

# Association of Insurance Status with Survival and Disease Stage at Presentation of Gastric Cancer. A National Cancer Database Analysis

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## BACKGROUND

- Gastric cancer is one of the leading causes of death worldwide, and curative treatment depends on the disease stage at the time of diagnosis
- The purpose of this study is to determine the association of insurance status with disease stage at presentation and survival among patients diagnosed with gastric cancer using the National Cancer Database (NCDB)

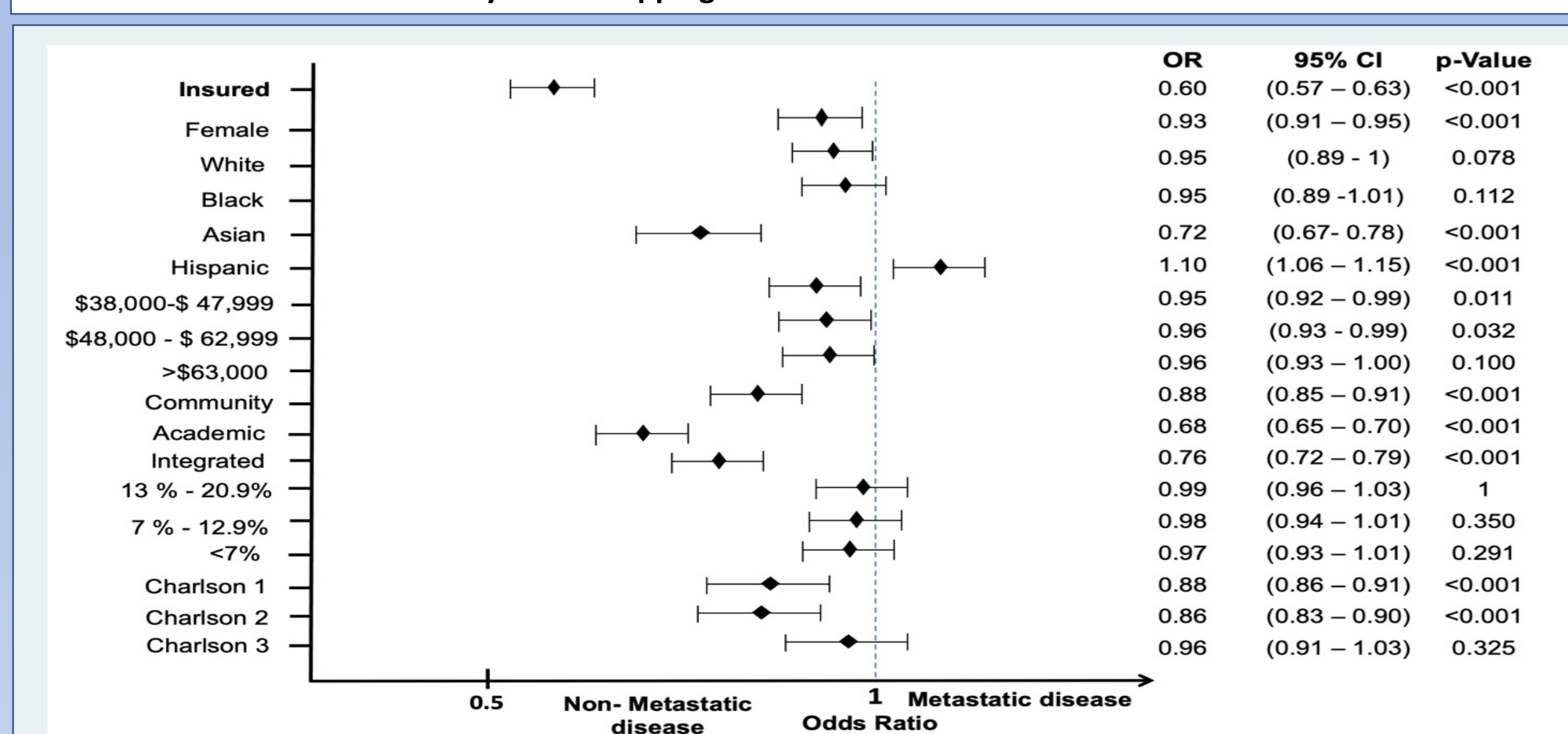
## METHODS

- Gastric cancer patients diagnosed from 2010 to 2015 in the NCDB were included
- Multivariable logistic regression models were used to determine the association between insurance status and gastric cancer stage at diagnosis/presentation
- Cox regression models were used to determine the association between insurance status and all-cause mortality

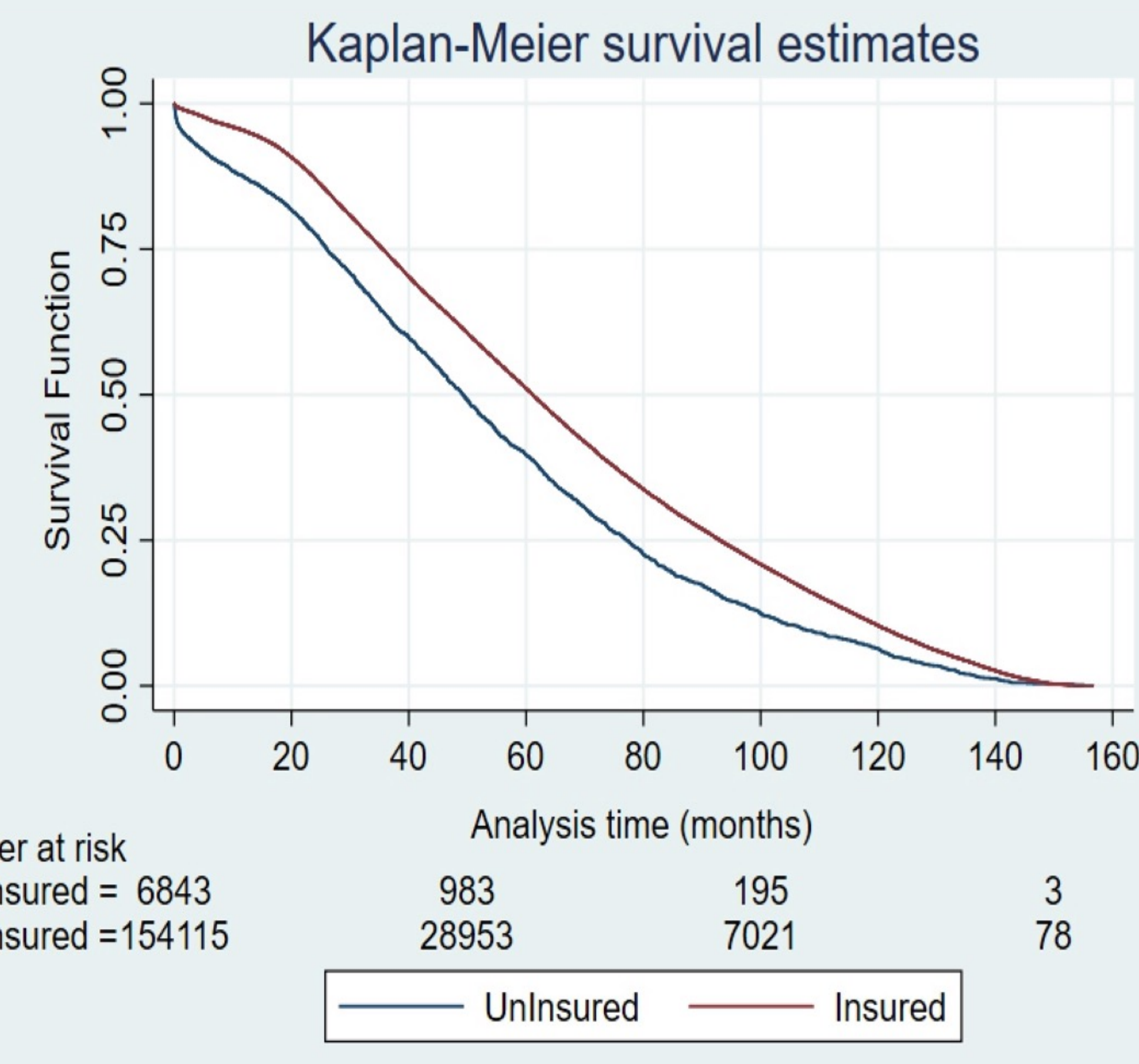
**Table 1: Baseline Characteristics**

	Insured (n= 171,199)	Uninsured (n= 7,442)	p-value
<b>SOCIODEMOGRAPHIC FACTORS</b>			
Age, mean (SD), years	67.75 +/- 13.48	54.71 +/- 12.13	<0.001
Sex male, No. (%)	105,863 (61.84)	4,819 (64.75)	<0.001
Race, No. (%)			<0.001
Asian	8,989 (5.25)	540 (7.26)	
Black	25,451 (14.87)	1,620 (21.77)	
White	131,023 (76.53)	4,859 (65.29)	
Other	5,736 (3.35)	423 (5.68)	
Ethnicity (Hispanic), No. (%)	14,586 (8.52)	2,364 (31.77)	<0.001
Type of residency, No. (%)			0.296
Urban	168,642 (98.51)	7,342 (98.66)	
Rural	2,557 (1.49)	100 (1.34)	
Facility Type, No. (%)			<0.001
Community	83,628 (50.28)	2,797 (42.06)	
Academic	64,458 (38.76)	3,051 (45.88)	
Integrated network	18,235 (10.96)	802 (12.06)	
Median Income, No. (%)			<0.001
<\$38,000	32,054 (19.04)	2,163 (29.59)	
\$38,000 - \$47,999	38,387 (22.80)	1,915 (26.19)	
\$48,000 - \$62,999	44,880 (26.66)	1,704 (23.31)	
>\$63,000	53,035 (31.50)	1,529 (20.91)	
Education <sup>a</sup> , No. (%)			<0.001
≥ 21%	34,190 (20.30)	2,706 (37.01)	
13% - 20.9%	44,245 (26.27)	2,067 (28.27)	
7% - 12.9%	53,541 (31.79)	1,640 (22.43)	
<7%	36,459 (21.65)	899 (12.29)	
Great circle distance <sup>b</sup> , mean (SD), miles	28.9 +/- 109.22	24.25 +/- 104.54	0.0004
Charlson-Deyo Score <sup>c</sup> , No. (%)			<0.001
0	116,590 (68.10)	5,770 (77.53)	
1	38,600 (22.55)	1,293 (17.37)	
2	11,320 (6.61)	250 (3.36)	
3	4,689 (2.74)	129 (1.73)	

<sup>a</sup> Education was defined as number of adults in the patient's zip code who did not graduate from high school.  
<sup>b</sup> Great circle distance was defined as the distance in miles between the patient's residence and the hospital that reported the case.  
<sup>c</sup> Charlson/Deyo value is a weighted score derived from the sum of the scores for each of the comorbid conditions listed in the Charlson-Comorbidity Score Mapping Table.



**Figure 1: Predictors of Advanced Disease**



**Figure 2: Kaplan-Meier Survival Estimates**

**Table 2: Preoperative Tumor Characteristics**

	Insured (n= 171,199)	Uninsured (n= 7,442)	p-value
<b>PREOPERATIVE TUMOR</b>			
Tumor size, mean (SD), cm	4.42 +/- 4.6	5.50 +/- 4.70	<0.001
Differentiation grade, No. (%)			<0.001
Well differentiated	12,244 (7.15)	384 (5.16)	
Moderately differentiated	36,394 (21.26)	1,230 (16.53)	
Poorly differentiated	78,541 (45.88)	3,960 (53.21)	
Undifferentiated, anaplastic	3,076 (1.80)	114 (1.53)	
Cell type not determined	40,944 (23.92)	1,754 (23.57)	
Tumor stage at diagnosis <sup>a</sup> , No. (%)			<0.001
Stage 0	3,081 (1.80)	40 (0.54)	
Stage I	35,769 (20.89)	852 (11.45)	
Stage II	21,970 (12.83)	723 (9.72)	
Stage III	27,921 (16.31)	1,159 (15.57)	
Stage IV	51,726 (30.21)	3,436 (46.17)	
Not applicable	5,066 (2.96)	205 (2.75)	
Unknown	25,666 (14.99)	1,027 (13.80)	
Metastatic disease, No. (%)			<0.001
No	115,122 (70.82)	3,815 (55.10)	
Yes	42,370 (26.07)	2,906 (41.97)	
Not applicable	5,058 (3.11)	203 (2.93)	

<sup>a</sup> Staging based on CT criteria and EUS according to American Joint Committee on Cancer (AJCC)

## RESULTS

- 171,199 patients (95.8%) had insurance in comparison to 7,442 patients (4.2%) who didn't have insurance
- Univariate analysis between the groups demonstrated a statistically significant higher proportion of poor differentiation, advanced disease, and metastasis at time of diagnosis in the uninsured group (Table 2)
- After adjusting for demographic and socioeconomic variables, being insured was the main predictor for not having metastatic disease at diagnosis OR: 0.60 (Figure 1)
- Median time to all-cause mortality was estimated at 45 months for uninsured patients vs. 60 months for insured patients (Figure 2)
- An adjusted Cox regression model demonstrated a similar trend favoring the insured group HR: 0.74 (95% CI 0.70-0.77, p-value <0.001)

## CONCLUSIONS

- There is an association between insurance status and disease stage at time of diagnosis for patients with gastric cancer
- Patients without insurance present with advanced disease and have a lower survival rate compared to insured patients