

Critical Review

A Framework for Assuring the Safety, Training, Evaluation, and Wellness of Radiation Oncology Residents During the COVID-19 Pandemic (ASTEROiD-COVID19)



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As the coronavirus disease 2019 (COVID-19) pandemic continues to disrupt nearly all facets of daily life, residency programs must ensure the safety and wellness of their residents while maintaining a commitment to their training and advancement. In addition to standard clinical training, radiation oncology residency programs integrate highly specialized elements specific to the delivery of radiation therapy. Few publications have addressed the significant effects of the pandemic on medical training and even fewer have addressed concerns specific to radiation oncology. We report our experience developing a resident-led adaptation of our training program in response to the COVID-19 pandemic with the aim of assisting other programs to meet this challenge.

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Introduction

The coronavirus disease 2019 (COVID-19) pandemic has severely disrupted life globally. Strict public health interventions are necessary to curb the spread of the virus and have dramatically altered how patient care and medical education are delivered. Medical trainees have endured abrupt restrictions on their clinical learning, which is a detriment to their professional development.¹ Residency programs are grappling with the challenge of adhering to rigid public health and institutional guidelines while ensuring resident education is not neglected. Although the body of literature pertaining to COVID-19

in radiation oncology is growing, most reports focus on the effects of COVID-19 on the delivery of radiation therapy and subsequent mitigation strategies.²⁻⁶ Comparatively few publications address the severe effect on medical training and even fewer address specific concerns for radiation oncology (RO) trainees.⁷⁻¹⁰ This article aims to assist radiation oncology residency programs in modifying clinical and educational duties to ensure the safety, training, evaluation, and wellness of radiation oncology residents during the COVID-19 pandemic (ASTEROiD-COVID19). We aim to provide guidance based directly on our experience adapting all aspects of our training program in the earliest stages of the pandemic. Initially, we outline a shared decision-making framework involving RO staff and residents that was used to develop policies to define modified roles and expectations during the pandemic. Subsequently, we describe details of the local implementation of these

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policies to provide other programs with a foundation for implementation and to spur further research and analysis to ensure all training programs are better equipped to deal with potential future disruptions.

Context

Our institution, the London Health Sciences Centre (LHSC), is a large academic center in southwestern Ontario, Canada, that serves a catchment area population of 1.8 million people. Operating as a subsidiary of the LHSC, the London Regional Cancer Program (LRCP) provides oncology services to this population and those referred from other regions for specialized care. The LRCP employs 20 radiation oncologists and maintains a contingent of 10 RO residents. Over a 5-year period, residents spend approximately 1.5 years off-service, with the remainder of the time spent on 1- to 2-month RO rotations working directly with a single supervising staff member in an apprenticeship model.

Developing a response framework

We aimed to implement interventions in a stepwise manner that balanced a response proportionate to the rapidly evolving pandemic situation with the maintenance of clinical and academic operations. Programs should consider the current risk to staff, the number of hospitalizations, the projected trajectory of the local and regional outbreak, and the current level of uncertainty in projections when determining a proportional response. During periods of heightened uncertainty, when cases are projected to surge, more restrictive measures should be taken. Comparatively, during periods of declining or plateauing infection rates, programs may decide to relax more restrictive policies while maintaining the capacity to rapidly reimplement a more comprehensive response should circumstance dictate.

Our institution was able to rapidly develop policies revising resident duties during the pandemic that were widely lauded and adhered to within the department. The success of this process was built on a stepwise shared decision-making model that was implemented by a committee of RO staff and residents (Fig 1). The committee comprised the RO department chair, the RO residency program director, the RO chief resident, and a junior resident representative. The committee met virtually and developed policies by first identifying issues that needed to be addressed in response to the current stage of the pandemic (Step 1: “Identify,” eg, maintaining resident involvement in contouring). Next, the group discussed these issues to assign priority and propose changes to address the top priority issues (Step 2: “Discuss,” eg, creating a system of assigning cases to residents and

promoting virtual review with staff). These proposed changes were then documented (Step 3: “Document”) and discussed at the next department meeting (all RO staff and residents present), which occurred virtually every 2 weeks during the pandemic. Feedback from these sessions informed the refinement of policies before implementation (eg, ensuring residents were aware of contouring deadlines when cases were assigned) (Step 4: “Implement”). An online central repository of up-to-date pandemic-related policies was maintained for ease of reference. We noted improved uptake in policies that were communicated in multiple formats (ie, email, policy memo, and teleconference) (Steps 3 and 4). Newly implemented policies were reviewed at the 2-week and 6-week mark at department meetings to provide further opportunities for feedback and revision as needed (Step 5).

During the initial wave of infection, we encountered 3 distinct phases and implemented rounds of policy changes that were proportionate to each. We later classified these stages as follows:

1. Presurge phase: Increasing risk of health care provider exposure or infection secondary to increasing case numbers and heightened uncertainty.
2. Peak phase: The volatile peak of infections, during which uncertainty in the expected total number of cases and the effect on the local health system is highest. Maintaining the integrity of clinical care while ensuring provider safety is prioritized.
3. Postsurge or plateau phase: A subsequent decline and plateau in the number of new cases, allowing for a careful resumption of clinical services that had initially been curtailed.

We targeted interventions at aspects of residency training that were most likely to be affected by COVID-19 and its associated restrictions. Policy responses were then tailored to the current phase with revisions made at the discretion of the program director and chair of the department and in accordance with guidance from the municipal, provincial, and federal public health authorities. A detailed process map of our decision-making process is provided in Figure 1.

Clinical responsibilities and safety

Residents typically play an important role in the delivery of RO services and frequently work in close proximity with colleagues in shared workspaces. The ability to physically distance is limited among this population compared with staff who work in private office space, and thus, the potential for dissemination of COVID-19 infection through a residency program is high. We sought to develop guidelines that preserve the ability for residents

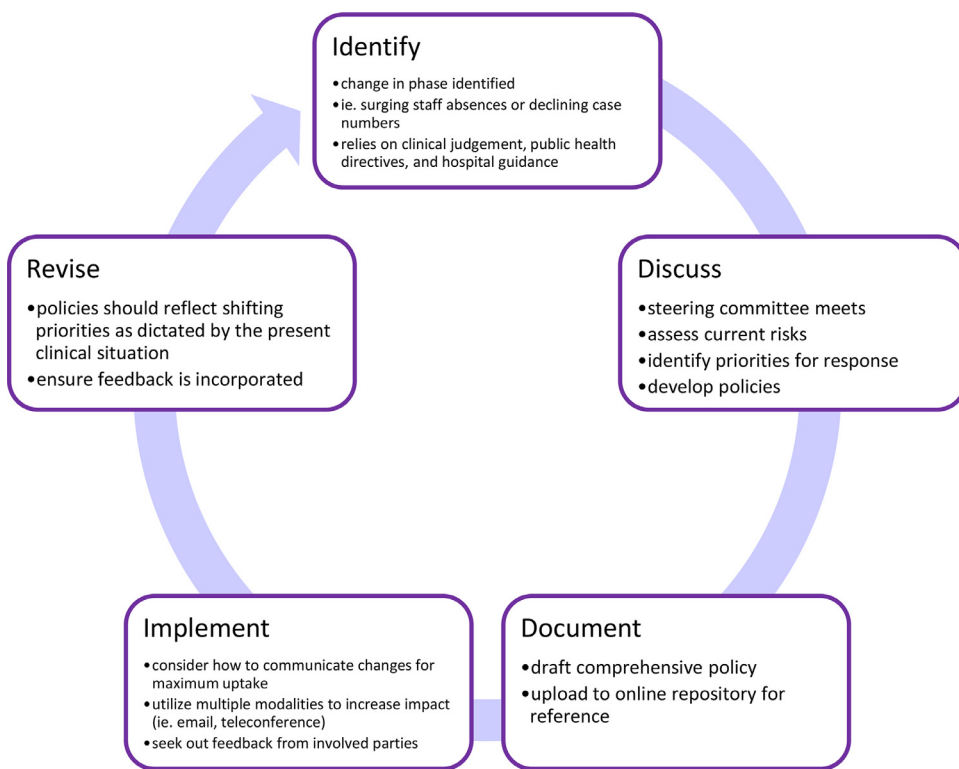


Fig. 1 Implementation framework for developing and revising a residency program’s pandemic response. These policies were developed by a steering committee consisting of resident representatives and program and department leadership that was maintained for the duration of the pandemic.

to complete clinical work while prioritizing safety and the minimization of potential infectious spread.

During the presurge phase, residents were advised to avoid international travel. Sick-day procedures were updated, and all residents were mandated to remain away from the center should they experience any potential COVID-19 related symptoms. An initial priority was ensuring all residents had remote access to hospital systems including the electronic medical record and treatment planning system. Residents continued with their scheduled RO rotations paired with a single RO staff member but were encouraged to work from home on days when there were no in-person patient appointments scheduled, including days when all patient appointments were virtual. Resident duties and communication between supervising staff were facilitated by encrypted collaborative software including Microsoft Teams (MT; Microsoft Corporation, Redmond, Washington) and Cisco Jabber (Cisco Systems, San Jose, California). The video-chat and screen-share features of MT were used for remote contour review and teaching with staff ROs (either one-on-one or to the whole resident group). Cisco Jabber voice call and text messaging functions allowed for secure daily communication of clinical information between residents and staff. Residents also used the voice call feature to carry out virtual follow-up appointments with patients while working from home to secure the

sensitive information being discussed and to block the residents’ personal phone numbers.

During the surge phase, residents were detached from their scheduled RO rotation and supervising staff and divided into onsite and offsite teams (Fig 2). The offsite team primarily assisted RO staff with assigned tasks including virtual clinics and contouring. They were also mandated to remain available to attend the center and provide clinical support if required. Onsite team members were assigned weekly roles that were designed to

Resident Coverage: Team Photon	
Team Leader#:	
Role	Resident
Inpatient Unit	
Day Call*	
Night Float*	
Outpatient Clinics	

Resident(s) on Isolation:
Residents Offsite: Team Electron

*Weekday on-call is divided between two residents per week.
 Day call: 0800 – 1800
 Night float: 1800 – 0800
 #Team leaders are responsible for reassigning work as required and are the primary contact point for ROs requesting assistance with clinical activities.

Fig. 2 A typical surge-phase weekly schedule outlining resident roles. Roles were assigned to minimize resident exposure to multiple clinical environments.

Table 1 Summary of resident roles during the surge phase

Role*	Responsibilities
On-site team	
Team leader (n = 1)	<ul style="list-style-type: none"> • Assign tasks to the rest of the team. • Provide support to the day call and outpatient clinic roles and shares in their responsibilities.
Day call (n = 1)	<ul style="list-style-type: none"> • Assigned to cover daytime urgent and emergent consults in the emergency or inpatient setting (excluding patients on the oncology inpatient unit).
Inpatient unit (n = 1)	<ul style="list-style-type: none"> • Assigned to assist with managing RO inpatients and new consults on the oncology inpatient unit.
Outpatient clinics (n = 1)	<ul style="list-style-type: none"> • Assigned to attend weekly in-person multidisciplinary clinics. • Assigned to assist with additional in-person clinics identified by RO staff through communication with the team leader.
Night float (n = 1)	<ul style="list-style-type: none"> • Remain offsite during the day. Cover call for the week during the evenings and nights after hours.
Off-site team	
Team leader (n = 1)	<ul style="list-style-type: none"> • Assign virtual clinics and contouring cases to the virtual support residents. • Share in the responsibilities of the virtual support residents.
Virtual support (n = 4)	<ul style="list-style-type: none"> • Assign cases to contour remotely, reviewed virtually with the corresponding RO staff. • Assign virtual clinics to attend. Resident coordinates with RO staff in advance and typically calls a proportion of patients scheduled for phone follow-up visits.

Abbreviation: RO = radiation oncology.

* These roles were held for 1 week at a time, and residents rotated through each role. Only 4th- or 5th-year residents served as team leaders.

minimize the number of residents exposed to clinical environments at a given time in the event of an outbreak. The onsite clinical roles included team leader, inpatient unit, day call, night float, and outpatient clinics. Residents rotated through these roles from 1 week to the next, and the team leader was always a senior resident (fourth or fifth year). Team leaders were in regular contact with the department chair and emailed staff radiation oncologists at the beginning of each week to identify clinics and cases for contouring that would be of educational value and/or benefit from resident support. Leaders assigned duties to the other residents based on their roles. The details of each role are summarized in [Table 1](#). An example of a typical weekly schedule is presented in [Figure 2](#).

In the postsurge phase, in response to a gradual resumption of clinical services, residents returned to the usual apprenticeship work model. Work from home was still prioritized whenever feasible, and shared workspaces were modified and expanded to support physical distancing and ongoing increased virtual and telemedicine work. These included the division of residents between 2 separate physical workspaces to respect maximum occupancy limits, maintenance of at least 2 meters between workstations, universal masking, and frequent cleaning of communal surfaces.

It is important to consider that some RO departments and training programs are also faced with requests for redeployment of RO residents to other services to assist with management of patients with COVID-19. At our center, the number of inpatients positive for COVID-19 did not reach a level where our residents were targeted for redeployment. Although not an issue we faced locally, our contingency plan was to request that off-site team

residents be considered first for redeployment. Ultimately, redeployment would have signaled a further escalation of the pandemic and would have required the committee to re-examine our coverage system and resident roles.

Training and evaluation

Given the uncertain timeline for a return to pre-pandemic procedures, a need exists to comprehensively address the academic and evaluation components of residency programs to ensure an ongoing focus on training progression. With the potential for a significant decline in in-person visits secondary to curtailing of services, virtual services should be conducted in a format that is conducive to the integration of residents into the care pathway. Residents in our program were provided training on the use of our local telemedicine platforms. A guide to virtual and telemedicine visits was produced and distributed to all staff. Generally, residents would review new patients and discuss a management plan with their supervising physician in advance of meeting with patients. Residents would then lead the initial portion of the virtual consultation. Supervising physicians were either muted and off-camera during the encounter to enable direct observation or were otherwise integrated at a later point to finalize the encounter. Feedback was provided to the resident immediately after the encounter. Feedback was also solicited from the patient where appropriate. Follow-up and review visits were generally conducted in a similar manner. Onsite residents were only scheduled for outpatient in-person clinics that were

likely to have a high educational value (ie, multidisciplinary clinics).

As part of the work-from-home directive, residents were tasked to complete all contouring work remotely. When a case was ready for review, the supervising physician operated the treatment planning system remotely with the trainee observing via screen-sharing within MT. Residents and physicians thought the software allowed for an adequate realization of a typical learning environment; they found it easy to use and did not identify any significant technical issues. Feedback and directed teaching were performed before, during, and after the review. A digital logbook stored on a secure database was created to allow residents to track the cases they completed remotely. This database was available for individual and program review as a record of the trainee's progression. As a companion to this work, we objectively measured resident output and satisfaction with virtual contour review. We identified that this intervention led to significant increases in both the number of cases contoured and real-time contour review and was rated as highly as in-person interactions.¹¹

Technological solutions that allow resident teaching to continue during the pandemic have been reported in the literature.¹² Locally, we leveraged the virtual meeting functionality of MT to facilitate regular teaching sessions. Sessions were varied in their format and included group lectures, small group discussions, case-based discussion, and oral examination. Presenters were encouraged to adapt their learning materials for the online environment. Most sought to deliver didactic-style lectures with audience participation. Some educators provided prework with sessions geared toward question and answer. The use of MT screen-sharing tools allowed some presenters to provide live contouring demonstrations or involve residents in anatomy or contouring teaching by facilitating control of the software environment from their personal devices. Resident satisfaction with the online format was not formally measured, but attendance and participation were high. Physician educators were provided with technical support by the program administrator, and none required further assistance after their initial session.

Existing standardized evaluation forms were leveraged to ensure ongoing evaluation of residents despite the shift in modality from in-person to virtual training sessions. Residents were responsible for distributing forms via an online platform. Forms were tailored to specific skills including communication and patient encounters, radiation plan review, and contouring. Evaluation forms were collated by the program administrator and incorporated into the resident's portfolio.

Wellness

Oncology residents show high rates of burnout and low resiliency compared with the general population.¹³

The various effects of the coronavirus pandemic increase the risk of further negative psychological effects in an already high-risk population, as evidenced by several recent publications examining this issue in medical students.^{14,15} Efforts are needed to ensure resident wellness remains a priority throughout this disruption. We acknowledge that resident wellness is a growing area of research interest, and how to best promote resident wellness and resiliency is unknown. Our approach during the pandemic was to reaffirm open-door policies with administration including the chair of the department, program director, and program administrator. Additionally, resident feedback relating to the various aspects of the pandemic response policies was encouraged and acted on. Residents were incorporated directly into all levels of decision-making. Taken together, our hope was that these measures would support a culture of inclusion and community.

In addition to careful attention to professional culture, further measures were aimed at maintenance of healthy work and personal habits. Weekly virtual resident meetings were organized by senior residents. During the peak phase of the initial wave, residents who were scheduled offsite were not expected to attend the center unless necessary to maintain normal operations. This provided trainees respite from clinical work and the opportunity to regain control over their personal schedules. Vacation and professional leave requests were not curtailed during the presurge and postsurge periods unless necessary to maintain normal operations. During the surge period, vacations were restricted to ensure that a contingent of healthy staff remained work ready. Restrictions could include a limit on the number of consecutive days off or vacations scheduled only during off-site weeks. Throughout the initial wave, residents were encouraged to continue using vacation time as a method for preserving wellness and resiliency.

As the psychological effects of the pandemic on trainees and providers are better characterized, it is clear that significant allocations of resources are required to bolster resiliency and counter provider burnout.¹⁴⁻¹⁶ Comprehensive wellness planning, which is outside the scope of this article, should be incorporated as an integral part of all training programs and clinical departments.

Accountability

Residents were expected to maintain standards of professionalism despite significant deviations from normal operations. Our program clearly communicated expectations to all staff and trainees. Guidance included defined working hours, during which time residents were expected to respond to email, phone, or page and be available to attend the center within 20 minutes if required. Residents were made aware that any deviations

would be reviewed by the program director with the potential for disciplinary action should any breaches of professionalism be identified. To date, we have encountered no issues regarding professionalism.

Conclusion

As the COVID-19 pandemic progresses, it is increasingly clear that a long period of uncertainty remains ahead. Case numbers in some countries have declined and remain low despite a reduction in restrictions, whereas in other areas, the outbreak continues to worsen. To date, our response has supported continued resident clinical output, has rapidly adapted the educational aspects of our training program, and has seen no cases of COVID-19 spread among our residents. Given the possibility of further waves of infection or future unanticipated disruptions to regular curricula, residency programs and residents alike have a duty to patients and society to respond swiftly and decisively to any deficits in training. We offer the ASTER-OiD-COVID19 framework as a guide for other RO residency programs with the hope that it will lend support during mandates and spur further work on how best to respond and adapt training to unforeseen circumstances.

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