ASSOCIATION OF HOSPITAL VOLUME AND TEACHING STATUS WITH SURVIVAL IN LUNG CANCER PATIENTS

Margaret M Byrne[1,2,3], Tulay Koru-Sengul[1,2], Wei Zhao[1], Feng Miao[1], Stacey L Tannenbaum[1]

[1]Sylvester Comprehensive Cancer Center, [2]Department of Epidemiology & Public Health and [3]Department of Surgery
University of Miami Miller School of Medicine, Miami, Florida

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INTRODUCTION

- Lung cancer is the leading cause of cancer death in the U.S.
  - An estimated 160,340 deaths in the year 2012
- It is unclear if disparities by hospital teaching status and volume exist for lung cancer
- The objective of this study was to determine if hospital volume and teaching status have an effect on survival in lung cancer patients

METHOD

- Linked data (1996 -2007) from:
  - Florida Cancer Data System – a population based cancer registry for patients' demographic and clinical characteristics
  - Florida's Agency for Health Care Administration for patients' procedure and diagnosis codes
  - U.S. census
- Main outcome is overall survival that is defined as elapsed time from the dates of lung cancer diagnosis to death or last contact
- Primary Predictors of interest:
  - High and low volume facility (HVF and LVF, respectively)- set at a 1% threshold of the number of patients treated in each facility/hospital
  - Teaching and non-teaching facility (TF and NTF, respectively)- grouped by 2005 Association of American Medical Colleges
- Statistical analyses:
  - Descriptive; median survival time and 1-, 3-, 5-year survival rates
  - Univariate and multivariate Cox proportional hazard regression models- are used to estimate unadjusted and adjusted hazard ratios (HR) and corresponding 95% confidence intervals (95%CI)

Table 1. R/E/SES by Hospital Volume and Teaching Status (Row%)

	All patients	Hospital volume		Teaching Status	
		Low	High	Non-Teaching	Teaching
All patients	165,465	106,496	58,969	153,145	12,320
Race					
White	152,880	64.2	35.8	93.1	6.9
Black	11,462	65.9	34.1	85.8	14.2
Other	1,123	64.0	36.0	89.1	10.9
Hispanic Origin					
Non-Hispanic	155,402	64.2	35.8	92.9	7.1
Hispanic	10,063	66.5	33.5	86.5	13.5
SES					
Lowest	21,406	63.2	36.8	87.6	12.4
Middle-low	53,742	66.7	33.3	92.1	7.9
Middle-high	61,840	65.2	34.8	94.3	5.7
Highest	28,477	59.1	40.9	93.3	6.7

R=race, E=Ethnicity, SES=Socioeconomic Status

Figure 1. Median Survival by Teaching Status, Hospital Volume, & Race/Ethnicity/SES

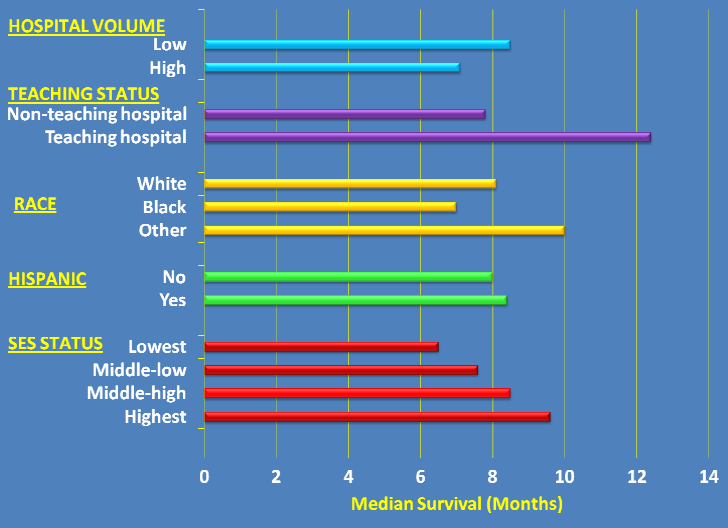

Figure 2. Survival Rates at 1 3 5 Years by Hospital Volume and Teaching Status

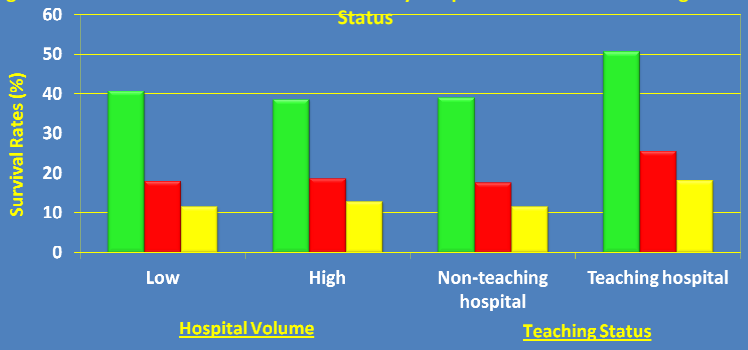

Table 2. Cox Regressions for Overall Survival Stratified by Teaching Status

	Non-Teaching			
	Univariate		Multivariate	
	HR (95%CI)	P-value	HR (95%CI)	P-value
Hospital Volume				
High	1.00 (reference)		1.00 (reference)	
Low	0.86 (0.85, 0.87)	<0.001	0.85 (0.74, 0.98)	0.026
	Teaching			
Hospital Volume				
High	1.00 (reference)		1.00 (reference)	
Low	1.56 (1.48, 1.65)	<0.001	1.31 (1.18, 1.44)	<0.001

Multivariate model includes additional demographic, clinical predictors as well as comorbidities. Since there are significant interactions between teaching and volume , race, ethnicity, and SES respectively in multivariate model , then we stratified analysis by teaching status.

RESULTS

- n= 161,465, of which 64.4% patients were treated at low volume facilities and 7.4% at teaching facilities.
- Median survival (months) was:
  - 8.5 for LVF and 7.1 for HVF
  - 12.4 for TF and 7.8 for NTF
- Predictors of better or worse survival in the unadjusted and adjusted models:
  - In the univariate models, LVF was a predictor of better survival (HR 0.94; P<0.001). After adjusting for confounders, it remained marginally significant (HR 0.86; p=0.05)
  - In the univariate model, NTF was a predictor of worse survival (HR 1.34; p<0.001), and remained so after adjusting for confounders (HR 1.20; p=0.014)
- Significant two-way interactions between teaching status and hospital volume were found in multivariate model and analysis stratified by teaching status:
  - Patients in NTF treated in LVF had a survival benefit compared with HVF, (HR 0.85; P=0.026); while patients in TF treated in LVF had decreased survival compared with HVF (HR 1.31; P<0.001)

CONCLUSION

- High-volume non-teaching and low volume teaching facilities confer more risk to patients than low volume non-teaching and high-volume teaching facilities.
- We contend that in NTF, a lower volume of patients allows providers to tend more carefully to each patient; while in TF higher volume presents more trainee/mentor encounters and a richer experience for treating patients. Therefore:
  - more research is needed to validate these speculations

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