greatest potential influencers on cost-effectiveness were the rate of development of distant metastases (0.009-0.055 for SBRT and 0.003-0.025 for RFA) and utility values following both SBRT (0.75-0.85) and RFA (0.65-0.75).

Conclusion: Overall, SBRT used as a primary treatment for RCC appears to be more effective at a marginal increase in cost compared with RFA. The use of SBRT appears to be cost-effective for larger tumors while for smaller tumors RFA may be more appropriate as an initial treatment strategy. Potential reasons for increased cost of RFA include equipment costs, costs for complications and admissions in comparison to SBRT> The validity of these conclusions are highly sensitive on the accuracy of local and distant progression rates reported in previous studies, and may be adjusted as the available data on SBRT and RFA continues to evolve and mature.

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Adolescent and Young Adult Populations Face yet another Barrier to Care With Insurers

A.J. Bishop,[1] J.A. Livingston,[2] C.A. Wages,[3] I. Valdez,[4] M.S. Ning,[2] M. Roth,[5] G.B. Gunn,[6] and S.L. McGovern[3]; *[1]Department of Radiation Oncology, Division of Radiation Oncology, The University of Texas MD Anderson Cancer Center, Houston, TX, [2]The University of Texas MD Anderson Cancer Center, Houston, TX, [3]Department of Radiation Oncology, The University of Texas MD Anderson Cancer Center, Houston, TX, [4]MD Anderson Proton Therapy Center, Houston, TX, [5]MD Anderson Cancer Center, Houston, TX, [6]The University of Texas M.D. Anderson Cancer Center, Houston, TX*

Purpose/Objective(s): Adolescents and young adults (AYA) with cancer have had less improvement in survival as compared to their older adult and pediatric counterparts with the same malignancies. Among malignancies that impact the AYA population, many require radiation therapy for management. Proton beam therapy (PBT) is often pursued to decrease integral dose and reduce acute and late toxicities in these young patients. We sought to examine insurance approval and appeal outcomes for the AYA population compared to pediatric patients.

Materials/Methods: We performed a cross-sectional cohort study of 157 patients aged 2 to 39 years (y) whose physicians requested PBT during 2018. Rates of approval, denial, appeal outcomes, and interval from initial request to final determination were recorded. Descriptive statistics were performed using Fisher's exact and Mann-Whitney tests.

Results: Of the 157 patients with requests for PBT, 74 (47%) were 2-18y (PED; median, 8y; interquartile range [IQR], 5-13y), whereas 83 (53%) were 19-39y (AYA; median, 30y; IQR, 25-35y) (Subsets - AYA1: 19-29y n = 39, 25%; AYA2: 30-39y n = 44, 28%). For PED patients, 100% of requests for PBT were approved upfront without appeal at a median time of 3 days (d) (IQR, 0-6d). In contrast, both the entire AYA cohort (41%, n = 34 of 83, $P<0.001$) and AYA subsets (AYA1: 51%, n = 20 of 39, $P<0.001$) (AYA2: 32%, n = 14 of 44; $P<0.001$) were significantly less likely to receive upfront approval for PBT. The interval to final determination was also significantly longer for AYA patients taking a median of 10d (IQR, 5-18d) ($P<0.001$). After appeal attempts among all AYA patients, 47% of cases (n = 23 of 49 initial denials) were ultimately approved for PBT at a median time of consecutive 12d (IQR, 6-19d) with no significant difference in approval rate between AYA1 (58%) and AYA2 (40%) ($P = 0.25$). When comparing final insurance approval for PBT after appeals, AYA patients were significantly less likely to have final approval for PBT (AYA: 68%, n = 57, $P<0.001$; AYA1: 79%, n = 31; $P<0.001$; AYA2: 59%, n = 26; $P<0.001$) compared to PED patients.

Conclusion: Despite the AYA cohort representing a considerably young cancer population, we observed significantly lower rates of PBT approval compared to pediatric patients both at the initial request and after appeals. Additionally, the delays awaiting appeal outcomes could negatively impact outcomes and certainly adds financial toxicity to this already at-risk population. AYA patients face significant barriers to cancer care, and opportunities to remove these barriers should be pursued. Insurers should re-evaluate their policies for PBT use in the AYA population.

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The Impact of Missing/Incomplete Data in Real-World Data Studies

D.X. Yang,[1] J.A. Miccio,[1] V. Jairam,[1] E. Chang,[1] J.B. Yu,[1,2] H.S.M. Park,[1,2] and S. Aneja[1]; *[1]Department of Therapeutic Radiology, Yale School of Medicine, New Haven, CT, [2]Cancer Outcomes, Public Policy, and Effectiveness Research (COPPER) Center, Yale University, New Haven, CT*

Purpose/Objective(s): The use of real-world data (RWD) in oncology has gained substantial interest in light of the recent Food and Drug Administration acceptance of RWD as a part of regulatory submissions. One limitation of RWD drawn from large cancer registries is the presence of missing/incomplete clinical data. Traditionally, patients with missing/incomplete data are excluded from RWD analysis. The effect of missing/incomplete data on the accuracy of RWD studies is currently unknown. The purpose of this study was to 1) assess the prevalence of missing/incomplete data in a large RWD source and 2) study the potential effect of missing data on accurately measuring outcomes.

Materials/Methods: As a representative of RWD set, we analyzed the 2016 National Cancer Database for all thoracic disease cancers, which captured data from over 1.7 million patients. To identify patients most often excluded from RWD studies, we limited our analysis of missing/incomplete variables to the 39 variables missing in $\leq$20% among patients in the NCDB. We categorized variables within the dataset into mutually exclusive categories of patient demographics, cancer-specific, and treatment. We created two cohorts of patients to compare outcomes: (1) patients without any missing/incomplete data, who are traditionally included in RWD studies and (2) patients with at least 1 missing/incomplete variable, who are traditionally excluded from RWD studies. Chi-square testing was used to identify patient characteristics associated with having missing/incomplete data. Log-rank testing was used to compare overall survival between patients with missing data versus those with complete data.

Results: Among over 1.7 million cases included in our analysis, a majority of patients had at least 1 missing/incomplete variable (976,175 patients, 54.9%). Demographic variables were missing in 230,128 (12.9%) patients, cancer-specific variables were missing in 575,454 (32.4%) patients, and treatment variables were missing in 506,324 (28.5%) patients. Patients with missing data were more likely to be older ($p<0.001$), to be non-white ($p<0.001$), and to live farther away from the reporting facility ($p<0.001$). There was a statistically significant difference in overall survival between patients with missing/incomplete data compared to those with complete data (10.4 months vs 13.4 months, $p<0.001$).

Conclusion: The presence of missing/incomplete data represents a significant issue with RWD sources. Survival of patients with missing/incomplete data are significantly worse than those with complete data who are often included in RWD studies, risking bias within outcome estimation from RWD studies. Methods to account for missing data without exclusion should be explored to better model outcomes in RWD studies.

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