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## Background

- Esophageal Cancer is an aggressive malignancy. It frequently requires multidisciplinary evaluation and trimodality therapy (surgery +/- chemoradiation) in order to optimize patient outcomes.
- The role of neoadjuvant chemoradiation (CRT) has proven benefit for some patient populations. However, the likely effect for an individual patient may not be clear.
- The specific aim was to develop a web based prediction tool for isolated surgery vs CRT based on patient-specific and clinically relevant tumor and treatment data. Such a tool may be helpful for medical decision making, patient counseling, and research protocol design.

## Methods

- Patients diagnosed with esophageal cancer between 1997 and 2005 were selected from the Surveillance, Epidemiology, and End Results (SEER) – Medicare database.
- The covariates chosen for retrospective analysis were: sex, T & N stage, histology, total lymph nodes examined, and receipt of CRT or not (isolated surgery).
- After weighting correction by treatment, a log logistic regression for overall survival (OS) was selected based on goodness of fit analysis. Bootstrap resampling was used for validation.
- “R” software was used for database processing and statistical analysis.

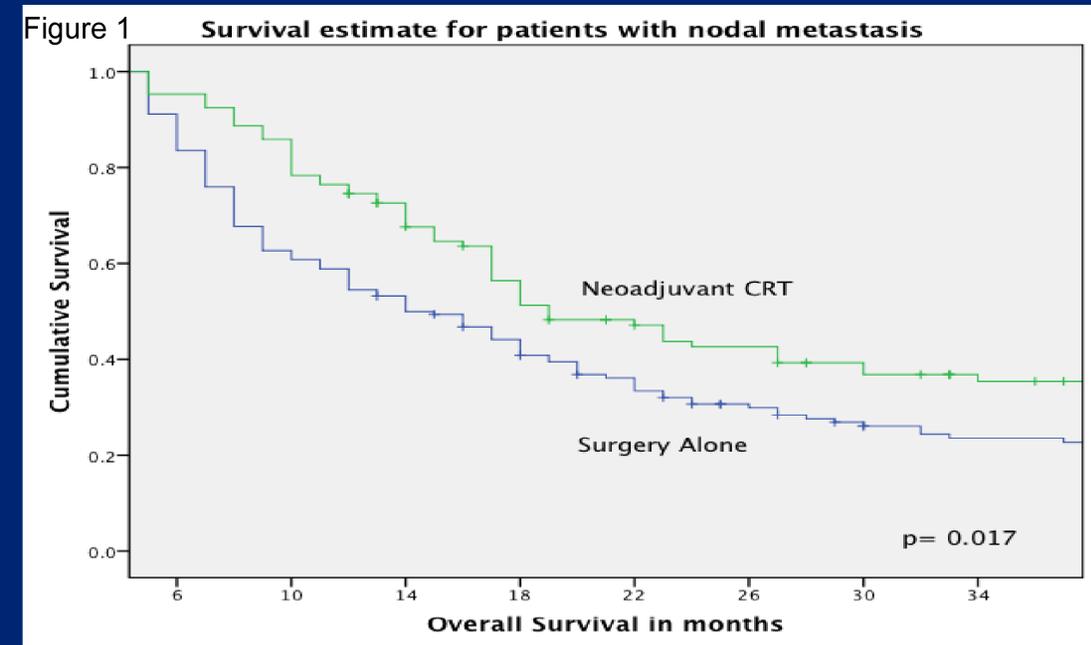


Table 1: Demographic and clinical characteristics		
	N	%
<b>Treatment</b>		
Isolated Surgery	562	
Neoadjuvant CRT	262	
<b>Age at diagnosis</b>		
Median (years)	71	
<b>Gender</b>		
Female	196	24%
Male	628	76%
<b>Histology</b>		
Adenocarcinoma	619	75%
Squamous Cell Carcinoma	205	25%
<b>T Stage</b>		
T1	277	34.8%
T2	179	22.5%
T3	284	35.7%
T4	54	6.8%
<b>Nodal Status</b>		
N0	551	67.6%
N1	146	17.9%
N2	94	11.5%
N3	24	2.9%

Kaplan Meier Estimate: Median Survival 38 (31.4-44.5) months

## Results

- Basic demographic information regarding the study population is available in Table 1.
- 824 pts out of 17,325 met the selection criteria. These pts received either only surgery or CRT followed by surgery based on their SEER-Medicare combined data.
- Pts with any lymph node metastasis or T4 disease based on (y)pTNM staging received notable benefit from CRT ( Figure 1). This benefit varied based on other pt-specific factors.
- The clinical variables selected for multivariate analysis were TN stage, age, sex, histology, total lymph nodes examined, & treatment. These were selected a priori and were significantly associated with outcome.
- A web based predictive tool was produced based on the logistic regression coefficients and propensity score weighting (Figure 2). This nomogram shows good predictive capability with a concordance index (CI) of 0.72.

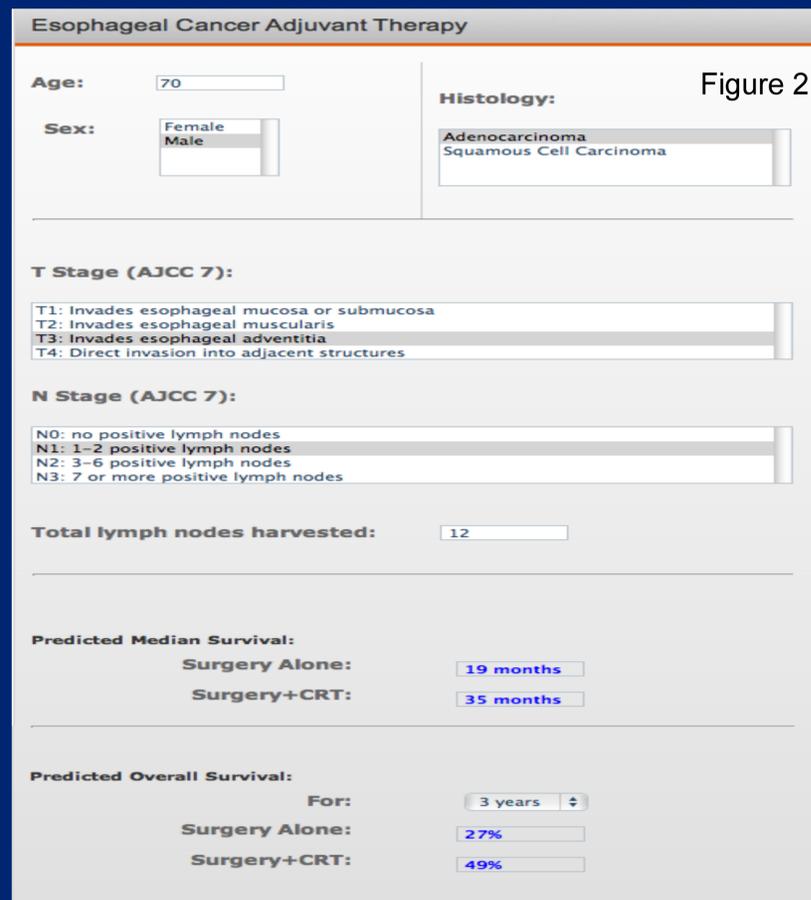


Figure 2: Esophageal Cancer Adjuvant Therapy nomogram. The tool displays predicted median survival for Surgery Alone (19 months) and Surgery+CRT (35 months), and predicted overall survival for 3 years (27% for Surgery Alone, 49% for Surgery+CRT).

## Conclusions

- Based on available SEER-Medicare data, patients with advanced (y)pTNM stage benefit from neoadjuvant CRT. Using our tool, an individual’s predicted survival is available, dependent on their unique oncologic history and treatment. This may aid in medical decision making and research protocol design.
- Additional predictive tools for esophageal cancer could incorporate elements of pre-treatment and/or response to treatment data.
- This nomogram may underestimate the benefit of neoadjuvant CRT due to its variable downstaging effect on final pathologic stage. This web based tool is available for use at <http://skynet.ohsu.edu/nomograms>.