

Entrustable Professional Activities in Radiation Oncology: A Framework for Competency-Based Training

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As residents in radiation oncology (RO), we navigate a unique learning journey that encompasses both technical expertise and nuanced clinical judgment. Do all residents feel equally prepared for independent practice at the time of graduation? Are training gaps a function of institutional environment or individual variability? Do we have a reliable way to assess readiness beyond case logs and rotation completion?

In our recent survey of graduating RO residents,¹ over 90% of residents report high overall program satisfaction and ~80% felt they had appropriate autonomy; however, disparities exist in perceived confidence across specialized treatment modalities. For instance, while 96% of residents reported perceived confidence in lung stereotactic body radiation therapy, only 25% felt prepared for independent practice in prostate high dose rate brachytherapy.¹ Prior studies echo this trend; Marcrom and colleagues reported that only half of PGY-4/5 residents felt confident in starting a brachytherapy practice upon graduation.² Our data show that program size could play a role in training disparity; smaller programs may lack access to specialized modalities like

proton therapy or adaptive radiation therapy, while larger programs may face barriers to hands-on procedural experience, particularly in brachytherapy. Besides case log requirements outlining a minimum number of cases to graduate, enforced by the Accreditation Council for Graduate Medical Education (ACGME), we currently do not have a reliable way to assess readiness. There is a growing interest in standardized, outcomes-focused education as exposure does not necessarily guarantee competence. Entrustable professional activities (EPAs) offer a practical, competency-based framework for assessing clinical readiness.

What Are EPAs, and Why Do They Matter to Us as Residents?

EPAs are discrete, observable tasks that represent the core work of a specialty. In 2023, the Project Leadership Committee within the Radiation Oncology Education Collaborative Study Group (ROECSG) published a consensus framework defining 52 EPAs across 4 developmental stages: Transition to Discipline, Foundations of Discipline, Core of Discipline, and Transition to Practice.³ This framework seeks to shift assessment from time-

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based progression to demonstrable competence in real-world clinical tasks.

For residents, EPAs offer 4 key benefits:

1. **Clarity of Expectations:** EPAs demystify what “on track” looks like. For example, moving from “interpreting a radiation therapy treatment plan” in the Foundations phase to “providing feedback on a radiation therapy treatment plan to planning staff or peers” in the Transition to Practice phase offers clear milestones for skill acquisition.
2. **Individualized Learning Trajectories:** Time-based models assume uniform progression. In contrast, EPAs recognize that residents may advance at different rates across domains. This framework enables tailored support where needed and autonomy where earned.
3. **More Meaningful Feedback:** EPAs provide a blueprint for personalized mentorship and high-quality end-of-rotation feedback to move away from “*read more*” and other boilerplate language to more actionable feedback in evaluating a treatment plan to use the above example.
4. **Portability and Transparency:** Whether transferring institutions or entering independent practice, a resident’s documented entrustment levels provide meaningful insight into their competencies beyond case logs.

Raising case minima could help mitigate deficiencies in some aspects of RO training. However, EPAs offer a structured approach to developing and assessing readiness regardless of program structure, one that focuses on teaching core skills and not maximizing volume or meeting an arbitrary cutoff. Future efforts should also be directed to developing a competency-based assessment framework specifically for procedural skills in brachytherapy and other specialized modalities as the current framework lacks granularity to properly assess procedural readiness.

EPAs in Practice: An Example

Consider EPA number 32: “Contouring complex target volumes and organs at risk using

appropriate imaging modalities” in the Core of Discipline phase.³ Rather than simply checking a box that a resident has completed a certain number of contouring cases, faculty would observe the resident’s approach to a complex case, assessing their ability to integrate information from various imaging modalities, apply anatomical knowledge, and make appropriate clinical judgments about target delineation. The faculty may rate the resident on a 5-point entrustment scale from “observation only” to “teaching others.” When sufficient observations consistently demonstrate competence, the resident would be entrusted to perform this activity with increasing level of independence. This process provides both specific feedback for improvement and documentation of progressive competence, aside from abstract feedback or lack thereof.

EPAs and Board Certification: Complementary or Competing?

How will EPAs align with existing assessment frameworks, such as ACGME milestones and board certification requirements? Ideally, EPAs would complement rather than compete with these systems. While milestones provide a somewhat abstract developmental framework across 6 core competencies, EPAs integrate these competencies into observable clinical activities that more closely mirror day-to-day practice. This integration could ultimately streamline assessment and provide more meaningful data for all stakeholders.

Implementation Considerations

Successful EPA implementation will require thoughtful design. Faculty development, streamlined assessment tools (e.g., use of a phone app), and integration into existing workflows are essential to minimize burden and maximize meaningful feedback. Experience from general surgery and radiology underscores these challenges as variability in faculty engagement and time constraints remain major barriers^{4,5}; this is especially relevant when teaching comprises a small percentage of overall faculty responsibility and the promotions package. Moreover, the rise of artificial intelligence in operationalizing simple tasks may threaten knowledge acquisition in early training years. RO must anticipate similar issues.

Departments will need champions to guide cultural change. The onus is also on us, the residents, who will need to embrace a growth-oriented mindset that values demonstrated competence over passive rotation through services.

A Vision for the Future of Radiation Oncology Training

The Canadian RO training model has implemented an EPA-based curriculum with 15 comprehensive EPAs with structured assessment plans, milestones, and contextual requirements.⁶ The US model, while with 52 distinct EPAs, remains in its infancy. Efforts are underway both at ARRO and ROECG to further develop those EPAs. Brisson and colleagues at ROECG are running a pilot survey study of 4 pairs of attending and resident physicians to assess the feasibility of using EPAs as a framework for actionable performance feedback.⁷ ARRO's EPA working group, led by Sayeh Fattahi, MD, and Zohaib Sherwani, MD, is developing a guide describing key features of each of the EPAs and will be made available to stakeholders upon completion.

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