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.

Results: The 3-class accuracy of CNNs for the top 5 CTCAE terms present/absent/negated in PCa OTV notes were: fatigue (accuracy = 0.93, F1 = 0.95), diarrhea (accuracy = 0.95, F1 = 0.94), nausea (accuracy = 0.98, F1 = 1.0), dysuria (accuracy = 0.97, F1 = 0.97), hematuria (accuracy = 0.99, F1 = 0.96).
Conclusion: Training naïve CNNs with RO-specific training data from OTV notes increased the accuracy of CTCAE toxicity coding. This approach addresses challenges previously encountered using classical NLP from RO EMR data. Therefore, use of CNNs in NLP may reduce barriers to implementation of automated methods to improve data extraction for retrospective and prospective analyses.

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Activity Monitoring for Early Detection and Management of Toxicity in Patients Undergoing Chemoradiation for Gastrointestinal Malignancy

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Purpose/Objective(s): Higher levels of physical activity assessed by step count have been associated with lower risk of hospitalization during cancer treatment. We hypothesize that it is feasible to use activity data to identify patients undergoing concurrent chemoradiation for gastrointestinal (GI) malignancy who are at high risk for emergency department (ED) visits and hospitalizations, and to successfully trigger and execute triage visits for symptom management.
Materials/Methods: This prospective study randomized patients to activity monitoring versus observation. Each group was provided an activity monitor. If a patient in the intervention arm had 20% decreased activity or 20% increase in heart rate from their baseline, a triage visit was triggered to evaluate and treat symptoms. In the observation group, activity data was recorded but no triage visit was triggered. Baseline step count and heart rate were established during a one-week period between radiation simulation and treatment start. The primary endpoint was to demonstrate an increased rate of triage visits in the activity monitoring group compared to observation. Secondary outcomes included rates of ED visits and hospitalizations. Crude and adjusted odds ratios (OR) were computed using logistic regression modeling.
Results: A total of 40 patients were enrolled on the study: 22 in the intervention group and 18 in the observation group. Primary disease sites included anus (n = 4), gastric/esophagus (n = 14), hepatobiliary (n = 4), pancreas (n = 7), and rectum (n = 11). Median age was 60 years in the intervention arm and 62.5 years in the observation arm ($P = 0.69$). The median radiation dose and fractionation were similar among the two groups. Average baseline daily step counts were similar in the two groups (5,103 in intervention group vs. 5,668 in observation group, $P = 0.43$). Average daily step counts decreased from week 1 to week 5 in both groups (-960 steps in observation group and -1,164 steps in the intervention group). There was an increased rate of triage visits in the intervention arm compared to the observation arm (86.4% v 38.9%, OR 9.95, 95% CI 2.12-46.56, $P = 0.015$). Rates of ED visits and hospitalizations were numerically lower in the intervention group compared to the observation group (9.1% vs 22.2%, $P = 0.31$; 4.5% vs 16.7%, $P = 0.31$, respectively). Patients with anal (-1456 steps) cancer showed the largest decrease in mean daily step count over the treatment course. Medical intervention was more common in the intervention group compared to observation ($P < 0.001$).
Conclusion: This study supports the feasibility of actively monitoring patient's daily step and heart rate data to successfully trigger triage visits for patients at high risk for toxicity. Further studies are ongoing and may support the use of automated activity monitoring to decrease the rates of ED visits and hospitalizations.

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Telehealth for Cancer Care During COVID-19: Patient Satisfaction Trends Over Time

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Purpose/Objective(s): COVID-19 has dramatically increased telehealth utilization for cancer care delivery. We hypothesized that patient satisfaction scores following virtual visits may improve over time as patients and physicians become more accustomed to a virtual platform. To evaluate this, we compared virtual visit patient satisfaction scores between early and late pandemic visits at a comprehensive cancer center.
Materials/Methods: Anonymized patient surveys from all virtual visit (VV) and in-person visits (IP) collected between April 2020 through January 2021 were included. Surveys consisted of 12 questions assessing the following aspects of the patient experience: connection quality, patient-physician communication, and overall provider quality. Open-ended questions (2/12) were excluded. Qualitative responses were given on a 1-3 Likert-type scale ranging from no, yes (somewhat), and yes (definitely). Surveys were grouped into early-pandemic (April 2020 - July 2020) and late-pandemic (August 2020 - January 2021). Responses were binned into satisfied (yes, [definitely] responses) and not satisfied (no and yes [somewhat] responses). Patient characteristics and survey responses for early and late pandemic were compared using a chi-square or independent t-test with significance set at $P < 0.05$.
Results: In total, 1,688 VV (45% early and 55% late pandemic) and 5,279 IP (39% early and 61% late pandemic) surveys were assessed. VV surveys were from the following specialties: 69% medical oncology, 13% surgical oncology, 12% radiation oncology, and 6% gynecologic oncology. The age distribution of VV patients was ≤49 (16%), 50-64 (28%), and ≥65 (56%) years compared to ≤49 (16%), 50-64 (32%), and ≥65 (52%) for IP patients. Survey response rates were 41% and 42% for VV and IP patients, respectively. Compared to early pandemic VV patients, late pandemic VV patients were more satisfied with regard to quality of explanation (91% vs 80%, $P < .001$), provider preparedness (89% vs 81%, $P < 0.001$), patient-provider trust (93% vs 87%, $P < 0.001$), provider listening (94% vs 86%, $P < 0.001$), follow-up instructions (85% vs 76%, $P < 0.001$), connection ease (83% vs 71%, $P < 0.001$), connection quality (85% vs 72%, $P < 0.001$), and appointment timing (84% vs 66%, $P < 0.001$). There was no significant difference between early and late pandemic for overall provider rating (mean [SD], 1-10 scale: 9.52 [1.45] vs. 9.58 [1.29], $P = 0.36$) or whether the patient would recommend the provider (94.6% vs. 92.3%, $P = 0.10$). In contrast, no significant differences were observed in patient survey scores between early and late pandemic for IP visits.
Conclusion: Patients who had virtual visits were significantly more satisfied on multiple aspects of their encounter later in the pandemic compared with earlier while no significant differences were observed for in-person visits. Understanding the underlying reasons will be important for optimizing the virtual patient experience, which is likely to remain a common way of "seeing" patients.

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Clinical Validation of Deep Learning Algorithms for Lung Cancer Radiotherapy Targeting

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Purpose/Objective(s): Automated target segmentation for non-small cell lung cancer (NSCLC) patients has the potential to support radiation treatment planning. Artificial intelligence (AI) has demonstrated great promise in medical image segmentation tasks. However, most studies have been confined to *in silico* validation in small internal cohorts, lacking data on real-world clinical utility. In this study, we developed primary tumor and involved lymph node segmentation algorithms in computed tomography (CT) images. Validation is performed in multiple large multi-institutional cohorts to assess model generalizability.

Materials/Methods: Simulation CTs and ground truth annotations were collected from multiple public and private sources (total n = 2584). We employed the following benchmarks: Inter-observer (6 radiation oncologists, n = 20, median volumetric dice 0.83, 95% CI 0.82-0.84) and intra-observer (1 radiation oncologist, 3 reads, n = 21, median volumetric dice 0.88, 95% CI 0.84-0.9). We developed two segmentation algorithms: seed-point assisted and fully automated. Model training data (n = 787) comprised NSCLC-Radiomics (stages I-IIIB, n = 422) and LungRT-1 (stages IA-IV, n = 365). Validation was first performed in an internal dataset annotated by a single thoracic radiation oncologist (LungRT-1, n = 136). Additional validation included: (1) an internal dataset annotated by other radiation oncologists, including generalists, in our center (LungRT-2, n = 1075), (2) an external clinical trial dataset from 185 different institutions (RTOG-0617, n = 403), and (3) a dataset of early-stage surgical patients annotated for diagnostic purposes by radiologists (NSCLC-Radiogenomics, n = 142). Volumetric dice, using expert manual segmentations as ground truth, was used as an evaluation metric.

Results: The model performance is comparable to the benchmarks when validated on internal data, with degrading performance in cohorts annotated by other radiation oncologists.

Conclusion: The results highlight the importance of assessing segmentation style among annotators and understanding model generalizability in external cohorts, all while cautioning against degrading performance in increasingly external data. Differences between radiologists and radiation oncologists performing the same segmentation task underscore the importance of clinical context in AI model deployment. Further validation includes studying the dosimetric impact of AI-generated segmentations, and conducting human subject experiments to assess AI output acceptance and time savings.

Abstract 129 — Table 1

Dataset	Stage (I, II, III, IV, n/a %)	Seed Point Assisted Dice	Fully Automated Dice	*P*-value (seed point assisted dice vs inter-observer benchmark)
LungRT-1	23, 5, 60, 10, 2	0.83 (0.82-0.85)	0.82 (0.80-0.83)	0.9
LungRT-2	12, 8, 46, 32, 2	0.61 (0.59-0.63)	0.59 (0.57-0.61)	< 0.001
RTOG-0617	0, 0, 93, 0, 7	0.71 (0.69-0.73)	0.69 (0.67-0.72)	< 0.001
NSCLC-Radiogenomics	34, 27, 10, 4, 25	0.68 (0.63-0.73)	0.64 (0.59-0.69)	< 0.001

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Final Results of a Phase I "RadVax" Trial of Hypofractionated Radiation Combined With Pembrolizumab in Patients With Metastatic Solid Tumors

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Purpose/Objective(s): Many patients treated with anti-PD-1 therapy do not show a clinical response. Preclinical studies suggest that adding hypofractionated radiotherapy (HFRT) to anti-PD1 can increase the efficacy of immunotherapy through several mechanisms including increased antigen presentation. We conducted a prospective trial testing the combination of pembrolizumab and HFRT in patients with metastatic solid tumors.

Materials/Methods: This prospective single-institution phase I trial tested pembrolizumab in combination with HFRT in patients with metastatic cancers (NSCLC, melanoma, pancreas, breast, others) and an ECOG performance status of 0-1. Melanoma and NSCLC patients were required to have progression of disease on anti-PD1, having received ≥ 2 doses of anti-PD1 and progression documented by RECIST v1.1. Patients were required to have an index lesion ≥1 cm that was amenable to HFRT and at least one other lesion that was not irradiated and could be followed for response using RECIST criteria. Pembrolizumab 200 mg IV every 3 weeks was administered beginning 1 week prior to the first fraction of radiation. The HFRT dose was 8 Gy x 3 fractions or 17 Gy x 1 fraction, determined by randomization during the Expansion phase. The primary objective was the safety of HFRT combined with pembrolizumab, with dose-limiting toxicity (DLT) defined as Grade ≥ 3 non-hematological toxicity related to