valuable resource to support practitioners and clinics in addressing this important aspect of being human.

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QUALITY OF LIFE IN ELDERLY/FRAIL PATIENTS WITH GLIOBLASTOMA MULTIFORME: RESULTS OF A RANDOMIZED PHASE III STUDY COMPARING SHORT AND STANDARD COURSE OF RADIOTHERAPY

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Purpose: A recently published practice-changing multicentre randomized study demonstrated no difference in overall survival (OS) and progression-free survival (PFS) between a short RT (arm1: 25 Gy in five fractions) and standard RT (arm 2: 40 Gy in 15 fractions) in elderly and/or frail patients with glioblastoma multiforme (GBM). The purpose was to compare study arms for health-related quality of life (HR-QoL).
Methods and Materials: EORTC core questionnaire QLQ-C30 and the brain module QLQ-BN20 were used to assess HR-QoL at baseline prior to RT, four weeks after RT completion and every three months thereafter until the disease progression. QoL scores over time were examined using generalized estimating equation adjusting for the treatment arms.
Results: Of 98 randomized patients, 96 were eligible for QoL analysis. There was no difference in global QoL/main function scales/symptoms (except for insomnia) between arms. Improvement of global QoL, social and physical function, fatigue and insomnia were observed when comparing baseline to four months post-treatment, but only significant for insomnia, favouring arm 2. Difference of ≥ 10 points from baseline to four months was demonstrated for social function and insomnia (arm 1), physical function (both arms) and fatigue (arm 2). Global QoL at baseline was significantly worse for arm 1, but statistically insignificant at one month and four months post-radiotherapy.
Conclusions: There was overall no difference in HR-QoL between the two arms. A trend toward significant difference was seen in social function, insomnia, and global QoL favouring short RT regimen.

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INAPPROPRIATE STAGING EXAMINATIONS IN EARLY STAGE BREAST CANCER: COSTS TO THE QUEBEC GOVERNMENT

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Purpose: Cancer staging, which consists in objectifying the extent of cancer spread, is essential before the initiation of therapy. Staging is often incorrectly performed, with a sizeable portion of patients receiving unnecessary staging tests, which are costly. This study seeks to quantify the cost of such unnecessary tests in patients with early-stage breast cancer in the province of Québec, Canada.
Methods and Materials: All patients diagnosed with breast cancer between 2012 and 2014 and listed in the tumour registry of the McGill University Health Centre, were included in this retrospective study. For each patient with early-stage breast cancer, the type and number of unnecessary staging tests, as per national guideline definitions, was extracted from the medical chart. The cost of each test, from a single payer point of view, was obtained from the Quebec government manuals of payment to physicians and departments. The total cost of unnecessary tests for staging of early-stage breast cancer was derived. Finally, an extrapolation was done to estimate the total cost for the whole province of Québec per year, given the number of diagnoses of breast cancer in that province.
Results: 1845 patients were listed in the tumour registry of the MUHC, 1116 of which were diagnosed with early-stage breast cancer. 82.5% of patients underwent at least one inappropriate staging test, with an average of 2.35 inappropriate tests were performed per patient. Less than 1% of these tests detected metastatic disease. The average theoretical cost of inappropriate staging tests per patient was $235.84, $251.83 and $217.34 for 2012, 2013, and 2014 respectively, with an average total cost to the government of Québec of $830,659.61 per year, and a 10-year cost of $8,306,596.18.
Conclusions: The majority of patients with early-stage breast cancer undergo unnecessary staging tests. In a social system with limited resources, these tests are costly to the single payer Québec government.

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GLOBAL ACCESS TO RADIOTHERAPY FOR CERVICAL CANCER: THE COST OF INACTION

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Purpose: Radiotherapy (RT) is a highly effective and curative treatment for patients with invasive cervical cancer, and is the standard of care for locally advanced disease. Although RT can be successfully delivered in developing countries, major gaps in access have resulted in substantial preventable morbidity and mortality, where nearly 90% of cervical cancer deaths occur. These gaps are multifactorial, but assumptions about excessive cost of RT in these regions preclude effective implementation. Using methodology developed for the Global Task Force on Radiotherapy for Cancer Control (GTFRCC), we examined the validity of these assumptions for the treatment of cervical cancer with external beam radiation (EBRT) and brachytherapy (BT) in upper middle-income income (UMIC), lower middle-income (LMIC) and low-income countries (LIC).
Methods and Materials: Based on the GTFRCC evidence-based estimation approach, we assumed that 71% of cervical cancer patients would require RT, with a mean of 21 EBRT and three HDR BT fractions per course, resulting in a 20% overall survival benefit. We developed a decision-analytic Markov model to assess three RT capacity scenarios from 2015 to 2035: 1) no increase in capacity; 2) linear scale-up from baseline coverage in 2015 to universal accessibility by 2035; and 3) immediate full availability. Model outcomes included total life years (LYs) and economic productivity (US Dollar). Costs, based on the GTFRCC efficiency model, and benefits were discounted by 3% annually over a lifetime horizon.
Results: If no action is taken to shift current RT capacity to universal accessibility, we project a loss of up to 21.4 million (M)

LYs and $271.3 billion (B) due to cervical cancer alone over the next 20 years. Based on a realistic linear investment model, RT yields an additional 9.8M LYs (2.9M in LIC, 4.7M in LMIC, and 2.2M in UMIC) over 20 years, a $53.2B net increase in economic productivity ($2.6B in LIC, $16.4B in LMIC, and $34.2B in UMIC), and a broader societal net gain of $137.5B ($10.3B in LIC, $44.8B in LMIC, and $82.4B in UMIC). The additional investment necessary for HDR brachytherapy, an essential component of curative treatment, was only 5.5% greater than EBRT alone. **Conclusions:** The failure to ensure global availability of EBRT and BT to treat cervical cancer would result in enormous human and economic consequences over the next two decades. This loss would occur before the benefits of primary cancer prevention strategies, such as HPV vaccination, are realized. The present study demonstrates that a realistic investment strategy over the next 20 years may yield a net economic benefit of up to $150B USD, and potentially further benefits beyond that point in time. These findings support the value of scaling-up of EBRT and BT to treat cervical cancer and help to justify their inclusion in national cancer control planning.

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UTILIZATION OF EMERGENCY DEPARTMENTS AMONG PATIENTS WITH CANCER

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Purpose: To compare emergency department (ED) use between patients with cancer and a matched cancer-free cohort of individuals and to examine the association between ED use and time to death.
Methods and Materials: Data were from the Manitoba Centre for Health Policy Data Repository and included cancer registry, hospital discharge abstracts, physician billing claims, ED visits, and vital statistics. The cancer cohort included adults (age 18+) with selected cancer diagnoses (breast, colorectal, lung and prostate) made between 2007 and 2011. Rates of ED utilization were compared during three time periods (pre-, peri-, and post-diagnosis) using generalized estimating equations between cancer patients and cancer-free individuals matched 1:1 on age, sex, and Charlson comorbidity score. The association between ED use and time to death was tested using a multivariable Cox proportional hazards regression model.
Results: A total of 5569 patients with breast (n = 1555), colorectal (n = 1327), lung (n = 1437), and prostate (n = 1250) cancer were included. When comparing ED utilization between cancer cases by site and their matches only lung cancer showed a significant increase during the pre-diagnosis period (relative rate [RR] 1.38 [95% confidence interval 1.18-1.62], p < 0.0001). ED utilization was increased during the peri-diagnosis period for breast (RR 1.74 [1.31-2.32], p = 0.0001), colorectal (RR 2.44 [1.72-3.45], p < 0.0001), lung (RR 4.51 [3.61-5.63], p < 0.0001), and prostate (RR 3.10 [2.14-4.47], p < 0.0001) cancer. In the post-diagnosis period, ED utilization was increased for breast (RR 1.45 [1.26-1.67], p < 0.0001), colorectal (RR 1.40 [1.11-1.76, p = 0.0005), and lung (RR 2.28 [1.94-2.67], p < 0.0001) cancer. ED use in the year prior to diagnosis was associated with time to death for prostate cancer (hazard ratio [HR] 1.12 [95% CI 1.02-1.24], p < 0.02) while ED use in the post-diagnosis period was associated with time to death for breast (HR 1.27 [1.18-1.37], p < 0.0001), colorectal (HR 1.11 [1.04-1.18], p = 0.0012), and lung (HR 1.10 [1.06-1.14], p < 0.0001) cancer.
Conclusions: The pattern of ED utilization varies with cancer site and time from diagnosis. All cancer sites were associated with increased ED use around the time of diagnosis, while patients with breast, colorectal, and lung cancers also showed increased ED use in the post-diagnosis period. Additional cancer-related urgent care services during the peri- and post-diagnosis periods may alleviate the frequency of ED visits among patients with cancer.

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POST-OPERATIVE "MINIPELVIS" RADIOTHERAPY WITH OR WITHOUT VAGINAL VAULT BRACHYTHERAPY BOOST FOR STAGE II ENDOMETRIAL CANCER

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Purpose: Patients with FIGO Stage II endometrial cancer (EC) are generally treated surgically, with risk-adapted adjuvant radiotherapy (external beam radiotherapy (EBRT) and/or vaginal vault brachytherapy (BT) boost) still suboptimally defined. With changing surgical practices in nodal assessment and/or resection, opportunity exists for selected patients to receive less intensive adjuvant therapy, with the goal of lessening treatment-related morbidity. In this single-institutional review, we explore outcomes of Stage II EC patients treated with adjuvant "minipelvis" (MP)-EBRT (a field covering at least the surgical bed, vaginal vault, and parametria, but not the classical elective nodal regions) +/- BT.
Methods: Women with pathologic Stage II EC receiving post-operative MP-EBRT from 2000 onwards were reviewed. Demographics, disease characteristics, treatment details, survival, and recurrence data were collected. Three-year relapse-free survival (RFS) and overall survival (OS) were calculated from the date of surgery (Kaplan-Meier method). Median RFS and OS were compared between those receiving MP-EBRT+BT and those receiving MP-EBRT alone (log rank test). Univariate analysis was performed (binary logistic regression) to determine factors associated with relapse.
Results: n = 42 patients (median age 63 years [36-86]) received adjuvant MP-EBRT (2000-2015), with median follow up 27 months (2-105). n = 37 (88%) had pelvic lymph node dissection. Endometrioid adenocarcinoma was predominant (71%) over other histologies. n = 20 had Grade 3 disease, n = 18 had deep (> 50%) myometrial invasion (MI), and n = 22 had lymphovascular invasion (LVI). n = 10 received adjuvant chemotherapy. MP-EBRT fields had conventional inferior and lateral borders and height less than 12 cm (range 7.8-11.8). Dose fractionation was typically 45 Gy in 25 fractions (40-52.6 Gy/20-25), and 32 (76%) received subsequent HDR BT boost, typically 15 Gy in three fractions (15-18 Gy/3) prescribed to vaginal surface. Ten patients relapsed (one vaginal recurrence, three in pelvis outside the field, six distant), four (40%) of those not receiving BT versus 19% of the BT group (OR 3.5, 95%CI 0.7-16.9, p = 0.125). Median time to relapse was 20 months (10-32). Tumour grade, LVI, and MI were not significantly associated with relapse. Three-year RFS and OS were 74% and 92% respectively.
Conclusions: In this small series, early outcomes following adjuvant MP-EBRT for Stage II EC align with those reported for conventional adjuvant EBRT, suggesting that this is a reasonable approach. Only three patients relapsed in the pelvis outside of the field. Further characterization of tumour and toxicity outcomes can help to better define the population most likely to benefit from MP-EBRT, and the value of BT boost in this setting.

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CURRENT PRACTICE OF BRACHYTHERAPY AND EXTERNAL BEAM RADIOTHERAPY FOR CERVICAL CANCER IN ONTARIO, CANADA

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Purpose: To document the practice of brachytherapy (BT) and external beam radiotherapy (EBRT) for management of cervical cancer across Ontario, Canada with a population of 13.6 million.
Methods and Materials: An electronic survey (SurveyMonkey)