to be under-represented in the literature given its relatively small size. The studies that included multiple specialties tended to exclude RO. For the literature dedicated to RO, none specifically dealt with concerns with the current TtP (Croke 2012, Dahn 2018, Debenham 2009, Patel 2006, Yoo 2018).Taken together, there is an information gap for how ROs experience and perceive the TtP, and what the perceived deficiencies are in new RO specialists.

2.7 Research Aims

Using the CanMEDS framework, and the results of this literature review, this study examined the perceived preparedness for independent practice that the current residency training programs provide for RO residents. It also attempted to describe the competencies perceived as lacking in new ROs. This will guide the future development of a curriculum to address the needs of transitioning RO residents and requirements of a TtP phase in the CBD curriculum. This study is unique in that it will provide specific information on perceived preparedness in all CanMEDS domains.

The study population includes stakeholders involved in the transition of RO residents to independent practice including; senior RO residents, RO fellows, new to practice ROs, RO residency program directors and members of the Royal College RO specialty committee CBD working group. No previous studies have included all of these

groups, which will provide a unique opportunity to clarify if preparedness is perceived differently amongst these groups and to identify common themes.

Chapter 3: Method & Methodology

3.1 Introduction

The purpose of this study was to examine the perceived preparedness for independent practice that the current residency training programs have on RO residents and attempt to identify the competencies perceived as lacking in new ROs. The data gleaned from this study will inform the development of a curriculum for the TtP phase of RO residency training.

Given the paucity of data specific for ROs during the TtP, qualitative research will be beneficial in exploring the perceptions of the various stakeholders involved in this process. Four stakeholder groups are particularly involved in the TtP: senior residents, fellows, new specialists, and residency program directors and members of the Royal College RO specialty committee CBD working group. Qualitative approaches will enable exploration of the perceptions of each group, and then enable comparisons across groups.

For these reasons a qualitative approach is being employed following the philosophies of Merriam (1998). Under her philosophy 'the primary interest of qualitative researchers is to understand the meaning or knowledge constructed by people… the way people make sense of their world and their experiences in this world' (Yazan 2015). This supports a study that is particularistic (i.e.: focused on a specific group or event), descriptive and heuristic (a practical method to problem solving, i.e.: rule of thumb, or educated guess). This aligns well with the examination of the TtP of RO residents, as different groups are involved and affected by the same process.

The philosophical underpinnings for this study are based upon the pragmatic worldview (Johnson 2007). This purports an examination of "practical consequences and empirical findings to help in understanding… [and] to help in deciding which action to take next as one attempts to better understand real-world phenomena." (Burke Johnson 2004). Pragmatism is also based on the assumption that the collection of both qualitative and quantitative data leads to a better understanding of the target construct – the TtP for RO residents (Creswell 2014, Johnson 2007). While this study represents the initial qualitative research phase, the planned next step is to use the results to inform a second, quantitative phase which will be the development of a questionnaire following the process outlined in the Association for Medical Education in Europe (AMEE) guide 87 – development of questionnaires for educational research (Artino 2014, Creswell 2014) to enable sampling of a much larger population of stakeholder groups. Taken together, the totality of this project will involve an exploratory sequential mixed methods approach; i.e., a qualitative phase followed by a quantitative phase. This would then be followed by the development and evaluation of a TtP curriculum to meet the requirements of the CBD curriculum.

To ensure the development of a construct is representative of the concerns around the TtP for RO residents, focus groups will be conducted. Focus groups were used to understand how stakeholders perceive the TtP and how it can be improved, and to determine how this is similar or different to what is reported in the literature (Gehlbach 2011, Sim 1998). The qualitative data will also help elucidate how the study population discusses TtP to ensure the questions developed for a future questionnaire are in a format familiar to participants (Morgan 1984).

A focus group involves 3 to 12 participants exploring a topic selected and facilitated by a researcher (Morgan 1984, Massey 2011, Sim 1998, Stalmeijer 2014). Each focus group will contain a single stakeholder group (i.e.: senior RO residents, RO fellows, new to practice (< 3 years) ROs, and a fourth comprised of RO residency program directors and members of the Royal College RO specialty committee CBD working group). This is to avoid ethical concerns and provide peer support (Barbour 2005, DiCicco-Bloom 2006, Stalmeijer 2014). Keeping the stakeholder groups separate also provides the opportunity to compare and contrast the responses between the groups.

A focus group will be conducted with each stakeholder group to capture their unique perspectives on the TtP. One of the key benefits is it allows for triangulation between participants. Also, it allows for simultaneous gathering of data from multiple sources which is endorsed by Merriam (1998) as it aids in capturing the complexity and entirety of the entity being studied. Focus groups also allow for investigation of both what participants think and why they think as they do (Barbour 2005).

3.2 Research Population: Selection Criteria

The stakeholders for this project are diverse and spread across Canada, thus a representative group was chosen for each stakeholder group.

Inclusion criteria

- Canadian trained Post-Graduate year (PGY) 4-5 RO residents

- Canadian RO fellows
- New to practice in the last 3 years ROs who trained and are practicing in Canada
- Canadian RO residency program directors or members of the RO specialty committee CBD working group

Exclusion criteria

- Any RO, who completed residency outside of Canada
- Any RO practicing outside of Canada
- Any RO who has been practicing independently for more than 3 years, and is not a Canadian RO residency program director or member of the RO specialty committee CBD working group

3.3 Focus Group Question Development

Based on the literature reviewed, questions were devised to attain the goal of the project; to examine the perceived preparedness for independent practice that the current residency training program has on RO residents and specifically determine the competencies perceived as lacking in new ROs. A pilot test of the original questions was conducted with two professors in Medical Education and a Master of Education student. The questions were also discussed with the thesis supervisors and steering committee. From this, 6 questions were selected:

1. Describe the current transition to practice for Radiation Oncology.

2. What are the current gaps in the transition to practice in Radiation Oncology?
3. Define a complete Radiation Oncologist.
4. How are these competencies best learned or acquired?
5. How could you address gaps in transition to practice, if you have identified gaps?
6. How can a resident acquire these competencies?

3.4 Focus Group Process

For logistical reasons, focus groups were conducted by both tele-conference and face-to-face. The first focus group occurred via tele-conference with members of the RO Specialty Committee on CBD working group. One week prior to the tele-conference, members of the working group were provided with the focus group participant information sheet and consent form (Appendices C, D). Twelve members of the working group participated, of which 10 were residency program directors, one was a regent for a program and another was from a department without a residency program. Thus, there was representation from ten of the thirteen RO residency programs in Canada.

Following this focus group, recordings were transcribed and verified, data was analyzed to determine themes, and the focus group questions were revised for clarity and to ensure the underlying study outcomes were being adequately addressed. These results were reviewed by myself, the two thesis supervisors and two external reviewers to ensure lack of bias in the original analysis of the data. Two changes occurred as a result of the initial transcript analysis. The first, was the use of an observer to record field notes for subsequent focus groups. This task was completed by a member of the steering

committee. The second was revision of the focus group questions, which then remained consistent for the remaining three stakeholder group focus groups:

1. Describe the current transition to practice for Radiation Oncology.
2. What are the current gaps in the transition to practice in Radiation Oncology?
3. How could you address gaps in transition to practice, if you have identified gaps?
4. What competencies, skills, knowledge and attitudes do you think, if any, should be taught/focused on during a TtP curriculum?
5. How can a resident acquire these competencies?

The second focus group occurred at the Canadian Association of Radiation Oncology (CARO) annual scientific meeting with new to practice ROs, in a face-to-face format. A flyer explaining the study was emailed to those who had enrolled in the CARO annual scientific meeting, inviting interested participants who met the study criteria to contact the principle investigator. Those that met the study criteria (new to practice ROs with three or less years of independent practice) were emailed an information package including the focus group participant information sheet and consent form (Appendices C,D). There were five participants of which two had completed a fellowship and one a locum.

The third focus group involved fourth (3 participants) and fifth (3 participants) year RO residents. This was a face-to-face focus group that occurred at the Annual National Canadian Preparatory Course in Clinical and Radiation Oncology. A general announcement to the group occurred at the end of a lecture inviting interested residents to approach the primary investigator if interested. Thus, this group was not provided with the participant information sheet and consent form prior to the focus group. In this case I

provided time for the residents to read the information sheet and consent documents, and to ask questions prior to starting the focus group interview.

The final focus group occurred via tele-conference with three RO fellows. A fellow is a physician who has successfully completed their specialty certification and who is pursuing additional focused specialized post-residency training prior to working as an independent specialist. RO program directors across Canada were asked to invite fellows currently enrolled at their center to consider participation. They were provided with a flyer outlining the study, and were asked to contact the primary investigator if interested in participating. Interested participants were provided with the participant information sheet and the consent form approximately one week prior to the tele-conference (Appendices C,D).

3.5 Data Analysis

All focus groups were audio recorded and transcribed. Following the transcription of the focus group discussions and field notes, the data were analyzed for key themes following the concepts of thematic analysis put forth by Massey (2011). Massey proposes three categories of qualitative data: articulated, attributional and emergent. Articulated data are the data that specifically address the questions posed during an interview. Attributional data are those discussion points that are related to *a priori* theories or research hypotheses, and thus arise from assigning meaning based on interpretation of relevance to issues of interest. This is most commonly used when direct questions are unlikely to provide enlightening responses, i.e.: asking workers about a manager's

leadership style. Lastly, emergent data includes the unanticipated comments, and are often linked to unspoken cultural perspectives, and group values. This type of data can contribute to new insights and hypothesis generation. For this study, articulated data was grouped as: details about current TtP practices, perceived gaps in the TtP, suggestions to address the gaps in the TtP. There were no attributional data as there were no *a priori* hypotheses examined. Data that did not fit into one of the above categories was analyzed separately as emergent data.

A coding system to facilitate placement of reported ideas under the appropriate CanMEDS core competencies based on the Objectives of Training in RO (Royal College, 2017d) was employed. The data was collected in table form with each stakeholder group in a separate column to allow for ease of comparison of comments for each heading, and to ensure consistency of sub-headings and coding across groups (Appendices E, F, G). Emergent data was also collected in table form with each stakeholder group in a separate column to allow for inter-group comparisons and consistency of coding (Appendix H). The coding was initially completed by me. The coding was checked by the two thesis supervisors and two members of the steering committee (Dr. T. Trotter, Dr. S. Loewen).

After each focus group was transcribed, it was reviewed by me, and coded as per the above thematic analysis. After this was completed, I left the data alone for a couple of days to allow me to reflect on the data and themes, and to allow an opportunity to reflect on how my position as both a researcher and newly transitioned RO might impact on the interpretation of results. Following the first focus group, the data was reviewed with the two thesis supervisors (Dr. R.J.L. Murphy, Dr. J. Sargeant) and two external reviewers (Dr. T. Trotter, Dr. S. Loewen) to ensure accuracy of coding and to verify the first round

of thematic analysis. This also allowed for clarification of the original focus group questions. This process was repeated after each subsequent focus group. After all focus group data was tabulated together, I noticed key themes under four larger categories: current TtP practices, perceived gaps in the current TtP, suggestions to address the gaps in the TtP and emergent data. These were reviewed by both the two thesis supervisors (Dr. R.J.L. Murphy, Dr. J. Sargeant) and two external reviewers (Dr. T. Trotter, Dr. S. Loewen).

The emergent data was collected in a separate table and discussed with the two thesis supervisors, from which the theme of roadblocks to the implementation of TtP curricula emerged. I also had the opportunity to discuss the data with two leaders in the field of medical education (Dr. Glenn Regehr and Dr. Kevin Eva). From these discussions, the idea to examine the unexpected/emergent finding of a perceived gap to exposure to the totality of the radiation planning process emerged. This was also discussed with the two thesis supervisors and external reviewers who agreed with this suggestion.

3.6 Role of the Investigator and Methods to Ensure Trustworthiness

The data analysis was carried out by me, in consultation with the others as noted above. Given the proximity to my own TtP, one could consider that I am situated within the TtP process. Also, I had progressed through being a member of each of the stakeholder groups that were recruited for this study including being a senior resident,

and RO fellow for two years, and new to practice RO. While I have not been a program director, I am a member of the RO residency program committee at Dalhousie University. Given this, my experiences, both positive and negative impact on how I responded to, and interpreted the data gleaned in the study. It could also have impacted how I responded to comments made during the focus groups, as those that resonated with my own experiences may have elicited a stronger response.

I used a few processes to help address these concerns, and to ensure that novel findings were not missed. I took time between each focus group to reflect on the data and how certain responses elicited different personal responses. All coding was also reviewed by and discussed with the thesis supervisors and members of the steering committee for which two were more involved (Dr. T. Trotter, Dr. S. Loewen). The review with the thesis supervisors allowed for discussion of the findings from a perspective outside of the RO TtP process, and allowed me to reflect on how my personal experiences affected my interpretation of the data.

The use of the CanMEDS framework to categorize themes, and the thematic analysis suggested by Massey (2011) was also decided upon prior to the initiation of the study. This allowed for a consistent framework from which to organize the data, and complete the first round of data analysis. Given this process, all responses were included in table form, in an attempt to ensure no comments or themes were lost, especially those that were unexpected.

3.7 Ethical Considerations

Research that involves human subjects needs to consider the impact it may have on human dignity and rights. In Canada the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS) provides standards for the ethical conduct of research (CIHR, NSERC, SSHRC 2014). Research within Canada is expected to adhere to this policy and it is used by research ethics boards (REBs) to assess for ethical flaws in the design, implementation, conduct and oversight of research. To ensure compliance with the highest ethical standards, this study obtained REB approval prior to initiating any step involving participants.

The TCPS is based on three core principles: respect for persons, concern for welfare, and justice (CIHR, NSERC, SSHRC 2014). Respect for persons encompasses the obligation to protect the autonomy of all research participants. This includes the requirement of full and informed consent prior to enrolment and on an ongoing basis. This was established through the provision of information sheets and consent forms to all prospective participants prior to involvement in the study (Appendices C,D). These included the ability to withdraw from the study at any point without punitive consequences. Participants were not enrolled prior to full informed consent and signing the consent form.

The second core principle within the TCPS is concern for welfare which encompasses the impact on individuals' physical, emotional, mental, social, and economic domains of health and wellbeing. This includes concerns about the maintenance of confidentiality of information gleaned from participants. This was

addressed through all steps of data collection, analysis, synthesis and reporting through the de-identification of records. Likewise, any comments that were reported were done in a manner that prevents identification of the individual. All data is stored on a secure computer under password protection to aid in maintenance of confidentiality.

There was a concern that involving multiple different stakeholders in a single group could produce an unintentional power structure that interferes or causes limitations on discussion (DiCicco-Bloom 2006). For example, senior residents who have not yet secured a specialist role, may be hesitant to discuss their perceived competency short-comings in the presence of RO residency program directors. Thus, each stakeholder group was represented in a single focus group to prevent this from occurring.

The final core principle within the TCPS is justice, which refers to the equitable treatment of all people. This includes equal representation of all stakeholder groups within the research. Thus, the steering committee, and focus groups were populated by representation of all stakeholder groups and all major geographical regions within Canada. All participants of each stakeholder group were presented with the same questions.

The last concern is potential conflicts of interest. This study has not received funding, thus the issue of constraints placed on reporting are not present. The results will lead to a Master of Education for the primary investigator, which may support academic promotion. There was no monetary gain associated with this project.

Chapter 4: Results

The results will be presented in a manner consistent with the sequencing of questions used during the focus groups. Thus, a brief overview of the participants, including the representation of Canadian RO residency programs will be provided. Next, articulated data, the data that directly answers the focus group questions, and thus the main research aim will be presented. These are separated under the headings of perceived gaps in the TtP and suggestions to address the gaps during the TtP. Within these two sections, the data will be categorized by CanMEDS core competency. Results in each section will identify the stakeholder group(s) addressing each CanMEDS core competency, with direct quotes which provide insight into the topic being discussed. Summaries are provided at the end of each section, with an associated table outlining the most frequently discussed topics and associated CanMEDS core competencies, by stakeholder group. The most commonly discussed areas were decided both by the number of comments and length of time the group spent discussing each point. The final section presents the emergent data, which is grouped by theme.

4.1 Participants

There were a total of twenty-six participants in the study. This included 12 program directors and members of the Royal College CBD committee, 5 new ROs, 6 senior RO residents and 3 RO fellows (Table 3). Overall, this allowed for representation of 11 of the 13 RO residency programs in Canada, as listed on the Canadian Resident

Matching Service (CaRMS) site (CaRMS 2018). The programs that were not represented were both within Quebec, and primarily French-speaking. Given that this study was conducted solely in English, language may have been a barrier to their participation.

4.2 Current Transition to Practice Curricula

The current curricula for TtP across Canada are heterogeneous and limited in scope. The RO residency program directors or members of the RO specialty committee CBD working group included 12 participants, representing 11 of the 13 (84.6%) post-graduate RO residency programs in Canada (CaRMS 2018). One participant was from a RO department that did not have a RO residency program. Thus, this group provided the best comprehensive information regarding the current use of a TtP curriculum. Five programs (45.4%) reported having a TtP curriculum, four (36.4%) did not, and the data was unknown for the remaining four programs (Table 3). For the other three stakeholder groups, less than 50% of participants reported having a formal TtP curriculum. The majority of TtP curricula occurred after the licensing examination, with a length ranging from one month to one year (resident longitudinal clinic).

Table 3: Current Transition to Practice Curricula

	Number	Presence of TtP curriculum	Timing TtP	Length
Program directors & CBD committee	12 (84.6%)	Yes: 5 (45.4%) No: 4 (36.4%) Unknown: 3	After exam: 3 1yr prior to exam (RLC*): 1 Unknown/no: 9	Unknown: 1 2mo: 1 3mo: 1 12mos: 1 24 patients: 1
New ROs	5	Yes: 1 No: 1 Unknown: 3		
Senior residents	6	Yes: 2 No: 3 Unknown: 1		
Fellows	3	Yes: 1 Unknown: 2	After exam: 1	2mo: 1

*RLC: resident longitudinal clinic

Blank: data not acquired

Amongst the stakeholder groups there were a few common themes with respect to the drivers and content of TtP curricular content. All groups had at least one participant mention that the level of supervision depended upon the staff with whom the resident was assigned. Related to this there was also the comment that "the amount of autonomy you have really depends on the preceptor that you're working with. So I could potentially have more responsibility as a R2 [second year resident]…" However, resident driven content was also discussed within the program directors and resident focus groups. Both groups had at least one participant at whose department the content of the TtP phase was

driven by the needs of the resident. This could manifest as a research project, teaching exposure, increased patient related responsibility or outside electives. As one program director commented: “we’ve just been winging it from person to person, depending what their needs are.”

For programs with a formal curriculum (5), the most common activities were a resident longitudinal clinic (RLC), managing a staff practice with minimal supervision, and graduated responsibility for patient and radiation planning related tasks. For some, the graduated responsibility was reflected in formal policy and procedures for specific tasks during TtP, while for others there was a gradual increase in responsibility throughout residency.

4.3 Perceived Gaps in the Transition to Practice

The majority of the discussion around gaps in the current TtP for all groups revolved around the Leader and Medical Expert core competencies within the CanMEDS framework. Health Advocacy was not discussed, the Collaborator role received some discussion, and there were few comments within the Communicator, Professional, or Scholar domains.

4.3.1 Leader

The most commonly discussed CanMEDS core competency was Leader, although many of the comments had themes that also tied into the Medical Expert

core competency. Within this domain, the most discussed topic was practice management, which included setting up and effectively running a practice, administrative duties required of staff physicians and time management skills. The program directors succinctly suggested that "senior residents don't always have an appreciation for dealing with the administrative aspects of practice." Although, the senior residents commented that this may be due to a lack of exposure, as one participant commented "what extra work the staff is doing other than the clinical service, I have no idea about that." Both program directors, and new ROs identified, that new physicians struggle with time management as "in the first few months, they suffer quite a bit in terms of everything taking longer and their day taking longer, and all their activities taking longer." This was associated with a feeling of discouragement, at least initially in the new RO group.

For effectively managing a full practice, all groups commented on the lack of exposure on how to set-up a practice, patient flow, how to manage information (charts, ordering tests), and how to effectively delegate work to other members of the healthcare team. One program director summarized the issue well: "I think residents don't appreciate how there is already organization to the clinic and the nursing staff and the clerical staff when they're working with somebody … Once it's established, it's sort of organized, things are in place, things happen without you really having to do much. And then when they get into practice, none of that's there." The other groups echoed this, and commented on limited exposure on how to set-up a practice, with most of the exposure being in small teachable moments. A fellow commented that "as far as like the day-to-day sort of how to structure a

practice, how to organize things, I am sort of getting teachable moments here and there. But not anything sort of overt or structured or anything like that."

Another area identified by all groups was the challenge of being prepared for the transition, when there are significant institutional differences with respect to how one is paid, the role of incorporation, expectations of physicians, culture and how clinics are set-up and run. As one program director stated that the TtP is especially difficult "if you go to a different centre, you're going to have orientation because you don't know how they do things." This may be compounded by challenges with respect to finding some of this information, as one new RO commented that the challenges associated with practice management was "not so much actually in the clinical work but in the expectations of what it means to be an attending at an institution, and all of the departmental policies. I'm sure they're written somewhere but no one even told me like where to find them." This issue was echoed by other participants in all the stakeholder groups.

Another large area of discussion was around business management (including billing and income) and the corollary of contract negotiation and career planning. All groups stated a lack of exposure to how to bill for services, or how to manage income. A senior resident commented that "because we don't know enough about it [billing] to know when we should start learning about it." The new ROs also brought up many related themes around the discussion of billing and pay: "I always found that it was very hush-hush thing where I trained," and "you're almost afraid to ask anybody because like money is like really bad to talk about supposedly." The program directors echoed this as one said "how we're paid and

the business management, and incorporation versus salaried, and is there a pension, and all that kind of stuff, that information is not really disclosed."

For contract negotiation, all groups reported having a lack of exposure to developing skills to negotiate a contract. Fellows and new ROs comment that part of this is related to the current poor job market in which residents and fellows will take any available job without negotiating or asking questions. Fellows and new ROs suggested that part of this gap is related to underdeveloped skills "for finding a job and navigating through the system and trying to understand where our goal is." One fellow suggested that part of this is understanding how to make one's self marketable in a tough job environment.

Less discussed themes within the Leader core competency included exposure to leadership roles, and enacting change. Both program directors and senior residents noted a lack of exposure to chairing tumor site groups or departmental committees. Senior residents felt that part of this was due to staff taking over the discussion around patients after a resident presented the initial details. The new RO group also commented on the challenges enacting change in a department. This was related to a feeling that "I wanted to conform but also, you know, gradually bring in some ideas that maybe I picked up during fellowship." This group commented however, that "it's a delicate art. And it's not something that of course is ever addressed in residency."

4.3.2 Medical Expert

The second most discussed CanMEDS competency was the Medical Expert. Within this domain, the majority of comments specifically dealt with insufficient exposure to the radiation therapy planning process. Some participants cited no, or very limited exposure to the final quality assurance of radiation therapy plans, and the verification of images taken during radiation therapy. The program directors also reported receiving feedback from residents that training regarding assessment of images taking during radiation therapy was poor. New ROs also brought forth that some of the challenges are related to institutional differences, and whether there are protocols in place for standardization of the planning process steps. One fellow suggested another barrier to gaining experience in this domain was the presence of fellows when they were a resident, which lead to questions regarding the treatment planning process being directed to the fellows instead of to residents, resulting in a feeling "that I'm not a part of the whole process. And that really affects your comfort level."

This theme led into a few other minor themes, including the sense of ultimate responsibility for patient care, and the continuity of care. Both program directors and fellows commented on the stress of having ultimate responsibility for patient care as a new staff physician. One fellow said "you don't necessarily get quite that same experience in residency unless you have a staff who is very comfortable with letting you drive." The program directors had many thoughts on this including: that "they [new ROs] are new at being responsible for everything, they tend to check and second-guess things" and "I think the most overwhelming

thing was to learn how to take charge of a patient from A to Z, knowing that it's your patient."

The new RO group focused more on the long-term management of patients. Specifically, "it's what happens after you do the contours that you don't really get a lot of experience with as a resident because you're seeing so many new patients," and "it's the continuity that often gets lost." The fellows had similar comments, with respect to insufficient exposure to not just reviewing and approving radiation therapy plans, but also the longitudinal follow-up of patients including symptom management.

Two other topics that were discussed by the new RO group as being gaps in the current resident curriculum were triaging new consults and completing forms. New ROs suggested that triaging patients was "a whole new clinical skill that I didn't have," and that "it took a lot of time initially to try and figure out. Like everything seemed urgent right away. And then you kind of start to realize, okay, what actually is, and what is a safe time to see them in." The other skill discussed by the new RO group was the accurate completion of medical forms. This group described frustration around not knowing how to complete forms such as patient insurance forms, or forms to order radiation therapy or even who to ask for help. One new RO commented that "I don't understand how to order tests, I don't know what forms to fill out to get patients treated. I don't even know who to ask when I don't know the answer to a question. So that's certainly very frustrating."

4.3.3 Collaborator

Within the Collaboration domain, two main themes emerged and were congruent within the groups that were on the same side of the TtP at the time of the focus group. Specifically, program directors and new ROs (post-TtP process) focused on lack of experience with collaboration with other members on the radiation therapy treatment team, while fellows and residents (pre-completion of the TtP process) focused on the challenges of being involved in radiation therapy decisions. For the post-TtP groups, there were comments about "When I came, I said let's start doing this. And then sometimes it is misinterpreted as, oh look, this person is just going to waltz on in and take over," and a realization that senior residents were not involved enough in discussions regarding radiation planning. The new RO group also reported not having experience with ensuring proper communication with other health care providers over the telephone. Fellows and residents echoed each other with the sentiment that residents are often excluded in discussions around patient management by other health care team members because "they don't sometimes know which rotation we're on" or "it's easier for them to just call the staff because sometimes we'll have to call the staff anyway." A fellow summarized the impact of this behaviour with the comment that "unwantedly, sometimes a resident gets excluded from the process of longitudinal care. And I think that's something that is very important."

4.3.4 Communicator

Only the program director and new RO groups discussed perceived gaps in communication. In both stakeholder groups the main theme was lack of clarity and teaching around effective documentation especially for technical documents such as radiation therapy completion notes, and insurance forms. One program director summarized this concern by saying "The radiation, the completion notes that we do, and documentation that we do. Nobody is actually talking about what to do." The program director group also commented that there is a lack of training and exposure around how to have a meaningful conversation with your chair and/or head of the department.

4.3.5 Professional

Both the program directors and new ROs focused on physician wellness within the Professional domain; specifically, how to manage a work-life balance and who can help when you are struggling. There were no comments from fellows or residents within this domain.

4.3.6 Scholar

Program directors also discussed professional development, in specific ensuring maintenance of certification through the Royal College, and documentation for future applications for academic promotion. With the impending

implementation of CBD, there was also a comment by a program director that there is a gap from the faculty perspective on "observing residents or figuring out how to interact with them." The sole resident comment was about an interest in gaining experience with mentoring and teaching.

4.3.7 Mentorship

In addition to perceived gaps in specific CanMEDS core competencies, both the new RO and RO fellows groups felt that availability of explicit mentorship was a gap in the current TtP process. One fellow commented that "I guess that's [mentorship] the part that might be missing from some of the residency programs." All groups discussed how mentors could be employed as a resource to address the gaps discussed above and topics not covered in the formal curriculum.

4.3.8 Summary

There is a breadth of perceived gaps in the current TtP for RO residents. The most commonly discussed issues that were brought up by all stakeholder groups, included lack of exposure to practice management and the nuances of the radiation treatment planning process (Table 4). The most commonly discussed gaps were decided both by the number of comments and length of time the group spent discussing each point. For each stakeholder group, the most discussed perceived gaps are listed in descending order of discussion. Thus, the topic that most the most

discussed is listed first. These were included within the Leader and Medical Expert CanMEDS domains respectively. Other concerns that were brought forth by three groups included lack of knowledge and exposure to billing and financial management, and recognizing and having exposure to how practices are run at various institutions. Both of these are within the CanMEDS Leader domain. Contract negotiation and career planning were discussed in detail by both the RO fellows and senior RO residents groups. Competencies within the CanMEDS Professional, Scholar, Collaborator and Communicator domains were infrequently discussed. Health Advocator was not discussed at all.

Table 4: Most discussed perceived gaps in the TtP

	CanMEDS core competency	**5 most commonly discussed competencies**
Program directors and CBD committee	Communicator	Creation/provision of clear, precise, appropriate records of clinical encounters and treatment plans
	Leader	Practice management – setting up & efficiently running a clinical practice
	Medical Expert	Ultimate responsibility – providing independent care for patients, time management
	Leader	Understanding physician remuneration, budgeting and financial planning
	Medical Expert	Radiation planning process
New ROs	Leader	Understanding physician remuneration, budgeting and financial planning
	Leader	Institutional differences – understanding the structure and function of the health care system, and how it varies by jurisdiction
	Leader	Practice management – setting up & efficiently

		running a clinical practice, time management
	Collaboration	Working with other health professionals to work as part of an effective team
	Medical Expert	Radiation planning process
RO fellows	Medical Expert	Radiation planning process
	Leader	Practice management – setting up & efficiently running a clinical practice
	Leader	Contract negotiation and career planning
	Leader	Institutional differences – understanding the structure and function of the health care system, and how it varies by jurisdiction
Senior RO residents	Leader	Practice management – setting up & efficiently running a clinical practice
	Leader	Understanding physician remuneration, budgeting and financial planning
	Leader	Contract negotiation and career planning
	Leader	Institutional differences – understanding the structure and function of the health care system, and how it varies by jurisdiction
	Medical Expert	Radiation planning process

4.4 Suggestions to Address the Gaps during the TtP

For suggestions to improve the TtP in RO, there were no comments with respect to Communicator, Collaborator, Health Advocator or Professional competencies. The majority of suggestions were to address perceived gaps within the Leader and Medical

Expert domains. There were also, numerous suggestions that did not directly fit within a specific CanMEDS core competency, which are presented at the end of this section.

4.4.1 Leader

Most of the discussions around suggestions to address gaps during the TtP curriculum within the Leader domain focused on improving practice and business management. The program director group suggested that teaching around practice and business management should begin during the junior residency years. A senior resident echoed this, with the suggestion of early introduction of discussion around practice and business management with scaffolding of knowledge over time. The new RO group had numerous suggestions for integration of practice management during a residency TtP curriculum including running a staff physician clinic independently, or covering a staff physician's practice including the pager with minimal oversight. They also suggested that new specialists may consider shorter clinics or longer appointments to account for inefficiencies associated with starting a new position. Fellows and senior residents suggested teaching from staff regarding how to structure a practice and the decisions around why they are structured thus. Senior residents suggested mandatory teaching sessions around practice management, or incorporation of this topic at the annual RO refresher course. However, fellows also posit that "it's not [just] about teaching, it's about self-learning that comes with the volume."

For hands-on practice management experience, all groups brought forth the idea of a senior resident longitudinal clinic (RLC). Program directors suggested that

the benefit of a RLC would be that "residents can figure out how they want to manage a practice and how they want to do their follow-up, and have more kind of responsibility that's in a longer time period." This sentiment was echoed within the other groups. The other groups also suggested that a RLC would also provide a protected environment for longitudinal learning, exposure to ultimate patient responsibility and increased experience with the radiation planning process (including plan assessment). A senior resident who participated in a RLC reported that "I think that's been a really helpful exercise. It was a lot of extra work but it was also a helpful exercise in learning how to manage [a practice]."

All stakeholder groups discussed methods to improve business management skills and knowledge. Formal teaching courses through a known physician entity such as the Canadian Medical Association (CMA), at the annual national Canadian preparatory course in clinical and RO, or during the resident refresher course at the Canadian Association of Radiation Oncology (CARO) annual scientific meeting were suggested. Other suggestions included a formal workshop around career and financial planning through the local post-graduate medical education department at the associated universities. A senior resident also suggested "open and honest discussions about things like salaries, benefits, and modes of reimbursement. Things that don't always come up on a day to day basis and a lot of people aren't comfortable talking about." This sentiment was also brought forth in the new RO and fellow groups.

Contract negotiation and career planning was discussed within all groups except the program directors. One senior resident reported that there was a course

offered through the post-graduate medical education office regarding this topic that was useful. Other suggestions included formal teaching on contract negotiation, or discussion with staff physicians. All three groups (except the program directors) suggested a need for improved information about interviewing skills, how to organize a fellowship to align with long-term career goals and negotiating a contract, but did not cite how these could be best introduced into a TtP curriculum.

Improving leadership opportunities was discussed within the new RO and resident groups. Both groups commented that it was not just about participating in tumor board discussions, but also "establishing your role in the tumor board environment, and having other specialties listen to you, and actually you being an active contributor." Thus, they suggested active participation in discussions instead of merely attending meetings.

4.4.2 Medical Expert

The majority of the discussion around methods to address the perceived gaps in the Medical Expert domain involved increasing participation and exposure to the radiation therapy planning process, and increased responsibility for patient care. All groups cited that the use of a senior RLC would be of benefit for exposing residents to the radiation planning process. The fellows and senior residents suggested that having the opportunity to sit down with radiation therapy planning specialties (physics and dosimetry) to discuss the nuances of treatment planning would be beneficial. However, the senior resident group also suggested that "being

more attentive, and some of that is self-directed, and following through on the plans we do" is also part of the learning process. The senior residents suggested that the more technical aspects of radiation therapy planning would be best taught in the senior years as the residents would have better foundational knowledge.

A teaching strategy that was discussed in detail in the senior resident group was the creation of a radiation planning process block. This block would be completed by a transitioning senior resident. During it, the resident would be the first person contacted to resolve any technical issues related to the radiation planning process, including at CT simulation, challenges with patient set-up on the treatment units, or with radiation therapy plans. One senior resident commented that the benefits of such a block would be exposure to "what questions the dosimetrists are asking staff, or the radiation therapists are asking…those, you know, clinical real live things I need to learn how to answer."

The other common discussion point within the Medical Expert domain was exposure to ultimate patient responsibility. Beyond the introduction of a RLC, there were not many suggestions. As one new RO commented "I don't know what the best way to impart that knowledge... We've talked a lot about like a gap being like how does that process work? And maybe it is just kind of getting more experience and being put in that position." Other suggestions were having staff delegate more tasks to transitioning residents with less oversight, or ensuring all staff involved in RO patient care are aware to call the transitioning resident first. One new RO suggested that the resident has to be proactive by "going down to see simulations, going down to see treatment, [and] approving plans."

The fellow group also suggested that being exposed to ongoing patient care would be helpful. Suggestions put forth included keeping track of patients and their tests to ensure you continue to follow them post-treatment, or asking the staff specialist to call/page you to see patients when they return. This group commented that the continuity of care issue is part of the ultimate responsibility of patient care over their entire oncologic journey. The other suggestion put forth by the fellow group was exposure to triaging new patient referrals. However, specific suggestions on how to incorporate this within aTtP curriculum was not addressed.

4.4.3 Scholar

Each group discussed at least one aspect of the Scholar competency that could be incorporated into a TtP curriculum. The program directors discussed the need to build a file or curriculum vitae that could be used for documentation for promotion. Suggestions included teaching around what is required for promotion and how to collect the necessary documentation on an ongoing basis. Both new ROs and program directors mentioned research, although the new RO group was clearer on goals of incorporation into a curriculum. They specifically suggested teaching on "how to write a grant, how to write a manuscript, [and] how to apply for ethics [approval]."

Senior residents and new ROs suggested provision of more exposure to teaching. A senior resident commented that "I know a lot of it [teaching] just kind of comes naturally and just with experience. But I think to some degree, it would be

nice to see some graduated teaching responsibility." Other group members suggested formal training through the post-graduate medical education office or during academic half-day teaching.

4.4.4 Collaborator

The new RO group was the only group to discuss methods to improve collaboration skills. These suggestions were aimed more for new to practice specialists. Specificially, one new RO commented that "I kind of wish that I would have… said a statement at the very beginning – I understand that in the next few months I'm going to ask for things that are not going to be the way you like to do it. You know, just basically alerting about the problem." Another suggested asking questions of all members of the RO team (physics, dosimetrists, radiation therapists) during the start of a new staff position. There were no suggestions from any group as to how to improve collaborative skills during residency.

4.4.5 Other

Numerous other suggestions to improve the TtP in RO were put forth that could not be categorized into a CanMEDS domain. These include the use of onboarding for new staff physicians, mentorship, peer support, helpful hints, suggestions for teaching strategies, tailoring the TtP curriculum to resident needs,

completing outside electives and fostering national collaboration. Mentorship and a list of helpful hints were brought forth by all groups.

All groups felt that mentorship should be an essential part to the TtP. The strength provided by a mentorship program, as described by a program director, is that "those things that aren't directly related to patient care could be done together with a mentor." The new RO group also suggested that the mentorship role should include coaching of a new or transitioning physician, and being someone with whom you feel safe discussing radiation therapy treatment conundrums. Fellows highlighted the role of the mentor in helping the resident build confidence: "I would like to really underline the importance of this mentorship thing. That would be very helpful moving into that spot that you are confident in your abilities as an independent decision-maker." The senior resident group added that "the mentor should know you better as an individual; what your tastes are, what your preferences are, what your restrictions are." However, this group also cautioned that there has to be a good relationship that isn't forced, otherwise the discussion would not be useful. Other topics that were suggested that a mentor could discuss included practice and business management, investment, networking, and negotiating a contract. The new RO group also discussed the role of peer support. They suggested that "even though I had really supportive mentorship, having these people that were actually going through it at the same time as me really helped."

The other suggestion that was supported by each group was a list of 'helpful hints' that could be provided to transitioning residents. These could include a "top 20 things that you will have to do in the first year of practice," "a list of not

necessarily skill sets but things that would be considered ideal practice," or a list of "the hidden aspects of the transition to practice." Other suggestions were the opportunity to "pick the brain of like some new staff… and just have them say here's what works, here's what doesn't work," and what you need to know to survive in practice.

The new RO group suggested creating a new designation for residents in a TtP curriculum to let staff know they have a new role with increased responsibilities. The senior residents also put forth the idea to create business cards for residents in a TtP curriculum or completing a RLC as it "facilitates them taking ownership… then they're the point of contact when that patient has questions or needs a form completed… I know sometimes it's a hassle but I think overall it really teaches them how to be independent."

All groups, except the RO fellows, suggested that the TtP curriculum should be tailored to resident needs. Specifically it could be tailored to either the sites the resident will be treating in fellowship or as a specialist, or to their personal interests and career aspirations. The senior resident group also suggested that a TtP curriculum may provide the opportunity to "pursue some of those things that kind of get clouded over in training." The new RO group suggested a method of picking one of three topics to focus on. Specifically "you have to do either education or research or administration."

The new RO group suggested sending senior residents to other centers or satellite centers. They reported that this can lead to better exposure to the heterogeneity of practice that exists within Canada and abroad. One of the strengths

of this practice is that it forces learners to think through why decisions regarding patient management are made the way they are and what other options are available. It was suggested that a two to three month block would allow the learner a more longitudinal exposure, and a better understanding of how that center operates.

Both groups that have transitioned to independent practice (program directors, new ROs) discussed the role of onboarding programs for new physicians. These programs could help cover some of the practice and business aspects of new positions. Both groups suggested this option is helpful as it is institution specific. The new RO group also commented that having a champion who is willing to create and maintain an orientation package can be of benefit. However, what should be included was not clearly described.

4.4.6 Teaching strategies

There were a few comments about teaching strategies that could be employed during a TtP curriculum that were not skills or knowledge dependent. Specifically, the new RO group suggested that learning during a TtP curriculum is "going to have to be hands-on. Like real workplace-based learning." The senior resident group suggested adding not clinical skills topics, especially practice and business management, negotiating a contract and career planning, to the annual RO pre-examination refresher course. The senior resident group also suggested the use

of simulation. They suggested it could be used to troubleshoot challenges with radiation therapy treatment and planning and multidisciplinary interactions.

4.4.7 Summary

The most commonly discussed suggestions for addressing the perceived gaps in the current TtP for RO residents fell within the Leader and Medical Expert CanMEDS domains (Table 5). The only suggestion brought forth by all groups was the central role of mentorship during the transition process, which incorporates all CanMEDS competencies as it was suggested it could help address any areas of concern not directly addressed by the forma curriculum. The most commonly discussed areas were decided both by the number of comments and length of time the group spent discussing each point. For each stakeholder group, the most discussed perceived suggestions are listed in descending order of discussion. Thus, the topic that most the most discussed is listed first. These included discussion of methods to improve exposure and expertise in financial management, and contract negotiation and career planning. These were discussed in three of the stakeholder groups. Continuity of care and the use of a resident longitudinal clinic (RLC) were also discussed in three stakeholder groups, which has overlap in both the Leader and Medical Expert domains. Methods to improve exposure and expertise to the radiation planning process were discussed in the RO fellows and RO senior residents groups. Specific methods to aid in increasing competencies during residency included use of simulation, a dedicated radiation planning block, lectures

during the regularly scheduled academic learning, and courses (Table 5). For new to practice ROs, both peer support and the use of on-boarding programs were suggested.

Table 5: Most discussed suggestions to address the perceived gaps in the TtP

CanMEDS core competency	5 most commonly discussed areas (suggestions for curricula)	Suggestions to address the gap
Program directors and CBD committee		
All	Mentorship for senior residents and new Radiation Oncologists	Discuss: topics not covered in current curricula
Leader	Understanding physician remuneration, budgeting and financial planning	Educational resources, mentorship
Medical Expert / Leader	Longitudinal practice and patient management	RLC, simulation
Scholar	Longitudinal documentation for planning promotion	Creating and managing a CV
Other	Helpful hints/tricks	List by specialists, and previous graduates
New Radiation Oncologists		
Medical Expert	Ultimate responsibility – providing independent care for patients, time management	RLC, graded responsibility
Other	On-boarding program	Orientation package and formal mentoring for new specialists
Medical Expert / Leader	Longitudinal practice and patient management	RLC, graded responsibility
Other	^Complete outside electives	Spend time at another institution
Leader	Understanding physician remuneration, budgeting and financial planning	Educational resources, course (local or national)

Scholar	Implementing strategies to ensure personal practice improvement: contract negotiation and career planning	Course, mentorship
Radiation Oncology fellows		
Leader	Practice management – setting up & efficiently running a clinical practice	Discuss with specialist, mentorship
Scholar	Implementing strategies to ensure personal practice improvement: contract negotiation and career planning	Course
Medical Expert	Radiation planning process	More exposure with graded responsibility, discussions with staff
Medical Expert / Leader	Longitudinal practice and patient management	RLC, discussions with staff, mentorship, self-directed
All	Mentorship for senior residents and new Radiation Oncologists	Discuss/help improve clinical confidence
Senior Radiation Oncology residents		
Medical Expert	Radiation planning process	More exposure with graded responsibility, self-directed learning, course (local, national), curricular block
All	Mentorship for senior residents and new Radiation Oncologists	Career goal setting, networking, practice management, remuneration, (topics not covered in curricula)
Scholar	Teaching	Graded responsibility, course
Leader	Understanding physician	Course (local, national),

	remuneration, budgeting and financial planning	workshop, mentorship
Leader	Implementing strategies to ensure personal practice improvement: contract negotiation and career planning	Course (local, national), mentorship
Teaching methods not otherwise discussed	**For senior residents** • Simulation, dedicated block: radiation planning processes and troubleshooting problems • Annual pre-examination refresher course: add non-clinical topics (administration, billing and pay, contract negotiation and career planning, practice management, helpful hints/tricks) • Academic courses/half day lectures: documentation, teaching/feedback, research (grant and manuscript writing), billing and pay, practice management • Tailor TtP to individual resident needs **For new to practice specialists** • Peer support	

^Outside elective: a period of time that a resident spends at a Radiation Oncology department, other than the one at which they are training.

CV: Curriculum vitae

RLC: Resident longitudinal clinic

4.5 Emergent Data

The final block of data involves emergent data – data that were unexpected and/or did not directly address the predetermined study questions. These data were further categorized into the following categories: roadblocks to an effective TtP curriculum, the culture of medicine, and thoughts regarding the role of national collaboration in devising new curricula under the CBD framework. The majority of the comments within this section addressed the perceived current roadblocks to an effective TtP curriculum.

4.5.1 Roadblocks to the Implementation of TtP Curricula

4.5.1.1 Staff buy-in and perceptions of senior residents

The most discussed barrier to an effective TtP curriculum, as discussed by all groups, involved challenges with staff buy-in and knowledge of expectations of residents who are within the transitional period. Program directors reported that "although we think it is clear that there should be more graduated responsibility and looking after the practice in a more independent way, it's not entirely clear that all the faculty knows that as well." The new RO group suggested that despite requirements from the Royal College around the necessity of a TtP curriculum, it is "the people who are actually on the ground doing the training, the rad onc staff, [that] have to be willing to divest themselves of a level of oversight and responsibility." Both the new RO group and senior resident groups suggested that buy-in is essential not just for physicians, but for all specialities with whom the RO residents would interact.

The new RO group also brought up the culture of medicine with respect to how senior residents are viewed: “this whole concept of I’m going to book in extra patients because I have a trainee. Like that’s the culture.” Another new RO supported this concept with the comment “I think though, we have to realize that like the point of having a training program is not to have extra staff to do your work.”

4.5.1.2 Historical view of fellows

The fellows group brought forth the thought that there is an “assumption that residents are not supposed to transition into practice right after residency in Canada,” and that “there has been this new kind of tradition of people doing multiple fellowships.” The program director and new RO group also commented that completing at least one fellowship has become the norm due to the relative job shortage. Both of these groups commented that fellowship, with its increase in responsibility helps with transitioning to practice especially with respect to practice management, and organization.

This discussion led into further comments about how this underlying theme led to a change in how senior residents are perceived. A RO fellow summarized their thoughts by commenting: “I think the programs are kind of capitalizing on that [residents doing fellowships prior to starting a staff physician position]. Saying that, well, as a fellow they would learn how to transition into practice.” Thus, this group felt that a lot of the TtP knowledge and skills were not addressed during residency, on the assumption this could be learned during a fellowship.

4.5.1.3 Logistical (Including software), Medico-legal

The program directors, new ROs and senior residents all discussed logistical and medico-legal barriers to an effective TtP curriculum. The program directors commented that "the challenges of logistics – nursing and clerks, and stuff like that – has been a problem." This was also echoed within the senior resident group. However, the senior residents and program directors also discussed the limitations of the treatment planning software in that "being able to review treatment images or sign off on plans and prescriptions, a lot of those things we don't have the privileges to do on the software." This group suggests that the result is that any post-contouring (the process of defining the volume to be treated with radiation therapy, and outlining the normal anatomical structures for which one wants to limit the radiation dose received) treatment decisions are ignored.

The new RO group discussed the medico-legal implications of a TtP curriculum in which the residents have more responsibilities. Specifically, whether the TtP portion will be post-Royal College certification and determining the level of medico-legal responsibility. One new RO commented that "if I had a resident underneath who was in transition to practice but I'm medico-legally responsible, I'm going to be much more hands-on than if they had something more akin to if they were a staff on their own." The group also suggested that this issue may be related to challenges with staff buy-in.

4.5.1.4 Historical exam timing & time allocated for TtP

One of the main issues of the previous residency training model, was that the Royal College certification examination was within 3 months of the end of the program. This led to challenges with a TtP curriculum as many residents would take vacation after the exam. The senior residents also suggested that "there's a tendency, at least at my centre, to 'check out' a little bit after the Royal College [exam]." The new ROs, fellows and senior residents all commented that the certification examination is a big distraction making it difficult to teach or introduce a curriculum in the months leading up to the examination.

All groups supported the placement of a TtP curriculum after the Royal College certification examination. The new RO groups commented that "I like that it's going to be after the exam… in a safer kind of environment where the trainee is not feeling the pressure of the exam" and "I remember the day after I wrote my exam, I felt like I could actually have an opinion." The fellows suggested that "then you can sort of focus on practical – okay, this is how I'm going to structure my practice. Instead of oh my gosh, I have to memorize every single detail of Quantec."

The program directors group suggested that six months should be the minimum length of a TtP curriculum, but the final length was debated between six months up to one year, or being resident dependent. The other three groups did not discuss a numeric length of a TtP curriculum. However, the fellow group also discussed how TtP should be a process through the final two years of training with a gradual increase in responsibility.

4.5.2 The Culture of Medicine

The culture of medicine, and specifically the role of the hidden curriculum and its impact on the transitional process was discussed within all stakeholder groups. The themes that emerged included the perception of staff physicians as the ultimate knowledge holders and decision makers, the implied value of residents, and the presence of topics that are considered taboo for discussion. These are further examined below.

4.5.2.1 Staff as the ultimate knowledge holders and decision makers

Both the new RO and senior resident groups discussed how staff physicians are perceived as infallible with respect to medical knowledge and decision making. A new RO summarized this by commenting that "there are some rigid radiation oncologists that want to do the plan their way, are not willing to accept other perfectly acceptable way of doing things." The senior resident group also commented that they are often excluded from decision making roles. Instead they are relegated to presenting patient stories, and are then expected to listen while specialists discuss the nuances of management.

This theme was also described in how other health professionals, members of the RO care team, interacted with senior residents. One senior resident commented that other health professionals "don't always want to check the schedule because it's an extra step for them. And then it's easier for them to just call the staff." For treatment decision making a RO fellow supported this idea by commenting that "people who are seeing the patient... during radiation direct the

patient to staff because they know that it's the staff who has the answers rather than the residents." This suggests that senior residents are perceived as peripheral members of the patient care team. This perception is held not just by physicians but also by other health care providers.

4.5.2.2 Implied value of residents

Both the senior resident and new RO groups discussed how they felt residents were valued. One senior resident reported on a discussion they experienced with a staff physician. When discussing being more involved in treatment planning decisions, they reported that "the staff said, 'I'm sorry, our responsibilities are to, you know, get the list clear as fast as possible.'" This suggests that the need to complete tasks supersedes a resident's learning needs.

A similar topic discussed was the use of senior residents by staff physicians to increase their clinical capacity. On this topic, one new RO raised the question, "will... centre[s] be willing to part with their senior residents who are able to... carry a higher burden of the clinical practice?" Another new RO quipped that "the point of having a training program is not to have extra staff to do your work." This topic was also briefly discussed in the other groups, but more obliquely. The program director group suggested that some staff will require more training and buy-in to ensure there are adequate learning opportunities and appropriate graded responsibility for senior residents. These comments suggest that this is a recognized problem with select physicians, and one that has yet to be addressed. Although one new RO suggested that one way to address this problem was that "if you have

someone who's not going to play then I would just say okay, you're not going to get senior [resident]."

4.5.2.3 Hidden curriculum, taboo topics

All stakeholder groups talked about how some topics seemed to be consistently overlooked from inclusion in formal curricula, or were considered a topic not to be discussed. One topic that was brought up in each group was a hesitance to discuss financial issues, especially physician remuneration. As one program director commented, "they [senior residents] don't know anything about how they get paid. And we haven't been very good at educating them on that." This was perceived as a huge problem by a new RO who suggested that "money is a very important thing once you start becoming a staff. And a lot of people get really up in arms about it." Another RO also discussed how this topic was seen to be taboo as she observed that "you're almost afraid to ask anybody because like money is like really bad to talk about supposedly." Taken together, these comments suggest that everyone agrees that the physician remuneration is important to discuss, but no one wants to discuss it. Interestingly, the suggestions to address this gap included formal courses at the national level (i.e. at annual meetings) or through the use of mentorship. Mentorship was brought up by all stakeholder groups as a modality to gain exposure to or discuss the competencies not covered by the formal curriculum.

4.5.3 National Collaboration

A final point that was raised by the new RO group was the role of national collaboration in the creation, implementation and improvement of new curricula within the CBD framework. In specific, one new RO suggested that "we all have national [mandated CBD] curricula… the Royal College subcommittee on rad onc but also CARO is a great avenue to be leveraging a lot of this kind of stuff." This was supported by the other members, in that CBD provides a unique opportunity to work together as a community to create a consistent TtP curriculum across Canada. Other suggestions included working with larger organizations such as the ASTRO education committee to ensure we learn and improve as a community.

4.6 Summary

Approximately half of the Canadian RO residency programs have a TtP curriculum, for which the content and length are highly variable. The most commonly cited gaps during this transitional period were found within the Leader and Medical Expert CanMEDS domains, and specifically included exposure to, and experience in practice management; understanding physician remuneration, budgeting and financial planning; the impact of institutional differences (including structure and function of the health care systems and how it varies by jurisdiction); and lack of experience with all aspects of the radiation therapy planning process. Suggestions to address these gaps were numerous, and included provision of education resources, courses and lectures, improved graded responsibility, participation in a RLC, mentorship, creation of a block specific to

radiation treatment planning, use of simulation, increased participation in tumor boards, creating and managing a curriculum vitae, spending time at another institution, peer support, onboarding programs, and creating a list of 'helpful hints'. Each stakeholder group also discussed perceived roadblocks to the implementation of a TtP curriculum. These included: logistical and software limitations, medico-legal concerns, poor staff buy-in, the historical placement of the certification examination (previously within three months of final graduation from residency), and staff perceptions of the role of fellowship (perceived as the period for transitioning). The culture of medicine, and specifically the role of the hidden curriculum and its impact on the transitional process was discussed within all the stakeholder groups. The themes that emerged included the perception of staff physicians as the ultimate knowledge holders and decision makers, the implied value of residents, and the presence of topics that are considered taboo for discussion. There was also support for national collaboration for the creation and improvement of TtP curricula.

Chapter 5: Discussion

5.1 Inter-Group Comparison

While there was significant overlap in the perceived gaps within the current TtP for ROs voiced by the various stakeholder groups, the perspectives on these gaps were different. On closer examination each group had a unique perspective on each perceived gap, with similarities most noted in the groups that were in the 'pre-practice' position versus the 'post-practice' position. Pre-practice for this discussion refers to those who have not yet started a full-time specialist position, and include the RO senior residents and RO fellows. Post-practice refers to the new to practice ROs and members of the RO specialty committee CBD working group who have experience as a specialist.

One example of the difference between the pre- and post-practice group is highlighted within the discussions regarding collaboration with other health care professionals. New ROs discussed this topic from the perspective of the challenges of starting a position and not knowing about the nuances of the institutional culture and existing relationships which could lead to discord. The perspectives of the RO fellows and senior residents were similar, as their discussion focused more on the perception that they were left out of treatment related discussions due to their more junior status. This suggests that while all groups see collaboration as a gap, the cause of this could be exclusion of learners from treatment decision making during residency training, or lack of knowledge of the culture and guidelines within an institution and challenges with relationships between other health care professionals.

There are a few studies that also listed collaboration skills as being among the most noted perceived gaps during the TtP (Beckett 2006, Brouns 2010, Card 2006, Kite 2006, Morrow 2009, Sachdeva 2014). Interestingly, Kite (2006) reported that the most significant stressor for new specialists was relationships with other health care providers, while the senior resident group listed knowledge and skills as being a larger source of stress. Morrow (2009) also reported that senior residents felt excluded from meetings and important decisions. There is also literature to support that a feeling of inclusion can enhance learning and improve the transitional process (Shiner 2013, Wiener-Ogilvie 2014, Westerman 2010).

Another area that was widely discussed by all stakeholder groups, that also highlights the differences between the pre- and post-practice groups, was the lack of exposure to practice management. This includes time and resource management, clinic scheduling, paperwork, manpower and appropriate delegation of tasks. Understandably, the post-practice groups were able to discuss the gaps within practice management with more nuances and details. These groups included discussions around organizational challenges, as well as managing departmental expectations of specialists. The comments from the pre-practice group were more general, with recognition that they lack the exposure to understand what managing a practice entails. This suggests that while there is agreement about a lack of exposure to practice management, the scope of that gap may not be appreciated by the pre-practice group, as most specialists with whom they work have an established practice. This is very well supported in the literature, across all specialities (Beckett 2006, Brouns 2010, Brown 2009, Busari 2011, Card 2006, Crosson

2011, Dijkstra 2015, Fakhry 2007, Gill 2007, Griffin 2010, Higgins 2005, Lynch 2003, McDonnell 2007, Morrow 2009, Morrow 2012, Westerman 2010).

A unique area of discussion was the perceived gap in exposure to the totality of the radiation therapy planning process. This was unexpected as the radiation planning process is one of the core roles of a RO, and thus this competency falls within the Medical Expert domain. This is in contrast to the available literature for which most report that new to practice medical specialists feel confident with their clinical competencies (Beckett 2006, Brown 2009, Card 2006, Crosson 2011, Dijkstra 2015, Griffin 2010, Li 2017, Lynch 2003, McDonnel 2007, Morrow 2009, Morrow 2012, Westerman 2010). For this perceived gap all stakeholder groups stated a lack of exposure to all steps of the planning process that occur through interaction with the treatment planning system (TPS). However, when one further examines the suggestions put forth to improve this, the dichotomy between and pre- and post-practice groups is appreciated. The post-practice group provided limited suggestions while the pre-practice stakeholder groups spent a significant amount of their focus group discussing this concern. Both cited a need for more graded responsibility and exposure, and concerns regarding exclusion from this process due to the limitations of the TPS. The pre-practice groups appeared to be much more invested in improving this concern, with provision of novel solutions including a specific block dedicated to radiation treatment planning and trouble-shooting.

Lastly, if one considers the topics that were most discussed in each group, there appear to be differences in what is thought as important (Table 4). Specifically, the pre-practice group spent a longer period discussing perceived gaps linked to concerns

foreseen for the immediacy of transitioning such as understanding physician remuneration, budgeting, financial planning; contract negotiation and career planning; concerns around the nuances of the initial process of setting-up a practice and concerns around institutional differences. In contrast, the post-practice group also discussed more novel perceived gaps, including communication with other health care providers, consideration about physician wellness and sustainable practice, creation and maintenance of a professional curriculum vitae, and maintenance of specialty certification. The differences seen between these two groups reaffirms the need to include all stakeholders in the decision making process when considering a TtP curriculum, as each provides a different perspective and suggestions for improvement that may not otherwise be considered.

Taken together this aligns with adult learning theory, as each stakeholder group discussed gaps from the lens of their current experiences (Kaufman 2014). This is most evident from the discussion of the new ROs who have experienced the spectrum of TtP, and are the closest to the process. Thus, their recollection of the process is the most recent. Many of their comments focused on their current lived-in experiences, instead of the challenges they perceived while a resident. However, this is still helpful as it provides support for the concept of transition as a process, and not a moment in time (Yardley 2018). It also supports the literature which suggests that support for new specialists is often well received and leads to lower levels of emotive stress (Brown 2009, Griffen 2010, Harrison 2014, Kite 2006, MacMillan 2016, Sachdeva 2014 Shiner 2013, Westerman 2010, Yardley 2018).

For other perceived gaps the comments were similar across all groups. For example, all groups suggested there was a lack of exposure to information about physician remuneration, budgeting and financial planning. All groups suggested that this was a topic that was taboo to discuss. This result could be considered as part of the hidden curriculum. That is, the internalized values, attitudes, beliefs and behaviours that are deemed important through latent observation and participation within the culture of medicine, instead of what is formally taught (Hafferty 1994).

5.2 Understanding the Study Results in Comparison to the Literature

Within this study, the most noted gaps were within the Leader and Medical Expert domains, and to a lesser extent the Scholar domain. There was no discussion around Health Advocacy roles, and little in relation to Professionalism, Communication or Collaboration. This is similar to the literature, in that the most commonly discussed gaps in competency could be categorized under the Leader, and to a lesser extent Collaborator, Scholar and Professional domains (Beckett 2006, Card 2006, Crosson 2011, Dijkstra 2015, Kite 2006, Li 2017, Lynch 2003, McDonnell 2007, Morrow 2009, Morrow 2012, Westerman 2010). Our study noted perceived gaps in practice management which includes managerial experience, writing a business plan, administrative experience, and meeting patient consultation targets, all of which are well reported in the literature (Beckett 2006, Brouns 2010, Brown 2009, Busari 2011, Card 2006, Crosson 2011, Kijkstra 2015, Griffin 2010, Higgins 2005, McDonnell 2007, Morrow 2009, Morrow

2012, Westerman 2010). Likewise, the gap in exposure and understanding regarding physician remuneration, budgeting and financial planning, is a topic that is highly reported in the literature (Beckett, 2006, Brown 2009, Busari 2011, Crosson 2011, Dijkstra 2015, Fakhry 2007, Gill 2007, Griffin 2010, Higgins 2005, McDonnell 2007).Of the other Leader gaps previously reported, two were discussed in this study (a lack of leadership experience, managing resources) and one was not (limited experience in monitoring one's own practice for improvement) (Beckett 2006, Busari 2011, Crosson 2011, Dijkstra 2015, Li 2017, Lynch 2003, McDonnell 2007, Morrow 2009, Morrow 2012, Westerman 2010).

From a Communicator perspective, the data was different from that previously reported (Table 2). None of the stakeholder groups discussed ethical issues, or lack of experience in discussing medical errors or end of life care. Given that RO often deals with non-curable cancers that lead to the ultimate demise of patients from cancer, it is posited that RO residents receive adequate exposure in the domain of breaking bad news and discussing end of life care to feel comfortable with these topics.

Given the complex nature of cancer management, RO by necessity works in diverse collaborations with many health care professionals for which clear documentation and discussion is essential. Thus it was surprising that this study reported a perceived gap in written correspondence skills for transitioning RO residents. However this was only discussed by the post-practice stakeholder groups.

For the Collaborator core competency, this study supports the current literature citing gaps in partnerships with other health care professionals, and exposure to conflict resolution (Beckett 2006, Brouns 2010, Crosson 2011, Kite 2006, Morrow 2009). Lastly,

in this study there was minimal discussion of competences found within the Scholar and Professional domains. However, what was discussed including supervision of learners, and physician wellness have previously been reported (Beckett 2006, Crosson 2011, Morrow 2009, Morrow 2012, Westerman 2010).

5.2.1 The Most Significant Finding

The most significant finding in this study that is in stark contrast to the current literature were the Medical Expert, or clinical skills, gaps that were reported. Specifically, all stakeholders reported lack of exposure to many of the aspects related to radiation treatment planning, which is the core competency of a RO. To clarify the issue, one must have a basic understanding of the unique competencies required of a RO, and specifically, how the interaction with a radiation treatment planning system (TPS) is integral to their day-to-day functioning with respect to the radiation therapy planning process (Figure 1).

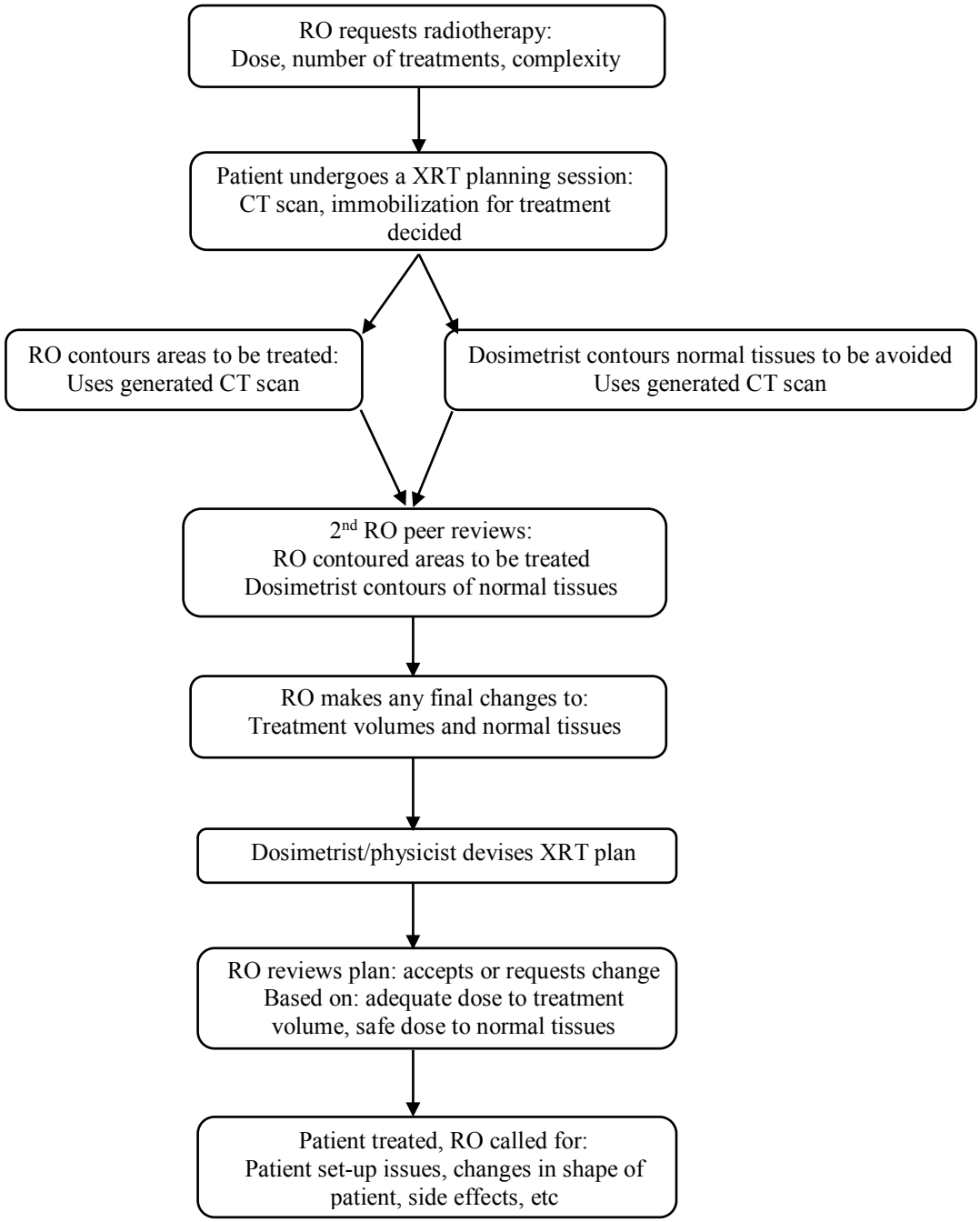
The radiation TPS is a software package in which all the steps involved in the radiation therapy planning process occur (Figure 1). For any patient for whom radiation therapy is offered, the first interaction between a RO and the TPS involves logging into the TPS and filling-out a request for radiation services. This includes all the important details with respect to how the patient should be positioned and immobilized during treatment, what dose and how many fractions of radiation therapy are to be given, the type of radiation therapy given and the expected complexity of treatment planning that is needed. Next the patient undergoes a radiation planning session, which generates a CT

scan around the area to be treated. From this scan, the treating RO outlines (contours) the areas to be treated, while a dosimetrist (radiation therapist trained in planning radiation therapy) contours the normal tissues for which the dose of radiation therapy it receives should be limited. A second RO peer reviews all these contours to ensure they are correct. The original RO then must finalize these contours, prior to a radiation therapy plan being generated by a dosimetrist or physicist. This plan is reviewed by the RO to ensure that treatment volumes are receiving an adequate dose of radiation, while normal tissues are not receiving too much. This must be approved prior to the patient being treated. Finally, the patient is treated on a radiation therapy unit. If any concerns arise during the course of the treatment, the treating RO is called. These issues can include problems with setting up a patient for treatment, changes in the shape of the patient (due to tumor regression/growth or weight loss/gain), technical problems with the treatment unit, and management of side effects. Also, any interaction with the patient is documented within the TPS, and can include weekly updates on how the patient is tolerating treatment as assessed by radiation therapists, nurses or physicians and a final summary document completed by the RO at the end of the treatment course outlining the details of the treatment given, the side effects experienced, and any plans for future follow-up.

These steps all occur through interaction of RO with the TPS. As one step is completed, the next step is automatically flagged by the TPS for the responsible person (the RO or dosimetrist). Of note, the TPS does not routinely provide for inclusion of a second “responsible person” such as a resident, and hence the resident is excluded from the planning and care process in the TPS. Seen in this light, the TPS emerges as a

significant barrier to the inclusion of residents in the treatment planning and follow-up process. The following section explores this emergent gap in the Medical Expert domain through the perspective of socio-materiality theory. This lens will also be used to consider other gaps expressed within this study.

Figure 1: Radiation Therapy Planning Process



XRT: radiation therapy

5.3 Socio-Materiality and the Impact on the TtP

5.3.1 Socio-Materiality

The current medical education landscape is moving from time or knowledge-based learning to outcome or competence based approaches (Frank 2010). This means a shift to development of learner abilities and skill attainment in a learner-centred environment (Frank 2010). This framework advocates for workplace-based learning, for which many of the current theories within adult learning focus on the individual's interaction with others and the environment (Kaufman 2014). Fenwick suggests that notions of participation are often confined to human interactions, focusing on social relations and cultural forces and the ways in which humans "use" tools or move through "contexts" (Fenwick 2010). These theories fail to recognize that the material and human aspects of an environment interact in a complex and often unrecognized manner (Fenwick 2010, Orlikowski 2007).

Socio-materiality provides a new perspective, which posits that systems include persons, context and material things (i.e. bodies, instruments, technology, desires, politics, settings, protocols) and that they are inseparable and act on each other in a complex adaptive manner (Fenwick 2010, 2014, 2015, MacLeod 2015). It allows one to explore learning from a perspective that recognizes that human and non-human objects interact in complex ways, and how the material affects learning and the work environment (Goldszmidt 2016, MacLeod 2015). It leads to a research perspective that decentres the human subject, and instead focuses on the complex interactions of the

human (consciousness, intention, meaning, inter-subjectivity and social relations) and non-human aspects of learning (Hopwood 2016, MacLeod 2015).

Using the socio-materiality lens to explore how materials affect practice, knowing and learning allows for the consideration of how materials are used within the realm of medicine and medical education, and how the authority ascribed to them shape practice and knowledge acquisition (Fenwick 2014). It looks beyond context as a simple container for learning to allow for investigation of the relationships among the many material and human elements within an environment, all of which interact in a dynamic manner (Fenwick 2014). It can also be employed to examine how material things can affect meaning, especially those ubiquitous to the workplace (i.e. technology, internet, medical records) that are often taken for granted or ignored (MacLeod 2015).

Taken together, socio-materiality provides a theoretical perspective to examine the perceived gaps within the Medical Expert domain found in this study, specifically with respect to the radiation therapy planning process. This lens allows one to more closely examine how the electronic TPS and its inherent eccentricities interact within the RO environment and cause a disruption of learning for RO residents. It may also provide insight into some of the other perceived gaps, which fall within the Leader (practice management) core competency.

5.3.2 Socio-Materiality: a lens to examine perceived gaps in the radiation therapy planning process

As described above, and outlined in figure 1, the radiation therapy planning process is complex, and mainly occurs through the radiation therapy TPS software interface. The entire process is highly digitized, with most of the discourse surrounding the radiation planning process including treatment development, peer review, treatment assessment and evaluation occurring electronically. Each task is assigned to a specific person or persons and when complete, the task is signed off and the next person in the flowchart is automatically tasked. The assignment of tasks is determined at the time of the radiation therapy planning session, with all RO tasks being assigned to the original treating RO. Thus, the TPS shapes the discourse surrounding the radiation therapy planning process for each individual patient. Its relationship and effect on the human aspect of RO can be considered from three standpoints (social, pedagogical and cognitive presences) as previously reported through the examination of distributed medical education through a socio-materiality perspective (MacLeod 2015).

5.3.2.1 Radiation therapy planning process and social presence

A learner's social presence can be considered as their ability to contribute and communicate within their community (MacLeod 2015). This includes the ability to participate in treatment and patient management decisions. However, the TPS used for the entire process of radiation therapy creates a significant barrier to this participation by residents. Tasks are assigned to the staff RO only, thus residents do

not know when a radiation therapy plan is ready for contouring, peer review, or plan review, without constantly checking a staff RO's task list within the TPS. Compounding this, residents have many demands on their time, thus a staff RO may complete a task without a resident having the opportunity to participate. As one senior resident reported "There are some staff who have said I don't want my list to go over 4 or 5. So you have your own educational responsibilities… by the time you come back, those cases have already been triaged or set-up." The new RO group also suggested that "all the other logistical aspects of the things that you don't realize are even happening as a resident but your staff are doing without even really telling you."

The radiation therapy TPS assigns each user specific allowable responsibilities or rights. Thus, a RO can approve plans, while a resident cannot. The user rights within the TPS are binary with no opportunity for graded responsibility. Thus, the current attitude, as one senior resident reported, is "I think part of it is that some of the more technical radiation things like being able to review treatment images or sign off on plans and prescriptions, a lot of those things we don't have the privileges to do on the software. So I think there's a tendency for us to just ignore that stage after putting the contours on." Even if a resident were to look at plans in the TPS, they are unable to make a treatment decision. So, unless they are sitting with the treating RO, the treatment decision will occur at a discontinuous time and place, which may not allow the resident to have a useful discussion about that part of the treatment planning process. Thus, while the TPS

allows for interaction with radiation therapy treatment plans at any computer it provides a significant barrier to discourse for learners.

Also, since the TPS assigns task roles at the beginning of the radiation therapy planning process, there is a lack of information conveyed to the associated health professionals about learners who should also be involved. A senior resident summarized this phenomenon as "they don't sometimes know which rotation we're on… and then it's easier for them to just call the staff because sometimes we'll have to call the staff anyway." As the new RO group suggested "I actually think that more of the pushback may be from the non-rad onc (RO) staff – from therapy staff and sort of the allied staff… and I think that there needs to be a buy-in from those who are implementing the program to… prevent the "Oh, that's not how we do it. I'm just going to call the staff and go over your head," sort of phenomenon."

This suggests that the TPS creates an environment that inherently excludes learners by not including them in the tasking and discussion of treatment decisions. This problem is perpetuated by a lack of knowledge by associated health professionals as to with whom each resident is working, and whom they should contact with treatment related questions or concerns. As such, the technology itself creates a distinction of the RO resident as *other*, instead of on a trajectory of graded responsibility and ultimately full inclusion in the community of practice. One could also posit, that this social issue not only impacts the Medical Expert domain – the lack of exposure to the radiation planning process – but also the collaborative domain, as is evidenced by the comments of exclusion with respect to collaboration with other health care providers.

5.3.2.2 Radiation therapy planning process and pedagogical/teaching presence

The pedagogical perspective considers how learning occurs, with respect to curricular design and administration, facilitating discourse and direct instruction (Anderson 2001). All stakeholders reported a paucity of exposure to the radiation therapy planning process. The resident group suggested that "we need a little bit of didactic teaching in that we can't just rely on all residents to have all the necessary experiences just by chance by the time they graduate. And right now… we don't have any like lectures that touch on that kind of thing." The fellow group echoed this with the comment that "It's really, really nice if you have a chance to sit down with a physicist and sort of pick their brain of why this and not this…" Even the new RO group supported the provision of more formal teaching. However, the best method to implement these suggestions or introducing graded responsibilities is unclear.

One also has to consider that the radiation therapy planning process occurs within the TPS software, and thus requires internet access, and a computer with this program loaded onto it. For group learning, the need to be able to project the interface onto a larger screen is also required, thus physical space constraints need to be considered.

One must also consider that as each treatment planning process task is approved, in can be opened and viewed, but no further changes can be made. Thus,

for the most realistic workplace-based teaching, in which residents can affect a treatment decision, they need to be involved in the task prior to its approval. This comes with its own limitations, which require the staff RO and the learner to be available at the same time, and in the same place. Or, the planning step to be discussed must be sufficiently non-urgent that the treatment planning task decision can wait until both the learner and staff RO are available simultaneously.

5.3.2.3 Radiation therapy planning process and cognitive presence

The last realm to consider is the cognitive presence, which incorporates how a learner interacts with learning, in specific the ability to "construct and confirm meaning through sustained reflection and discourse" (Garrison 2001). This includes the ability of the learner to ask questions, reflect on their learning, and engage in discourse. As described above under social presence, the current use of the TPS has led to an exclusion of residents from the discourse surrounding the radiation therapy planning process. Limitations with respect to time constraints, and the ability to 'sign-off' tasks remotely also interferes with the development of a meaningful dialogue that includes the resident.

One must consider, how real-time discourse around radiation therapy planning processes can occur. This requires the completion of radiation therapy planning tasks with a resident and RO present together. The discourse that occurs would be subject to the social context in which it occurs. For example, are they rushed? Did the discussion occur at the end of an emotionally charged clinic? Otherwise the discourse would need to occur discontinuously over email. Formal interactive

sessions, as suggestrf by the resident group would allow for improved interaction between a teacher and residents and would also provide a dedicated space for learning to occur.

5.3.2.4 Summary: Socio-Materiality and the radiation therapy planning process

The use of socio-materiality provides a lens to examine the perceived gap in competency within the radiation therapy planning process during RO residency. It helps elucidate the multiplicity of the relationships between human and material factors inherent within the user-TPS relationship. A social, pedagogical and cognitive perspective on this entangled relationship reveals that the perceived gap is more complex than social theories would suggest. Specifically the radiation therapy TPS creates an exclusion of residents from the treatment decision making process that perpetuates the exclusion of resident from other treatment decision making steps by other health care professionals. Since the TPS is a software program, the use of it for teaching, and exposure to the radiation therapy treatment planning process is limited by the necessity of having internet access, a computer with the software available and the availability of appropriate teaching resources. Lastly there is currently minimal teaching provided regarding the radiation therapy treatment planning process, thus, there is a lack of opportunity to reflect and engage in meaningful discourse and thus scaffolding of learning.

5.4 Results Not Explained by Socio-Materiality

Socio-materiality provides a lens to examine the complex web of interactions that occurs within a clinical work environment, and specifically includes the impact of the non-material (including technology) with the material (humans). However, this theoretical perspective has its limitations and cannot adequately address all the results herein. This is especially evident for the perceived gaps within the Leader core competency including experience in practice management, understanding physician remuneration, budgeting and financial planning contract negotiation and career planning, as well as understanding the structure and function of local and regional health care systems and how they vary by jurisdiction. Many of these are aspects of practice that are already in place for the specialists with whom residents work. Thus, there is minimal opportunity to participate, or observe the process of setting up a practice and negotiating the nuances of financial management; it is assumed. The reason for this could be lack of exposure to these experiences, due to RO being a small speciality with minimal staff turnover and thus minimal opportunities to participate or observe the decision-making processes regarding practice management. Another consideration is that some topics are traditionally considered taboo for discussion, as was evidenced within this study regarding physician remuneration and billing. For the reported gap in experience or exposure to contract negotiation, this could be partly explained by the current poor job market. Two of the stakeholder groups suggested that the current poor job market impacts their willingness to negotiate a contract, as there is a perception that if you can get a job you should just take it. Thus, the gaps within the Leader domain are multi-factorial, and

are influenced by the culture of RO practice, the inherent characteristics of a small speciality, and the larger health care system as evidenced by the poor job market.

Other gaps that are more challenging to explain using a socio-materiality lens include lack of exposure to creating and maintaining a professional curriculum vitae, and development of a program for maintenance of certification. These skills are not required of residents, as their use is tied to an RO's academic promotion and the maintenance of fellowship status with the Royal College of Physicians and Surgeons of Canada respectively. As such, they may not be considered by residency programs as essential components of the formal curriculum.

There was also a perceived lack of exposure to leadership and teaching opportunities, but the link to material (technology, settings, protocols) or socio-material concerns would be difficult to argue. The resident group reported that some of the concern from a leadership perspective was exclusion from treatment decision making, pointing to more of a social constraint. Likewise, for teaching, there was a reported lack of graded responsibility, instead of discussion around challenges with technology or teaching settings.

Overall, many of these issues have complex reasons for being perceived as a gap in competency for transitioning RO residents. One commonality to consider is the workplace environment, which may not provide opportunities for learning about specific practice related topics. The culture within the community of practice in RO can also influence what is perceived as an 'allowed' topic for discussion, or the normative role of residents with respect to complex collaborative decision making. These issues are better explained through consideration of the influence of culture and tradition upon practice,

and social theories of learning, especially communities of practice (Kaufman 2014). When people engage in collective learning in a shared domain of human endeavour, the group could be considered a community of practice (Wenger 2015). Within this, three characteristics are necessary: a shared domain of interest and/or shared competence (i.e. the field of RO), a community in which the members engage in joint activities and shared learning and a shared practice that includes a repertoire of experiences, stories, tools and ways of addressing problems (Wenger 2015). One of the primary purposes of a community of practice is knowledge translation, which he defined as "the exchange, synthesis, and ethically sound application of knowledge – within a complex system…" (CIHR 2004). On an individual level, this construct posits that newcomers start as peripheral participants with access to the community's resources and relationships, and slowly progress towards full membership, participation and legitimization of their contributory role.

One could consider residents as having peripheral participation within the RO community of practice, with progressive participation and legitimization through residency, with full participation only granted when a specialist designation is achieved. However, the results suggest that there is not enough progression of participation or legitimization of their role over time within the community especially for senior residents.

5.5 Suggestions to Address Perceived Gaps in the TtP Process

Numerous suggestions were put forth by the participants in the study, of which many have previously been reported. Suggestions that could be implemented during residency include increased responsibility to senior residents to allow for learning conditions that more closely mirror a specialist workload, provision of leadership or teaching training, and mentoring (Beckett 2006, Blumenthal 2012, Brouns 2010, Busari 2011, Card 2006, Croke 2012, Fakhry 2007, Higgins 2005, Lister 2010, Sachdeva 2014, Westerman 2010, Wichman 2009, Wiener-Ogilvie 2014, Yardley 2018). Another commonality is the use of workshops or formal courses, especially for the use of increasing exposure to business management including physician remuneration, budgeting and financial planning (Blumenthal 2012, Brouns 2010, Higgins 2005). Our participants made suggestions that many of these issues could be incorporated into learning opportunities that already exist for senior RO residents including the refresher course at the CARO annual scientific meeting, and the Annual National Canadian Preparatory Course in Clinical and RO that occurs yearly and workshops held by post-graduate medical education departments. These would be practical solutions to providing an environment dedicated to teaching these topics to senior RO residents. However, this will require buy-in from these groups, finding champions and experts to create evidence-based content. Thus while feasible, it may be a challenge to implement. Suggestions about integrating these topics into the current academic teaching schedule could be challenging given that curricula are usually set in advance, with minimal room for extra topics.

To aid in exposure to and experience in the radiation therapy planning process and in having ultimate responsibility for patient care, one suggestion put forth by all focus groups was the incorporation of a resident longitudinal clinic. This intervention has previously been reported and was well received (Croke 2012, Lister 2010). This curricular idea has been incorporated in a few programs within RO. This would suggest that it is possible to implement. Also, it provides an opportunity for experiential learning within an authentic workplace environment, which is supported by the literature (Yardley 2018). However, there are possible roadblocks to implementation including logistical (clinic space, nursing and administrative support), and medico-legal concerns (ensuring there is a most responsible specialist assigned to each patient).

Two other more novel suggestions put forth included a dedicated block on radiation planning, evaluation and trouble-shooting and use of simulation. Both of these suggestions would help negate many of the issues discussed in the section addressing the limitations imposed by the TPS and understood through the lens of socio-materiality. In specific, learners would have a larger social presence and be able to collaborate with other health care professionals regarding treatment decisions. Both could also provide more opportunities for self-reflection and discussion regarding treatment decisions. Simulation would also put the radiation planning process at the centre of a learning experience, thus promoting discourse around the nuances of radiation treatment decision making. This is supported by the literature which has shown simulation to allow learners to practice skills and knowledge in realistic settings, increase exposure to less frequently encountered experiences, as well as enhance feedback, deliberate practice and reflection (Younan 2016).

A radiation planning block could be feasible, however much like a RLC, dedicated curricular time and logistical issues need to be considered. Simulation would be the most challenging to implement as this has not been previously considered for radiation treatment planning learning. Thus, one would need to create a new curriculum with considerations for learners, how it will be assessed, what competencies are to be addressed, the conditions for learning and the context in which the learning occurs as well as considerations regarding validity and reliability (Bordage 2011, Palaganas 2015).

More easily implemented suggestions that can occur on an informal basis include discussions with specialists and other health professionals around radiation specific topics, practice management and business management were put forth. Other suggestions that could also be easily implemented include use of business cards for residents to provide patients, and a compilation of 'helpful hints' to provide to transitioning residents. Another consideration is use of elective time to travel to other centers to increase exposure to different methods, and techniques. Current residency programs allow for this, although the uptake amongst residents may be variable. Another concern would be lack of familiarity of the resident at the visiting institution.

Suggestions to aid new to practice specialists were also discussed. Most of them have been reported in the literature and are perceived as having a positive impact. These include the use of onboarding programs, peer support and mentorship (Brown 2009, Griffin 2010, Harrison 2014, Higgins 2005, Sachdeva 2014, Wilkie 2005). Mentorship was discussed in this study as a perceived benefit throughout the transition process. Our participants suggested that mentors could provide insight and help for all areas not adequately covered by the current curricula, and specifically practice and business

management, career planning, contract negotiation and a sounding board for challenging cases. Mentorship is linked to improved care quality, patient safety, and increased confidence, job satisfaction, working relationships, while decreasing stress and burnout (Brown 2009, Griffin 2010, Harrison 2014, Higgins 2005, Sachdeva 2014, Yardley 2018). The questions that remain are: how to choose mentors – should they be assigned or sought by the learners? Should it be mandatory, especially during times of greatest perceived turmoil?

5.6 Roadblocks to TtP Curricula – The Way Forward

Some of the emergent issues included perceived roadblocks to the implementation of a TtP curriculum. The most discussed were staff buy-in and their current perceptions of senior residents, specifically not allowing for appropriate graded responsibility for senior residents and the view of using senior residents, who have acquired increased clinical acumen, as a means to increase the number of patients they book and thus bill for in a clinic. Part of this requires staff education, with inclusion of all specialities that interact with residents, with clear guidelines of expected level of graded responsibility. One suggestion was to stop assigning senior residents to staff that use them to increase their patient load without providing meaningful learning opportunities. One also has to consider that this is part of the hidden curriculum or culture of medicine. Thus, the issue would need to be addressed with clear guidelines and possibly consequences for non-adherence.

Along this same theme is the historical view of fellowship as an extension of training for all RO residents. Due to a relative staff specialist position shortage in RO, most residents by necessity complete one or more fellowships prior to successfully starting an independent practice. Given this climate, there was a voiced concern that staff may not see the need for a TtP curriculum during residency, as a fellowship could provide this experience. The problem here is that not all residents complete a fellowship, and the job climate is starting to change. Also, a TtP phase is part of the new CBD curriculum, and thus must be included. Thus, while this is currently an ongoing issue, the implementation of CBD will in many ways force the creation of a TtP phase for senior residents.

The implementation of CBD will also lead to the board certification examinations occuring earlier. Thus, while historically the examination could occur within the last three months of residency, it will now occur further away (approximately 6 months). This will address the concerns about inadequate time for a TtP curriculum and lack of participation by senior residents who are focused on their examinations or their plans post-residency.

A last roadblock raised was regarding the logistics and medico-legal concerns of implementing a new TtP curriculum. These include the support and space for a resident longitudinal clinic, how to provide the necessary privileges within the radiation therapy TPS and how to navigate the medico-legal aspects of a learner who has successfully completed their certification examinations but still holds a learning medical license. The logistical concern is one that is a constant in many cancer centers, and will require individual solutions based on the space and resource availability at each centre. It will

require buy-in of entire care teams, and likely creating solutions that work within each environment. CBD will provide some impetus and momentum but a solid leadership team will be necessary. It may be that what is available is centre specific, with some able to complete simulation and radiation planning blocks, but due to lack of space no on-site resident longitudinal clinics. Creative solutions such as blocks at a peripheral or non-academic centre, where there is the potential for increased responsibility may need to be considered.

As to the medico-legal concern, it is valid, with no clear solution. This is a systemic issue that will need to be addressed at the national level with collaboration between many groups including the Royal College, provincial licensing bodies and the Canadian Medical Protection Agency. There is also a paucity of research in this area, specifically how to balance progressive clinical independence for learning and ensuring patient safety (Yardley 2018).

5.7 The Culture of Medicine

This topic is interwoven with the roadblocks to TtP curricular development, but is addressed separately to ensure a richer discussion. The main themes that emerged with respect to the culture of medicine, and its impact on the TtP were the perception of staff physicians to be the ultimate knowledge holders and decision makers, the implied value of residents and taboo topics. This is an important discussion as it is the hidden curriculum from which learners derive their physician identities and become socialized into the field of medicine (Hafferty 1994, MacLeod 2011). The hidden curriculum is

comprised of the ideological or subliminal messages of the formal and informal curriculum that are often transmitted through behaviour, and the structures and observed practices of an institution (Wear 2009). It is the hidden curriculum that shapes the beliefs, values, and related behaviors of a community of practice. (Hafferty 1994, Lingard 2013, MacLeod 2011, Wear 2009). The hidden curriculum is often at odds with the curriculum and espoused values of the formal educational program.

In this study, a theme of the perception of staff physicians being the ultimate knowledge holders and decision makers emerged. This was reflected in comments that some ROs were unwilling to accept views that deviated from their own. This is supported by the literature surrounding the culture of medicine which has broadly accepted that a hierarchy of power within the field of medicine exists (Hafferty 1994, Lingard 2013, MacLeod 2011). The hidden curriculum supports and reinforces the current hierarchies and helps establish what is considered normal (MacLeod 2011). Within this hierarchy learners are placed under significant pressure to demonstrate their competence to gain acceptance into the community of practice (MacLeod 2011). Through role modelling, they observe the role of the physician to be one of doubtlessness, objectivity and evidence, often without consideration of social context (MacLeod 2011, Taylor 2003). It also can signal an unspoken value of medical knowledge as something that is gained through clinical knowledge beyond what is read in textbooks (Lingard 2013, Taylor 2003).

Hafferty (1994) also suggested that the unspoken hierarchy seen in medicine is upheld by those professions that interact with medicine. This was also acknowledged in the results, as multiple stakeholder groups commented on how other health care

professionals often excluded them from decision making by going directly to the staff for answers on the presumption that the resident would not be of help.

The exclusion of residents from participation in tumor board discussion also highlights this theme. A tumor board is a meeting of individuals from diverse healthcare specialities that care for patients with the same tumors (i.e.: pathologists, radiation oncologists, medical oncologists, surgical oncologists, radiologists, nursing, allied health). This practice can perpetuate the hierarchies of power that exist by normalizing the behavior of excluding residents. The silencing of residents can be construed as a method to navigate the power hierarchies and relegation of learners to observers instead of participants (Lingard 2013).

This blends with the second theme of the perceived value of residents. In this study it was reported that some learning opportunities are not made available as the staff physician needs to complete tasks too quickly to be able to involve residents. A similar finding was also discussed in a qualitative study of psychiatry medical students, residents and staff physicians that specifically examined the role of the hidden curriculum (Wear 2009). One of the themes that emerged was how the hidden curriculum affects the value of time. Both medical students and residents reported how some staff seemed to be more focused on completion of clinical tasks to the detriment of teaching and patient interaction. Our study supports these findings, as both the RO fellows and residents reported that the amount of teaching and autonomy they experienced varied by preceptor.

Two other areas that were brought up in this study were the use of senior residents to increase the number of patients seen and thus billed for, and the presence of unspoken topics that are not to be discussed (especially physician remuneration). While both of

these were discussed in multiple focus groups within this study, the literature around these specifically is minimal. For the former, one suggestion is to no longer assign senior residents to staff physicians who may use them only to increase clinic sizes, without provision of learning opportunities. However this does not address the underlying issue of the culture of medicine. As for the latter, this study suggests that the topic of money is a taboo topic nationally. All groups suggested the implementation of formal teaching on this topic, including the use of national level curricula.

5.8 Limitations of the Study

The aim of this project is to examine the perceived preparedness for independent practice that the current residency training curriculum provides RO residents in Canada. Thus, the applicability to specialities other than RO, or in locales outside of Canada may be limited. Likewise, the information gathered would not be transferable to other transitions seen in medical practice, such as progression from medical student to resident. This study was conducted with a representative sample of the entirety of the stakeholder groups. Thus, the comments made may not be inclusive of the comments that would be available if the entire study population participated.

Given the logistical, financial, and time constraints of the study, the medium over which the focus groups were conducted was not uniform. Three groups received the questions in advance of the focus groups, while one did not (senior residents). Thus, there is a concern that the outlier group did not have as much time to consider the questions, and some opinions may not have been voiced. Also, two focus groups occurred in person,

while two occurred via video-conference. Thus, some of the nuances of responses for the video conference groups may not have been appreciated. Likewise, there is literature that supports that use of tele-conferencing may impact on participation for those not at the primary site (MacLeod 2015).

One of the main findings of this study was the emergence of a perceived gap in competence within the Medical Expert domain, and specifically within the radiation therapy planning process. This was an unexpected result, best examined though a socio-materiality lens. However, since this was unexpected, and not realized until data analysis, this finding was not fully explored within the context of this study. Thus, some of the nuances and complex relationships within this finding are likely not adequately explored. Further exploration of how to address the issues uncovered is required.

Lastly, one has to consider that the analysis of qualitative research is coloured by the experiences of the primary investigator. In this case, the primary investigator is a new to practice RO, who could be considered to be completing a TtP. Thus, her own experiences may have impacted on how the data herein is presented. Efforts to mitigate this included use of a framework for data coding that was decided prior to the data analysis stage, and reviewed by her supervisors and an independent reader to check for bias.

Chapter 6: Conclusions

The achievement of a training program that completely mitigates the apprehension of TtP, and leads to expert level fulfilment of all core competencies is likely unachievable. One must also recognize that the TtP is a continuum that happens over an extended period of time. However, some of the perceived gaps in the current transition can be lessened through an evidence based TtP curriculum.

This study aimed to examine the perceived preparedness for independent practice that the current residency training programs have on RO residents and attempted to uncover the competencies perceived as lacking in new ROs to help inform the development of a TtP curriculum. Within this we found gaps in almost all CanMEDS domains, with the majority falling within the Leader and, unexpectedly the Medical Expert domains.

It was found that a socio-materiality lens provided a useful tool to examine the complexity of the perceived gap of limited exposure to the radiation planning process. Given RO is a medical speciality that is heavily reliant of technology this perspective was able to provide further insight into this finding. It also suggests, that as our healthcare system becomes more complex and reliant on technology (electronic medical records, social media, data sharing); we should also consider how this technology is influencing our workplace, and the impact on learning.

We stand in the unique position of participating in the national implementation of a competency based curricular framework (CBD) for post-graduate medical education. Thus, we have the opportunity to use the data gleaned herein, including the perceived

gaps, suggestions to fill those gaps in the TtP, and anticipated roadblocks to create new curricula to help future graduates transition more seamlessly to a specialist position. Since this is a national program, supported by the Royal College, we have the opportunity to work together as a national community to share experiences, collect further data and improve. I would also echo Yardley (2018), that this also provides an opportunity to advance our knowledge regarding the impact of TtP curriculum on outcomes beyond perceptions of utility.

The next research steps arising from this study are to use the results to design a questionnaire which will enable sampling of a much larger population of the stakeholder groups. Ultimately, the current results, and the future data from the questionnaire will inform the development and evaluation of a TtP curriculum that will be available to all Canadian RO residency training programs and meet the requirements of the CBD TtP phase of residency training.

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Appendix A: CanMEDS core competencies

Medical Expert

Practice medicine within their defined scope of practice and expertise

Perform a patient-centered clinical assessment and establish a management plan

Plan and perform procedures and therapies for the purpose of assessment and/or management

Establish plans for ongoing care and, when appropriate, timely consultation

Actively contribute, as an individual and as a member of a team providing care, to the continuous improvement of health care quality and patient safety

Communicator

Establish professional therapeutic relationships with patients and their families

Elicit and synthesize accurate and relevant information, incorporating the perspectives of patients and their families

Share health care information and plans with patients and their families

Engage patients and their families in developing plans that reflect the patient's health care needs and goals

Document and share written and electronic information about the medical encounter to optimize clinical decision-making, patient safety, confidentiality, and privacy

Collaborator

Work effectively with physicians and other colleagues in the health care professions

Work with physicians and other colleagues in the health care professions to promote understanding, manage differences, and resolve conflicts

Hand over the care of a patient to another health care professional to facilitate continuity of safe patient care

Leader

Contribute to the improvement of health care delivery in teams, organizations, and systems

Engage in the stewardship of health care resources

Demonstrate leadership in professional practice

Manage their practice and career

Health Advocate

Respond to an individual patient's health needs by advocating with the patient within and beyond the clinical environment

Respond to the needs of the communities or populations they serve by advocating with them for a system-level change in a socially accountable manner

Scholar

Engage in the continuous enhancement of their professional activities through ongoing learning

Teach students, residents, the public, and other health care professionals

Integrate best available evidence into practice

Contribute to the creation and dissemination of knowledge and practices applicable to health

Professional

Demonstrate a commitment to patients by applying best practices and adhering to high ethical standards

Demonstrate a commitment to society by recognizing and responding to societal expectations in health care

Demonstrate a commitment to the profession by adhering to standards and participating in physician-led regulation

Demonstrate a commitment to physician health and well-being to foster optimal patient care

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Appendix B: ACGME: 6 core competencies

Patient Care and Procedural Skills

Residents must be able to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health.

Residents must be able to competently perform all medical, diagnostic, and surgical procedures considered essential for the area of practice.

Medical Knowledge

Residents must demonstrate knowledge of established and evolving biomedical, clinical, epidemiological and social-behavioral sciences, as well as the application of this knowledge to patient care.

Practice-based Learning and Improvement

Residents must demonstrate the ability to investigate and evaluate their care of patients, to appraise and assimilate scientific evidence, and to continuously improve patient care based on constant self-evaluation and life-long learning.

Interpersonal and Communication Skills

Residents must demonstrate interpersonal and communication skills that result in the effective exchange of information and collaboration with patients, their families, and health professionals.

Professionalism

Residents must demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles.

Systems-based Practice

Residents must demonstrate an awareness of and responsiveness to the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care.

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Appendix C: Participant Information Sheet – Focus Groups

Transition to Practice in Radiation Oncology

You are invited to consider participating in this research study which is examining what skills are perceived as deficient in Radiation Oncology residents as they transition to independent practice. You have been selected as you are either a senior radiation oncology resident in the final two years of study, a Radiation Oncology fellow, a Radiation Oncologist within 3 years of starting practice, a Radiation Oncology department head, and a Radiation Oncology residency program director or Radiation Oncology residency program administrator.

This study is being conducted across Canada. The primary investigator will explain the details of the study and how the information gained will be used. Please read through the entirety of this document to better understand what participation involves. You can discuss it with your family, and friends prior to making a decision. You can also ask the primary investigator for further explanation or if you have questions. Participation is voluntary.

The primary investigator is Dr. Lara Best, a Radiation Oncologist associated with Dalhousie University in Halifax, Nova Scotia. This project is part of a Thesis for completion of a Masters of Education through Acadia University in Wolfville, Nova Scotia. No funding has been obtained for this study and there are no perceived conflicts of interest on the part of the researchers.

What is the main purpose of the study?

The transition from residency to a full specialist role is associated with a sense of achievement, but is also often fraught with raised stress levels and negative emotions. Most new graduates report a high feeling of competency in the clinical domains, but cite concern in other areas of practice management. These areas can be dissembled into a few larger themes. Initiation of a full staff position is usually accompanied by a geographical move leading to feelings of isolation, fewer perceived networking opportunities, less peer support and difficulty accessing meaningful long-term clinical relationships. Another common theme is a sense of being inadequately prepared for the non-clinical demands of being a staff specialist, including management skills, handling the new financial aspects of personal and clinical expenses, supervising learners and having a teaching role. Taken together, these stresses lead to a high level of burnout.

These concerns have been recognized by the Royal College of Physicians and Surgeons of Canada (Royal College) who as part of the mandated the transition from time-based residency to Competence by Design (CBD), have included a Transition to Practice module as the last stage of residency. However there has been minimal guidance as to what should be included in this module, beyond higher-order CanMEDS roles. The goal of this project is to examine the perceived preparedness for independent practice that the current residency training curriculum provides Radiation Oncology residents. The data will help inform the development of a TtP curriculum to help fill this void, and fulfill the Royal College requirement for a TtP phase of residency training.

What if I don't want to take part in this study or want to withdraw later?

Participation in this study is voluntary. You can withdraw your consent at any point. Tell any member of the research team about your desire to stop and you may stop participating. This can occur at any point during the study.

What does participation in the study involve?

This portion of the study involves the use of focus groups. A focus group involves 6 – 10 participants discussing a topic, under the direction of a researcher. You are asked to participate in a focus group that will include others involved in the transition to practice for Radiation Oncology residents. These can include; senior radiation oncology residents in the final two years of study, Radiation Oncology fellows, Radiation Oncologists within 3 years of starting practice, Radiation Oncology department heads, and Radiation Oncology residency program directors or Radiation Oncology residency program administrators. You will be asked to discuss what effect the current residency training program has on Radiation Oncology residents on their transition to independent practice. To help answer this, you will also be asked to discuss a few other issues including:

1. Describe the current transition to practice for Radiation Oncology

2. What are the current gaps in the transition to practice in Radiation Oncology?

3. How could you address gaps in transition to practice, if you have identified gaps

4. What competencies, skills, knowledge attitudes do you think, if any, should be taught/focused on during a TtP curriculum?

5. How can a resident acquire these competencies?

The focus group will be audio recorded. The researcher will also take notes during the discussion. You will also get a follow-up phone call or e-mail/letter outlining what was discussed at the focus group. This is to ensure than any comments you made have been transcribed accurately by the research team.

If you decide to participate, you will be asked to sign the Study Consent form. By consenting, you do not waive any rights to legal recourse in the event of a research-related harm.

Are there any benefits associated with participating in the study?

Participation in the focus groups will allow your opinion to help shape our understanding of the issues and concerns around the transition to practice for Radiation Oncology residents. Your comments and suggestions may help the researchers decide what skills, knowledge and attitudes should be added to a transition to practice module during residency training. This could include what topics are included, how these skills/competencies are taught, and how much time should be spend on addressing each.

Are there any risks associated with participating in the study?

There is the theoretical concern that participation may harm professional relationships. In particular, whether discussion about competencies not adequately covered during residency by a senior resident may interfere with their ability to get a staff position. This

issue will be discussed with the focus group prior to commencement. It will be reiterated to participants that all discussion is confidential and all data published will be anonymous so that individuals cannot be identified.

Will taking part in the study cost me anything, and will I be paid?

There is no cost involved with participation in the study, beyond the time required. It is expected that the focus group will take between 1 – 2 hours. You will not receive payment for taking part in this study.

How will my confidentiality be protected and what happens with the results?

All data about you collected for this study will be kept in an electronic file that is stored on an encrypted, and password protected server. The data will be stored for 10 years. The data will not be shared with anyone outside of the research group. However, employers may have access to information that is submitted through a workplace computer. We cannot guarantee total privacy, as your information may need to be released in confidence to the regulatory authorities and/or the Human Research Ethics Committee, with the understanding that the records will be used only in connection with carrying out our obligations relating to the study.

If you decide to withdraw from the study, data collected prior to that point may still be used as part of the study. A person can refuse to allow any more information to be collected about them if they withdraw from the study. If the information gathered from

this study is published or presented at scientific meetings, all personal data will be removed so that you cannot be recognized.

You will maintain the right to access and request correction of information related to the study. You will receive a follow-up phone call or e-mail/letter outlining what was discussed at the focus group. This is to ensure than any comments you made have been transcribed and interpreted accurately by the research team, thus providing you a chance to make any necessary corrections.

What should I do if I want to discuss this study further before I decide?

If you have questions about the study, you can contact the study team. The primary investigator, Dr. Lara Best can be reached at 902-473-1474, Radiation Oncology Department, Dickson Building, 5820 University Ave, Halifax Nova Scotia, B3H4J2 or via email at Lara.Best@nshealth.ca.

Who should I contact if I have concerns about the conduct of this study?

This research has been approved by the Acadia University Research Ethics Board. For concerns about your rights as a participant while you are part of the study, or if you have a complaint about the manner in which the research is being conducted, it may be given to the researcher. Or, if an independent person is preferred, you can contact Dr. Stephen Maitzen, Research Ethics Board Chair at Acadia University, who can be contacted at: Research Ethics Board, 214 Horton Hall, Acadia University, Wolfville Nova Scotia, B4P2R6, email: smaitzen@acadiau.ca.

Appendix D: Study Consent Form

Transition to Practice in Radiation Oncology

Dr. Lara Best has discussed the above study with me.

I have:

- Read, understood and kept a copy of the Participant Information Sheet related to this study
- Had an opportunity to ask questions and have had them answered to my satisfaction
- Been informed of the possible risks and benefits of enrolling on this study
- Understood that the study is to examine what skills are perceived as deficient in Radiation Oncology residents as they transition to independent practice, and may or may not benefit me
- Been informed that my information will be stored in a manner to ensure confidentiality is maintained
- Given consent for publishing of results related to the study, provided my identity is kept confidential
- Understood that I can withdraw from the study at any point without penalty
- Agreed to participate in the study

PARTICIPANT'S NAME: _____

PARTICPANT'S SIGNATURE: _____

DATE: _____

I confirm that I have fully discussed the nature, purpose and reasonably foreseeable risks of participation in the above mentioned study. I confirm that he/she has read and kept a copy of the Participant Information Sheet and he/she freely agrees to participate in the study.

RESEARCHER'S NAME: Dr. Lara Best

RESEARCHER'S SIGNATURE: _____

DATE: _____

Appendix E: TtP Curricular Details

	Program directors / RC CBD committee	New ROs	Fellows	PGY4/5
Content	**Heterogeneous based on resident wishes: 1** • If they have a job to go to, we have let them go on an elective to their new site so that they can get a feel for it. • If they're going into a fellowship then they continue on with training • at least one of the residents this year, that we felt that a research block would have been more beneficial to that individual rather than to have him do more clinical work. So his clinical work was excellent but had a deficit in terms of the research component and completing the scholarly project. (Otherwise, have formal policy and procedures to give signing authority to residents, and then also having more graduated responsibilities in terms of seeing patients and having staff on-call during the day, and more responsibilities within QA rounds and multidisciplinary rounds, and etc • Others have used that time to either fulfil their ABR requirements in terms of getting their ___ [? 00:10:41] medicine stuff done that they might not have done before • residents just kind of bounce around to whatever clinic they feel that they need more experience in • a couple of our residents	• I nominally had a rotation called transition to practice… I had a fine experience . I just didn't think it was all that much different than what I had been doing for the previous year	•we do one month of rotation with only one staff as a transition to practice •we were pretty well prepped or I was pretty well prepped by the end of residency in terms of, you know, what's your approach to QA-ing plans and what to look for and how to look for it. And, you know, who to talk to if there's sort of a concern	**Practice Management** • So they've [staff] been giving us different pointers. Like keeping track of the patients at various stages of treatment or diagnosis, and really trying to learn to follow up on investigations that we order ourselves, and take ownership of the patient. But I would say it's very variable depending on the staff we are working under. • There's one staff who is comfortable going away for a period of time, who will check her patients' lab works for every patient that's there, sign off on imaging reports, and if they're flagged, talk to other services if need be. But for all intents and purposes, most other staff do not actually let us take significant responsibility for patients. They're still the overarching authority. **Resident Longitudinal Clinic** • we have a longitudinal clinic from PGY 4.5 to halfway through PGY 5 where we are assigned to see patients and consult, and follow them through most of the planning process and in follow-up for that year. So we're supervised by a responsible staff

	have done research blocks to complete their research work. And that's been successful. • One did some elective time in a disease site at another centre, anticipating doing a fellowship back at our centre in that disease site • she's interested in teaching. So she did some… She participated in a resident physics teaching course that was going on with the junior residents • we've just been winging it from person to person, depending on what their needs are • We have some graded responsibilities for senior residents in terms of their responsibilities for treatment planning – what they can and can't sign off. But that's not exclusive to transition to practice **Formal curric/component: 2** • implemented a senior residents clinic where they have minimal supervision for that • residents work…they pick up 24 patients that they treat independently, and they do all the patient review and follow-up, and they do all the planning, and they can sign the plan and send it for physics check. It's just the first treatment isn't delivered until the staff signs it • formal policy and procedures to give signing authority to residents, and then also having more graduated responsibilities in terms of seeing patients and			physician. But the onus is on us to triage referrals, identify patients that we want to see, and then follow them along. So it gives a bit more independence with regards to some of the management and learning about some of the administrative perils and pitfalls that come with following people for that length of time **Tumor board participation** • In our centre, like the residents do present the case [at tumor rounds]. Like the discussion part, it's more the staff.

	having staff on-call during the day, and more responsibilities within QA rounds and multidisciplinary rounds, and etc • RLC 1yr prior to exam • We have some graded responsibilities for senior residents in terms of their responsibilities for treatment planning – what they can and can't sign off. But that's not exclusive to transition to practice			
Drivers	**Resident dependent: 2** **Faculty: 1** • we're going to try to educate our faculty better **Mixed: formal policy and resident dependent: 1** • at least one of the residents this year, that we felt that a research block would have been more beneficial to that individual rather than to have him do more clinical work. So his clinical work was excellent but had a deficit in terms of the research component and completing the scholarly project. So we made a few changes based on that resident.		**Staff/faculty** • Whatever sort of prep you got for practicing depended on what staff you were working with at the time of residency. So it was extremely variable	**Staff** • I notice it's staff-dependent. • So some of my staff feel really strongly about getting residents starting in PGY4 to start learning how to manage practices • It's very staff dependent • So my experience is… the amount of autonomy you have really depends on the preceptor that you're working with. So I could potentially have more responsibility as an R2 than as an R4, depending on what staff I'm with and their level of comfort in allowing me to be more independent **Resident** • I would say there's mainly self-directed. So you put your mindset… Like in PGY5, you set your mind to act as a staff and to try to be as independent as possible • you just try to drive yourself as if you are a staff. So you are preparing yourself by yourself.

Appendix F: Perceived gaps in TtP

	Program directors	**New ROs**	**Fellows**	**PGY4/5**
Collab-oration	• discussion with the planner, whatever discussions take place kind of in the process, that they're not involved with enough	• Our residency program, we did some kind of like conflict resolution kinds of sessions. But it was more patient-centred. And I feel comfortable with different patients. But as far as just staff dynamics, that can really drag somebody's day down if there's that kind of politics and stuff happening.And things you delegate that I'm supposed to do versus my say admin. Because as a resident, you did it all. And then you now have an admin who's there to help you. And you don't really know what they're supposed to do • [balance between implementing change]... And not ruffling too many feathers • I'm just kind of walking in and like just kind of doing stuff. But I would be doing things, and not knowing that I've ruffled somebody's feathers one day or the next day • putting people in different situations or making them uncomfortable, asking them to do things differently. And sometimes it's	• Meaning that it's always easier for the physicist or for the primary or even for people who are seeing the patient like nurses during radiation to direct the patient to staff because they know that it's the staff who has the answers rather than the residents. So unwantedly, sometimes a resident gets excluded from the process of longitudinal care. And I think that's something that is very important	• So our program director tells the staff to then actually call us. But they don't sometimes know which rotation we're on. They don't always want to check the schedule because it's an extra step for them. And then it's easier for them to just call the staff. Because sometimes we'll have to call the staff anyway. So instead of calling junior residents, they know that it's just easier to bypass that step

		making people feel like they're not doing things properly when I haven't really said that, you know • When I came, I said, oh, let's start doing this. And then sometimes it is misinterpreted as, oh look, this person is just going to waltz on in and take over… so I think, yeah, like the communication and stuff when you're first starting • But no one verbalized that expectation to me. It was just like, "Oh, Dr. Blah-blah-blah doesn't come to the SIM." Like she doesn't think she needs to. Whereas no one told me. How would I know that? • … I'm trying my best not to upset the apple cart and do things differently. But people… But I'm like not getting the answers that I sort of am trying to pull out of people.		

Commun-ication	• And how that needs to be sent to the family doctor. How do I send that to the family doctor? • How to say no to your chair • Radiation completion notes: We assume that the diagnosis has to be there, the prescription. But how detailed? You know, do we put in what __ [? 00:20:13] energy, side effects, all these things? Everything's assumed. And there's no standardized way of putting it down. As long as it's just done. So that's a problem • I think part of the challenge is, for example, the radiation, the completion notes that we do, and documentation that we do. Nobody is actually talking about what to do • I think part of the challenge is, for example, the radiation, the completion notes that we do, and documentation that we do.	as a staff, not only are you having to get kind of the consult on paper, and maybe talking to the physician on the phone, trying to get what information is there, and what kind of timely fashion can you see them		

	Nobody is actually talking about what to do • XRT planning notes: Everything's assumed. And there's no standardized way of putting it down. As long as it's just done. So that's a problem • about insurance forms and how to complete them, and why it's important for the patient and whatnot • insurance forms are a real pain. I'm still struggling on how to figure out how to fill them out			
Health Ad	•			
Leader – Admin	• I've observed that our senior residents don't always have an appreciation for is dealing with the administrative aspects of practice. • other very overwhelming was all the… administration and the paperwork			• What extra work the staff is doing other than the clinical service, I have no idea about that.
Leader – Leader-ship	• Chairing tumour site groups or			• M2: Like in our centre, like the residents do present

roles	chairing departmental committees			the case. Like the discussion part, it's more the staff. R2: Exactly. They skip over you and go back to the staff, "Like what do you want to do?"
Leader – Billing & Pay	• billing, you know, they really have no exposure to that at all in our centre • they don't know anything about how they get paid. And we haven't been very good at educating them on that • how we're paid and the business management, and incorporation versus salaried, and is there a pension, and all that kind of stuff, that information is not really disclosed • other very overwhelming was all the billing and the administration and the paperwork • That different jurisdictions, different organizations, depending on how you're paid, incorporation may or may not be beneficial**.** And that information is	• Except that as a resident, you don't know any of the logistical background and billing issues… I got none of that • with respect to billings and payments and incorporation and that. • I think also like the financial aspect. No one teaches us and then we're supposed to all of a sudden be business savvy. And like the first year you have to do your taxes as a staff, like that is very overwhelming. You have no idea. And I always found that it was a very hush-hush thing where I trained. I trained at a centre that was fee-for-service. • … And it was like you don't know the rational. Like yes, we should get paid for what we do. But you need to know the decision-making so you don't just start doing things on autopilot. And then you start billing… And I found when I started, no one… One side of one of the sites I treated were great with telling me, "Okay, this is what we bill	• But I think there's a procedural transition to practice as well, exactly as was brought up - how you're going to bill and what are all these nuances. And I think that's something that can be learned over a short period of time	• The billings • But then on top of that, you have your billing. • Because we don't know enough about it [billing] to know when we should start learning about it. • So stuff like that that [career planning, financial planning workshop], you know, people don't really talk about.

	really hard to get and to understand. • how we're paid and the business management, and incorporation versus salaried, and is there a pension, and all that kind of stuff, that information is not really disclosed	for this, for this, for this, for this. This is how we do it," and it made sense. And then the other site, I had no idea. And like I talked to some friends at other sites that do things, and I'm like, oh, that doesn't sound right. And then I talked to other people, and I'm like, okay, that sounds right. Then you kind of just pick what you think is a happy medium. But you don't know. • money is a very important thing once you start becoming a staff. And a lot of people get really up in arms about it • I don't think we get any of that financial stuff • Or if you're salaried or… But like do you need to get RRSPs? Do you have a pension? Do you have to all of a sudden invest? • certainly in the provinces, there are large variabilities between centres in terms of how payments are structured and billings are structured • I always found that it was a very hush-hush thing where I trained. [discussion around the financial aspects of practice management at a center that was fee-for-service] • then like you're almost afraid to ask		

		anybody because like money is like really bad to talk about supposedly.		
Leader – Recognize own limits	• they go to senior staff a lot. Which is absolutely fine. But then it reflects back on their time management			
Leader – Time manage-ment	• especially in the first few months, they suffer quite a bit in terms of everything taking longer and their day taking longer, and all their activities taking longer • they also are unaware of how much work they can handle… Time management can become an issue on them	• I can't work at the same capacity that staff physicians who have been doing this for 10 or 20 years can work at. Like just in terms of the volume that I can see and the time that it takes me, I'm not as efficient. And I found that that was really discouraging at least initially.		
Leader – Practice Manage-ment	• I think residents don't appreciate how there is already organization to the clinic and the nursing staff and the clerical staff when they're working with somebody – how that person's practice is… Once it's established, it's sort of organized, things are in place, things happen without you really having to do	• You start your independent practice. And then it's like, okay, here's your grid for when your patients are going to come. They're going to come every 15 minutes, and you're going to have a consult at 9:00, 10:00 and 11:00 with fellowships in between, and here you go, do it. There's no one that really meets with you • it took quite some number of months to figure out how to make…to make sure I was doing that kind of right or in a way	• as far as like the day-to-day sort of how to structure a practice, how to organize things, I am sort of getting teachable moments here and there. But not anything sort of overt or structured or anything like that. • I'll have certain ideas as to how I think things should go, and the staff I'll be working with that day says,	• I think generally managing a practice. Like the time and organizational factor. Like I don't think we recognize how much… Like just doing the clinical work is enough and occupying most of your day. Just hunting down, you know, results and calling your patients and doing this and that. • Like how do you delegate your secretary to do your stuff? • Like some staff are

	much. And then when they get into practice, none of that's there. So every single thing that has to happen, every patient that has to get fit in somewhere, or how often you're going to see your patients • don't know where the orders go. So they tell a nurse that, "I need a CT scan," and then, "Well, I get the CT scan," and then they don't know when…how to follow that up • do a referral • how do I do a chart check or to ensure that I review the pathology? How does that information come back to me? • <u>information management</u> • I think establishing your own practice of how to not lose a patient in follow-up or not lose a patient	that worked for me in terms of time management and making sure all those boxes were checked and whatnot • I also found one of the biggest gaps was expectations and what is expected of you. You come in. Okay, you're going to treat head and neck, and breast. Okay. How many patients are you supposed to see? How many new patients are you supposed to see? How many follow-ups are you supposed to see? When are contours supposed to be done? When do patients get SIM? So patients have a SIM… Like do I have a SIM day or are patients intermittently getting done? Am I supposed to come down to the SIM and mark the wire? • knowing like how many days you're supposed to be clinic, and like what are your responsibilities going to be, and what is expected from you in terms of how many patients you should be seeing per week or per month. • not only a skill in terms of administration [practice management], which is what a lot of these skills we're talking about are that are gaps that we're missing, but also a	"No, absolutely not. If you do that, you'll be seeing patients until 3 in the morning. You have to do it like this." • I think part of it is also, okay, you've got a well patient and now what do you want to do next? How are you going to structure follow-up? How are you going to schedule these follow-ups so that you don't get so overburdened that you have no room to see consults? Because your clinics are booked up for the next 6 months • I think clinic management is another thing	describing what they are doing… but not everyone • There's one staff who is comfortable going away for a period of time, who will check her patients' lab works for every patient that's there, sign off on imaging reports, and if they're flagged, talk to other services if need be. But for all intents and purposes, most other staff do not actually let us take significant responsibility for patients. They're still the overarching authority. • what do you need to know to actually sink or swim in your career practice

		clinical skill that I never really got. • what is my practice going to be, how can I slot them in? So not necessarily only just gaps in the administrative side but also there are some like clinical gaps that just as a resident, you don't get…I didn't get exposed to at least. • I remember my first weekend being on-call and having to treat a patient, and being like how who's turning on the machine, how are we getting physics, how are we getting therapy, who do I… whom am I calling? I had no idea. So then you're sitting there feeling like an idiot because you're now the staff • Some of the logistic stuff, not so much because you didn't want to waste people's time.		
Leader – Institu-tional Diff-erences	• information management. And it can be unique to each centre. So what works during their training may not be the same way that it's managed at another centre. • That different jurisdictions, different organizations, depending on how you're paid, incorporation may or may not	• As a resident, you don't know any of the logistical background … and what is required of you in terms of documentation and so on. And I got none of that • no documentation of like what's given to you, or at my institution at least, when you start of what should be done. And like to make sure that you're hitting all of the right steps. And so I find that has been the	• And I am finding differences in sort of how you would structure a practice here versus [elsewhere] • Because some of that is going to be institutional where, you know, you have nursing support or you have other people where you can sort of, "Okay, can you please	• And there's a difference. Like when people come from other centres or staff are hired from other centres, and they bring their own experience in from their own centre, it's like, "Oh, when we had treatment planning, or like when we had a plan to sign, everybody went to the dosimetrist together." Like the resident with their staff. And there wasn't as much of a

	be beneficial. And that information is really hard to get and to understand. • especially if you go to a different centre, you're going to have orientation because you don't know how they do things •	greatest challenge • all the other logistical aspects of the things that you don't realize are even happening as a resident but your staff are doing without even really telling you • what is the institutional standard? • Then it's also like the culture, I guess, of your institution. Like where I was, like no one really wanted to treat after-hours. • I returned to the institution where I did my residency training, that the…a lot of information that I feel like I should have as an attending physician was not really given to me because they just assumed that I knew how things worked at the institution • Not so much actually in the clinical work but in the expectations of what it means to be an attending at an institution, and all of the departmental policies. I'm sure they're written somewhere but no one even told me like where to find them. So that's been challenging • Not so much actually in the clinical work but in the expectations of what it means to be an attending at an institution, and all of	check this for me," so that you're not having to do every single thing yourself	time crunch at their centre. But our centre is like very like flag system, must be done by this time. And we rarely sit down together with the dosimetrist with the resident, with the staff together and ask those ___ [00:17:45] Can I push this more here, can I push that more here? It depends on our experiences

		the departmental policies. I'm sure they're written somewhere but no one even told me like where to find them. So that's been challenging • a lot of differences between different centres. And so you'd go to a different centre, and you're like, "Oh, this is how we did it in centre A." And so it would be, "We don't have that ability. So here's how we do it here." And so you've got a little bit of a difference • [trying to teach about financial aspects]Which would probably vary depending on where you've trained too, right. Like so obviously every training program is going to have slight differences. And if you go to a different province or different centres.		
Leader – enacting change	•	• And I think for me, the biggest gap was trying to find a balance between hopefully enacting change in the new centre, like if I feel like I have something to add. • I want to conform but also, you know, gradually bring in some ideas that maybe I picked up during fellowship • it's like a bit of an art of like when to like start bringing in, "You know, when I	•	•

		did my fellowship, we did MR SIMs in these situations, and it actually worked out really nicely. And, you know, it's something we should consider in the future." And I do find it's a delicate art. And it's not something that of course is ever addressed in residency (collaboration??)		
Medical Expert – Ultimate Respons-ibility	• they find that the assessment of palliative simulation and making sort of immediate decisions at the simulator stressful • being ultimately responsible for the decision • the buck stops here • when you're first year in practice, the buck stops with you • making the decision and being responsible for the decision, not being backed up • they are new at being absolutely responsible for everything, they tend to check and second-guess things • I think the most overwhelming thing was to learn how to take charge of a		• You don't necessarily get quite that same experience [making patient management decisions] in residency unless you have a staff who is very comfortable with letting you drive more, and you're sort of feeling competent enough to say, "No, no, I am sort of going to spearhead this."	

	patient from A to Z, knowing that it's your patient			
Medical Expert – Continuity of Care	•	• I think that that's what often gets… It's the continuity that often gets lost • You know, it's what happens after you do the contours that you don't really get a lot of experience with as a resident because you're seeing so many new patients and doing contours all the time. And then because a lot of this is protocolized, it just goes on autopilot.	• But when it comes to reviewing the plans and approving the plans and actually dealing with the side effects of the radiation which is being done, that longitudinal follow-up sometimes is not existing.	•
Medical Expert – XRT planning process	• gotten a lot of feedback about onboard imaging assessment being weak • assessment of plans… they're not involved with enough • XRT planning notes: Everything's assumed. And there's no standardized way of putting it down. As long as it's just done. So that's a problem	• the centre that I'm working at, is I'm really having to think about how do I want to simulate patients, how do I want them set up, how do I want them treated, what imaging do I want – all these other things. Whereas during training, it was already basically set up for me and I never had to think about those things. And it's actually quite difficult now to actually have to go through and think about each and every step. And not that I think I'm doing things wrong but I just don't have the experience thinking through those steps • kind of not understanding the process • what task should I put in the Aria treatment planning	• So fellowship has helped with that feeling of independence and signing off on plans and that kind of stuff. • I'm pretty comfortable QA-ing plans once I've got the different constraints here down pat because they are very different from what I'm used to. • I would say that my main area that I thought after, even after Royal College, that I needed to focus on a little bit better was plan approval and plan evaluation. • We barely did any of that in	• I think the American residents are called far more frequently for image verification, for example. So I was talking to some of my American colleagues. It almost feels like, oh my goodness, you have all that training in residency? And then we'd have to transition to that as junior staff. Which is going to be intimidating. Who do you ask if you're the last authority there?

		system to make sure that this gets triaged to the right person?" • I find this is like 90% of my clinical responsibilities, is just like asking how to get things done	residency [plan approval and plan evaluation] • particularly for the programs that have a lot of fellows, then to the same token, it's easier always to say the fellow because they have a little bit of a higher authority when it comes to making decisions. So as a resident, sometimes I really felt that I'm not part of the whole process. And that really affects your comfort level, whether you are prepared to move into a full-blown consulting position.	
Medical expert – triaging cases	•	• Like as a resident, you just see whatever your staff has booked that day. And you don't really think about, well, when did that consult come in? • as a staff, not only are you having to get kind of the consult on paper, and maybe talking to the physician on the phone, trying to get what information is there, and what kind of timely fashion can you see them • It took a lot of time initially to try to figure out. Like	•	•

		because everything seemed urgent right away. And then you kind of start to realize, okay, what actually is, and what is a safe time to see them in? • A gap in terms of like triaging patients themselves. Which I found was like a whole new clinical skill that I didn't have		
Medical Expert – completing forms	•	• But knowing certain things about insurance forms and this and that, I would just find it would waste a lot of my time initially • I don't understand how to order tests, I don't know what forms to fill out to get patients treated, I don't even know who to ask when I don't know the answer to a question. So that's certainly very frustrating	•	•
Professional	• physician wellness piece • how do you go into your own practice and still have a good work-life balance? Who do you go to if you're running into trouble? Who do you talk to? We need to teach that better.	• How do you get all that done in an 8 to 10 hour day, and get home, and not be still doing paperwork all night? • How do you get the balance of your personal life and your professional life? • I don't really know how to address that culture issue because that seems to be the challenge in every domain of professionalism everywhere		
Scholar – Direct Observe	• observing residents or figuring out			

	how to interact with them			
Scholar - teaching	•			• The seniors residents don't really get to take that chance to be mentors or to do teaching. So maybe integrating more of that
Main of Cert	• we were working on professional development too. So we have, you know, MAINPORT and everything like that. When you become attending, you just kind of have to muddle through and figure out what does it really mean. I mean they are taking steps to address that in CBD. But currently when you become attending, you just have to kind of jump in and try to figure out what all these categories and MAINPORT and CME and everything like that.			
Scholar – contract negotiation & career planning	• how to negotiate a contract or a working contract •	• When you're a resident, especially like in the current environment in the last few years, if there is a job available, like everyone is just like, "Of course I'll take that job. Like there's	•I think during residency, we don't necessarily acquire the skills for finding a job and navigating through the systems and	• And even the negotiation aspects of getting a job • Like some staff, like [staff] asked me to sit down and showed me how to the billing stuff. But not everyone.

		no jobs. Iike I'm going to take whatever job you offer me, and I'm not going to negotiate anything or ask any questions or do anything." • knowing what questions to ask • I think that residents are going to need to be guided a bit more in knowing kind of what type of…thinking about what kind of practice they want to have	kind of trying to kind of understand where is our goal given the job situation in radiation oncology • But now the competition is such that you really need to train yourself in terms of both your clinical and research acumen, and also to be able to understand which centre necessarily would be a good fit for your future career	
Documentation & promotion	• documenting all your teaching activities and whatnot [with respect to academic promotion] • Academic promotion: There's a lot of documentation that's required. And unfortunately sometimes you don't learn that until you're trying to submit it. And then going back and acquiring that documentation is really hard.			
Other - mentorship		• But the thing that does not go very well is the lack of mentorship or coaching or even someone telling you what the expectations	• And I guess that's [mentorship] the part that might be missing from some of the residency	

		are	programs.	
Other		• I think that there is an issue with sort of rigidity and not thinking through all of the policies because these policies have already been created	•	

Appendix G: Suggestions to fill gaps in TtP

	Program directors	**New ROs**	**Fellows**	**PGY4/5**
Collab-oration	•	• I find I'm asking like as many questions as possible. And like often not to physicians. Like I'll run to like a therapist and be like, "By the way, how should I do this? • I kind of wish that I would have come in just…and said a statement at the very beginning – I understand that in the next few months I'm going to ask for things that are not going to be the way you like to do it. You know, just basically alerting about like the problem. • Consulting an outside physician or a physician within your institution		
Commun-ication	•			
Health advoc.	•			
Leader – Longitudinal Clinic	• It would be nice to simulate this part of residency, where this is kind of like a longitudinal clinic or…where residents can figure out how they want to	• like a continuity or a longitudinal clinic • they will do the new patients but I'm still responsible • longitudinal clinic. Like even just thinking about it from a lot of departments now have like rapid access clinics. And I find like in palliative situations, it's been really easy to implement that		• I think that's [resident longitudinal clinic] been a really helpful exercise. It was a lot of extra work but it was also a helpful exercise in learning how to manage. • [Resident longitudinal clinic] Like

	manage a practice and how they want to do their follow-up, and have more kind of responsibility that's in a longer time period • in a protected environment and not necessarily when they're an attending. That they'll have the safety net of the residency program with a mentor or a supervisor	• transition to practice is not going to be ideal for every single tumour site. Like maybe pediatrics or head and neck are not going to be like the most optimal sites to implement, you know, a transition to practice clinic • if I'm your supervisor, I will sign off when those things take place. So they won't happen within a week. They are longitudinal. So being responsible for the patient journey, I guess is the way I'm meaning it.		you're ultimately responsible for the treatment for the patient during the entire course of treatment. And administrative responsibilities as well. • I mean I like that idea of that longitudinal clinic
Leader – business manage-ment / Billing & pay	• There are a lot of educational sources related to business. The CMA is one of them that provides a document that does have a lot of discussion about taxes related to being a physician, not just as a resident, and incorporation. • And there are several accountants that are employed by the CMA that can come in and give talks like to residents about that. • And so	• You know, business 101… • But just knowing some of the differences and some of the terms [with respect to RRSPs, pension, investment etc] • But maybe that could be something that CARO could take the lead on. [financial training] • We do the resident refresher every year. Maybe an hour, an hour and a half of the resident refresher every year can be, "Hey, you're a PGY4, 5. These are some things that you need to think about when you actually start making some money."	• [Having a chance to pick the brain of new staff] Where's the billing sheets? What code do I put in? Do I use that in this case? • I don't think you need to spend a ton of time on this but actually how to physically bill and how to use codes so that you're being…you're not gaming the system but you're being efficient? Because if you had to spend, you know, extra time because of X, and that is a legitimate code, like just to	• I was thinking of like Post Graduate Medical Education sent all the senior residents to a like career planning, financial planning workshop. And it was somewhat helpful to go. And they talked a lot about just like planning your finances because you don't get paid for the first few months when you're like transitioning into practice • Even some of this stuff could be like a specialty issue. Some of this stuff could become like a refresher or some sort of education • [mentors could discuss] Financial

	making use of those resources as an educational content, and provide exposure to our residents.		know sort of where to look, what's sort of commonplace stuff that you're going to need, and sort of, you know, how that process works.	management, investment • And just open and honest discussions about things like salaries, benefits, and modes of reimbursement. Things that don't always come up on a day to day basis and a lot of people aren't comfortable talking about •
Leader – practice manage-ment	• So I think it's good to teach them from day one almost (WRT billing, administration, taking charge, est a practice	• As a fellow, when I first came in my first month, the staff had gone away. So I was responsible for running their clinics. So certainly that helps with the transition to practice with time management, organization, etc • this is what you have to do. Like run a clinic. Like I'm going to be in the building, I'm going to be in my office. Here's my pager. Take the staff pager. Here's my email. You know, my inbox is going to be open. Probably nothing personal coming. But like this is what a staff life is like. And okay. And not sink or swim but do it. And I'm around. Like you have the supervisor. The person supervising has to be there and ready to be available. It can't just be like okay, go. • taking that same approach but maybe like shorter clinics or maybe longer appointments to see the patients. Things like that to kind of build in the redundancy and the inefficiencies that	• Just having a little bit of insight as to what to expect or how things are going to get structured [by having a chance to pick the brain of new staff]. Or what sort of standard operating procedure in the centre you're at. So this way you don't sort of get to your first day of practice and go, okay, now what? • I think it's not about teaching, it's just about self-learning that comes with the volume • I think that's something that helps – just learning time management on your own • what are the important things to	• So they've [staff] been giving us different pointers. Like keeping track of the patients at various stages of treatment or diagnosis, and really trying to learn to follow up on investigations that we order ourselves, and take ownership of the patient. • I think we're also fortunate to have a few staff that will have us manage their practice a bit more…or they'll put the onus on themselves to make sure that you're managing their practice more than them • like mandatory half-days on this topic [practice management, career planning] like for each school rather than like leaving it up to the…it should

		you're inevitably going to have as a new staff	actually ask and what are those things that are not too, too important in order to keep the flow going on? And as you were saying, not end up staying in the clinic until 2 am just working on these things and dictations and all that. So I think that's another skill that helps with your efficiency in clinic. And therefore you can work easier as you consult.	be built into the curriculum. • Even some of this stuff could be like a specialty issue. Some of this stuff could become like a refresher or some sort of education • [mentors could discuss] like time management, give you an idea how they are managing all the extra stuff. • And just open and honest discussions about things like salaries, benefits, and modes of reimbursement. Things that don't always come up on a day to day basis and a lot of people aren't comfortable talking about • So maybe just clear objectives for the staff, what the residents want to know. And timing-wise, maybe this should be after the exam • Like based on CBME, if we could split the curriculum. Like in PGY3, learning to, you know, manage…like learn to go into treatment machines, or follow up in terms of treatment planning. And then in PGY4, doing more of that. PGY5,

				people are usually trying to down scale the amount of clinical work because of the exams. But at that time, learning to bill and like administration and managing the time factors of practice. So splitting it up rather than doing it all in the end of the 5th year
Leader – leadership roles	•	• Attending, you know, tumour boards and presenting		• skills needed for tumour boards, I think that's also a skill. Like a lot of the residents, like we just sit there and listen. We don't really know when to say something sometimes. And I think it's actually a skill to learn to use that as a staff rather than as a resident • … It's like establishing your role in the tumour boards environment, and having other specialties listen to you, and actually you being an active contributor •
Medical Expert – XRT planning process	• the residents have said that they learn a lot about the process they don't know about (they pick up 24 patients that they treat independently	• I think it would have been beneficial to me if I had had some more experience thinking through those steps [process of treatment planning] during training	• I think sitting with the physicist and trying to understand exactly what they have done and what are all these dose constraints. And we are	• Or having some kind of built-in standard for plan evaluation to ensure that it's done more regularly and assessed would be beneficial [so residents can participate]

	, and they do all the patient review and follow-up, and they do all the planning, and they can sign the plan and send it for physics check. It's just the first treatment isn't delivered until the staff signs it)		moving into an era that we are doing different things, including SBRTs with multiple doses and fractionations that vary from one institution to the other. I think grasping that content and grasping those concepts is something that I thought probably I would have wanted to learn better during residency • It's really, really nice if you have a chance to sit down with a physicist and sort of pick their brain of why this and not this, why this and not this. Especially as we're getting more complicated in our plans, you know, we're doing a lot more SABR, we're doing a lot more re-treatments • I think as residents, we always want to be complete and thorough and ask about all the details of social history and, I don't know, family history. And to	• So I think being more attentive, and some of that is self-directed, to following through on the plans that we do [to get experience with being able to review onc treatment images or sign off on plans and prescription] • I think it has to be really intentional with things like plan evaluation, onc treatment imaging, and stuff like that • I think if it is [technical aspects of radiation oncology – dosimetry, image verification] more towards the senior years, it would be more efficient so people understand what they are doing • I think we need a little bit of didactic teaching in that we can't just rely on all residents to have all the necessary experiences just by chance by the time they graduate. [discussion around technical aspects of radiation oncology – image verification, plan evaluation etc]. And right now I don't know about your programs but we don't have any like lectures

			be honest, some of that as a staff would kind of lose its relevance, I would like to say. So I think it's a skill to learn – what are the important things to actually ask and what are those things that are not too, too important	that touch on that kind of thing • I think if it is [technical aspects of radiation oncology – dosimetry, image verification] more towards the senior years, it would be more efficient so people understand what they are doing **XRT planning** **process block** • We have a resident who came from Belgium. And we knew from her that part of their rotation is to do a rotation with the CT scan. Just the whole day is dedicated to the CT scan. And any issues with any…and the treatment units as well. And any issues with the CT scan or the treatment unit, anything, she's the one who's responsible to take with her. But it's in her schedule. It's part of her training program. So it is nice. Like just like we have rotation in the inpatient and the clinical thing, I think it's more important to have rotations in the technical side of the rotation.

				Otherwise you are faced with it when you are a staff, as a junior staff, and you start to have those holes and wondering what should I do, what should I do? • So my suggestion is back to the Belgium experience, so it's nice to have a dosimetry thing, but it's more nice to be more involved within the technical issue. And what questions the dosimetrists are asking the staff or the radiation therapists are asking, what kind of things that is… Like are we expecting the SSDs not 100, it's 105? What should I do? Like those, you know, clinical real live things… I need to learn how to answer their question if they have any issues. So maybe this is an extra rotation to be done.
Medical Expert – ultimate patient respons-ibility	•	• you ultimately deciding what fractionation you're going to use, what are your volumes going to look like, or field borders. And then having a staff feel more comfortable signing off on that type of maybe less complex plan would be a great opportunity to start something like that. To integrate all these	• So I think that skill of managing everything about a patient, and having kind of a share to play in a clinic rather than spending half an hour as a luxury while the staff is	• I've had someone that I was working with on a peripheral rotation who said to the staff, it was a smaller centre so there were only 3 radiation oncologists, and she kind of said that the ___ asked, "You're

		issues that we're thinking are quite crucial • you're going to make this decision to treat this patient. Do it top to bottom. • it's going to have to be know how to treat an emergent patient, how would you do that. You know, responding to triages and outside calls. • going down to see simulations, going down to see treatment, approving plans • The non-rad onc staff at the centre who control a lot of patient access, they have to be willing to call the resident, not call the staff and say, "Hey, staff, come do this because I know exactly what you're going to say so it's going to go faster." • I think seeing new patient clinics, and then that's your patients that you see and follow up. • I think there should be more of a focus on continuity. Like start to finish, whether it's all the patients that you see or you pick like one… • this continuity of care from start to finish, you know, doing everything, fielding calls, responsible for simulation, responsible for treatment, etc., etc., etc., • I don't know what the best way to impart that knowledge on someone going for transition to practice is. We've talked a lot about like a gap being like how does that process work? And maybe it is just kind of getting more experience	going through other cases	going to call Tricia first. You're going… And give me a call afterwards and I'll come. But she's going to be the person that will make the decisions. And if I disagree with them, I'll let her know," after… Like as we're doing it, as opposed to me kind of just trailing along and finding out after it's happened. I found that really helpful. But that's kind of a situation that was pretty unique

		and being put in that position. • designated one or two people that are like your back-ups that you can like review challenging cases with or whatnot. Like my husband's a family med resident, and in his clinics, he's in his senior year, he sees a full clinic kind of parallel with his preceptor. And at the end of the day, they review any questions he had. But he basically manages them, he prescribes what he needs to prescribe, whatever. I guess if there was a really emergent, he could go get his preceptor from the other room. • So maybe you have kind of like your supervisor. But they still run their own clinic. They're still doing their own thing. They're not kind of just sitting there waiting for you to call them at the end of each patient to review. But you do have someone designated to go to		
Medical Expert – Continuity of patient care	•		• my staff are quite good at if they think at all that I've seen this patient before then they'll sort of make sure that I get in to see it. • I've also started keeping tabs on the patients that I've seen. So just through fellowship,	•

			I've sort of gotten into the habit of okay, this person's got a scan coming up, or I've got to check on this, or I want to check on their blood work. And then I'll look up the results, and then sort of email the staff – FYI, this is what we got on the report, this is what's showing up, this is what I think we should do next. And they'll either say great, or they'll say no, we want to do this, or whatever the case. • I think it's not about teaching, it's just about self-learning that comes with the volume. So I think that goes back to my previous comment about longitudinal care and being able to actually take responsibility as the resident	
Medical Expert –	•	• And also I mean you're triaging. I did the same thing, I'd get consults. And at the first centre I	•	•

triaging cases		went to, it would be like I would do gynae triage for the month… And at first I was like, oh, this patient has cervix cancer. She needs to be seen like tomorrow... And then realizing that what's urgent and what's not. And I think if I had practiced that as a resident or a fellow, it would have prepared me • You have the same clinics. You have to do all the triaging. You have to answer all the calls like as if you were a locum • You have to do all the triaging • the triage issue I think is absolutely something that could be addressed in this transition to practice		
Professional	•			•
Scholar – Documentation & promotion	• We started to ask residents to do the university format curriculum vitae to prepare themselves and add what they do in residency to that. So they are already building their files for promotion later • One way to teach it [building a file for promotion??] potentially could be			

	simply to have a list of what is it that they will need to do in their practice			
Scholar – contract negotia-tion & career planning	•	• knowing how to discuss with perspective employers, you know, what your wants and needs are, and try to align them with their needs as well • That could be in the same course as like negotiating your contract • starting to think, you know, maybe in your PGY5 year about the type of practice you envision for yourself and how to go about achieving it, and knowing how to organize your fellowship, if you're planning on doing one, to align with that goal	• I think apart from just being able to manage a practice, being able to manage to find a practice and to settle on one that technically fits your flavour is something that probably can be focused on during the course of it • Or even in terms of just understanding what questions to ask. • If you're in an interview setting, and you're trying to figure out is this going to be a good fit for me or not, like just knowing sort of what you don't know and what you need to know	• We had a really helpful session that was offered by our Post Graduate Medical Education Office. But it was offered after I had already signed the contract. And they were saying here's some things that you can look at. But I think having some of that information early on. • So almost taking a look at what do you need to know to get a job, to plan ahead for fellowship, plan ahead for the job • I was thinking of like Post Graduate Medical Education sent all the senior residents to a like career planning, financial planning workshop. And it was somewhat helpful to go. • like mandatory half-days on this topic [practice management, career planning] like for each school rather than like leaving it up to the…it should be built into the curriculum. • Even some of this stuff could be like

				a specialty issue. Some of this stuff could become like a refresher or some sort of education •
Scholar – Research	• a lot of them appreciate having a bit of time to finish their research	• how to write a grant, how to write a manuscript, how to apply for ethics – all of that		
Scholar – feedback	•		• also a little bit of feedback from the staff too	
Scholar - teaching	•	• Because it's give and take between a staff and a trainee, I think. Like if a trainee is going to do contours for me then it's my responsibility to teach them about the plan. And so I think it's… And it puts more onus on the learner to come to us. But you know, I think even if you do work in an academic centre, that doesn't necessarily mean that every person there should be a teacher		• I wonder if teaching skills would be something to try to focus on. Like I know a lot of it just kind of comes naturally and just with experience. But I think to some degree, it would be nice to see some graduated teaching responsibility. • But formal training [on teaching] would be great. And we don't have to all go and do a masters in education but… • So I mean we have something from the university called Residents as Teachers. Which is a very not spectacularly rad/onc specific but we have an opportunity to teach other residents in life skills, for example

				• Our university has a mandatory Residents as Teachers component now. So you're required to complete that or prove that you've done something equivalent. So like a masters in education or like a dedicated rotation in education in order to like basically get into like your more senior training levels now. So that's something that kind of helps with that. But I think some of the skill is like actually teaching as opposed to just learning about it • So like a masters in education or like a dedicated rotation in education • But I think to some degree, it would be nice to see some graduated teaching responsibility
Other – On-boarding	• Some programs and departments might have good onboarding packages that kind of cover a lot of that, although I imagine a lot of it is specific to an institution.	• we kind of looked and made a point of saying, okay, this is like the orientation package, this is what's missing. So I think having a package in place and then also having a champion who is willing to take it on and help make it better. But necessarily what is better and what should be there, I think can be debated		

	And the principles may be similar but the details will differ a lot from place to place			
Other – Mentor- ship	• some of those things that aren't directly related to patient care could be done together with a mentor • maybe they need a specific mentor assigned to them for the transition to practice phase that is tasked to discuss, you know, a lot of these things about incorporation, etc. • when they transition into practice, they need to identify a mentor for themselves in their practice, and recognize that that's normal and required • That you have to have somebody you can go to and discuss all these issues, whatever they are, and not feel like somehow you should know how to do all	• wherever you're doing this transition to practice, having good mentorship is huge • So very informal mentoring but always feeling safe to can I run these contours by you, can I get you to…you know, what would you do for this patient • then as you go to transition to practice then it is still my responsibility not so much to teach you because you know but it's my responsibility to coach you and give you feedback to help you transition successfully **Culture to ask questions** **(as new staff)** • I do have very good oversight of the colleagues that I can discuss with. So that's very helpful • but always feeling safe to can I run these contours by you, can I get you to…you know, what would you do for this patient • So having people that you feel comfortable going to about patient care issues, I find I was more willing to do that • I'm asking people who have more experience, you know, how do you do things here	• I would assume that mentorship is a very important part • Meaning that from PGY 2, PGY 3, you start to kind of move in that direction with the help of the mentor to gain that clinical confidence that okay, I'm the one who is going to make the decision for this client, I'm the one who's going to deliver that and take responsibility. And I think that for me it wouldn't happen in only one short rotation, regardless of when that's going to happen • I would like to really underline the importance of this mentorship thing. That would be very helpful moving into that spot that you are confident in your abilities as an independent decision-maker	• R3: I'm not sure the mentorship have some role in that. Everyone is having a mentor, right. So maybe the mentor, it's part of the discussion. Because usually the discussion is how are you doing, I'm doing fine. M1: Is everything okay? R3: Everything's okay. Okay, good. R2: Good-bye. • So maybe the mentor needs to talk about the fellowship, how to choose a fellowship, and how to, I don't know, probe the market, how to decide about your fellowship, and things like that. • the mentor should know you better as an individual, what your tastes are, what your preferences are, what your restrictions are. So if I can't leave the province then maybe the mentor has suggestions of other people in the province who can network. I think we rely on our mentors a lot

	this and be able to figure it out yourself. • That it's normal to need some coaching. • I've also heard from the new hires that they would like to have a mentor in their first 6 months when they have joined • it's easier to do it because the department head can have frequent interactions and ask about how the practice is going			for networking because they have known the system, right. • like time management, give you an idea how they are managing all the extra stuff. • R1: Financial management, investment • I don't know if this is too much on the mentor unless they are going to have a training program or something, right. Because as a mentor, you cannot do that by yourself unless you are really talented
Other – Peer Support	•	• Even though I had really supportive mentorship, having these people that were actually going through it at the same time as me really helped. We all kind of were working a little bit more at the same efficiency level and were really more sort of sounding boards for each other. • peer support helps	•	•
Other – helpful hints and tricks	• Even just having a kind of list of, you know, these are the top 20 things that you will have to do in the first year of practice that you haven't been doing so far in residency, and	• They meet with you to say here's the patient safety, here's radiation safety, here's how you wash your hands, and do that. But there's no one that really meets with you to give you I guess the hidden aspects of transition to practice • And I think experience thinking about why practices are the way they are rather than	• I would love to, and I've been doing this sort of unofficially, but have a chance to pick the brain of like some new staff and say, okay, you know, what did you do, what did you like, what did you not like?	• More to figure out what we're going to do in life and like what we need to know in order to survive practice • what do you need to know • The med oncs have business cards which facilitates them like taking

	then how do we familiarize you with some of those things • I would think that there would be a list of not necessarily skill sets but things that would be considered the ideal practice. And it's kind of like a checklist that some trainee or resident could take to the new centre. There might be different policies and procedures of the way the workflow is but there would be kind of a core element of what is required, both medical and legally. And then also to help with the transition to their tenure role	simply saying these are the practices, do them, will provide a lot more training to trainees when they end up working in other centres, which the majority of trainees will end up working in centres different than where they trained. • some kind of new designation or something to let everybody know that you're in a new class and you have a new role, and not just like a PGY5 resident. Like there's a designation that everybody will be alerted that you have a new role in the cancer centre, and you should be taken more as a staff at that time	And just have them say here's what works, here's what doesn't work, here's what works for me. You know, in terms of how to structure practices, you know, how to do billings, how on earth that looks, and how that sort of impacts pay. Because it's going to be different… And granted, it's different depending on what province you're in. And it's going to be different across the board. But just having a little bit of insight as to what to expect or how things are going to get structured. Or what sort of standard operating procedure in the centre you're at. So this way you don't sort of get to your first day of practice and go, okay, now what? Where's the billing sheets? What code do I put in? Do I use that in this case?	ownership. Like they'll give the patient the card, and then they're the point of contact when that patient has questions or needs a form completed. Which I know sometimes is a hassle but I think overall like really teaches them how to be independent and stuff
Other –	•	• it's going to have to be hands-on. Like real workplace-based		**Refresher course**

teaching strategies		learning • I think it almost needs to be like you're doing a locum •		• Even some of this stuff could be like a specialty issue. Some of this stuff could become like a refresher or some sort of education **Simulation** • That [simulation] would also be a good way to teach people to troubleshoot things like the SSD or the imaging not matching. • We have a multidisciplinary simulation. We just did it once. But it had the radiation therapy students and the medical physics residents in it too. So that was also a way to foster collaboration. • sim lab for radiation oncology where emergent cases might be thrown at you and then you have to manage it, triage it in a certain way. If it was possible to make that a component of your education instead of just individual centres doing it, I think it would be really helpful.
Other – tailor to resident	•	• if you're more interested in academia, versus research, versus leadership, versus basic science, like in your TTP, that would…you		• Tailoring some of the transition to practice to what we might need if we're going on to a fellowship in a

needs		know, the needs and wants, your aspirations for your future, that should be stuff you're getting experience in • maybe there could be some that are like pick one of three. So like you have to do either education or research or administration. You have to have some experience and some level of competency in one of…in at least one of those three. So you know, someone who's super not academic doesn't need to be writing a CIHR grant		specific site. Perhaps it's spending time in that site. Perhaps it's spending time in another site that you know you have knowledge gaps in that you will end up needing to treat in the future. Or if you have a special interest in one aspect of administration or something like that, it's nice to have the option to pursue some of those things that kind of get clouded over in training when you're just bogged down with trying to survive and pass an exam
Other – Outside electives	•	• I also took 6 months of my residency and did radiation oncology overseas. And so I saw how a whole different healthcare system worked. So that kind of helped… I guess maybe just exposure earlier • my centre where I came from is actually not so huge. But there is quite a variety of practice. And I always thought that was one of the strengths of our program, even though it's not really regarded as a strength in other places because people like homogeneity of practice. But it was always sold as one of the…like one of the proud features of our institution, is that attendings think very differently about		•

		different things. And I found that it really forced us to think through some of those questions that you're dealing with. And it's just a different emphasis. But I do think that it really is a very big part of this transition to practice, and a very important point to make • a good opportunity to send your very senior residents who are in this transition to those satellite centres. Because probably they're trained to get their core experiences in their first few years to prepare for their exam. But then in the satellite centres, it tends to be more of a general practice, and physicianslog tend to be much more independent than they are in large academic centres • a 2, 3 month block for them to really get that kind of as longitudinal as you can within that timeframe. To see what it's like to work in a different centre • a lot of provinces are becoming a bit more centralized in that way, and they do have more and more kind of satellite centres affiliated with the main training centres. And so that could be an opportunity to integrate them in that transition to practice year		

Appendix H: Emergent Data

	Program directors	New ROs	Fellows	PGY4/5
Road-blocks for TtP – logistical & software, medico-legal	• And in terms of carving out the clinic specifically for a senior resident, the challenges of logistics – nursing and clerks, and stuff like that – has been a problem as well • … It's probably not long enough and not enough patients (24 patient clinic) •	• I guess the other level of potential challenge or things that maybe need to be thought of is like medical legally, what that sort of year looks like. Are you truly still a resident? In which case, it's going to be hard to have buy-in from your staff. • I can imagine if I had a resident underneath who was in transition to practice but I'm medically legally responsible, I'm going to be much more hands-on than if they had something more akin to if they truly were a staff on their own. And so kind of addressing what that looks like is something on • So medical legally, there will be a few less issues because you will be certified • I don't know because as it was before, we were only certified upon completion of the training program, even if you passed the exams. So unless that changes		• I think part of it is that some of the more technical radiation things like being able to review onc treatment images or sign off on plans and prescriptions, a lot of those things we don't have the privileges to do on the software. So I think there's a tendency for us to just ignore that stage after putting the contours on. And sometimes the staff will go through and clear their list without us necessarily being involved in that process • I think part of that is the system and part of that is, you know, it's up to the resident but you have to have a system in which it is set up to support that. • I think there's some challenges in terms of starting a clinic like that [resident longitudinal clinic] – time factors, staffing, staff support • They don't always want to

				check the schedule because it's an extra step for them. And then it's easier for them to just call the staff.
Road-blocks for TtP – Staff buy-in or knowledge	• although we think it is clear that there should be more graduated responsibility and looking after the practice in a more independent way, it's not entirely clear that all the faculty knows that as well. So it doesn't… You know, sometimes it is very good and sometimes it's not. •	• You need champions within your local centre. And there are champions within every local centre, and there's going to be champion therapists, championphysicists. • But if you have someone who's not going to play then I would just say okay, you're not going to get senior… The transition to practice… And I think because it's going to have unique competencies and it's going to be a unique situation, especially for the first couple of years, it's going to be to certain people • How are you going to get buy-in? How are you going to get buy-in from the rad onc staff, and how are you going to get buy-in from the non-rad onc staff? It's one thing for the Royal College or for whoever it is that's designing this program to say this is a requirement of the program. But the people who are actually on the ground doing the training, the rad onc staff, have to be willing to divest themselves of a level of oversight and responsibility. They have to be willing to, just as we discussed before, they have to be willing to let the	• I think the other part… is this sort of assumption that residents are not supposed to transition into a practice right after residency in Canada. And most of the residents have to do some sort of fellowship anyhow. So I think the programs are kind of capitalizing on that. Saying that, well, as a fellow they would learn how to transition into practice. • I think because there has been this new kind of tradition of people doing multiple fellowships… So I think there is a lot of assumption that, oh, well, we'll figure this out later because you're going to do a fellowship and it's going to be somewhere else. So you know, you'll figure it out as	• That's a really important, the time factor that's been raised. There are some staff who have said I don't want my list to go over 4 or 5. So you have your own educational responsibilities, academic half-day, for example. And if 2 or 3 cases come back-to-back, by the time you come back, those cases have already been triaged or set up. And the staff said, "I'm sorry, our responsibilities are to, you know, get the list clear as fast as possible." • I find it interesting that so much of what they think that is important to us is learning how to take ownership of the patient and treatment planning, and assess, and evaluation, and look at off-line imaging. But the amount of time dedicated in terms of residency to that is actually quite different from

		trainees practice the way they want to practice, and they have to be willing to accept the differences, if it's different from the way that they want to practice, within guidelines of course • But they [attending physicians] have to be willing to accept differences • They [non-Radiation Oncologist health professionals] have to be willing to take a little bit of extra time and potentially listen to a slightly divergent opinion from the transition to practice resident, if this is something that we are actually going to push to be a large part of the senior resident experience • I'm not saying that it can't happen but I think it's going to be difficult. • the question of how do we get buy-in from everybody who needs go buy in, not just the rad onc staff and not just the Royal College committee. I think that needs to be a big focus of how to do that • the buy-in is super huge • what are the carrots or the sticks that you use if there is a program or some subset of a program that's against that idea? • there are some rigid radiation oncologists that want to do the plan their way, are not willing to accept other perfectly acceptable	you go	what they would like us to do • So our program director tells the staff to then actually call us. But they don't sometimes know which rotation we're on. They don't always want to check the schedule because it's an extra step for them. And then it's easier for them to just call the staff. Because sometimes we'll have to call the staff anyway. So instead of calling junior residents, they know that it's just easier to bypass that step. • … The resident has to be the one to hunt down that plan, to really remember which process that the patient is in at that step. And I think sometimes the staff really expect us to do that while still recognizing that sometimes it's hard • I just think the expectations will have to be very clear in order for us to make best use of this time. Like the staff will have to be very clear on what is expected of the residents during that time., and the residents as well, to make sure that they're making

		way of doing things • I actually think that the more of the pushback may be from the non-rad onc staff – from therapy staff and sort of the allied staff… And I think that there needs to be a buy-in from those who are implementing the program to say…to prevent the, "Oh, that's not how we do it. I'm just going to call the staff and go over your head," type of phenomenon. That's more what I'm imaging might happen. • The non-rad onc staff at the centre who control a lot of patient access, they have to be willing to call the resident, not call the staff and say, "Hey, staff, come do this because I know exactly what you're going to say so it's going to go faster." • faculty development is going to be huge, and continuing medical education **Staff perceptions of** **senior residents** • But will the main centre be willing to part with their senior residents who are able to do…carry a higher burden of the clinical practice? • I think that that attitude exists. I don't know to the degree that it exists but I think that that attitude probably exist (using senior residents to increase patient load) • Yes, it would require a		the most of it.

		culture change. And as I'm saying, I don't think these are issues that can't be overcome. I just think that they are issues that need to be addressed. (using senior residents to increase patient load) • And I think though we have to realize that like the point of having a training program is not to have extra staff to do your work • So this whole concept of I'm going to book in extra new patients because I have a trainee. Like that's the culture • Just because you're an academic and you do a lot of research doesn't necessarily buy you the right to have trainees to do your work		
Road-blocks for TtP – historical / exam timing	• some bank their vacation and they essentially take that whole last month off to go move to wherever they're moving for their fellowship • historically what has happened is some residents will take their vacation after the exam. And so they're practically absent after the exam, especially when they pass it. Another challenge is the sort of… We've gone fully electronic in terms of our treatment planning and approvals. And it's been a challenge to get			• I think moving the…like the exams moving to the end of R4, that will help a lot with that. Because that will take that distraction away and hopefully allow time for us to focus a little bit more, especially guided by, you know, some kind of very specific curriculum. • I know right now, there's almost a tendency, at least in my centre, to check out a little bit after the Royal College. And the months preceding the Royal College are… Like the

	our systems to accept senior residents to have a signature. Essentially it's all or none. So if they signed off, it's signed off. You can't have an attending sign off again. So that raised a lot of concerns from staff • I think moving the exam earlier is actually naturally going to help some of this. Because a lot of these content and topics, if you try to teach it, the residents are very fixated on just learning the medical expert for the test. And if you just get the test out of the way a bit earlier, I think we'll be able to address more of the things you need to practice. • moving the exam earlier so that they can experience that [longitudinal clinic] • doing the exam earlier and giving that 6 months with a match would be an excellent idea. And it would help the centres when you get new hires			Royal College is the big distraction because people are just focused on that, and they're tending to pick staff to work with who may not have as clinically a heavy load so that they have more time to study
Roadblock **historic** **view of**	• My preference would be to have a lot of that training as part of the residency	• I did a fellowship. I think that was part of my transition to practice • As a fellow, when I first came in my first month,	• I think the other part… is this sort of assumption that residents	•

fellows	program that has been traditionally part of the fellowship • I think the primary benefit of the transition to practice is for those that don't go on to fellowship, that they can go straight into practice and be effective • I think there's some opportunity there that someone before they are in independent practice, and still in a supervised role as a fellow, can gain some experience. And there certainly will be fellowships in radiation oncology in the future.	the staff had gone away. So I was responsible for running their clinics. So certainly that helps with the transition to practice with time management, organization, etc • in Canada, the majority of graduating residents are now doing fellowships. Not all of course but many. And as a resident, I kind of knew that going in. So I kind of relied on that fellowship experience to help in the transition. • As a PGY5, you do get greater responsibility but you are still very much supervised. As a fellow, you do get more independence • I guess as a locum, there's maybe…there's not obviously sort of supervision but I think there is some…a little bit more understanding of you kind of being thrown into this new pool	are not supposed to transition into a practice right after residency in Canada. And most of the residents have to do some sort of fellowship anyhow. So I think the programs are kind of capitalizing on that. Saying that, well, as a fellow they would learn how to transition into practice. • I think because there has been this new kind of tradition of people doing multiple fellowships… So I think there is a lot of assumption that, oh, well, we'll figure this out later because you're going to do a fellowship and it's going to be somewhere else. So you know, you'll figure it out as you go	
Time allocated to TtP?	• I'd say a minimum of 6 months, I think is… Like for some of them, I think that's… Even at the high performance, I think 6 months. Really it takes you that long to	• Like I like that it's going to be after the exam… in a safer kind of environment where the trainee is not feeling the pressure for the exam. Where every time they're answering a question, they feel like they're answering it for their exam. They're	• if it's clinical transition to practice, that needs to happen over time. So I don't think that just PGY 4 and PGY 5 is a good time for people to	• Timing-wise, maybe this should be **after the exam** [teaching around billing] So almost taking a look at what do you need to know to get a job, to plan ahead for

	get your groove • I think 6 months would be the minimum. Even up to a year. • If the exams potentially were in the fall after, you know, core is really complete, then you have, you know, roughly 9 months that you could focus on transition to practice. • I would say somewhere between 6 and 12 months. • 6 would be the absolute minimum • 6 months would be really good. • I also feel that in a system where the resident is familiar, a minimum of 6 months is reasonable, and certainly more • should it be a minimum of 6 months ,and what about if somebody is doing very well, can they leave earlier? I suppose we would have certain amount of funding, right. So the expectation would be let's say if the exams are in the fall, that we would have funding until end of June, right. So it would be whatever – 6, 7, 8 months. But…	going to be answering it for life. And that was a huge difference. • I remember the day after I wrote my exam, I felt like I could actually have an opinion. Whereas before that, I felt like I was structuring everything according to this template. • I mean because these people are in their senior years. They will have written their exams. So there's already this like bar of competency set • I think the earlier, the better, as long as it makes sense. So if you can get a Royal College pass early, like in 4th year and that kind of thing, and give all the 5th year to have some component of transition to practice, instead of just the last 3 months or something like that. I think the longer time, the more you can develop yourself as a resident to actually gain skills that you're looking to get • Maybe to start, like as a PGY2 or 3, you pick one patient per clinic…per new patient clinic that you see, and that's your patient forever. And then maybe as a senior resident, it becomes more and more	suddenly transition into a full-blown consultant. And I think that's something that needs to happen over time. • And moving the transition to practice right at the end of residency after you've passed the Royal College, I think is going to be a great move in general. • Then you can sort of focus on practical – okay, this is how I'm going to structure my practice. Instead of oh my gosh, I have to memorize every single detail of Emami	fellowship, plan ahead for the job, and then what do you need to know to actually sink or swim in your career practice, and some of the billing stuff might be... **But after the exam.** So stuff like that that [career planning, financial planning workshop], you know, people don't really talk about. And so some of that I found really helpful [Post Graduate Medical Education seminar]. We went at the beginning of PGY5. And I was kind of like some of this would have been useful last year. But some of it would be **more useful later on in training**. •

	And that would be the funding and the kind of expectation. But if somebody is meeting all EPAs and doing well, and wishes to leave sooner because they've accomplished it all, then they could, right? So if they find a job then obviously the university saves money, or whoever is paying. So from that perspective, that person could transition, and somebody else could finish it and then go into a fellowship because of whatever they want to achieve. So it probably would work out			
Comments on CBD / TtP	• I certainly think with CBD, it's brought this out to discussion, having its own stage. And to have the weight of the Royal College supporting that as part of the residency program in all, not just radiation oncology but all specialties, I think it was identified as an issue. And so I think that that is being addressed as we move forward • I'd say the opportunity came about 2 years ago with the Royal	• I'm wondering if maybe for transition to practice, it would not be here's my assessment for x competency but like here's my…like looking at like integrating them all, like your knowledge, skills, and integrating them as the various competencies into a patient, and making it like an integrated whole task. Like okay, this is Mr. Smith. And you know, from the time he gets referred to the institution, to the time I see him in follow-up, I'm responsible for all of those steps • It's so true that a residency program, part of their responsibility…a large	• one thing that I think that may help the whole transition to practice is that the Royal College exam moving earlier. And I find that you get a lot of confidence when people pass it, and staff have a lot more faith in you.	• I know some schools have like this transition to practice block or like two blocks dedicated to that. Which seems interesting. . And somehow maybe that should be worked into the curriculum

	College exam being sooner within the calendar year x3	part of their responsibility is to prepare us for independent practice, right. That is like the entire purpose of a residency training program. And so I do think that that is essential • For Competency of Design to work, it kind of has to, right? I mean because we have this terrible awful growing period where the culture hasn't changed yet. And yet Competency by Design is here, and we're like this is going to be terrible. [check 50:22] But eventually it has to change, otherwise this Competency by Design is going to fail		
TtP and the hidden curric	•	• They meet with you to say here's the patient safety, here's radiation safety, here's how you wash your hands, and do that. But there's no one that really meets with you to give you I guess the hidden aspects of transition to practice • Some of the logistic stuff, not so much because you didn't want to waste people's time. Like you could always feel comfortable raising a patient issue or a contour • I don't really know how to address that culture issue because that seems to be the challenge in every domain of professionalism everywhere • I always found that it was a very hush-hush thing where I trained. [discussion around the	•	•

		financial aspects of practice management at a center that was fee-for-service] • then like you're almost afraid to ask anybody because like money is like really bad to talk about supposedly. • I think also like the financial aspect. No one teaches us and then we're supposed to all of a sudden be business savvy. And like the first year you have to do your taxes as a staff, like that is very overwhelming. You have no idea. And I always found that it was a very hush-hush thing where I trained. I trained at a centre that was fee-for-service.		
National collaboration	•	• So if we all have national curriculum then I think working at the national… So whether it's within the Royal College subcommittee on rad onc but also CARO is a great avenue to be leveraging a lot of this kind of stuff. • ASTRO, and I know ASTRO is much bigger, but if you look up their agenda or itinerary every year, they have like all those ARRO. Like a lot of other stuff. Like how to write a grant • I think leveraging CARO nationally because I think going for…when we go into CBD, CARO, their education committee within CARO will have a bigger role. Because if we are now having standardized EPA	•	•