

# Has the Survival for Patients with Non-Small Cell Lung Cancer Treated with Radiotherapy Improved Over Time? An Analysis of the SEER Database.

## Purpose

Over time the management of patients with non-small cell lung cancer (NSCLC) has significantly changed. Technological advances, including improved staging modalities, radiotherapy techniques and the use of chemotherapeutic agents for radio-sensitization, have been shown to improve the outcome of these patients. Here we attempted to document the improvement in survival over time in all patients as well as the subset receiving radiotherapy.

## Materials and Methods

- We used the Surveillance, Epidemiology, and End Results (SEER) database to examine the outcomes of patients with NSCLC over time and to determine if any trends were present.
- We assembled a cohort of patients aged 21 years and older with NSCLC diagnosed from 1988 to 2002 and followed through 2007.
- Potential covariates included patient age at diagnosis, sex, race, year of diagnosis and histology.
- To reduce the effect of unequal follow-up, all patients were censored at 5 years survival.
- Cox proportional Hazard model was used. Patients were required to have complete information on staging.

## Results

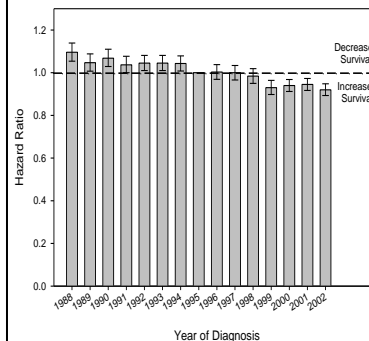
There were a total of 140,307 patients selected for our analysis. On multivariate analysis, we looked at the effect of the year of diagnosis, adjusting for age, sex, tumor location, histology, and treatment. Subset analysis was performed for Stage I, Stage II/IIIA/IIIB, and Stage IV; separate analysis were performed for with respect to the use of surgical or non-surgical therapy, except for Stage IV. Abbreviations: NOS= Carcinoma not otherwise specified; BAC=Bronchioalveolar Carcinoma, AWMST= Adenocarcinoma with mixed subtypes

## Analysis of all Patients

**Table 1. Multivariate Analysis for All Patients**

	HR	CI	p
<b>Increasing Age</b>	1.006	1.006-1.006	<0.0001
<b>Sex</b>			
Female	0.856	0.845-0.866	<0.0001
Male	1.00	(Ref.)	
<b>Location</b>			
Left	0.992	0.980-1.004	0.2042
Right	1.00	(Ref.)	
<b>Race</b>			
Black	1.011	0.992-1.031	0.2536
Other	0.904	0.881-0.927	<0.0001
White	1.00	(Ref.)	
<b>Histology</b>			
NOS	1.022	1.003-1.014	0.0225
Large Cell	1.060	1.036-1.085	<0.0001
Adenocarcinoma	0.937	0.923-0.951	<0.0001
BAC	0.709	0.686-0.734	<0.0001
AWMST	1.00	0.972-1.028	0.9815
Squamous Cell	1.00	(Ref.)	
<b>Stage at Diagnosis</b>			
I	0.548	0.536-0.561	<0.0001
II	0.843	0.819-0.868	<0.0001
IIIA	1.00	(Ref.)	
IIIB	1.212	1.188-1.237	<0.0001
IV	2.225	2.183-2.268	<0.0001
<b>Treatment</b>			
Surgery only	0.797	0.780-0.814	<0.0001
Radiotherapy only	1.776	1.744-1.809	<0.0001
Both	1.00	(Ref.)	
<b>Increasing Year Of Diagnosis</b>	<b>0.989</b>	<b>0.988-0.990</b>	<b>&lt;0.0001</b>

Figure 1. Plot of Harzard Ratio by Year for All NSCLC Patients



## Analysis of Stage I Patients

Figure 2a. Plot of Hazard Ratios by Year for Stage I NSCLC Patients Treated with Surgery Alone

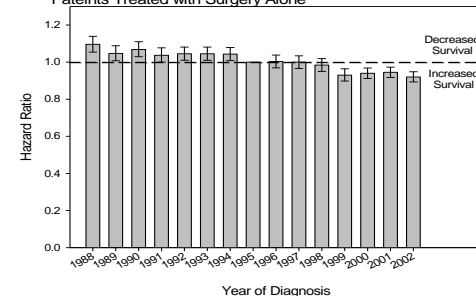
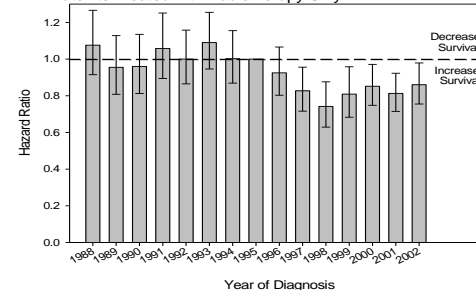
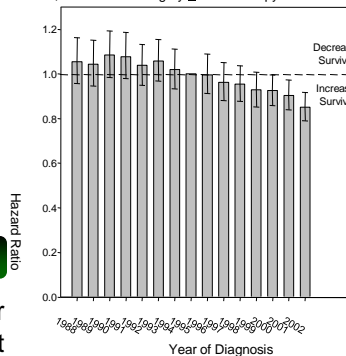


Figure 2b. Plot of Hazard Ratios by Year for Stage I NSCLC Patients Treated with Radiotherapy Only

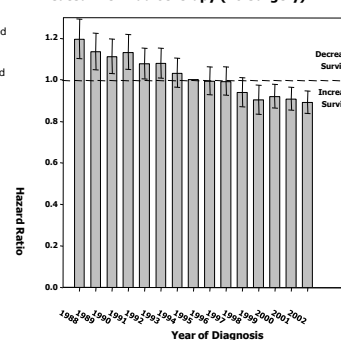


## Analysis of Stage II-III Patients

Plot of Hazard Ratios by Year , Treated with Surgery ± Radiotherapy



Plot of Hazard Ratios by Year Treated with Radiotherapy (no Surgery)



## Conclusions

The survival for patients with NSCLC has improved with time. We hypothesize that the benefit seen in stage I and IV NSCLC, represent a primarily and improved in staging. The benefit see in stage II/IIIA/IIIB represent not only an improved in staging, but also improvements in radiotherapy as well as the integration of chemotherapy for radiosensitization.

## Analysis of Stage IV Patients

Figure 4. Plot of Harzard Ratio by Year for Stage IV NSCLC Patients

