



FIFTH ANNUAL SPRING SYMPOSIUM

**“GROWING THE RADIATION ONCOLOGY
EDUCATION COMMUNITY:
FIVE YEARS OF ROECSG SYMPOSIA”**

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CHICAGO, ILLINOIS, USA

2022 SYMPOSIUM CHAIR:

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2022 ROECSG SPRING SYMPOSIUM SCHEDULE

All times Chicago/CDT (UTC/GMT -5 hours)

8:30 - 10:00 CDT: Poster viewing (in-person), Asynchronous Oral Presentations (virtual), Breakfast, Coffee, & Networking

10:00 - 10:10 CDT: Welcome Remarks and Introductions - Steve Braunstein, MD, PhD
Five Years of ROECSG Spring Symposia

10:10 - 12:00 CDT: Session #1 “The Changing World of Radiation Oncology: Developments in Education and Evaluation Across the Globe”

Moderators: Idalid “Ivy” Franco MD MPH and Gabrielle Peters MD

12:00 - 12:15 CDT: ROECSG Working Group Updates/Call for Volunteers

12:15 - 1:15 CDT: Lunch, Poster Viewing, & Networking (break-out rooms for virtual attendees)

1:15 - 1:20 CDT: Report from ARRO – Amishi Bajaj MD

1:20 - 1:25 CDT: Report from ADROP – Rachel Jimenez MD

1:25 - 2:45 CDT: Session #2 “The Modern Practice: Implementing New Education Programs to Expand Skillsets”

Moderators: Matthew Spraker MD PhD and Jillian Gunther MD PhD

2:45 - 3:00 CDT: Break

3:00 - 3:30 CDT: Keynote Address:

“Mastery Learning for Clinical Skill Acquisition”

[William C. McGaghie, PhD](#)

Professor, Departments of Medical Education and Preventive Medicine

Northwestern University Feinberg School of Medicine

3:30 - 3:40 CDT: Keynote Discussion/Break

3:40 - 3:50 CDT: “How to Succeed Publishing Medical Education Scholarship”

James Bates (PRO Associate Section Editor) and Paris Ann Ingledew (Red Journal Section Editor)

3:50 - 5:10 CDT: Session #3 “The Clinical Environment: Improving Our Collective Experience and Patient Centered Care Through Education”

Moderators: Horatio Thomas MD MSc and Laura Padilla PhD

5:10 - 5:15 CDT: Closing remarks – Steve Braunstein, MD, PhD

5:15 - ??? CDT: Post-Symposium In-Person Networking

Keynote Address - [William C. McGaghie, PhD](#)

“Mastery Learning for Clinical Skill Acquisition”



Professor of Medical Education and Preventative Medicine
Northwestern University Feinberg School of Medicine

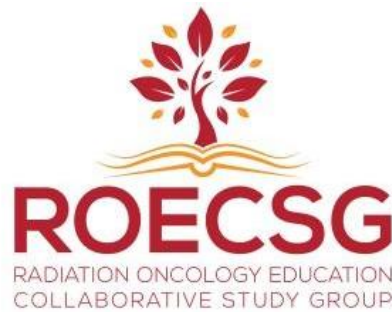
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William C. McGaghie, PhD is a Professor in the Departments of Medical Education and Preventive Medicine at the Northwestern University Feinberg School of Medicine in Chicago, Illinois USA. Dr. McGaghie’s medical education scholarship is wide-ranging including personnel and curriculum evaluation, research methods, clinical skill acquisition, the science of expertise, and especially simulation-based mastery learning. Dr. McGaghie has been a consultant to a variety of professional organizations including the National Board of Medical Examiners (NBME), the American Board of Internal Medicine, the American Board of Medical Specialties, and to universities and medical schools worldwide. In 2019 he received the John P. Hubbard Award from the NBME for excellence in the field of evaluation in medicine. Dr. McGaghie has authored or edited ten books and has published more than 300 journal articles, textbook chapters, essays, and book reviews in health professions education, simulation-based education, and related fields. His recent publications include (with JH Barsuk and DB Wayne) *Comprehensive Healthcare Simulation: Mastery Learning in Health Professions Education*. New York: Springer, 2020; and (with DB Wayne, JH Barsuk, and SB Issenberg) [Deliberate practice and mastery learning contributions to medical education and improved healthcare. *Journal of Expertise* 2021; 4\(2\): 144-168.](#)

ORAL SESSION 1:

THE CHANGING WORLD OF RADIATION ONCOLOGY: DEVELOPMENTS IN EDUCATION AND EVALUATION ACROSS THE GLOBE

Moderators: Idalid “Ivy” Franco and Gabrielle Peters



The Process of Re-developing a National Training Curriculum for Radiation Oncology: The Irish Experience

Presenter: Neil Wallace
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Purpose: There have been significant advancements in the speciality of radiation oncology (RO) in recent years. This has been reflected in the modernisation of RO infrastructure in Ireland. Two large satellite units connected to our largest training centre in Dublin opened in 2011. The other two national training sites in Cork and Galway have also been expanded which has introduced the capability to treat with advanced techniques. RO trainee numbers have also significantly increased over this time, in parallel with these developments.

Methods: An RO curriculum development subcommittee of the Irish Faculty of Radiologists was established. This included faculty representatives, the national training coordinator, the local training coordinators for each of the three sites, and 2 trainee representatives. The subcommittee reviewed the current curriculum and identified areas for modernisation using Grant's 6 steps method for guidance. These steps include needs assessment, curriculum purpose, learning outcomes, curriculum organisation, educational experience and curriculum evaluation. Multiple sources were referenced to aid content generation. For example, the Medical Council of Ireland's 8 domains of Good Clinical Practice were followed to ensure that the goals of the training scheme were in keeping with the highest professional standards. Training curricula from North America, ESTRO, Australia and the UK were used as references to guide the clinical aspects of training. The subcommittee divided work and met regularly to review progress over a 12-month period. More broad surveys of stakeholders including trainees and trainers were undertaken for some aspects.

Results: The new curriculum was agreed by the members of the subcommittee and approved by the Faculty. Due to the nature of post graduate RO training, the curriculum design is overlapping between the modular and the spiral design. Several new documents are now in place including introductory guidelines to help new trainees through the training scheme. Non-clinical aspects related to management and communication skills have been introduced. Formal processes for evaluating clinical skills related to radiotherapy planning, and a reference to modern treatment techniques including SABR and SRS, have also been incorporated.

Discussion: We have created a new national training scheme, based on the 6 steps method, which reflects modern RO practice in Ireland. This should facilitate the training of ROs with excellent professional and clinical skills and allow for international recognition of the training programme.

Keywords: Curriculum development, National training programme

Improving Education in Radiation Oncology in Poland

Presenter: Aleksandra Napieralska

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Background: A national, anonymous survey evaluating the quality of radiation oncology training in Poland was conducted by young members of Polish Society of Radiation Oncology (yPTRO) in 2018 and more than 70% radiation oncology (RO) trainees participated. We noted that courses included into the specialty program were not sufficient for up to 80% of participants. Thus, we identified several aspects of the training requiring modifications. To address those issues, we introduced a new set of on-line lectures prepared by yPTRO members.

Methods: Based on the survey and the questionnaire on social media, we started a series of on-line educational lectures hosted on video conference software. Topics were chosen by RO trainees. Sessions were recorded and are publicly available. Pre- and post-surveys of participants which evaluated the quality of the sessions were conducted in half of the cases. Sessions were advertised via social media on dedicated RO groups.

Results: Four lectures were held from April to October 2021. We covered the following topics of: consolidation immunotherapy in stage III NSCLC, introduction to biostatistics, radiotherapy in (oligo)metastatic prostate cancer and emergencies in RO. As of now, the lectures had almost 600 views. One woman and three men from four different institutions presented the lectures which lasted from 45 to 200 minutes. Based on the evaluation, the consolidation immunotherapy was considered the most useful. However, the participants reported that more case-based discussion is needed. Biostatistical workshops got 4.8/5.0 points and besides too long time of the lecture (the one which took more than 3 hours) were received as very well prepared. Similar to the immunotherapy lecture, more practical and case based aspects were recognized as necessary in the future lectures. The optimum frequency of the lectures declared by the majority of responders was once a month. Further lectures will cover the topics of brain tumours and various aspects of cranial and extracranial stereotactic radiotherapy.

Discussion: We believe that virtual education on an online platform is a practical and feasible way of collaboration on national level. We expect this effort will result in an improved confidence of RO trainees and will broaden the knowledge of the participants.

Keywords: Education, Training, Radiation oncology, Residents

Experience from a hypofractionation curriculum pilot: Overcoming education as a barrier to implement hypofractionation

Presenter: Maria Caicedo-Martinez

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Background: Hypofractionation has equivalent oncologic outcomes to conventional fractionation, with the advantage of shortening treatment time. This is beneficial for health systems in low-to-middle income countries (LMICs); however, little is known about how to promote its adoption globally.

Methods: The non-profit Rayos Contra Cancer developed a hypofractionation e-learning program to pilot in Colombia, free of charge, and shared through the Colombian Association of Radiation Oncology. Two electronic surveys were distributed, one before and one after the completion of the course. Physicians were asked questions regarding their attitudes to hypofractionation. Different sections focused on clinical scenarios related to breast, prostate, rectal, and CNS gliomas, asking current practices regarding conventional fractionation, hypofractionation (15-20 fractions), and ultra-hypofractionation (5 fractions). To measure the impact of the curriculum, we categorized physicians' use of hypofractionation with a numerical score from 0 to 12 (12 = More conventional, 0= more hypofractionation).

Results: Across 19 cities in Colombia, 149 participants enrolled: 61 radiation oncologists, 59 medical physicists, 7 radiation oncology residents, 18 physics residents, 1 technologist, and 1 dosimetrist. 33 physicians responded both surveys. More respondents chose hypofractionation after the curriculum for all scenarios (mean "pre-curriculum" score= 5.9, vs. "post-curriculum" score = 4.15, $p= 0.03$). For breast cancer, hypofractionation use after N0 lumpectomy increased by 24.2% for older patients (51% to 75%, $p= 0.766$) and 18.2% for younger patients (42% to 60%, $p= 0.00$), and for locally advanced postmastectomy increased by 12.1% (76% to 85%, $p= 0.435$). For prostate cancer, use for unfavorable intermediate-risk patients increased by 15% (67% to 82%, $p= 0.176$), for favorable intermediate-risk by 12.1% (76% to 85%, $p= 0.00$), and for high-risk by 12.1% (42% to 54%, $p= 0.52$). For rectal cancer, the increase in hypofractionation for T3N1 and T4N1 mid-rectal patients was 24.2% and 21.2%, respectively. In CNS high-grade gliomas respondents increased the use of hypofractionation in older patients with poor performance status (18.2%). At baseline, education was perceived as a barrier for the use of breast (ultra-hypo/hypo), prostate (ultra-hypo/hypo), rectal, and CNS hypofractionation in 69.7%, 45.5%, 78.8%, 63.6%, respectively. These percentages decreased by 24.2%, 9.1%, 18.2% and 12.1%. When asked if the course had increased their confidence and knowledge towards hypofractionation 100% of respondents said yes.

Discussion: Education is a perceived barrier for the use of ultra-hypofractionation schedules in a LMIC with a bundled payment system. An E-learning approach appears to be feasible and effective at reducing the educational barrier and increasing the use of hypofractionation.

Keywords: Hypofractionation, Radiation Therapy, Education.

Developing the Next Iteration of Radiation Oncology Milestones: How to Make Assessment More Useful for Both Residents and Faculty

Presenter: Horatio Thomas
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Purpose: Radiation Oncology Milestones 1.0 was developed in 2011 using the Accreditation Council of Graduate Medical Education's (ACGME) 6 core competencies to standardize the competency-based assessment of radiation oncology medical residents conducted by Clinical Competency Committees biannually. Critiques of Milestones 1.0 included the lack of clear progression between levels of the subcompetencies, and the complex language made it difficult to interpret by residents and faculty. The development of Milestones 2.0 aimed to simplify the language, clarify the expected progression of residents' competence, and provide supplemental resources for implementation.

Methods: The ACGME assembled a 9-member working group (academic radiation oncologists, residents, community members) to compose Milestones 2.0 for Radiation Oncology using a modified Delphi method consisting of multiple asynchronous small-group meetings interspersed with four web-based whole-group meetings until consensus was reached for each competency.

Results: Milestones 2.0 replaced disease-specific Patient Care subcompetencies (e.g., Lymphoma, Genitourinary) with those that emphasize the care delivery pathway (e.g., Consult, Simulation, Contouring and Target Delineation, Treatment Planning and Plan Evaluation, Treatment Delivery, Follow-up), restructured the Medical Knowledge competency, revised all subcompetency descriptions to chart a clear progression between levels, removed research from level 5 criteria, and provided a supplemental guide to aid implementation. Patient Care subcompetencies in Milestones 1.0 limited direct assessment of residents to specific rotations while revised subcompetencies in Milestones 2.0 can be assessed on every rotation. Level 5 in each subcompetency now reflects skills exhibited by the top 10% of residents and includes items such as "leads the multidisciplinary care team" under Consult. Previously, Medical Knowledge was an assessment of Medical Physics and Radiation/Cancer Biology. This has been modified to include Applied Sciences and Evidence-Based Foundations of Radiation Oncology with specific constructs to guide assessment. The supplemental guide gives real-life examples for each level within the subcompetencies to promote consistency in the implementation of Milestones 2.0 across residencies. The guide is designed as a living document to be tailored by programs to align with individual practices and allow for a shared mental model for faculty expectations.

Discussion: Milestones 2.0 builds on the foundation laid by Milestones 1.0 by aligning subcompetencies with clinical practice and represents a comprehensive approach to assessing core competencies necessary to succeed as a competent clinical radiation oncologist. The new framework will be put into practice in July 2022. Real-time feedback and additions to the supplemental guide will continue to refine and improve assessment of radiation oncology residents' clinical competence.

Keywords: Assessment, Medical Residents, Competency

Analyzing Resident Perceptions of Current Radiation Oncology Evaluation Methods

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Background: In an effort to facilitate positive change in radiation oncology (RO) resident evaluations, we collect and report resident familiarity and perceptions of current evaluation methods. We hypothesize familiarity with evaluation methods is predictive of the perceived utility of evaluations, stress or intimidation of evaluations, and behavioral changes.

Methods: A survey with Likert-scale questions was distributed to RO residents at 13 institutions. Questions assessed resident familiarity with evaluation methods, satisfaction and utility of different aspects of evaluations, stress, or intimidation of receiving evaluations, and likelihood of changing post-evaluation. Likert-type scales included: 1) not familiar=1; extremely familiar=5; 2) extremely unsatisfied=1; extremely satisfied=5; 3) strongly disagree=1; strongly agree=5; 4) extremely unlikely=1; extremely likely=5. Summary statistics are reported as (median, IQR). Regression analysis was used to analyze relationships between different variables.

Results: Eight of 13 programs responded to the survey with a response rate of 50% (52/104 residents). Surveyed residents reported being "not familiar" with the Next Accreditation System (1, 1-1) and "slightly familiar" with the six Core Competencies and the factors use to assess them (2, 2-3). Satisfaction with aspects of the resident evaluations was variable: frequency (3, 3-4), timeliness (3.5, 3-4), clarity of strengths or areas of improvement (4, 3-4). Overall, residents agreed that evaluations were useful in informing them of their competence, progress, strengths, and areas of improvement (median 4). Residents were neutral when asked whether they agreed with the statement, "receiving evaluations intimidates me," although 24/52 (46%) reported either "somewhat" or "strongly" agreeing with the statement (3, 2-4). Most residents agreed that receiving evaluations was stressful (4, 2-4). Additionally, residents indicated they were "very likely" to change behaviors and practices following evaluations (4, 4-5). Resident-reported familiarity with the evaluation methods was not found to be a significant predictor of the utility of evaluation methods (coefficient= -0.02, p=0.83), stress (coefficient= -0.11, p=0.62), or intimidation of receiving evaluations (coefficient= -0.06, p=0.792), or the likelihood of changing post evaluation (coefficient= 0.41, p=0.204).

Discussion: Familiarity with evaluation methods is not correlated with perceptions or behavioral changes necessitating further investigation of alternative predictor variables. Despite the low familiarity with evaluation tools, most residents reported that evaluations were useful and likely to elicit changes in their behaviors and practice, highlighting the value of current evaluation methods. This study is a part of a larger multi-institutional project that aims to consolidate evaluation methods across different institutions and develop interventions to improve the training process for the RO trainees.

Keywords: graduate medical education, radiation oncology residency, resident evaluations

Evaluating The Oncology Research Internship (Orion) During the Covid-19 Pandemic: A Comparison of Virtual and In-Person Iterations

Presenter: Sondos Zayed
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Background: The Oncology Research Internship (ORIoN), a novel resident-supervised initiative for medical students (MS), was first established in 2018 and found to be beneficial to both residents and MS. The COVID-19 pandemic halted many scholarly programs which relied heavily on mentorship through in-person interactions. We report results of the first virtual program, adapted to the COVID-19 pandemic, and compare participant feedback to previous in-person iterations.

Methods: ORIoN applications were open to first- and second-year MS. A panel of 3 physicians reviewed and scored applications. Successful MS applicants were paired with resident supervisors; each pair supervised by a staff oncologist. Compared to previous years, all meetings, correspondences and presentations between MS, residents, and supervising oncologists were conducted exclusively remotely. At the program's conclusion, each MS delivered a live virtual oral presentation of their completed case report, previously done in-person. Resident and MS participants completed questionnaires pre-/post program. Responses were collected on a 5-point Likert scale. Survey results from this virtual and the previous in-person programs were compared.

Results: Of 54 applications (previously 32 in 2018), 9 MS (three first-year, six second-year) were accepted and assigned to 9 volunteer residents (6 radiation oncology, 2 medical oncology, 1 pathology). To date, 9 manuscripts have been completed with 2 submitted for publication (1 published, 1 under review). Survey response rates were 100% (9/9) for residents and 89% (8/9) for MS. In the post-program surveys comparing the virtual and prior in-person programs, 87.5% (7/8) MS felt comfortable completing a clinical research project (22% strongly agree (SA), 62.5% agree (A), previously 25% and 75% respectively) and 100% (8/8) felt comfortable writing a case report (50% SA, 50% A, previously 75%, 25% respectively). All MS felt comfortable giving an oral research presentation (37.5% SA, 62.5% A) and teaching another MS to complete a case report (37.5% SA, 50% A). Similar to the in-person program, MS unanimously agreed that ORIoN was a beneficial experience (100%) and felt the program contributed to their career goals (100%, previously 88%). Post-program, all residents felt comfortable as a supervisor (67% SA, 22% A, previously 33%, 67% respectively), reviewing manuscripts (56% SA, 33% A, previously 33%, 50% respectively) and providing constructive feedback to trainees (67% SA, 33% A, previously 17%, 67% respectively).

Discussion: Compared to the in-person program, the virtual ORIoN retained strongly favourable ratings from MS and residents alike. These findings support adapting similar programs to a virtual setting when in-person interactions are not feasible.

Keywords: Medical education, virtual mentorship, COVID-19

Evaluation of a Radiation Oncology Microclerkship as a Component of Medical Student Training

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Background: Many US medical students gain clinical exposure to oncology specialties such as medical and/or surgical oncology throughout their core clerkships. Radiation oncology (RO), however, lacks similar representation during the standard curriculum, and few students pursue a dedicated RO elective. This substantially limits the broader understanding of the role of radiation therapy (RT) in multidisciplinary cancer care, including the role of palliative RT and survivorship care. The hypothesis of this study is that incorporating a 1-day "microclerkship" in RO as part of related clerkships will be feasible and perceived as valuable to participating students.

Methods: The RO clerkship director at a single institution partnered with clerkship directors in medical oncology, palliative care, and radiology so that every 3rd or 4th year medical student rotating in those specialties would spend 1 day in RO during each clerkship. Students were given educational materials to review beforehand, including a 30-minute introductory recorded presentation about general RO principles, and a slide deck and article describing how radiation therapy is relevant to patient care in primary care and other medical subspecialties. At minimum, the day in RO included shadowing one radiation oncologist (and any resident working with them) in clinic and observation of patient treatments, including attending tumor board, brachytherapy procedures, or treatment planning sessions if feasible. Students were invited to complete an anonymous electronic survey immediately after their experience, containing multiple choice and Likert-type questions (1=not at all valuable, 5=extremely valuable).

Results: Pilot data from 15 students are reported. No student had visited a RO department previously, and only 1 had attended a prior lecture from a radiation oncologist. Students reported the experience to be valuable (median 4, [4-4.5 interquartile range (IQR)]). 13 students (87%) rated the experience quite or extremely valuable. 14 students (93%) felt moderately, very, or extremely more knowledgeable about the role of radiation therapy in cancer management. After the microclerkship experience, some students were more interested in a full 2-4 week RO rotation (8 of 13, 62%) and RO career (4 of 13, 31%).

Discussion: Preliminary data suggest a valuable role of incorporating RO exposure into related medical student clerkships. Future plans include increasing student participation from these and other related clerkships and expanding the program to other institutions. We hypothesize that this approach will improve US medical student exposure to RO, which could make a subsequent positive impact on referral patterns and multidisciplinary patient care.

Keywords: undergraduate medical education, clinical clerkship, radiation oncology

Design and implementation of a radiation oncology standardized letter of evaluation (RO-SLOE) for the evaluation of medical students and radiation oncology residency applicants

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Background: Prior research has shown that clerkship grades and letters of recommendation for radiation oncology residency applicants are susceptible to grade inflation and bias, both of which diminish the utility of these criteria when evaluating prospective candidates. This is especially pertinent in light of the shift of USMLE Step 1 to Pass/Fail and recent initiatives in our field to better promote diversity, equity, and inclusion. Other fields such as emergency medicine have implemented a standardized letter of evaluation (SLOE) to address these and other concerns. This project will seek to design and adopt a new radiation oncology SLOE (RO-SLOE).

Methods: Members of the Radiation Oncology Education Collaborative Study Group (ROECSG) Undergraduate Medical Education (UGME) working group designed a survey to assess attitudes regarding the efficacy and design of a RO-SLOE. This is conditionally approved under an educational IRB waiver and pending full IRB approval. The survey population will be members of the Association of Directors of Radiation Oncology Programs (ADROP), current residency program directors, and medical school clerkship directors.

Results: Our data will provide a contemporary snapshot of residency admissions practices, willingness of residency programs to consider the RO-SLOE in the admissions process and provide a framework to design novel questions for inclusion on a final RO-SLOE. We anticipate that a RO-SLOE would transparently reflect applicant's level of preparedness for residency compared to their peers, reflect institutional and evaluator grading practices, and allow for narrative feedback to qualify these objective metrics.

Discussion: We expect that the RO-SLOE will offer a novel, easily adaptable means to provide both actionable feedback to medical students and a standardized admissions criterion to residency programs to better discriminate between applicants. A RO-SLOE may promote greater diversity in the residency admissions process by minimizing sources of bias in clerkship evaluations and encouraging a shift to more holistic candidate review. By working with stakeholders, we hope to facilitate the RO-SLOE's incorporation into medical school clerkship evaluations and the residency application process.

Keywords: Clerkships, evaluations, residency admissions

TEaching Mentoring in Radiation Oncology (TEAMRO): a ROECSG GME multi-institutional pilot study on teaching mentorship skills to residents

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Background: Mentorship plays a critical role in the training and career development of medical trainees. Formalized mentorship curricula and programs have been associated with increased satisfaction in mentor-mentee experiences and earlier development of preceptor skills in the mentee. However, an apparent lack of formalized mentorship exists in radiation oncology. Teaching-the-teacher workshops for residents can translate to positive long-term impact including higher job satisfaction and improved patient communication skill. Further, near-peer mentorship, such as between senior to junior residents, has been associated with increased satisfaction and experience, particularly among mentees of underrepresented minorities. We hypothesize that a mentorship curriculum for residents will lead to successful resident-student mentorship as well as positive impact on residents' own mentor relationships and career development.

Methods: A prospective pilot study will utilize the ROECSG Graduate Medical Education working group to enroll radiation oncology residents who interact with medical students during sub-internship rotations. In phase I, residents will undergo a self-administered didactic curriculum on core components of mentorship. This curriculum will include curated literature, a 60-minute didactic lecture on best practices of mentorship for medical students rotating in radiation oncology, and informal feedback sessions with faculty mentors. In phase II, a formalized mentorship program will involve a resident mentor and medical student mentee during an existing 3-4 week clinical sub-internship rotation in radiation oncology. This program will build on existing resident-medical student interactions in addition to weekly 60-minute mentorship sessions. Weekly mentorship sessions will include resident-led teaching of principles of radiation oncology, evaluation of evidence-based medicine, preparation of grand rounds presentation, and career counseling for medical student mentees. At the end of the rotation, residents will follow up with medical students at 1, 3, and 6 months after the rotation for continued career development among other interests.

Results: Primary endpoint will be positive change in the previously validated Mentorship Competency Assessment (MCA) before and after the proposed intervention to assess their comfort in mentorship skills (5). Secondary endpoints will assess change in pre- and post-survey assessments of perceived impacts on their own faculty-resident mentorship relationships, impact on career development, and overall well-being and experience of the program.

Discussion: Formalized mentorship curricula and programs may improve mentorship in radiation oncology. This multi-institutional study will investigate the potential of formalizing mentorship in existing resident-student interactions, which may serve to empower radiation oncology residents in their own mentorship relationships and overall career development.

Keywords: Medical student, Career Development, Peer Mentorship

Treatment Plan Evaluation Workshops for Residents: Learning the ROPES (Radiation Oncology Plan Evaluation School)

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Background: Plan evaluation is a key component of radiation oncology practice, yet many residents and new attendings are not comfortable with plan review due to insufficient experience during residency. According to a recent needs assessment of treatment planning education for residents, 24% of respondents were not at all or only slightly comfortable evaluating treatment plans. Several tools have been created to improve teaching of plan evaluation, yet a standardized curriculum for radiation oncology residency programs is lacking. We are creating disease site-specific educational material to teach plan evaluation, combining didactics and case-based questions.

Methods: Through a ROECSG GME Working Group collaboration, we will develop teaching material about treatment plan evaluation, utilizing Kern's Curriculum design. The material will be provided to individual residency programs to host a workshop for residents. Each workshop will focus on a single disease site and should be directed by an attending with expertise in reviewing radiation treatment plans for that site. Each teaching set will be organized according to the CB-CHOP paradigm. They will begin with informational slides, to be delivered in traditional lecture format, and will be followed by multiple case-based questions. The questions will include screenshots of treatment plans, dose volume histograms, and goal sheets, and will address the material covered in the didactic portion. To start, we will create workshop materials for the following: lung, head and neck, breast, and gynecologic malignancies.

Results: We will deliver pre- and post-surveys to residents among participating programs. Surveys will consist of a subjective portion to assess confidence level in independent plan review (evaluating plan, deciding treatment planning priorities, requesting changes to plans, etc.) and an objective section to evaluate impact on trainee knowledge about plan evaluation. We hypothesize that participation in these workshops will improve sense of preparation and knowledge about plan review. We aim to reduce the fraction of residents with little or no comfort evaluating treatment plans to less than 5%.

Discussion: This initiative represents the first attempt to provide standardized education for radiation treatment plan evaluation for residents. By creating the educational material in advance and disseminating among residency programs, we will facilitate more consistent training in plan review among radiation oncology residents. Improving plan evaluation can potentially ease the transition to practice for new attendings and may lead to better radiation treatments for patients.

Keywords: dosimetry, plan evaluation, workshop

ORAL SESSION 2:

THE MODERN PRACTICE: IMPLEMENTING NEW EDUCATION PROGRAMS TO EXPAND SKILLSETS

Moderators: Matthew Spraker and Jillian Gunther



Creating Inclusive and Accessible Residency Training programs: Lessons Learned from Establishing a Deaf and American Sign Language Inclusive Model for Residency Training

Presenter: Colin Hill
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Purpose: There is a growing need for a more diverse physician workforce to address gender, racial, and ethnic disparities in medicine. Investigations into vulnerable populations, including African, Native, Hispanic, and rural Americans all have overwhelmingly shown that these groups have diminished access and increased barriers to receiving radiation treatment. Increasing diversity among physicians can help address health care disparities in underserved populations. Accessible and inclusive residency training programs are needed to promote recruitment and retention of underrepresented physician groups. However, limited attention has been given to the potential benefits of training physicians with differences other than gender, race, or ethnicity. Americans with a disability represent about 27% of the population, whereas 1%-3% of physician trainees report having a disability. In 2017, our program matched a Deaf resident who preferentially utilized American Sign Language (ASL) to communicate. However, to date, there had been no published strategies on how to create an ASL inclusive residency training program for Deaf trainees. Herein, we report the development of a Deaf and ASL-inclusive residency program to serve as a model, which can be tailored to meet the needs of other underrepresented physician trainees in radiation oncology.

Methods: In preparation, department leadership engaged key stakeholders and leaders within the university's health system and among the department faculty, residents, and staff as well as the incoming resident, which led to the development and implementation of an inclusive ASL training model for the program.

Results: In this process, 5 important principles and steps were identified. First, the trainee should be directly engaged and involved as a primary and key collaborator as to any cultural, linguistic, or physical needs and preferences. Second, key stakeholders within the institution, including hospital and department leadership, should be engaged early, and involved in implementing and creating strategies. Third, with the trainee's input, efforts should be initiated to utilize resources internal and external to the institution, including institutional ADA officers, disability services, and training consultants. Fourth, cultural and communication expectations should be discussed with faculty and staff with the goal of creating an inclusive training culture for all participants. Finally, workspace accommodations that remove any physical barriers should be addressed based on the trainee's input.

Discussion: Through collaborative efforts, a Deaf and ASL-signing resident was successfully integrated into the residency program. The 5 principles of our model allow for efficient implementation of a similar framework at other institutions seeking to employ similar inclusivity initiatives.

Keywords: Accessibility, Diversity, Graduate medical education

PIRADS for Rad Oncs: A Multidisciplinary Educational Lecture to Improve Prostate MRI Interpretation for Radiation Oncology Residents

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Ebenezer Asare, Hanna Batchelor, Omar Khozouz, Christopher Luminais, Stacey Jesser, Christopher McLaughlin, Einsley M. Janowski

Background: The Prostate Imaging Reporting and Data System (PIRADS) reported on multiparametric magnetic resonance imaging (mpMRI) is a standard assessment in the diagnostic workup for patients with prostate adenocarcinoma. Therapeutically, mpMRI and PIRADS lesions are increasingly utilized in radiation oncology target delineation for definitive treatment with either external beam radiation therapy or brachytherapy. Though imaging interpretation is an integral component of radiation oncology, formal education is limited. Here we report on an educational lecture created with radiology colleagues to increase knowledge and confidence in mpMRI and PIRADS.

Methods: An educational lecture was created to summarize the aims and limitations of the PIRADS version 2.1 and to review the relationship of mpMRI, PIRADS scoring, and the dominant intraprostatic lesion (DIL). Educational materials were reviewed by a radiology fellow specialized in body MRI and two faculty radiation oncologists; a radiology fellow also attended the lecture. Radiation oncology residents from three institutions participated in the lecture and completed a pre-lecture (pre-test) and post-lecture (post-test) survey. The surveys assessed the participants' confidence and knowledge in PIRADS and mpMRI. Confidence was assessed using Likert scales ranging from 1-5. The knowledge assessment portion consisted of true/false, dichotomous choice, and multiple choice questions. Statistical Analysis: Likert confidence ratings pre- and post-lecture were averaged separately for each participant. A Wilcoxon Signed Rank test was performed to compare average confidence ratings. A paired sample t-test was performed to compare pre-lecture and post-lecture raw scores of the knowledge assessment section. All statistical analysis was performed using IBM SPSS Statistics for Mac, Version 28.0. (Armonk, NY: IBM Corp).

Results: 13 participants completed a pre-test survey and attended the lecture. 11/13 (85%) of participants completed a post-test survey. The median pre-test confidence score was 1.6 (Range 1-4), indicating that participants did not feel confident in PIRADS interpretation and mpMRI. The median knowledge assessment pre-test score was 58.3% and significantly improved by 43% after the lecture, with a median post-test score of 83.3% (Range 50%-100%, $p < 0.001$). Participant median confidence score increased to 4.1 (Range 2-5, $p = 0.003$) suggesting increased confidence in interpreting PIRADS and mpMRI.

Discussion: Radiation oncology residents do not feel confident in PIRADS scoring and imaging interpretation on mpMRI. Formal educational lectures can improve resident comfort and knowledge in PIRADS, and multidisciplinary lectures in collaboration with radiology colleagues should be encouraged.

Keywords: Prostate, PIRADS, Imaging

Development of an Educational Workshop on the Practical Application of Respiratory Motion Management Techniques for Radiation Oncology Trainees

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Background: Respiratory motion management (RMM) is an important tool that is increasingly utilized in the era of image-guided radiation therapy. There are several different techniques available to limit tumor motion during respiration with the goal of allowing for effective dose escalation to the target, while limiting toxicity to nearby organs at risk. Selection of the appropriate RMM tool depends on the clinical scenario and requires input from the treating physician and/or residents and medical physics staff, however, there is a paucity in trainee education on the various RMM methods. The purpose of this initiative was to develop a formal didactic and hands on experience for our trainees that described the RMM tools available and the appropriate clinical scenarios in which to best implement these specific techniques.

Methods: Trainees (medical and physics residents as well as medical students) participated in a two-phase educational workshop: a 45 minute didactic session followed by a hands-on demonstration of RMM modalities and pertinent software for motion evaluation. Each participant completed pre- and post-workshop surveys assessing their confidence on RMM (based on a 5-point Likert scale) and knowledge based quizzes to assess their understanding of the various RMM techniques. Participant scores were paired for statistical analysis using Wilcoxon-Rank Sum and student T-tests.

Results: This educational workshop was held annually in 2021 and 2022. There were 7 participants (5 medical and 2 physics residents) in 2021 and 9 (2 medical students, 6 medical, and 1 physics resident) that participated in 2022. For all participants, there was a significant increase in self-reported post-workshop confidence in RMM techniques (median 3.625 pre- vs 4.634 post-workshop, $p=0.018$ in 2021 and median 1.125 vs 3.750, $p=0.008$ in 2022). There was also a significant increase in the participants' scores in the post-workshop knowledge based quizzes (mean 85.71% vs 92.86%, $p=0.03$ in 2021 and mean 48.60% vs 87.50%, $p=0.008$ in 2022).

Discussion: In order to optimize patient care, it is essential that RO trainees understand and are able to implement RMM techniques appropriately when treating intrathoracic and abdominal cavity tumors. This initiative showed that a dedicated educational workshop on RMM techniques significantly improved RO trainee's knowledge and confidence on the use of these important tools. Future aims of this project include continuing to offer this workshop annually to trainees to assess information retention and creation of a shared resource for trainees at other institutions.

Keywords: respiratory motion management, educational workshop

Preparing for the MR-Linac: Analyzing an Educational Curriculum

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Background: Image guided radiotherapy (IGRT) has made multiple advances that allow for more precise delivery of dose. Incorporation of magnetic resonance imaging (MRI) into workflows has provided the next incremental step. MRI capable linear accelerators (MR-Linac) provides the ability for treatment adaptation and replanning, which requires significant alteration of clinical workflows. Treatment on MR-Linacs has proven cumbersome for this reason, with multiple feasibility studies failing on time constraints. Minimal data is available regarding departmental preparation for the MR-Linac, despite expansion to multiple institutions. This trial set out to create and apply an educational curriculum regarding the MR-Linac, addressing this gap for future expansion.

Methods: In this IRB approved study (NU STU00216145), intradepartmental radiation therapists (RTs) and resident physicians (RPs) were recruited to participate in the educational curriculum and subsequent contouring assessment. The course consists of lectures and demonstrations tailored to each cohort. Proficiency of the course will be assessed by volumetric analysis of contours delineated on multiple MRI series both before and after the course, with requested organs specific to each cohort. Collected data will be anonymized. Each volume will be compared to a gold standard multiple physician consensus for Dice coefficient analysis. A post-education questionnaire will be distributed for analysis of the quality of the course and assessments.

Results: A total of 5 RTs and 6 RPs were recruited. The full course consisted of 4 hours for each cohort. RTs were each given 5 cases for both pre- and post education analysis, while RPs were given 3 cases. Currently, all RTs have completed their pre- and post-education cases with 100% retention. RP education is still underway. The null hypothesis predicts no increase in either individual Dice scores or total cohort Dice scores from pre- to post-education MRI volumes. Surveys will be distributed after completion of the trial.

Discussion: This is a novel educational study performed during the implementation of an MR-Linac in an academic hospital. The objective of this study is to prepare personnel for treatment adaptation while assessing feasibility of an educational series. Feasible implementation will be signaled by significant improvement from pre- to post-education contours on MRI series when compared to a gold standard. Results of this study will show the extent of education required to adequately prepare both RTs and RPs to perform MRI-based contouring during adaptive radiotherapy. If proven to be feasible and well received on surveys, this course could be formalized and exported.

Keywords: MRI, Contouring, Volumetric

Determining the Feasibility and Effectiveness of a Virtual Interactive Residents-As-Teachers Curriculum: A Proposed Pilot Study

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Background: Recently, we conducted a national targeted needs assessment survey of U.S. radiation oncology resident physicians, in which respondents expressed a desire for training in specific teaching scenarios across a variety of audiences.¹ We describe a pilot study for a virtual, interactive Residents-As-Teachers (RaTe) curriculum to assess the feasibility and efficacy of such a curriculum for radiation oncology residents.

Methods: This longitudinal curriculum is being implemented with radiation oncology residents of all levels at a single institution for a pilot study, with support from program and departmental leadership. For individual assessment, participants will be recorded giving a presentation before and after taking the online modules, and the recording will be analyzed for various teaching skills by two evaluators based on objective structured teaching evaluations. Participants will also complete self-assessment questionnaires before, immediately after, and 6 months after the intervention to evaluate the development of their teaching skills. For curriculum evaluation, we will have the pilot study participants complete anonymous questionnaires after each module and at the end of the course to provide feedback on their experiences. Their responses will inform further improvement of the curriculum for future iterations.

Results: There are six modules planned for the RaTe curriculum for radiation oncology residents, each between thirty minutes to an hour long. The six course modules will be: (1) Teaching in the outpatient oncology clinic, (2) Creating an inclusive interdisciplinary learning environment, (3) Teaching contouring and plan evaluation, (4) Creating and delivering evidence-based PowerPoint presentations, (5) Giving mini-lectures "on the fly", and (6) Giving effective feedback. With funding from our institution, we plan to use a learning management system to create interactive online modules and enlist the help of the educational technology team for creating and incorporating video simulations of teaching scenarios.

Discussion: We have previously demonstrated that there is a need for a radiation oncology-specific RaTe curriculum. Additionally, there is a need for periodic reinforcement of teaching skills, as studies have shown that even within a year, teaching quality can decrease after the intervention of a RaTe curriculum. In the long term, we plan to make these modules readily available for residents to review, and easily accessible so that residents at other institutions can use them as well. Since radiation oncology residency programs are relatively small compared to other specialties, creating a national standardized curriculum is the most accessible way to implement a RaTe curriculum for all radiation oncology residents.

Keywords: Residents-As-Teachers, Virtual, Curriculum

Lessons Learned from Multi-Institutional Medical Physics Animated Video Production

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Background: Medical physics education is a vital part of radiation oncology (RO) residency. However, its instruction is heterogenous across training programs. We present the results of a pilot series of high-yield videos, with special focus on lessons learned for future educational pilots.

Methods: The ASTRO Core Curriculum was used to choose 4 high-yield topics to cover in 5-10 minute animated videos. Scripting was done by ROs, reviewed by medical physicists, and graphics created by university broadcasting specialist; there were 8 active team members. Participants were recruited through social media and AROPC emails over the course of 1 month with aim of 80 participants. Demographic information was collected for each participant and the surveys were sent to eligible registrants sequentially, such that video 2 would be sent once survey assessment of video 1 was complete. Video evaluation was developed based off validated technology acceptance model (TAM) questionnaires composed of a series of Likert style questions.

Results: Creation of the four pilot videos took 7 months, with multiple iterations of scripting and storyboarding. Video cost was estimated to have been nearly 10x the quoted and agreed upon fee due to significant time needed to communicate graphic designer regarding complexities of radiation physics. Ultimately, 169 unique participants enrolled in the pilot from across the country which was 211% of the targeted cohort size. Of this cohort, 108 initiated the series and 85 completed the pilot resulting in a 78% completion rate. Videos were watched for a median duration of 6:38 out of ~10 minutes. All participants reported the use of graphic animation improved understanding across all videos. 93% agreed with a need for additional resources geared specifically towards RO and 100% would recommend these videos to other residents.

Discussion: The Hi-Phy pilot series was a successful in developing videos that were effective in teaching RO physics concepts. As RO residents report a need for free and high quality standardized educational resources, it is important to learn from this experience.

Keywords: radiation physics, animation, educational videos

Interobserver agreement among multiple generalists or specialists are comparable to that of recognized experts: Prospective acceptability benchmarks for H&N from the C3RO crowdsourced initiative

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Background: A challenge in the development of artificial intelligence (AI) is the lack of multi-expert observer datasets large enough to train deep learning models; this is particularly true for head and neck (H&N) cases, which have high interobserver segmentation variability. As such, we created Contouring Collaborative for Consensus in Radiation Oncology (C3RO), a crowdsourced challenge engaging international radiation oncologists in cloud-based contouring, to evaluate whether collective contours generated from large numbers of non-experts could meet or exceed expert interobserver agreement, the current "gold standard," in the segmentation of a H&N case.

Methods: Participants who contoured at least one region of interest (ROI) for the C3RO H&N challenge were categorized as generalist, self-identified specialist, or recognized expert. Cohort-specific ROIs were combined into single simultaneous truth and performance level estimation (STAPLE) consensus segmentations. STAPLEgeneralist ROIs or STAPLEspecialist ROIs were evaluated against STAPLEexpert contours using Dice Similarity Coefficient (DSC). The expert interobserver DSC (IODSCexpert) was calculated as a performance acceptability threshold between STAPLEgeneralist or STAPLEspecialist versus STAPLEexpert. To determine the number of generalists required to match the IODSCexpert for each ROI, a single STAPLEbootstrap consensus contour was generated for a 10-fold random-bootstrap using a variable number of generalists (between 2-25) and then compared to the IODSCexpert.

Results: This H&N challenge yielded contours from 58 generalists, 8 self-identified specialists, and 15 experts. The DSC for STAPLEgeneralist or STAPLEspecialist versus STAPLEexpert were both higher than their respective expert IODSCexpert for most ROIs, including the right parotid (STAPLEgeneralist/ STAPLEspecialist/ IODSCexpert, 0.95/ 0.94/ 0.87), left parotid (0.94/ 0.91/ 0.86), muscle constrictors (0.8/ 0.6/ 0.58), larynx (0.9/ 0.91/ 0.67), primary gross tumor volume (GTVp) (0.83/ 0.86/ 0.78), right submandibular gland (0.83/ 0.89/ 0.78), left submandibular gland (0.93/ 0.94/ 0.85), and clinical tumor volume 2 (CTV2) (0.84/ 0.82/ 0.7). The DSC for both STAPLEgeneralist and STAPLEspecialist were lower than their respective IODSCexpert for CTV1 (0.68/ 0.65/ 0.85). Interestingly, the DSC for STAPLEgeneralist was higher (0.96), while STAPLEspecialist was lower (0.8) when compared to the IODSCexpert (0.9) for the nodal GTV (GTVn). For the brainstem, the DSC for STAPLEspecialist (0.86) exceeded IODSCexpert (0.82), while the DSC for STAPLEgeneralist did not (0.8). The theoretical minimum number of generalist segmentation needed to cross the IODSCexpert acceptability threshold ranged between 2-5 for all H&N ROIs.

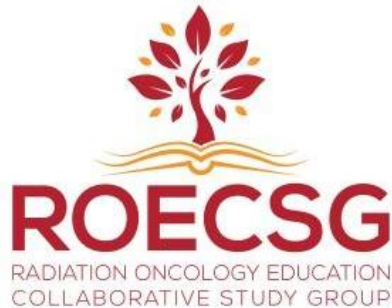
Discussion: Results show that 5+ generalists could potentially create consensus ROIs with performance approximating an individual expert, facilitating feasible mechanism to improve AI algorithm development for H&N.

Keywords: contouring, artificial intelligence, crowdsourcing

ORAL SESSION 3:

THE CLINICAL ENVIRONMENT: IMPROVING OUR COLLECTIVE EXPERIENCE AND PATIENT CENTERED CARE THROUGH EDUCATION

Moderators: Horatio Thomas and Laura Padilla



Sustainability and expansion of an interprofessional education for medical assistants in radiation oncology after 4 years of experience

Presenter: Sumi Sinha
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Background: Medical assistants (MAs) are allied health professionals who support a diverse range of functions in the clinical setting. Few certification requirements or continuing education opportunities exist for MAs; training specific for work in radiation oncology is particularly lacking. A interprofessional education program for MAs in radiation oncology was established in 2017. Here we report on the sustainability of the program and the aim of expansion.

Methods: In previous work, we describe the development of a novel education program based on needs assessment of a single institution cohort of MAs in radiation oncology. The resulting 20-month curriculum was implemented primarily through resident-led didactics (2017-2020, Cycle 1). Program evaluation was performed through pre- and post-assessments. Following completion, the curriculum was updated to foster greater interprofessional education and was led by a mixture of medical residents, physics residents, nursing, nurse practitioners, therapists and additional radiation oncology staff (2020 - current, Cycle 2). Educators were nominated based on topic area expertise and interest.

Results: As previously reported, sessions in Cycle 1 were found to be consistently comprehensive (median Likert score, MLS 4-5) and informative (MLS 5) and the program showed increases in sense of empowerment (MLS change from 3.5 to 5) among the cohort (n=2-5 responses per session). Over the length of Cycle 1, there was sustained improvement in clinical knowledge within the scope of the MA role (MLS 5) and empathy for patients (MLS 5) and stably high rating of job satisfaction (Likert Scale range 4-5). Cycle 2 is currently in progress with results forthcoming. Notably, the program was stably expanded from n=5-7 to n=7-8 MAs in Cycles 1 and 2 respectively. Program participation was challenged by COVID-19 staffing shortages however demonstrated sustained interest and participation (range 2-6 participants per topic). Cycle 1 included 4 (20%) interprofessional educators whereas Cycle 2 included 11 (55%).

Discussion: Here we report on a 20-month interprofessional education program for MAs in radiation oncology which demonstrated improvement in empowerment, clinical knowledge, and high job satisfaction. The program is found to be implemented longitudinally with expansion in both educators and participants. Incorporation of interprofessional educators has improved leadership and educational opportunities and increased program sustainability. Future directions of the program include expansion to a multi-institutional setting for Cycle 3, to begin July 2022. Increased cohort size may allow for further understanding of the impact of MA education on clinical workflow, interprofessional collaboration, and patient care.

Keywords: curriculum development, medical assistants, medical education

Development of Patient-centered Communication Curriculum for Radiation Oncology Residents

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Background: Radiation oncologists often speak with patients who are terminally ill and may be near the end of their life. In fact, up to 63% of patients who died of cancer receive palliative radiation in their last year of life. Despite this, training on palliative care including patient-centered communication skills for radiation oncology residents is lacking. This prompted the development of a serious illness communication curriculum designed for radiation oncology residents.

Methods: Curriculum development followed Kern's Six-step approach. A national survey of radiation oncology residency program directors outlined the lack of communication training and served as a general needs assessment. We performed an institution-specific targeted needs assessment with a cross-sectional survey and semi-structured interviews that reaffirmed a convincing need at the residency program level for a practice-based patient-centered communication skills training program. The objectives, educational strategies, implementation, and evaluation of the curriculum were then developed to target identified deficiencies in resident communication skills.

Results: Data from the targeted needs assessment showed that most residents felt only "somewhat prepared" (Likert 3/5) to discuss important topics such as prognosis (93%), reconciling the seriousness of one's illness (71%), and discontinuing life-sustaining treatments (64%). When asked how they might improve these skills some residents remarked, "practicing conversations," "observing others," and "learning best practices for these situations." A baseline radiation-specific simulated patient encounter was performed at the university's simulation-based learning center. Then, two virtual half-day teaching sessions led by expert faculty facilitators were held. These consisted of didactic learning and mentored resident practice with simulated patients and real time feedback. All teaching and practice were designed for radiation oncology residents. A post-course simulated patient encounter will be performed. Faculty trained in serious illness communication who did not participate in the course will then review the simulated patient encounters and complete a blinded standardized assessment to compare pre- and post-course measurable communication skills.

Discussion: We developed a practice-based patient-centered communication skills curriculum for radiation oncology residents. We expect this work in progress will show measurable improvement of these skills. We plan to integrate this curriculum on a regular, repeating basis for additional skill development and to facilitate durable learning. We hope this course can serve as an adaptable model that can be instituted among radiation oncology residency programs.

Keywords: communication, radiation oncology, palliative care

Optimizing patient-centered, inclusive care in oncology: Healthcare professionals' knowledge, attitudes, and practices in caring for LGBTQ2+ individuals

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Background: The sexual and gender diverse community of lesbian, gay, bisexual, transgender, queer/questioning, two-Spirit, plus (LGBTQ2+) patients experience cancer-related health disparities and inequities compared to heterosexual and cisgender patients. Our objective was to examine healthcare professional (HCP) knowledge, attitudes, practices, and education interest when caring for LGBTQ2+ patients with cancer, and identify gaps and opportunities to improve care.

Methods: A 38-item online survey was sent to all Gynecologic oncology staff (n=92) within a tertiary care cancer centre in Toronto. Items included respondent demographics (n=7), and LGBTQ2+ knowledge (n=7), attitudes (n=15), practice behaviours (n=5), education interest (n=1), and open comments (n=3). Descriptive statistics summarized survey responses. Fisher's exact test was used to assess interactions between demographics and survey responses. Thematic analysis was used to analyze open-ended questions.

Results: 75/92 (82%) HCPs completed the survey. Although most respondents felt comfortable (96% strongly agree/agree) treating LGBTQ2+ patients, only 45% felt knowledgeable about their specific health needs. In comparison, staff reported less comfort (87%) and knowledge (27%) caring for transgender patients. Respondents believed it is important to know a patient's sexual orientation (58%) and gender identity (41%); however, significantly less felt comfortable inquiring (sexual orientation 41%, p=0.023 and gender identity 36%, p<0.001). LGBTQ2+ health-related knowledge items yielded responses of "neutral" and "not sure" ranging from 19-73% and most were "not sure" about institutional practices regarding collecting patient sexual orientation (61%), sex assigned at birth (52%) and gender identity (60%). Almost all (96% strongly agreed/agreed) were interested in receiving LGBTQ2+ specific education. Age, having friends/family who identify as LGBTQ2+ and non-white race were found to have some influence on attitudes. Thematic analysis of open-comments identified two main themes: (i) HCPs are concerned of offending LGBTQ2+ individuals because of their lack of knowledge and experience, and (ii) HCPs desire LGBTQ2+-specific health training and the creation of inclusive environments.

Conclusions: Although HCPs report feeling comfortable caring for LGBTQ2+ individuals, most report a lack of knowledge and awareness in caring for this population. We recommend institutions implement cultural competency training for HCPs to improve high quality and inclusive patient-centered care for LGBTQ2+ patients and their caregivers.

Keywords: LGBTQ2+, healthcare providers, oncology

Screening for Vaccination Status and Providing Appropriate COVID-19 Vaccine Education to Radiation Oncology (RO) Patients

Presenter: Joseph Kim

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Background: Patients with cancer who are receiving Radiation Therapy (RT) are at an elevated risk of morbidity and mortality (M&M) from COVID-19 infection. Patients also may be unable to self-isolate, as they often require multiple hospital visits and close exposure to healthcare practitioners (HCPs). COVID-19 vaccination has been shown to mitigate risk of both COVID-19 infection and morbidity. It is important that patients undergoing RT or those recently diagnosed with cancer receive complete COVID-19 vaccination. Given their rapport with patients, HCPs are in a unique position to assess and treat the patient's cancer and engage in discussions regarding important health decisions. Our goal was to use the patient-provider relationship to identify reasons to forego vaccination, address specific concerns as a trusted source, and encourage COVID-19 vaccination for patients with cancer.

Methods: We identified and screened all new patients who were either unvaccinated or had undocumented COVID-19 vaccination status from 11/2021 to 2/2022. Instruction on reconciling vaccination status in EPIC was provided to HCPs. Weekly reports of unvaccinated patients were generated and distributed for upcoming consultations. HCPs were given vaccine education resources and instructed to document that education was delivered. Information regarding pre-simulation COVID-19 PCR testing, vaccine status, vaccine education, and reasons for not being vaccinated was collected.

Results: A total of 909 patients were seen in consultation from 11/1/2021 to 2/28/2022. Of these, 152 patients were unvaccinated/undocumented vaccination status, of which 136 (16.2%) were eligible for our vaccination education (1 declined prior to consultation, 3 pediatric, 1 patient with dementia excluded). 27 (19.9%) patients received vaccination education at time of consultation. 22.2% Of these patients, 6 (22.2%) eligible patients who received vaccine education initiated the COVID-19 vaccination within 60 days of consultation. On pre-simulation COVID testing, 32 patients tested positive for COVID-19.

Discussion: COVID-19 infection has significant M&M and has serious implications for patients with cancer. We developed a COVID-19 vaccination initiative to identify and reconcile vaccination status and provide vaccine education to cancer patients. 27/136 (19.9%) eligible patients received vaccine education, of which 6 (22.2%) received partial or full vaccination. Despite educating clinicians and sending weekly reports, COVID-19 vaccine education to patients remained low, which may suggest there are several challenges for specialized HCPs in performing vaccine education despite its clear medical importance. As the outlook of COVID-19 continues to evolve, providing accurate information regarding the COVID-19 virus and vaccination is crucial for the well-being of cancer patients.

Keywords: COVID-19 vaccine education, patient care, patient education

The application of patient reported outcomes (PROs) to build personalized patient education aids

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Background: After diagnosis, cancer patients receive a large volume of information in a short period of time when they are usually feeling anxious and stressed. In particular, prostate cancer patients can be overwhelmed by multiple treatment options and the expectation of making a life-altering personal choice during shared decision-making. Consent forms attempt to summarize potential side effects but are rarely personalized to each patient. Clinicians can underestimate symptoms/side effects experienced by patients, compared to patient-reported outcomes (PROs). PROs are the best estimate of how our patients will feel during/after treatments.

Methods: We used real world data including PROs and clinical/radiation data from the Enterprise Data Warehouse and our departmental radiation database to explore patient characteristics associated with PRO changes over time. We created several different visualizations showing how PROs changed over time, and tried to pick visualizations that were most accessible to patients with different backgrounds, languages, data/health literacy. In the future, we hope to conduct patient interviews to improve visualizations, and to automate real-time generation of personalized patient education aids for use at consultations.

Results: Our cohort included ~3,900 patients who completed >35,000 PROMIS-10, >5,000 EPIC-26, and >11,000 weekly radiation treatment visit questionnaires about urinary, bowel, erectile, and overall quality of life. Among significant predictors of toxicity were initial symptom severity.

Discussion: Patient reported outcomes (PROs) improve outcomes and have become standard in clinical trials and are gradually being incorporated into more cancer clinics. The next phase of PRO research is continuing to expand applications into general clinical practices and routine daily workflows using real world data (collected from each clinic because clinical practices/outcomes can vary). It is time to use our PROs work back to directly benefit patients. We are working on real-time generation of personalized patient education resources in the routine clinical workflows. Resources include data visualizations that aim to be accessible to patients with diverse backgrounds, languages, data/health literacy. Prostate cancer patients could especially benefit from personalized resources for standard-of-care shared decision-making after initial diagnosis. This work in progress describes how to combine PROs and clinical data to create personalized PRO visualizations for patient education, and potential mechanisms for real-time generation of these resources.

Keywords: Patient reported outcomes; Patient education; Clinical informatics

Prospective Pilot Study to Measure Baseline Radiation Knowledge Prior to Radiotherapy After Standard Education at Consultation

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Background: Pre-operative patient education has been shown to reduce patient anxiety and increase patient medical comprehension. This prospective pilot study hypothesized that patient knowledge related to the radiotherapy treatment process would be low after receiving traditional radiation educational materials and counseling at the time of initial consultation.

Methods: Patients with non-metastatic cancer receiving definitive or adjuvant radiotherapy at three suburban radiation therapy clinics affiliated with an academic medical center completed a 34-question survey. Patients received traditional radiation educational materials. The survey included questions on demographics, the Spielberger State-Trait Anxiety Inventory short-form (STAI-S-6), a modified radiotherapy Amsterdam preoperative anxiety and information scale (mRT-APAIS), and radiotherapy knowledge. Patients also provided qualitative responses. Surveys were administered prior to the patient's CT-simulation scan. Descriptive statistics were performed.

Results: 22 patients were enrolled in this prospective pilot study. 19 (86%) patients were female. The median age was 66 (range: 38-80). 14 (64%) patients were white, 7 (32%) black, and 1 (4%) American Indian/Alaskan Native. 6 (27%) patients received a high school degree or GED, 10 (46%) obtained a 2-year degree and 5 (22%) received a 4-year degree or higher. 16 (73%) patients had breast cancer with the others having lung, brain, gastrointestinal, gynecologic, or other malignancies. The median radiotherapy knowledge score was 35.0 [IQR: 31.0 - 39.5] and 58% of patients endorsed low overall radiotherapy knowledge (score < 35). Patients reported low levels of knowledge related to radiotherapy set-up (41%), immobilization (41%), x-ray use (64%), and sensation (tactile 41%, auditory: 59%). The median STAI-S-6 score was 43.3 [IQR: 36.7 - 46.7] and the median mRT-APAIS score was 18 [IQR: 14.8 - 20.0]. 68% of patients were "anxious" by STAI-S-6 (score ≥ 40) and 77% by mRT-APAIS (score ≥ 12).

Discussion: A majority of patients reported low levels of knowledge related to the radiotherapy treatment process prior to CT simulation. These findings suggest an educational intervention at the time of consultation may be beneficial to reduce patient anxiety and increase patient knowledge related to the radiotherapy treatment process. Accrual is ongoing in this prospective pilot study. Future research directions include a phase 3 multi-institutional stepped-wedge clinical trial to investigate the impact of a novel patient education tool such as the Communicating the External Beam Radiotherapy Experience (CEBRE) discussion guide used during initial consultation to reduce patient anxiety and increase patient knowledge about radiotherapy.

Keywords: Patient education, health literacy, quality of life

Impact of Individualized Patient Education Material on Patients' Cancer Care Experiences

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Background: Patient education materials (PEMs) empower patients to have an understanding of their health and treatment options. PEMs that currently exist in Radiation Oncology are available primarily as text heavy resources, or multiple-click web-based Internet resources, exceeding the national readability recommendation of a 6th grade reading level. A health literacy level appropriate PEM that simplifies the complexity of a cancer diagnosis and treatment options may be a reasonable option to facilitate patient-provider communication in Oncology.

Methods: We are developing a multidisciplinary, health literacy appropriate thoracic oncology PEM at Rush University Medical Center (RUMC) in Chicago, IL, which serves a diverse patient population with varying health literacy levels. This new PEM, part of an ongoing study, aims to address the knowledge translation gap. The primary outcome is to assess the mean difference in patient satisfaction between control and study groups. The secondary outcome is to assess an interaction effect between health literacy and the overall effect of the PEM on patient satisfaction.

Results: This prospective randomized control trial with IRB approval is ongoing. The PEM was developed collaboration with media designers and the RUMC Patient Education Committee. Readability of the PEM was assessed with ten common readability assessment scales, represented through a mean score. All English or Spanish speaking adults scheduled for a new patient consult during Comprehensive Lung Clinic will be included. The control group will receive the standard of care (physician encounter without the PEM), while the intervention group will receive standard of care and the PEM. All patients will complete an anonymized validated survey that measures health literacy levels, sociodemographic factors, and satisfaction of the encounter. A cumulative anonymized health-care provider survey will gather descriptive data about health-care providers' experiences using the PEM. Descriptive statistics will characterize the control and study group. Patient satisfaction will be measured on a 5-point scale. A two-sample t-test with a one-sided alternative will measure the difference of mean score of patient satisfaction between the control and study group. We will apply interaction tests to determine the differential impact of health literacy on the correlation of the PEM and patient satisfaction. Multiple linear regression modeling will be done to determine the correlation of the PEM and patient satisfaction after adjusting for other socio-demographic variables.

Discussion: If received well, we will explore expanding this study to other treatment sites, with the overall goal of improving health literacy appropriate PEMs in Radiation Oncology.

Keywords: Health Literacy, Patient education, Patient satisfaction

ASYNCHRONOUS ORAL PRESENTATIONS



What motivates the post-graduate medical trainee in seeking feedback?

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Background: This study focuses on the post-graduate trainee during implementation of competency-based medical education (CBME). Based on social and organisational psychology theoretical models, using a goal-orientation theory framework, this study aims to explore how goal-orientation affects postgraduate medical trainees' feedback-seeking behaviour and preferences.

Methods: This sequential mixed methods study employs quantitative "profiling" of post-graduate trainees into categories based on a goal-orientation questionnaire, and then explores whether learner "profile" affects feedback-seeking behaviours through goal-orientation specific, semi-structured group interviews.

Results: 213 of 974 questionnaires were completed which identified 90 respondents having a preferred goal orientation; either Learn, Performance-Avoid (Avoid), or Performance-Prove (Prove). 4 Learn, 3 Avoid, and 3 Prove participants were interviewed. Responses were from a representative sample of post-graduate medical trainees. Five themes were identified: dominance of summative assessment or "judgement", dependent learning, self-direction, goal-setting, and relationship or "trust".

Discussion: Findings suggest that those who have a learning goal-orientation seem more likely to use goal-setting and self-directed learning strategies than those in either of the performance goal-orientation groups. Avoid and Prove learners were more likely to view feedback as judgements and be dependent learners. A conceptual framework was developed and highlights that regardless of goal-orientation, the teacher-learner relationship was paramount to feedback receptivity. In particular, trust in the dyad enables the learners to expose weaknesses leading to more effective feedback. These findings can help optimize CBME feedback and assessment tools and may also have implications for resident workshops on self-assessment, goal-setting, and on the creation of faculty development workshops on giving feedback.

Keywords: Competency-based medical education, formative assessment, feedback

Problem-Based Learning Curriculum as a Tool to Increase Medical Student Exposure to Radiation Oncology

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Background: For many years Radiation Oncology was known to be a highly competitive and specialized field. However, over recent years there has been an increase in the number of residency spots available and a decline in the residency application pool. Thus, it is imperative to explore new techniques to recruit students to the field. Early exposure to cancer management may translate to increased student interest in Oncology-related fields and improved understanding of Oncologic treatment modalities. Problem-Based Learning (PBL) may be an effective way to provide this exposure, as it is a popular teaching method at medical schools across the country. We propose that an Oncology-focused PBL case will increase exposure to Radiation Oncology and other Oncologic subspecialties during pre-clinical years.

Methods: In May 2021, first year medical students (n = 140) participated in a one hour long small group PBL case that focused on pancreatic cancer and Radiation Oncology during the gastroenterology curriculum. Students were provided a case prompt and resources to review approximately one week prior to the PBL case. During the PBL case, facilitators guided students to desired learning objectives including: Describe the clinical presentation of pancreatic cancer; List imaging modalities used to make the diagnosis of pancreatic cancer; Define important terms in management of pancreatic cancer including neoadjuvant therapy, adjuvant therapy, concurrent chemoradiation, Whipple procedure; List different types of radiation and common side effects of radiation; Describe basics of planning and delivery of radiation. Facilitators consisted of attendings or residents in the field of Radiation Oncology.

Results: Following the PBL, there was an increase in the number of preclinical students who expressed an interest in Radiation Oncology and proceeded to shadow physicians in the department (n=1 in 6 mo prior to PBL, n=5 in 6 mo following PBL). Additionally, we saw an increase in the number of subscribers to the Oncology Interest Group (n = 22 prior to PBL, n = 58 following PBL).

Discussion: The Problem-Based Learning approach serves as an effective avenue to introduce concepts of Oncologic care to preclinical medical students. Active participation in medical school PBL curriculums could be used to increase recruitment of preclinical medical students to the field of Radiation Oncology. Upon repeat of the PBL session in May 2022 we will be including surveys to provide additional assessment of the efficacy of this technique.

Keywords: Problem-Based Learning (PBL), preclinical medical student exposure

Integrating Radiation Plan Review into Radiation Oncology Curriculum: Single-Institution Experience

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Background: Lack of residents' dedicated training and satisfaction with regard to radiation plan review was one of the major issues detected in our needs assessment at Indiana University. Therefore, a monthly session focusing on dosimetry and plan review for residents was added to our didactics.

Methods: This session was designed based on Kolb's cycle of experiential learning. All residents have been exposed to radiation plan review in clinic and during peer review (concrete experience). However, this session will emphasize on reflective observation and abstract conceptualization. Each month, we cover a specific disease site for the resident plan review session. Residents pick 3-4 radiation plans in advance. Each session begins by presenting the patient followed by plan review based on CB-CHOP acronym. Faculty are present to highlight the important aspects of plan review. Dosimetrists are sometimes present to explain the steps needed to design the plan. If there is a plan that was not approved by faculty, that plan will also be reviewed to highlight the issues and familiarize residents with less optimal plans. This session gives residents the opportunity to actively participate and ask questions, a factor that can be missing in departmental peer review sessions.

Results: This curriculum change was implemented in January 2021 at Indiana University and is in effect. There are 7 residents in our program and our evaluation has shown that all believe that this addition to the curriculum has improved their understanding of different steps of plan review and has increased their confidence to evaluate plans independently. It has been highlighted that the presence of dosimetrists and their detailed explanation of plan design has also helped them understand the process better. They all agree that this session should be continued in the future.

Discussion: Integrating plan review in our curriculum has resulted in increased confidence and satisfaction of residents regarding radiation plan review. We are currently working on the fourth part of Kolb's cycle which is active experimentation to actively involve residents and will ask our faculty and dosimetrists to provide feedback about residents' ability to review plans. As our next step, we would like to collaborate with other institutes to design a plan review curriculum. We also look forward to collaboration with dosimetrists and physicists to help us design scenarios and plans that require improvements.

Keywords: Radiation plan review, curriculum, radiation oncology residency

Value-Based Cancer Care: What are the opportunities to improve training for future Radiation Oncologists on the Quality/Cost Equation?

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Purpose: A cancer diagnosis can lead to lasting financial problems for many Americans. The American Medical Association has called for a greater focus on value and affordability education to increase awareness of burdens on both patients and the healthcare system. This study evaluated how future physicians were educated on cost and value-based principles during their undergraduate medical education. Radiation Oncologists were the focus given their oncology specific residency.

Methods: An anonymous 18-question survey was developed by the study team to assess undergraduate medical education experiences on cost, quality, and value. A list of recently graduated (2016-2012) physicians was generated from residency applications; emails and Twitter handles were identified via publicly available data and contacted August 2021- February 2022 to complete the survey.

Results: Of 279 contacted, 67 (24.0% response rate) completed the survey. Participants graduated in 2016 (25.4%), 2017 (6.0%), 2018 (25.4%), 2019 (17.9%), 2020 (14.9%), and 2021 (10.4%); they trained in the Northeast (34.3%), South (26.9%), Midwest (29.9%), and West (9.0%). Less than half had a lecture on value (49.3%, n=33) or costs (32.8%, n=22). Only 19.4% (n=13) had an entire class on value. About half had heard value mentioned "occasionally" (55.2%, n=37) during their time on the wards and less than a third (28.4%, n=19) heard about it "frequently". Similarly, half had heard about costs "occasionally" (52.2%, n=35) and less than a quarter (17.9%, n=12) had heard it mentioned "frequently". Less than half had a lecture on health insurance (46.3%, n=31); about a third had heard it mentioned "occasionally" (38.8%, n=26) on the wards while less than a tenth (7.5%, n=5) had heard it mentioned "frequently". A third had NO education on improving affordability for patients (34.8%, n=23) although about a half had been taught to discuss the \$4 list and/or pill splitting (47.0%, n=31). Less than a tenth (9.0%, n=6) had a "good idea" of the charged/billed prices and even less (6.0%, n=4) knew the out-of-pocket costs for standard tests, procedures, and medications. Most (89.6%, n=60) felt their education about value, affordability, and cost was marginal or insufficient.

Discussion: Most recent graduates entering radiation oncology have not received adequate education on cost, affordability, and value. This education gap leads to the vast majority stating ignorance to the cost burdens on patients. Given rising healthcare costs, systemic reform of medical education will be required to educate the next generation of oncologists on the importance of value-based cancer care.

Keywords: Value, Affordability, Costs

Pilot Implementation of a Multidisciplinary Tumor Board Seminar Series to Foster Increased Understanding of and Interest in Oncologic Care Among Medical Students

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Background: Prior work has demonstrated a need for educational curricula to increase medical student understanding of how to care for a growing population of patients with cancer, particularly in a multidisciplinary setting. Tumor boards (TBs) foster both high quality complex care for patients with cancer and continued education for oncologists. While TBs are critical components of oncologic practice, medical students have minimal exposure to TBs. We designed a TB seminar series for preclinical medical students with the primary aim of promoting a multidisciplinary lens towards cancer care and a secondary aim of increasing exposure to radiation oncology (RO).

Methods: Seminars were developed in collaboration with a resident-led RO Education Committee and a medical student-led Oncology Interest Group (OIG) at a single academic institution. Each seminar comprised of a 30-minute RO resident-led didactic session followed by a 60-minute institutional TB meeting and concluded with a 15-minute resident-led debrief. The didactics were used to provide a scaffold for observing the TB by describing the specialists' roles, commonly encountered diseases, treatment paradigms, and clinical challenges frequently addressed in this venue. In the resident-led didactic, special emphasis was placed on describing RO approaches and considerations. The post-TB debrief offered an opportunity for consolidation by providing a forum to address questions, highlight learning points, provide closure to challenging scenarios, and explore opportunities for engagement in research.

Results: The first seminar series piloted was Stereotactic Radiosurgery TB. An email inviting participation was sent via the OIG to all first-year medical students at our institution. Six students pre-registered for the seminar and subsequently participated in the seminar. Three students expressed interest in writing a case report on a patient treated with radiosurgery following the seminar experience. Participating students and program leadership expressed interest in continued seminar programming; the second seminar in the series will expose students to a breast TB.

Discussion: Pilot implementation of a multidisciplinary TB seminar series for medical students is feasible and may spark clinical and scholarly interest in RO. Future directions include formal integration of TB opportunities into longitudinal oncology curricula in preclinical medical education and promoting sustainability of the seminar series through institutional support. We plan to conduct a longitudinal mixed-methods study among students who attend at least one TB seminar in the series to assess the impact of the seminar series on familiarity with multidisciplinary care, interest in a career in RO, and participation in RO-focused scholarship.

Keywords: Multidisciplinary education, tumor board, medical education

Improving Educational Practices During Radiation Oncology Residency Rotations

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Background: As rotations in radiation oncology residency are typically designed according to the apprenticeship model, there can be variability in educational value. Overall, the current design and educational content of residency rotations in radiation oncology are not well understood. Furthermore, there are no recommendations for how rotations should be structured, despite ongoing efforts to standardize the radiation oncology residency curriculum. We aim to describe current educational practices within rotations of United States radiation oncology residency programs and suggest best practices.

Methods: First, we created an anonymous online survey to identify current elements and potential deficiencies within residency rotations. Questions addressed rotation duration, setting of expectations, one-on-one educational sessions, review of example cases, attending feedback, and educational simulations. We distributed the survey to current (2021-2022) radiation oncology residents (PGY2 - PGY5) in ACGME-accredited programs by e-mailing program coordinators, directors, and select residents with publicly available e-mail addresses. Next, we developed a guideline for best rotation practices using survey results. This guideline will be used to guide teaching faculty members. We plan to pilot these guidelines in a single institution and monitor feasibility and adherence to recommendations.

Results: Of an estimated total of 773 radiation oncology residents, 118 completed the survey (overall response rate, 15%). Respondents consisted of residents from both small and large residency programs (47% from programs with less than 9 total residents vs. 53% with 9 or more total residents), more junior than senior residents (60% PGY2 or PGY3 vs. 40% PGY4 or PGY5) and a higher proportion of men than women (68% vs. 32%). The most commonly reported rotation length was 2 months (44%), and a majority stated that most rotations have a 1:1 resident-to-faculty ratio (84/118, 71%). Forty seven percent (56/118) of residents reported that none or only some of rotations provided a service-specific guideline that clearly expressed expectations of the rotating resident. Most responding residents (63%, 74/118) said that none or only some rotations include regular educational sessions outside of didactics, and a similar number (62%, 73/118) state they want more routine educational sessions.

Discussion: A substantial number of radiation oncology residents report few routine educational sessions within rotations and are interested in receiving more dedicated teaching from attendings. A considerable number also indicate a limited understanding of expectations at the start of rotations. In response, we have developed a guideline for rotation best practices and plan to pilot these within a single institution and will monitor implementation and response.

Keywords: residency rotation, educational sessions, expectations

Analysis of the Association of Residents in Radiation Oncology Equity and Inclusion Subcommittee (ARRO EISC) Black History Month (BHM) Campaign: Moving Beyond Awareness

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Background: Social Media (SoMe) is an important tool to translate knowledge for Justice, Equity, Diversity, and Inclusion (JEDI). It promotes collaborative discussions beyond traditional borders. We report on our experience with our second annual Association of Residents in Radiation Oncology (ARRO) Equity and Inclusion Subcommittee (EISC) Black History Month (BHM) campaign. We hypothesize that this social media awareness campaign will result in participation and engagement among radiation oncologists (ROs).

Methods: A one-month Twitter campaign was conducted by the ARRO EISC from February 4th to March 8th, 2022. We highlighted work of one historical Black RO weekly through a series of Tweets, video presentations, and engagement (replies, quote tweets, retweets, and likes). Main hashtags utilized included #BlackHistoryMonth and #EISC. Tweets were collected each week using NodeXL. Cross-sectional analysis provided engagement and demographic data.

Results: There were 59 unique tweets (22, 10, 8, 19, during weeks 1-4 respectively) including 33 original (14, 6, 5, 8) and 26 with quoted comments (8, 4, 3, 11). There were 18 replies (8, 2, 4, 4), 80 retweets (32, 18, 9, 21), and 311 likes (32, 18, 9, 21). There were 6,012 video views (3034, 844, 1099, 1035). For the weekly tweets, there were a total of 48,181 impressions (27224, 6227, 7280, 7450) and 1,201 engagements (448, 176, 184, 393). Among 64 total participants, 20 provided unique content (48, 18, 13, 25), with 45 trainees (including 37 RO Residents/Fellows and 6 medical students), 39 MD staff including 35 ROs and 3 oncology-related disciplines. Additional participants included 10 oncology allied healthcare professionals including 7 physicists, 18 organizations including institutions and specialty societies. The most online engagement was from RO residents (169, 40.4%), RO faculty (143, 34.2%), organizations (52, 12.4%), and others (32, 7.7%). Activity was highest on week 1 and the day of the original posts. There were more RO-related black history month tweets not related to our campaign, including cross-tweeting from our participants and partners.

Discussion: We showed sustained interest through an intentional social media campaign highlighting Black RO during BHM with an increase in number of participants, and high engagement using video presentations. Limitations included missing data from lack of hashtag use, inability to quantify reach outside Twitter, English language, and North America. Future campaigns can focus on greater coordination with Black ROs engaging in similar activities and focused planning leading to Black History Month.

Keywords: Medical Education, Health Equity, Social Media

Implementation of a dedicated head and neck radiotherapy peer review conference: results of a prospective study

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Background: Head and neck radiotherapy (RT) is complex, involving multiple targets and organs at risk (OARs). Routine RT plan peer review is often inadequate for thorough review of the head and neck targets and OARs.

Methods: Patients treated between August 2020 and December 2021 were evaluated in a weekly structured head and neck RT plan peer review conference including at least one head and neck RT subspecialist. Patient and disease factors were recorded, as were the results of the peer review discussion, including the number and nature of recommended RT plan modifications and the rate of implementation. A major change was defined as any modification to the high-dose planning target volume (PTV) or RT prescription or fractionation. A minor change was defined as modification to at least one of the intermediate-dose PTV, low-dose PTV, or any OAR.

Results: 186 patients treated by 8 individual providers were prospectively recorded, 86.6% from the main site and 13.4% from 3 regional practices. The most common primary sites were oropharynx (29.6%), oral cavity (22%), cutaneous (16.7%), larynx/hypopharynx (16.1%). T3-4 disease was present in 68.3%, N2-3 in 37.6%. RT intent was definitive (44.6%), postoperative (49.5%), preoperative (1.6%), or palliative (4.3%). A major change was recommended in 14.5% (18 high-dose PTV, 7 prescription, 1 high-dose PTV and prescription) and implemented in 21 of 26 cases (80.8%). A minor change was recommended in 18.8% (20 low-dose PTV, 10 intermediate-dose PTV, 2 intermediate and low-dose PTV, 2 OAR, and 1 low-dose PTV and OAR) and implemented in 29 of 32 cases (90.6%). Additional workup was suggested in 2 cases (1.1%; 1 imaging study and 1 procedure) and was completed in both cases. Correction of plan changes was associated with a statistically significant delay of 1 day in overall treatment planning ($p = 0.001$).

Discussion: A dedicated peer review conference for head and neck RT plans is feasible and well-accepted by providers. Peer review with structured review of head and neck RT contour volumes is associated with substantial rates of suggested and implemented modifications to the plan with minimal treatment delay.

Keywords: Peer-review, Quality assurance, Contour review

An interactive smartphone application for trainees in Radiation Oncology: "The Rad Onc Handbook"

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Background: Radiation oncology (RO) textbooks and primary references are often complex, technically advanced, and inaccessible to medical trainees. To address this, we designed a free, interactive smartphone application, to introduce trainees to the basics of RO.

Methods: We created and implemented an Apple iOS smartphone application with RO content, targeted for medical trainees. The beta version is free for download via the TestFlight application (<https://testflight.apple.com/join/4A6qXjq2>). The application incorporates both introductory topics relevant to radiation oncology and advanced, site-specific modules, that focus on the different tumour sites and their management. Content includes written text, audio lectures, interactive quizzes, and clinical cases. Two questionnaires were implemented to elicit feedback; one for application design and the other a knowledge-quiz for an advanced learning module on breast cancers. Both contain quantitative 5-point Likert-scale questions and one qualitative freeform text question seeking suggestions for improvement.

Results: There have been over 70 unique downloads of the application. 40 participants completed the survey on application design. Over 80% have selected "agree" or "strongly agree" to the six statements listed below:

1. The app is well structured and easy to use.
2. The app content is relevant to radiation oncology.
3. The audio lessons enhanced my learning.
4. The quizzes and cases enhanced my learning.
5. My overall knowledge in radiation oncology has increased.
6. I would recommend this application to a colleague.

25 participants completed the survey on the advanced learning module. 70% of all survey participants "agree" or "strongly agree" to the five statements listed below:

1. The module was well structured.
2. The module is relevant to radiation oncology.
3. The module was an appropriate level of complexity.
4. My overall knowledge about breast cancers has increased.
5. I would recommend this module to a colleague.

Overall, the application and advanced learning modules were well received and the trainees express a desire for other advanced learning modules in the free text responses.

Discussion: This free smartphone application provides an easily accessible resource for self-directed learning in radiation oncology. Initial feedback was very favourable and recommended use of this innovative learning resource among a wider group of trainees. In response to trainee feedback, future work will focus on the development of additional modules, incorporating interactive virtual patient cases, in other tumour sites. As web-based learning continues to become increasingly popular, this application can be a useful educational resource for medical trainees."

Keywords: Smartphone application, medical education

A Novel Method to Characterize Medical School Research Productivity among Radiation Oncology Residents

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Purpose: Altmetric score (AS) is a weighted average of the number of mentions on various websites, such as news outlets and social media, for publications. Prior studies have used h-index as a proxy for research impact, which relies on citation counts that may take years to accrue to a meaningful level. However, AS has been shown to follow social media dissemination trends, with a sharp increase in score upon publication followed by a rapid taper. The authors aim to explore research productivity of radiation oncology (RO) residents during their time in medical school using AS.

Methods: A PubMed search was performed for every RO resident in the class of 2024 to collect manuscripts published during medical school (January 1st, 2016 to December 31st, 2019). Extensive metadata were captured for each article, including AS and number of mentions on social media and other websites. Residents who completed a PhD or took longer than four years to graduate were excluded. Medical schools were divided into US News Top-40 and non-Top-40 schools.

Results: A total of 129 residents from 67 residency programs published 665 articles during medical school. Each resident published articles that accrued a mean total AS of 60.4 and an average AS of 9.9 per article. Residents who graduated from Top-40 medical schools obtained significantly higher total AS ($p < 0.001$) and average AS ($p < 0.001$) than those who graduated from non-Top-40 schools. While only 39.5% of residents graduated from Top-40 institutions, 55.4% of articles with the highest quartile of AS were published by those from these schools.

Discussion: The results of using AS to measure the impact of manuscripts published by RO residents appear to be consistent with those of traditional bibliometric studies. Residents from higher-ranked medical schools published more higher-impact articles than their counterparts from lower-ranked medical schools. Limitations of the study include possible differences in AS at time of residency application vs. current day and lack of control for possible confounders (e.g. possible increased research interest in Top-40 school students). Our data again suggests that students who attend higher-tier medical schools may have an advantage in access to potentially higher-impact research opportunities. With the recent shift of the Step 1 exam to a pass/fail format, there may be more emphasis placed on extracurricular activities such as research. Further work is needed to understand the optimal method by which holistic review can be incorporated into the RO residency selection process.

Keywords: Altmetric Score; Bibliometrics; Research Productivity

Virtual cadaver facilitates abdominopelvic anatomy teaching

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Purpose: CT imaging of the upper abdomen has complex anatomy that can be difficult to parse given similar densities of multiple organs. Understanding of upper abdominal anatomy, limitations of CT imaging, and alternative methods for visualization are important for physicians in multiple surgical and non-surgical fields. We repurposed a novel, open-access resource to facilitate teaching upper abdominal anatomy.

Methods: This pilot study with medical students had three learning objectives: 1) identify abdominal organs and sub-structures on CT and 3D human cadaver imaging 2) justify why different types of contrast (e.g. oral or IV) are used or can be omitted based on region of interest. 3) Rationalize use of non-CT visualizations such as MRI, endoscopy, or laparotomy for select scenarios. Hybrid in-person and virtual attendance at sessions employing CT images linked with human cadaver image set serially sectioned from Visible Human Project (https://www.nlm.nih.gov/research/visible/visible_human.html). Students identified and outlined structures on CT using three orthogonal planes prior to blending in cadaver images. Facilitated discussion of challenging organ interfaces (e.g. pancreas and duodenum) and techniques to improve contrast or alternative visualization modalities (e.g. MRI or direct visualization). Post-session survey delivered via e-mail same day.

Results: Seven students attended the pilot session (3 virtually) with five of seven responding to survey (71% response rate). All respondents found the session to be moderately or very helpful and felt that after the session they were moderately or very confident in their ability to identify upper abdominal structures. Regarding the cadaver images, 1 student thought it was very helpful (20%), 3 students thought it was moderately helpful (60%), and 1 student thought it was not at all helpful (20%).

Discussion: Human cadaver imaging can help facilitate teaching of CT based anatomy in a pilot study of medical students. Additional sessions may better elucidate benefits and limitations. This resource could be adapted for residents identifying hepatobiliary structures, distinguishing prostate apex from genitourinary diaphragm, and differentiating mediastinal nodal levels from vascular spaces.

Keywords: Anatomy, undergraduate medical education, abdomen

Does a mentorship award in radiation oncology inspire medical students to pursue the specialty? A survey analysis of medical students, resident mentors, and research project supervisors

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Background: Radiation oncology (RO) residencies vary in popularity year-to-year. Many North American regions are experiencing increasing demand for radiation oncologists with a shortage in physician supply while numbers of radiotherapy cases are rising. This study aims to determine the impact of a national Medical Student Research and Mentorship Award on student exposure and interest in RO research and RO as a career, as well as its impact on mentorship and teaching in the perspective of RO residents and research supervisors.

Methods: Three separate surveys were created: one for medical student mentees, one for resident mentors, and one for staff physician research supervisors. These surveys were developed using best practice strategies for medical education surveys and circulated for peer-review amongst experts in oncology medical education. The surveys were sent to the 7 students, 7 residents, and 7 supervisors who participated in the award program. After anonymization, quantitative answers were analyzed using descriptive statistics and narrative responses were evaluated using a grounded theory approach.

Results: There was a 100% survey response rate. For the medical student mentees, the award maintained or increased interest in pursuing a career in RO for all respondents. It increased interest in 17% and maintained interest for 83%. According to these students, the most important aspects of the research award was conference registration costs and mentorship with an RO resident. Through the mentorship program, 50% of students felt they attained valuable information about a career in RO, 33% gained insight into RO residency, and 33% received helpful residency matching advice. From the perspective of the resident mentors, all respondents felt the program either maintained or increased motivation to mentor students in RO. Research project supervisors unanimously enjoyed their role in this program and would participate in this program again.

Discussion: This study characterized how a national research and mentorship award in RO impacted medical students, resident mentors, and research supervisors. Medical students greatly appreciated the opportunity to be mentored by RO residents and to present at a national conference with registration costs covered, motivating all to continue pursuing research and a potential career in RO. The program also enhanced mentorship skills in residents and staff physicians, which will encourage further mentorship in RO for the next generation of students. Further research can be done with future iterations of the award and with potential expansion of this type of award at other research conferences.

Keywords: Mentorship, Specialty Choice, Medical Education

Preferences Amongst Radiation Oncology Residents for Virtual and In-Person Radiation Treatment Planning Review

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Background: Broadly, medical education e-learning is equivalent to in-person in student satisfaction, knowledge, skills, and outcomes. However, when e-learning is best used, and in what form is still being determined. For instance, e-learning with greater interactivity, practice, and feedback is associated with improved learner satisfaction and outcomes. Considering the computer-basis of radiation treatment planning, radiation oncology residents plausibly may prefer virtual treatment planning and review formats. We aimed to assess resident use of Virtual, In-Person, or a combination of Both review formats, to elicit their format preferences, and reasons for their preferences. We theorized virtual-preferring residents would endorse areas previously associated with enhanced e-learning outcomes more than in-person peers.

Methods: Online questionnaires were emailed to current PGY1-PGY5 residents in Canadian radiation oncology programs. Questionnaires examined level of training, typical review format, preferred format, and reasons for format preference. Chi-square tests compared differences in format preference and reasons for preference.

Results: 52 respondents were included for analysis; PGY1s were excluded due to limited treatment planning exposure. 76.9% of residents typically review with Both virtual and in-person formats, significantly more than 17.3% who review In-Person ($p<0.0001$) or 5.8% who review Virtually ($p<0.0001$). When asked which format they preferred, 44.2% preferred Virtual, 36.5% In-Person, and 19.2% preferred a combination of Both. Preference was significantly greater for Virtual versus Both ($p=0.006$) and In-Person versus Both ($p=0.049$). Reasons for preference were thematically grouped, reflecting focus upon Interactivity, Practice, Feedback, Convenience, and Teaching Quality. Significant differences were not found between In-Person and Virtual-preferring respondents in terms of Feedback, Interactivity, or Practice. However, significant within-group differences existed between Convenience versus Teaching Quality (Virtual-preferring: 84.3% $>$ 61%, $p=0.0198$; Both-preferring: 76.7% $>$ 40%, $p=0.0324$; In-person-preferring: 25% $<$ 63%, $p=0.00214$), and between Feedback versus Interactivity (Virtual-preferring: 66.7% $>$ 45.4%, $p=0.0048$; In Person-preferring: 59.7% $>$ 37%, $p=0.00634$).

Discussion: Our results suggest residents review contours and treatment plans with a combination of virtual and in-person formats, more than either format alone, despite low resident preference for this approach. While use of either format appears acceptable to residents, differences in emphasis on convenience with virtual-preferring and teaching quality in residents preferring in-person review suggests that educational priorities may differ between residents. Feedback more than interactivity seems important for residents irrespective of preferred format. Thus, residents and attendings should identify a format that best meets resident's educational needs and priorities. Further research should explore attending preferences.

Keywords: Resident Education, Didactic Teaching, Radiation Treatment Plan Evaluation

Ten-year trends in Canadian female medical student interest in radiation oncology: an analysis of data from the Canadian Resident Matching Service (2012-2021)

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Background: Canadian medical student (MS) interest in Radiation Oncology (RO) residency training has varied over the last decade. Concerns related to post-training job availability, employment location flexibility, and extended fellowship training may have affected MS perceptions of RO, potentially deterring past applicants. With recent job market improvements, there has been increased MS interest in the specialty. However, despite recent years showing no gender differences in successfully matching to first-choice overall nonsurgical disciplines, the number of women entering RO residency remains low. This study examines 10 years of resident match data to assess trends in gender-specific interest and match characteristics in RO.

Methods: Publicly available Canadian Resident Matching Service (CaRMS) data from 2012 to 2021 were compiled. Gender-based analysis focused on Canadian medical graduates (CMGs) ranking RO as their first-choice discipline in the match's first iteration. No applicant gender data were available for the 1 to 8 first-year residency positions carried over to the second iteration that occurred in 7 out of 10 matches over the study period. Pearson's chi-square test was used to evaluate whether the number of female applicants differed significantly from what could be expected if RO applicant gender breakdown reflected Canadian CaRMS participant demographics.

Results: Numbers of applicants ranking RO as their first-choice discipline have recently increased. 2018-2021 saw 23-28 RO-preferring applicants, while 2012-2017 saw 9-18. Total applicants ranged from 24-51 per year over the study period. Numbers of female RO-preferring applicants have remained largely unchanged, with a 10-year average of 7 women per year, ranging from 2/15 (13%) in 2016 to 12/27 (44%) RO-preferring applicants in 2018. Overall, 190 CMG applicants ranked RO as their first choice over the last 10 years, comprising 73 females (38%) and 117 males (62%). During this period, 56% (17696/31618) of CMG applicants who participated in the CaRMS match were female. Rates of female applicants to RO were significantly lower compared to rates of female applicants to all specialties combined ($p < 0.01$).

Discussion: While recent years have had more RO-preferring applicants overall, numbers of RO-preferring female applicants have remained low, and disproportionately less than rates of female CaRMS participants. Findings highlight the need for greater understanding of the factors influencing female medical students' career selection and CaRMS ranking decisions to develop strategies to improve female representation in RO.

Keywords: Residency Applicant Trends, Gender Trends, Radiation Oncology Residency

Power of pedaling: Physician well-being as a collaborative effort in social media-based cycling

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Background: The impact of the COVID-19 pandemic on the lives of radiation oncologists, from the attending to trainee level, has been multifactorial. One such notable shift has been the limitation of colleague interactions to Zoom-type calls for over two years. Moreover, work-related stress has significantly risen largely due to additional and increasingly complex patient management secondary to COVID-related precautions. As part of the run-up to the ACRO 2022 Annual Meeting, we initiated a friendly competition utilizing a social media-based cycling platform to promote physician well-being as part of #TOURdeACRO. The goal was to support both formation of new connections and strengthening of existing ones between colleagues.

Methods: Team members were solicited via email, social media, the ACRO websites, and word of mouth. #TOURdeACRO occurred between 1/1/2022 and 2/28/2022. Team members competed based on the number of miles they completed using a social media-based cycling platform. Participants were asked to post their rides on social media platforms so that other Team Members could view the rides and offer positive encouragement. Interval updates were given to encourage friendly competition and reinforce continued investment of teammates in one another's progress. At the Annual meeting, all Team Members were given an official ACRO Racing Jersey to strengthen the unified team culture.

Results: A total of 7 female and 5 male team members participated, including 3 resident physicians and 9 attending physicians. Female riders were significantly more productive than male riders, as evident by total combined mileage. The overall winner was determined on the last day of the #TOURdeACRO. The top three productive team members produced 1066 miles, 834 miles, and 787 miles over the two months. Eight riders reported significant increases in weekly and monthly mileage over their baseline in preceding months.

Discussion: A social media-based cycling platform was useful and effective in creating and fostering a team culture for a demographically diverse group of radiation oncology physicians. Moving forward, additional riders will be recruited and other social media-based platforms that involve exercise (other than cycling) will be explored to further strengthen this inclusive team environment to enhance physician well-being.

Keywords: Well-being, pedal power, teamwork

Development of Climate Health and Oncology-Based Curricula: Understanding Climate Change's Impact on Cancer Care and a Physicians' Role

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Background: Climate change has well-documented impacts across the cancer care continuum, from increased carcinogenic exposures to disruption of health care systems required for cancer prevention, screening, diagnosis, treatment, and follow-up care. Incorporating the impact of climate change into oncology training will be essential for future physicians. When surveyed, only 13% of U.S. medical students felt they were receiving adequate climate change and health (CCH) education. Yet there is no standard climate curriculum in medical education in part due to an abundance of essential topics that must be covered. In collaboration with a Climate Health Resources Education (CRHE) pilot, we present the development of climate health and oncology educational resources aimed at providing succinct, accessible, and evidence-based resources for educators to incorporate CCH into medical curricula.

Methods: In partnership with CRHE, oncology topics with associated evidence-based learning objectives were established. Recruitment of content creators took place via email distribution lists, professional societies (e.g., Healthcare Without Harm, Medical Students for a Sustainable Future), social media (i.e. Twitter), and word of mouth. Working groups with medical students, residents/fellows, faculty advisors, and an expert advisor were established. Using standardized CRHE templates, medical students wrote and designed practice-based learning cases, while residents created associated PowerPoint slide decks. Faculty mentors and expert advisors were responsible for content review and ensuring accuracy.

Results: For the oncology lectures, a collaborative working group of eight healthcare professionals was formed (4 medical students, 4 residents/fellows, 3 faculty advisors, and 1 expert advisor). Over the course of four weeks, two lectures with associated practice-based problems and slides were developed on the topics of, 1) particulate matter pollution and lung cancer; 2) climate change impacts across the cancer control continuum. The oncology CCH educational resources were incorporated into CRHE's topic-based longitudinal curriculum and will be made publicly available for online, open-access distribution across health training programs nationwide.

Discussion: It is essential for physicians-in-training to be educated on the topics of CCH, the impact on cancer control, and the effect on our communities. Future physicians will need to be prepared to adopt and advocate for climate-smart, sustainable, and resilient care to meet the shifting needs of a vulnerable population affected by a changing climate. This initiative exemplifies the collaborative effort that will be required to integrate climate health topics into medical education, including oncology-specific topics. We look forward to reporting further results on the adoption and implementation of the curriculum.

Keywords: Climate health education, Global health, Healthcare sustainability

Cancer Careers a ROECSGXLearnOncology podcast: Increasing Accessibility to Information about Oncology Careers

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Purpose: In recent years, medical student (MS) applications to U.S. and Canadian radiation oncology (RO) residency programs have declined. The Radiation Oncology Education Collaborative Study Group (ROECSG) recently formed an Undergraduate Medical Education (UGME) committee consisting of attending physicians, residents, and MSs across the globe to further UGME educational efforts. This group identified a need for outreach activities to increase exposure to and interest in RO.

Methods: In collaboration with LearnOncology, an online, interactive tool to teach oncology skills to learners at all levels, the UGME subcommittee created a structure for a podcast series to highlight oncology careers. This podcast series will be hosted on LearnOncology. Together, these groups identified key topics, informally surveyed MSs, wrote a standardized script, trained interviewers on recording and editing audio content, and set goals for the future scope of the podcast.

Results: MS and resident interviewers recently completed training and have scheduled initial faculty interviews. Edited podcast episodes will be ≤ 20 minutes, conducted informally to spotlight both the career and personality of the interviewee. Prominent oncology specialists (e.g. radiation, surgery, medicine, interventional radiology, and physics) will be featured. Listeners will be prompted to complete a brief survey. Interviewers and interviewees will partake in a separate survey to examine the impact of project participation. Podcast analytics and survey data will guide subsequent iterations of podcast episodes.

Discussion: Podcasts for UGME are a cost-effective teaching method, which gained popularity during the COVID-19 pandemic. We hypothesize that this podcast will be a unique way to positively impact undecided MSs facing the challenge of choosing a career path and increase awareness about oncology specialties. Additionally, this may positively impact mentorship through linking MS and resident interviewers to specialist interviewees. The LearnOncologyXROECSG podcast platform, Cancer Careers, was created to address student questions, anxieties, and excitement related to choosing an oncology career. We expect that this project will increase exposure to oncology and MS interest in oncology careers, including RO.

Keywords: medical education, podcast, ROECSG subcommittee

Enhancing medical student interest in the oncologic fields via a novel third year elective

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Background: Medical student exposure to oncology specialties during medical training is limited. Radiation Oncology specifically is a field that lacks its own third year clerkship and is oftentimes only offered as an optional elective rotation during medical school. At our institution, we piloted a multidisciplinary oncology elective rotation that is available to third year medical students to expose them to the paradigms of oncologic treatment.

Methods: We developed a two-week rotation consisting of three days of Radiation Oncology clinic, two days of Radiation Oncology didactics, and the remaining five days of Medical Oncology and Surgical Oncology clinic. A pre- and post-survey graded on a 5-point Likert scale was given to all participating medical students prior to starting the rotation and then again at the end of the rotation respectively. The rotation focused on diagnosis, patient interaction, treatment planning, and the multidisciplinary collaboration between the oncology specialties with an emphasis on Radiation Oncology.

Results: Seven students chose to enroll in our multidisciplinary oncology elective rotation from July 2021 through December 2021. All students who enrolled successfully completed the rotation. Survey response rate was 100%. Average scores on the 5-point Likert scale increased from 1.57 to 2.43 ($p=0.0001$) for ability to perform a patient workup, 2.43 to 3.07 ($p=0.0445$) for comfort level with communication with oncology patients, 1.45 to 3.21 ($p=0.0001$) for level of understanding of radiation therapy, and 1.14 to 3.21 ($p=0.001$) for comprehension of the role of multidisciplinary collaboration. Each student was also asked to grade their level of interest in oncology as a future career. Initially, three students (43%) expressed interest in oncology. Following completion of the rotation, this increased to four students (57%). Of the three students who originally expressed interest in oncology, one student became undecided by the end of the rotation.

Discussion: It is important to expose medical students to oncology specialties during their third year of medical school to foster interest and growth in our field and to recruit passionate future oncologists. A multidisciplinary rotation encompassing Medical Oncology, Surgical Oncology, and Radiation Oncology allows students to increase their understanding of the collaboration necessary in treating cancer patients. Our goal in the future is to standardize this rotation to allow widespread reach to medical students nationwide.

Keywords: Medical student, Multidisciplinary, Elective

Measuring resident/faculty contour concordance as a potential tool for quantitative assessment of residents' performance in target volume delineation: a feasibility study

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Background: Accurate target delineation/contouring is essential for radiation treatment planning and the clinical efficacy of radiation therapy. Clinical trial data has demonstrated the importance of quality contouring and treatment planning for optimal survival outcomes. As a result, improving the quality of target delineation is an important goal in the education of radiation oncology residents. However, there is limited quantitative data on the quality of residents' contours. Therefore, it would be beneficial to track performance and improvement in resident target delineation during residency. The purpose of this study was to determine if it was feasible to track the concordance of radiation oncology residents' contours with faculty physicians' contours.

Methods: Residents were asked to contour target volumes (GTV, CTV, ITV, PTV, etc.) based on patient history, physical exam, clinical stage and fused diagnostic imaging and were allowed to use any available outside resources, including textbooks, review articles, consensus guidelines, and online atlases. Resident contours were saved as separate structures. Finalized, faculty physician-approved contours were also saved. Saved contour structures and data from October 2019 through June 2020 were reviewed for feasibility.

Results: In total, 209 structures had both resident and faculty versions saved within Eclipse and were available for analysis. The Boolean Operations Tool in Eclipse (Varian Medical Systems, Palo Alto, CA, USA) was used to create an intersection volume of the resident/faculty contours. Separately, the Boolean Operations Tool was used to create a union volume of the resident/faculty contours. Based on these two volumes, the Jaccard Concordance Index (JCI) was calculated by dividing the intersection volume (in cubic centimeters [cc]) by the union volume (cc). The JCI could be successfully calculated for 203 (97.1%) of the 209 structures. For 6 structures (2.9%), both the intersection and union volumes could not be calculated because the volumes were too small for Eclipse to determine. All 6 of these structures were small brain metastases.

Discussion: Tracking and comparing the concordance of resident contours and faculty physician contours is feasible using available tools in Eclipse. Additional data collection and assessment is necessary before this technique can be more widely utilized.

Keywords: Graduate Medical Education; Target Volume Delineation; Quantitative Metrics

Introductory Curriculum to Health Disparities for Medical Physics Trainees: A Pilot Experience

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Purpose: The COVID-19 pandemic brought to the forefront longstanding and pervasive health disparities (HD) in the United States that are driven by underlying structural inequities rooted in racism and intersecting systems of power. It is imperative that medical physics training programs increase their commitment and investment in teaching trainees about HD, especially as the profession becomes more patient-facing. To address this current training gap, we designed an introductory HD curriculum for medical physics graduate students and residents.

Methods: A HD scholar and medical physicist collaborated to design this course. The curriculum consisted of four weekly 1.5-hour synchronous online sessions. Sessions were developed based on transformative learning theory and involved didactic lectures, case studies, large and small group discussions, and reflection exercises. Session topics included social determinants of equity, structural racism, implicit bias, public outreach, and critical reflection. Participants were asked to fill out pre-post surveys containing open- and close-ended questions for each session and the overall course to evaluate the curriculum's impact on participants. Due to the relevance and timeliness of this topic, trainees were encouraged to attend any part of the course as getting exposure to at least some HD training was prioritized over having a consistent course cohort for optimal data collection.

Results: Fifteen trainees attended at least part of the course with 8-11 attendees/session. Most participants reported that weekly sessions increased their feelings of competence to explain the relevance of HD to their role in medical physics (4/7), address mistrust, bias, and stereotyping during patient-provider encounters (6/10), engage in critical reflection (7/8), and design public engagement strategies to reduce HD (5/5). Among participants that completed a pre-post survey for the overall course (N=4), 75% reported they will likely/very likely explore issues related to HD in their future education, research, and/or practice. All would recommend this course to colleagues noting satisfaction with topics, atmosphere to discuss sensitive issues, virtual format, activities, and facilitators.

Discussion: The course was well-attended despite being outside of program requirements, which showed there was interest in the subject. Topics presented resonated with participants and were viewed as timely and relevant to their practice. The implementation of this course shows that it is possible to successfully incorporate HD instruction into the medical physics curriculum in an introductory manner. More robust and consistent data collection is necessary to fully assess the impact of the course on participants.

Keywords: Health disparities, health equity, medical education

Career advising structure and roles in five Chicago medical schools

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Background: There has been a decrease in overall applicants in radiation oncology in 2019, 2020, and 2021. There is also an association between the availability of radiation oncology advisors and ultimately having students match into radiation oncology. The goal of this study is to investigate how career advising processes in medical schools are structured, to better understand how students find opportunities for future specialties such as radiation oncology.

Methods: Website content was analyzed at five Chicago medical schools followed by a 20-minute semi-structured interview of a dean or director of advising at each school by one study team member (TMP). Interviews were transcribed and thematic analysis was performed.

Results: Career advising uses a variety of strategies and is structured differently at each school. However, each school shares these 4 primary components: 1) longitudinal physician advisor communities, 2) an office of student affairs (OSA), 3) specialty faculty advisors, and 4) peer advisors. Physician advisors' roles included mandatory individual/group meetings all 4 years covering orientation to school resources, career exploration panels, residency application, and professional development. The OSA's role in career advising is twofold - formal career programming and general advising. Advising involves directing students to the best person/resources, although OSA staff sometimes directly advise on topics such as the ERAS application process. The specialty faculty advisor's role is to prepare students for the residency application process once the student has chosen a specialty, often in the third year. The structure of this advising is student driven, meaning the number of meetings and involvement varies widely. Peer advising involves student leadership helping to pair third- and fourth-year medical students with junior peers.

Discussion: Career advising at each school has some form of physician advisor communities, OSA, specialty faculty advisors, and peer advisors. To ensure incorporation of radiation oncology in career advising, individualized resources about radiation oncology could be developed for each advisor role. Radiation oncologists could participate in the physician advisor role or participate in ensuring the physician advisors are up to date on the field of radiation oncology. Cross-institutional specialty and peer advising could be implemented for schools that don't have a radiation oncology department or fourth year students going into the field. Through the groundwork laid here, we hope new ideas can be implemented to ensure students are aware of radiation oncology as a specialty choice, its potential pros/cons, and are equipped to pursue it if desired.

Keywords: Career advising, Undergraduate medical education

Impact of a Single Institution Resident-Led Education Committee in Radiation Oncology

Presenter: Christina Phuong

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Purpose: Resident-led collaborative groups provide a platform to refine ideas and support professional development and scholarship during residency. To actively engage in radiation oncology (RO) education and leadership, residents formed an Education Committee (EC). Here, we discuss the structure and impact of a resident-led EC.

Methods: With the support of the RO program leadership at a single academic institution, this committee was created with the goals of (1) identifying and addressing gaps in residency education, (2) implementing sustainable educational initiatives across various interprofessional groups, and (3) sharing ongoing projects within medical education to identify resources and invite collaboration. The leadership core consisted of 1-2 resident co-chairs and committee sub-leads. The committee held one-hour monthly meetings, which consisted of journal club to review medical education literature followed by pre-set discussion of topics spanning committee goals. Faculty consultants were invited to attend to provide their expertise.

Results: The EC included medical and physics residents and grew from 6 to 10 members within the first two years of implementation. It worked with department and institutional leadership to implement initiatives to address gaps identified in medical resident education, medical student outreach, and interprofessional RO education. Additionally, members used this platform to find collaborators and identify resources for education projects, including global health and climate health initiatives. Key outputs of the EC included an updated repository of shared residency resources with high-yield educational material, site-specific reading lists developed with faculty, and a week-long statistics module now integrated into the curriculum. To improve medical student outreach, the EC established collaboration with the affiliated medical school's Oncology Interest Group to launch mentorship programs, including a tumor board seminar series engaging students in multidisciplinary oncology care. To support interprofessional RO education, the EC leads a medical assistant RO curriculum, which now has plans for multi-institutional expansion to other RO programs.

Discussion: Residencies are in need of pathways to foster resident engagement in medical education and scholarship. Additionally, the apprenticeship nature of RO training often lacks leadership and teaching opportunities, which can be supplied through resident-led collaborative groups. Here, we described our experience establishing a resident-led EC in RO, which has cultivated a community of resident leaders in education at our institution. This committee has been instrumental in implementing and sustaining initiatives across various facets of medical education. Successful initiatives can then be scaled for national implementation. This committee structure can serve as a framework for other RO programs.

Keywords: Education Committee, Resident led, Collaboration

Integration of Plan Review into Resident Clinical Didactics

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Background: While treatment planning complexity has increased significantly, residents report insufficient exposure to treatment planning. Review of treatment plans with an attending is highly variable, with 71% of residents reviewing ≤50% of plans with an attending (Wu et al, 2020). We sought to integrate treatment planning and plan review longitudinally into our clinical didactics.

Methods: Thirteen clinical attendings were invited to lead weekly plan review sessions (PRS) which were scheduled in one-hour slots following chart rounds. Attendings chose which case(s) they wished to review. Surveys with a 5-point Likert scale (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree) were administered to attendings and residents after 21 sessions to gather feedback on the program, with results reported as median score [interquartile range].

Results: Twelve attendings led a total of 21 sessions over 35 weeks from July 1, 2021 through March 3, 2022. Five sessions were canceled due to unplanned attending conflicts and were replaced with ASTRO-ARRO "Meet Me in Treatment Planning" webinars. The remaining nine weeks were not scheduled due to Mortality, Morbidity and Improvement conferences, holidays, or outside lecturers. Ten attendings and ten residents participated in the surveys. Both attendings and residents enjoy PRS (attendings: 5 [4-5], residents: 5 [5-5]). Attendings spent a median of 38 minutes [range 10-90] preparing to lead a session. Resident-attending interaction is increased during PRS compared to conventional clinical didactics (attendings and residents: 5 [4-5]), and PRS permits complementary teaching to clinical rotations and didactics (attendings: 5 [5-5], residents: 5 [4-5]). Both attendings and residents strongly agreed plan review sessions should continue (attendings and residents: 5 [5-5]). Residents preferred reviewing 1-3 cases in greater detail to reviewing more cases with less time per case (4 [4-5]). PRS exposed attending insights that were otherwise unshared (residents: 5 [5-5]). Residents across PGY level strongly agreed that PRS were useful for their learning level (5 [5-5]). Live PRS engaged residents more than pre-recorded virtual sessions (5 [4-5]), but residents were still glad that these sessions were incorporated into the series (4 [4-4]).

Discussion: We successfully implemented longitudinal treatment planning and plan review into clinical didactics. With low burden on attendings and high overall satisfaction among both residents and attendings, this program will continue in the future with incorporated feedback to maximize learning for residents. The program represents an easy method to quickly add in-depth treatment planning and plan review to clinical didactics.

Keywords: plan review, treatment planning, resident education

A Targeted Interest Survey of Preclinical Medical Students for Implementation of Exposure Opportunities in Multidisciplinary Oncology Education

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Background: With the growing prevalence of cancer, fostering multidisciplinary interest in oncology is an important priority in medical education. However, medical student interest in radiation oncology has declined in recent years (1) in part due to a lack of exposure. Efforts have been made to increase formal radiation oncology lectures within didactics. Additionally, preclinical extracurricular activities can provide unique opportunities for meaningful exposure to oncology, including radiation oncology. This study aims to assess current interest for oncology-related activities in preclinical medical students to facilitate innovative integration of radiation oncology-related curricula.

Methods: An anonymous web-based survey was created and distributed to the first-year class at a single academic institution. The survey included questions exploring interest in oncology-related talks, mentorship, shadowing at tumor board discussions, and participation in a longitudinal cancer patient advocacy program.

Results: The survey was distributed to 169 students, with a response rate of 33.1% (n = 56). Among responders, the highest interest activities were lectures (100%, n=56), tumor boards (89.2%, n=50), mentorship (60.7%, n=34), and volunteering (57.1%, n=32). For lectures, students were most interested in surgical oncology (42.9%, n=24), followed by medical oncology (41.1%, n=23) and radiation oncology (32.1%, n=18). Among topic-based talks, 69.6% (n=27) were interested in "how to break bad news", 62.5% (n=35) in cancer disparities, and 48.2% (n=27) in multidisciplinary panels. Respondents reported interest in tumor board discussions, with lung cancer receiving the most interest (53.7%, n=29), followed by breast (48.1%, n=26) and head and neck (40.7%, n=22). In addition, 57.1% (n=32) were interested in volunteering for a longitudinal patient advocacy program. Lastly, there was interest in oncology-specialty mentorship from residents/fellows (Medical=21.2%, n=11, Surgical=10.6%, n=7, Radiation=4.3%, n=2, and any specialty= 26.9%, n=11). A significant proportion of surveyed first-year medical students at a single institution are interested in oncology-related talks, tumor boards, mentorship, and volunteering. However, there was disproportionately lower student interest in radiation oncology specific topics and mentorship.

Discussion: These results support invested development of robust, sustainable, extracurricular oncology programs during preclinical years. This helps guide areas to focus our efforts to cultivate and solidify interest in oncology with unique opportunities to integrate radiation oncology curricula. Similar interest surveys can be distributed at other institutions to assess what opportunities would garner interest and delineate activities that would present a meaningful perspective on radiation oncology and oncology as a whole.

Keywords: Medical students, interest survey, preclinical extracurricular

Increasing Resident and Medical Student Participation in National Conferences with Sponsored Travel Grants via a Need-Based Method

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Background: Resident and medical student attendance at national conferences can be associated with significant personal financial toxicity for travel expenses. As a result, attendance at conferences favors large academic programs who have sizeable research-based programs with associated travel support. Individuals from smaller programs whose departments lack adequate funding, as well as medical students, are forced to pay out of pocket expenses to attend. To help address this deficit, the American College of Radiation Oncology (ACRO) secured sponsorship from an industry partner to award ten trainees a financial travel grant via a need-based method to enable attendance at the 2022 ACRO annual meeting.

Methods: The ten \$500 travel grants supported by the industry sponsor were advertised on the ACRO website, via email, and on social media. ACRO also contributed complimentary registration, thus the total award was \$600. ACRO members in good standing with lack of departmental financial support to attend were eligible. Submission included a letter of support, copy of CV, a personal statement, and acceptance of the grant required confirmation of attending the conference in-person. Of the 10 grants, 7 were designated for residents and 3 for medical students. Need-based selection criteria was based on departmental funding, size of residency, distance from the conference, and was determined by a non-biased panel of individuals. **Results:** There were 26 total applications submitted for the 10 travel grants offered. Of those, 20 were current residents and 6 were current medical students. Of the resident submissions, 5% PGY-5, 40% PGY-4, 25% PGY-3, 30% PGY-2. Of the medical students, 33% MS4, 17% MS2, 50% MS1. Applications were received from 16 different states in the USA, and 3 different countries including the United States, Canada, and India. When asked about how they heard about the award, 8 responded from twitter, 5 from ACRO website, 5 from mentors, 5 from email, and 3 from colleagues. 75 residents registered and attended the ACRO 2022 conference compared to 59 for the 2020 conference. The number of medical students registered also increased from 2 in 2020 to 14 in 2022.

Discussion: By utilizing industry sponsored funds for monetary travel grants, we were able to further diversify the attendance at the ACRO 2022 annual meeting through supporting international residents, smaller programs, and medical students via our need-based selection method. There remains utility in travel awards to offer the future of our field an equal opportunity of attending these highly valuable conferences.

Keywords: Need-based, grant, travel

Feasibility of an education-focused travel award for radiation oncology trainees

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Background: Most travel grant opportunities available to radiation oncology trainees are for research, with selection criteria focused on the scientific merit of an abstract submitted by the applicant. Despite increasing interest in trainees serving as educators, there are few opportunities to encourage scientific meeting participation for those interested in education. In 2022, the American College of Radiation Oncology (ACRO) launched a novel industry-supported travel grant for the ACRO Annual Meeting for trainees who successfully contributed new cases to the free online contouring reference eContour.org.

Methods: Applications for the grant were solicited via email, social media, the ACRO and eContour websites, and word of mouth. Applicants were required to complete a form with details for their proposed case for eContour, including disease site, stage, and literature that would be used to guide contouring recommendations. Selection criteria included the novelty of the proposed case, the strength of the available evidence base, case feasibility, and credentials of the identified mentor. Each aspect of this rubric was rated on a 1-5 scale by two reviewers independently to generate preliminary scores. Final rankings were then determined by consensus of the entire review committee. Recipients were awarded \$500 for travel expenses supported by an industry partner and complimentary registration courtesy of ACRO (\$100 value). Recipients were instructed to upload their educational cases to eContour where they were peer-reviewed prior to publication.

Results: A total of 24 submissions were received from 16 institutions in the United States and Canada. Applicants primarily learned about the award via word of mouth from colleagues/mentors (n=6, 25%), twitter (n=5, 21%), email (n=5, 21%), and a banner on the eContour website (n=4, 17%). The median training level of submitters was PGY-3 (range MS-4 to PGY-5). Disease sites with multiple case proposals included gynecologic cancer (n=7, including 5 vulvar cancer), CNS/pediatrics (n=4), lymphoma (n=2) and prostate (n=2). 10 grants were awarded, resulting in successful initial submission of 10 new cases. Four cases were finalized and uploaded to the eContour website coinciding with the ACRO interactive contouring session on March 10, 2022. The remaining cases are in final stages of quality assurance prior to publication. Almost all recipients (n=9, 90%) were able to attend the ACRO annual meeting.

Discussion: Education-focused travel grants are feasible and generated significant interest from a diverse cohort of radiation oncology trainees. Recipients successfully generated novel educational content and attended a national radiation oncology meeting.

Keywords: grant funding, scholarship, eContour

Evaluating a structured applied physics case-based course for radiation oncology and radiation physics residents

Presenter: May Tsao

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Background: We supplemented applied physics textbook learning and clinic learning with case-based discussions. The purpose of this study was to review this applied physics course, in terms of structure and teaching evaluations.

Methods: We reviewed the 6 year applied physics teaching experience (2016-2021) in a multi-hospital site university affiliated accredited training program. A unique component of the course is the intentional inter-professional education, due to the inclusion of both radiation oncology and medical physics learners and faculty. This course ran weekly from September to May for a total of 29 weeks. All sessions were 1 hour long and case based except for 5 didactic sessions. Each session was taught by a pair of faculty members (one radiation oncologist and one medical physicist). The cases in the syllabus were reviewed yearly by teaching faculty and adjusted for updated clinical management and technological changes. A final examination was given to each trainee consisting of 3 clinical case scenarios, with written and oral questions on applied physics concepts learned throughout the course. In 2020 and 2021, during the pandemic, the applied physics course syllabus was shortened to 8 weekly video sessions (2 hour class per week) and given from April to May.

Results: The number of trainees who took the course ranged from 7-14 per year. Ninety-four percent of trainees passed the final exam. Trainees who did not pass the final exam were given a supplemental exam. Feedback was given to each trainee who did not pass the first exam. All trainees who did not pass the final exam, were successful in passing the supplemental exam. For the years 2016-2021, the mean and median teaching evaluation scores were 4.65 and 5 respectively, where 1 represents the worst teaching quality and 5 represents the best. In 2020-2021, due to the covid-19 pandemic, the teaching evaluations administered included 2 questions regarding the virtual format of the course. For these 2 questions relating to the virtual format of the course, the mean and median responses were 4.14 and 5 respectively.

Discussion: The structured syllabus of cases, case based questions and discussions were ranked highly by the trainees for teaching effectiveness. The success of this course is also dependent on faculty who demonstrate excellent teaching skills. Our experience indicated that the nature of this course was adaptable to a virtual format and could be useful for small programs without a structured applied physics curriculum.

Keywords: applied physics, course, trainees

Analysis of Patient Contacts with the Radiation Oncology Triage Nurse: The Experience of a Single Center

Presenter: Benjamin Weber
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Background: Prior studies have shown that triage nurses play a valuable role in addressing patient phone calls in various health care settings, most notably emergency medicine and urgent care. The topics encountered by radiation oncology triage nurses, however, have not been thoroughly explored. This study was designed to identify common themes in patient phone calls and electronic medical record messages routed to triage nurses to better understand the role of radiation oncology triage nurses and inform the future design of novel workflows.

Methods: This retrospective chart review analyzed patient messages sent via electronic medical record (EMR) software and phone calls to the radiation oncology nurse triage line between 9/1/2021 and 11/31/2021. Messages were thematically coded and were assigned a secondary/tertiary theme if applicable. The author of the message was also recorded. This project was identified as a quality improvement initiative and was granted IRB exemption.

Results: Thirteen message themes were uncovered through analysis. Scheduling was the most common theme for both phone calls (30.9%) and EMR messages (21.2%). The next most common themes for phone calls were medication refills (16.7%) and treatment-related side effects (13.1%). Regarding EMR messages, the next most common themes were treatment decision making (17.6%) and questions about test results (12.9%). Messages with multiple themes comprised 3.6% of phone calls and 21.2% of EMR messages. Thirty percent of incoming phone calls and 11.7% of EMR messages were initiated by someone other than the patient.

Discussion: This analysis reveals the nature of patient concerns being routed to nursing triage line at one radiation oncology clinic. Common themes were scheduling, medication refills, and treatment decision making. About 30% and 10% of phone and my chart message, respectively, came from patient care givers highlighting importance of family communication. We identify several areas that may be targeted for future intervention, including reducing the number of scheduling calls that are routed to the triage nurse and implementing an order set for patients with claustrophobia. Future interventions may focus on leveraging patient supports and providing information to their caregivers.

Keywords: Interprofessional Practice; Nurse Triage; Quality Improvement

2022 ROECSG Spring Symposium Planning Committee

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