Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

measures mitigated the need for extended breaks during treatment courses that had already been initiated. The majority (64.3%) of patients were being treated with curative intent, while 10 patients (23.8%) were treated as a result of an inpatient palliative consult. A third (35.7%) were transferred from a regional campus to the main campus for management prior to expansion of biocontainment resources. The median number of biocontainment sessions required by each patient was 6 (range: 1-15).

Conclusion: The construction of negative pressure environments and development of a COVID-19 biocontainment protocol have helped to mitigate the impact of the pandemic on our patients and to maximize efforts in protecting our staff.

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Development and Implementation of an Evidence-Based Pregnancy Screening Protocol in an Academic Radiation Oncology Department

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Purpose/Objective(s): National guidelines give broad recommendations for which patients should be screened and timing of screening. Previous survey of ASTRO member institutions indicated that approximately 30% of centers did not have a clear pregnancy screening protocol. In this department, screening was done on the basis of individual physician clinical judgement. The purpose of this project is to develop an institutional protocol that defined patient criteria and timing for pre-radiation pregnancy screening in patients and to compare rates of screening before and after policy implementation.

Materials/Methods: A review of both radiation oncology and OB/GYN literature was performed with attention to risks of radiation to the fetus, current pregnancy screening protocols, and women at risk for pregnancy. Our institutional protocol defined the "at risk" population as female patients age 12-50 with intact reproductive organs. Contraceptive use was not considered an exclusion from screening. Screening would not be required for boost simulations or replans. Screening had to be performed within 30 days of CT simulation. Our policy was implemented 10/1/21. All CT simulations from 1/1/18-9/30/21 were reviewed. The medical record of patients meeting screening criteria was reviewed in further detail to establish the baseline screening rate. The medical records of patients meeting screening criteria from 10/1/21-1/31/22 was reviewed to establish an adherence rate after implementation.

Results: From 1/1/18-9/30/21, a total of 5,107 CT simulations were performed. Of these, 414 were performed on women age 12-50. 49 had prior removal of reproductive organs. This left 365 women as the baseline population. Screening occurred per the newly developed protocol in 189 of these women (51.8%.) There was one positive test. Retesting was negative, and the patient proceeded with treatment. An additional 64 patients underwent screening deviating from our current protocol. This included testing within 3 months but greater than 1 month from the date of CT simulation as well as screening after the date of simulation but prior treatment initiation. 112 of 365 women did not have documented pregnancy screening prior to CT and treatment initiation (30.6%). After the implementation of the screening protocol on 10/1/21, a total of 403 patients underwent CT simulation through 1/31/21. Of these, 34 were women age 12-50. 7 had prior removal of reproductive organs. Of the remaining 27 patients, 25 underwent screening per protocol (92.5%). One patient was 49 years old and refused testing. The other was tested before the initiation of therapy.

Conclusion: Our conclusion is implementation of a pregnancy screening protocol in an academic medical center radiation oncology department improved the screening rate for women at risk for pregnancy prior to radiation treatment planning. The use of a standardized policy eliminates inter-provider variation and improves patient safety.

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Balancing Infectious Disease Control and Radiotherapy Risk Management Using a Novel Analytic Approach

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Purpose/Objective(s): To develop an analytic risk management method that uses mathematical models in Failure Modes and Effects Analysis (FMEA) to design mitigation efforts to control pandemic infection, while ensuring safe delivery of radiotherapy.

Materials/Methods: A two-stage FMEA approach is proposed to modify radiotherapy workflow during a pandemic. In stage 1, an Infection Control FMEA (IC-FMEA) is conducted, where risks are evaluated based on environmental parameters, clinical interactions, and modeling of the pandemic infection risk. Occupancy` Risk Index (ORI) is defined as a metric of infection risk probability in each room, based on the degree of occupancy during clinical operations. ORI, in combination with ventilation rate per person (R_p), is used to provide a broad infection risk assessment of workspaces. For detailed IC-FMEA of clinical processes, Infection containment failure mode (ICFM) is defined to be any instance of disease transmission within the clinic. Infection risk priority number (IRPN) has been formulated as a function of time, distance, and degree of protective measures. Infection control measures are then systematically integrated into the workflow. In stage 2, a conventional radiotherapy FMEA (RT-FMEA) can be performed on the adjusted workflow. A number of different clinical processes within radiotherapy workflow have been evaluated with this approach.

Results: The COVID-19 pandemic was used to illustrate stage 1 IC-FMEA. ORI and R_p values were calculated for various workspaces within a radiotherapy clinic. A deep inspiration breath hold (DIBH) CT simulation was used as an example to demonstrate detailed IC-FMEA with ICFM identification and IRPN evaluation. A total of 90 ICFMs were identified in the DIBH process. For minimal protective measures the IRPN values ranged from $2 - 1200$, while for increasing degrees of infection control the values decreased to 2-530 and 1-189 corresponding to moderate and enhanced measures respectively.

Conclusion: The framework developed in this work provides tools for radiotherapy clinics to analytically assess risks and adjust workflows during a pandemic.

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Impact of COVID 19 Pandemic on Radiation Oncology Care Path Time

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Purpose/Objective(s): We seek to investigate the impact of the COVID19 pandemic on the radiation oncology care path timeline. We hypothesized that the COVID19 pandemic would result in increased time to complete the care path from simulation to start of radiation.

Materials/Methods: Care path data of patients treated at a single institution were included for 3 epochs: Pre COVID (July 2019 − March 2020),

C1 [PreV] (April 2020 − Dec 2020), and C2 [PostV] (Jan 2021 − September 2021). The following tasks in the care path were evaluated: simulation start time, contours completed, physician review, plan finalization, IMRT/IMPT QA, and radiation treatment start. Time stamps of completion of tasks in the radiation treatment planning care pathway were extrapolated and used to create 9-time intervals. Demographic, tumor, and treatment characteristics were gathered to stratify patients. Patients with care path times greater than 25 days were excluded from the analysis. Numerical variables are summarized using mean and standard deviation while categorical data is summarized using counts and percentages. The ANOVA test is used to compare means in RT planning times between time epochs.

Results: A total of 3557 patients were included in the study analysis: 1095 PC, 1105 C1, and 1357 C2. There were improvements in multiple car path intervals following the start of the pandemic. Across epochs, the mean time from simulation to RT Start was 10.5 days (10.9 PC, 10.3C1, and 10.3 C2) (p =0.008). The mean time from simulation to plan finalization was 5.5 days (5.6 PC, 5.7 C1, 5.2 C2, p =0.008). The mean time for plan review to start time was 5.5 days (5.7 PC, 5.2 C1, and 5.5 C2) (p=0.010). Contour completion to radiation start time was significantly shorter after the pandemic (8.8 PC vs. 8.4 C1 vs. 8.4 C2, p =0.046). The mean time from physician review to IMRT/IMPT QA was 1.7 days (1.8 PC, 1.7 C1, 1.5 C2, p = 0.007). Physician review to RT start took a mean time of 5.5 days (5.7 PC, 5.2 C1, 5.5 C2, p = 0.010). Plan finalization to IMRT/IMPT QA took a mean time of 1.1 days (1.2 PC, 1.1 C1, 1.0 C2, p = 0.01). IMRT/QA to RT start took a mean time of 4.4 days (4.6 PC, 4.0 C1, and 4.5 C2, p =0.002). The mean time from plan finalization to RT start was 5.0 days (5.2 PC, 4.6 C1, 5.0 C2, p = 0.004). There were no significant differences in simulation to contour time (p =0.181) and physician review completion to plan finalization (p =0.223)

Conclusion: The COVID19 pandemic has been a disruptive force in the management of patients in Radiation Oncology. However, we demonstrate improved efficiency in care path completion as we entered into the pandemic. Further investigation into care path efficiency is important for provider and patient satisfaction.

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A Structural Solution for Task Management in a Resident-Directed, Team-Based Radiotherapy Clinic

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Purpose/Objective(s): The radiation oncology service at our urban safety net hospital is high volume and organized into a series of resident-directed Teams covering various disease sites. As configured in our OIS, task management was difficult, and OIS-related miscommunication led to rushed/excess work and risked patient impact. An initiative was started to reduce the incidence of such miscommunication and associated sequelae.

Materials/Methods: A root cause analysis was performed. Clinical and OIS processes were mapped and failure modes assessed. While the clinic was organized into Teams, the OIS was not, and manual assignment of users to tasks was required. This was time consuming and error prone, with errors most common after residents rotated, during cross coverage, and with long intervals between consultation and simulation. Scheduling therapists often scheduled the incorrect resident to at least one task. Multiple attendings had patients on any given Team, but each was unable to see the entire Team's tasks. Tasks associated to specific residents had to be accounted for after they switched rotations. OIS functionality was such that only attendings could be automatically assigned to tasks and that individual tasks could not be assigned to multiple user groups. An alternative solution was developed involving a specific naming schema for tasks, creation of virtual resources for task assignment representing Teams and key user groups, and procurement of Team-specific VOIP phones.

Results: The Team concept was integrated into the OIS, and missed tasks and other OIS-related miscommunication are no longer a common reason for process failure. A minimum set of actions necessary to meet needs was codified into a set of Team-based clinical pathways. Task naming used the convention "<responsible group> - <task>." Tasks assigned to Team resources allowed rapid Team-specific, user group-specific identification of rate-limiting actions when sorted alphabetically. This also allowed transparency into the status of key activities performed by all user groups. Attendings maintained an accurate personal list. The updated system was reliable, required fewer actions, and reduced cognitive demand for all users. For schedulers, the minimum number of clicks required went from 25 to 5 and the minimum number of choices went from 8 to 1. Work to determine which resident to schedule was eliminated as therapists could rely on the less variable Team concept. A forcing function detected likely failure modes of wrong attending and wrong Team. Team-specific VOIP phones allowed the correct resident to be contacted no matter their physical location while minimizing interruptions to co-residents.

Conclusion: A novel implementation of virtual task lists improved quality by eliminating systematic sources of error and excess work.

Abstract 3042 − Table 1

Team 1	Breast, Metastatic lung
Team 2	Gyn, Sarcoma, Brachy
Team 3	GI, CNS, Primary lung
Team 4	H&N, GU, Skin, Heme

*Disease sites chosen to balance load across Teams.

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Implementation of a Special Medical Physics Consult Process for Re-Irradiation in Patients with Brain Tumors: Planning and Toxicity Outcomes

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Purpose/Objective(s): We hypothesized that implementation of a systematic approach to re-irradiation (ReRT) using a special medical physics consult (SMPC) process would lead to acceptably low rates of high-grade toxicity associated with planning parameters impacting clinical management.

Materials/Methods: Consecutive patients treated using the ReRT-SMPC process during the first 18 months of its implementation were included. Accuracy of data set registration in the region of treatment was assessed by physics and verified by physician to generate cumulative physical and biologically corrected dose maps (equivalent dose in 2 Gy fractions EQD_2, alpha/beta 2.5 for normal tissue). Standardized dose discounts based on time interval from prior treatment and consistent guidelines for acceptable EQD_2 dose-limits per organ-at-risk (OAR) were used in all cases to provide allowable dose constraints prior to planning. Post-planning physics evaluation highlighted exceeded limits to assist clinical management. Comparison of planning parameters among patients with and without high-grade