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## Costs of Early Adjuvant Radiation Therapy After Radical Prostatectomy: A Decision Analysis

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## Purpose/Objective(s)

Prospective, randomized trials support adjuvant radiation therapy (RT) for adverse pathologic features after radical prostatectomy (RP). However, adjuvant RT is not universally delivered in this setting. Criticisms of adjuvant RT include toxicity, financial costs, potential overtreatment, and effectiveness of salvage RT. The objective of this study was to construct a decision analytic model to estimate real world cost of RT vs. no RT within the context of the effectiveness of early adjuvant RT for prostate patients based on published clinical results of the Southwest Oncology Group prospective trial of adjuvant RT (SWOG 8794).

## Materials/Methods

A decision analysis was constructed in TreeAge Pro 2009 to compare adjuvant RT versus no RT for patients with adverse pathologic features after RP over 10 years. Treatment success was defined as the absence of PSA failure (PSA < 0.2 ng/mL). Probabilities of treatment success (instance of biochemical control), salvage RT, ADT, and adverse events (AEs) were taken from published results of SWOG 8794. Cost inputs included adjuvant RT, ADT, salvage RT, and management of AEs due to ADT and RT. Costs were based on 2010 Medicare reimbursement rates, assuming that 4-field, conformal RT was delivered to 60-64 Gy. A series of one-way sensitivity analyses were conducted to evaluate the relative importance of each cost and probability assumption on the model. Mean incremental costs for RT versus no RT were calculated from the model results and applied to the incremental successes per 100 patients from SWOG 8794.

## Results

Per SWOG 8794, early adjuvant RT versus no RT results in a higher PSA success rate with 58 vs. 28 successes or 30 incremental PSA successes with RT per 100 treated men. Preliminary model results show that the mean incremental cost per patient was \$7,506, or \$750,600 per 100 men, treated with versus without adjuvant RT. The incremental cost per success for early adjuvant RT was \$2,502 per patient, per year, over the 10 year time horizon. Sensitivity analyses revealed the model to be most sensitive to the likelihood of treatment failure and ADT cost. Findings were moderately sensitive to RT cost.

## Conclusion

This decision analysis of adjuvant RT, versus no RT, after RP for patients with adverse pathologic features, estimates an incremental cost per success of \$25,020 over 10 years, under the assumption that the doubling of treatment success seen in SWOG is realized in clinical practice. This model provides a baseline for further analysis of the incremental costs when using IMRT in the post-RP setting, and can be used to test potential cost reductions that can be achieved with hypofractionation. Furthermore, this model provides a foundation for subsequent cost comparisons for adjuvant RT versus close surveillance and selective salvage RT after RP.