

Socioeconomic Indicators, Tumor Stage, and Mortality After Lobectomy: A Census-Linked Analysis

Andrew J. Bedard BS¹, Emma Wong BS¹, Brandon Dyer¹, Carla C. Moodie PA-C², Joseph R. Garrett MPH ARNP-C², Diana K. De La Cruz PA-C², Lindsay P. Power PA-C², Jenna R. Tew PA-C², Jobelle Joyce-Anne R. Baldonado MD², Jacques P. Fontaine MD2, Samuel T. Freyaldenhoven MD², and Eric M. Toloza MD PhD²

¹ USF Health Morsani College of Medicine, University of South Florida, Tampa, FL, USA ² Thoracic Oncology, Institution is Moffitt Cancer Center, Tampa, FL, USA.

Introduction:

- Various socioeconomic indicators contribute to patient care, with factors, such as lack of insurance, lower income, and education, contributing to lower survival following pulmonary resection
- Individual-level measures are optimal for identifying socioeconomic contributions, but multiple barriers to gathering these data.
- Area-level composite indices and geographic measurements offer more convenient approximations but lack proven validity.

Objective:

- To evaluate relationships between census-derived socioeconomic indicators, tumor stage at presentation, and postoperative mortality following lobectomy.

Methods:

- Study Design: Retrospective Cohort Analysis.
- Population: 845 patients who underwent robotic-assisted pulmonary lobectomy from 2010-2025.
- Census Tract Variables Analyzed:
 - median household income,
 - poverty rate,
 - unemployment rate,
 - insurance coverage,
 - educational attainment,
- Tumor stage (I–IV) and mortality outcomes (in-hospital, 30-day, and 90-day) were examined.
- Statistics: Univariate analyses used Spearman and Kendall correlations and Mann-Whitney U tests with Cliff’s delta effect sizes. Multivariate logistic regression modeled mortality with adjustment for Charlson Comorbidity Index (CCI) and tumor stage. Overall survival was evaluated with Kaplan-Meier, log-rank, and Cox proportional-hazards analyses.

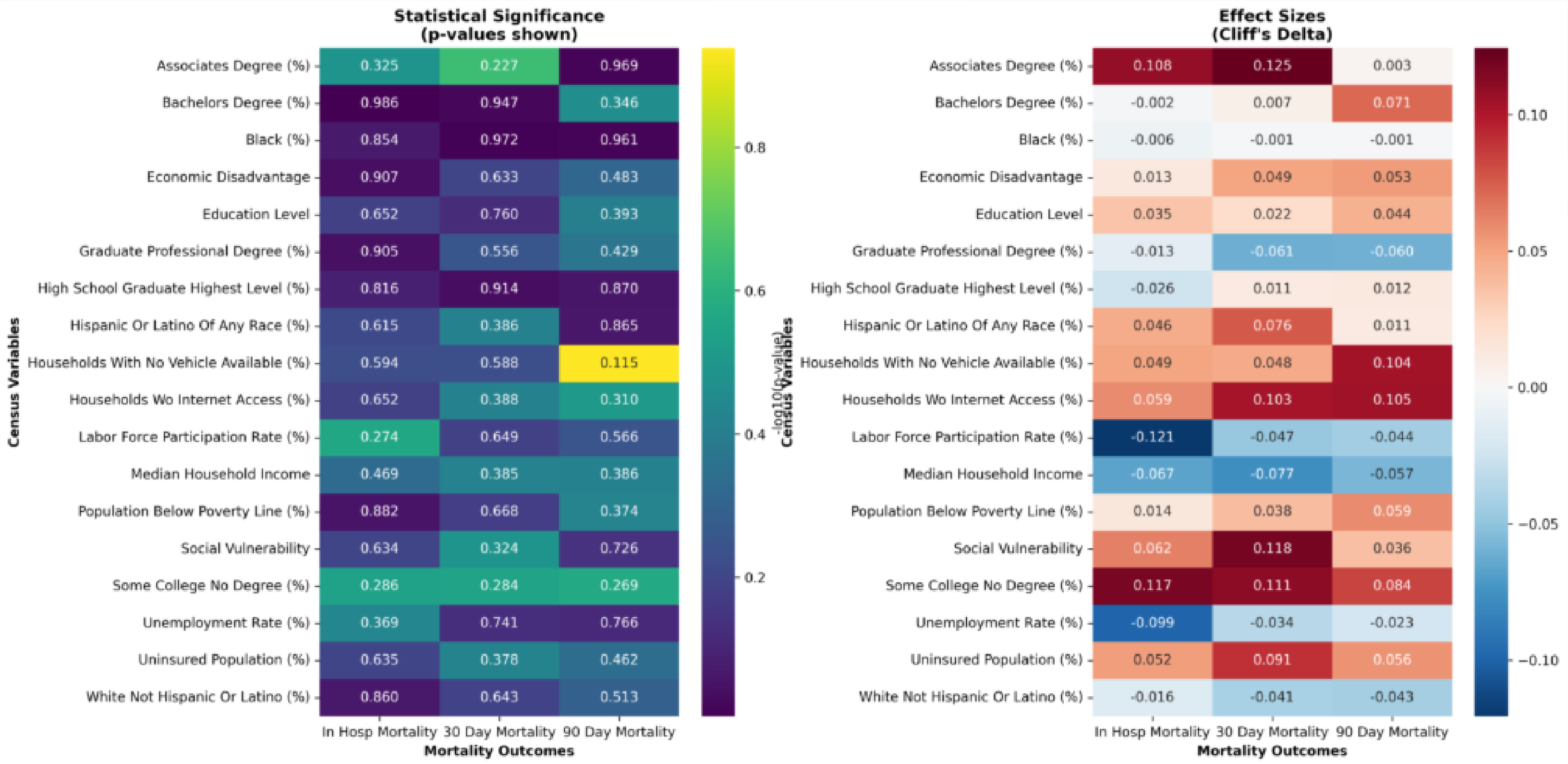


Figure 1: Univariate Analysis Results

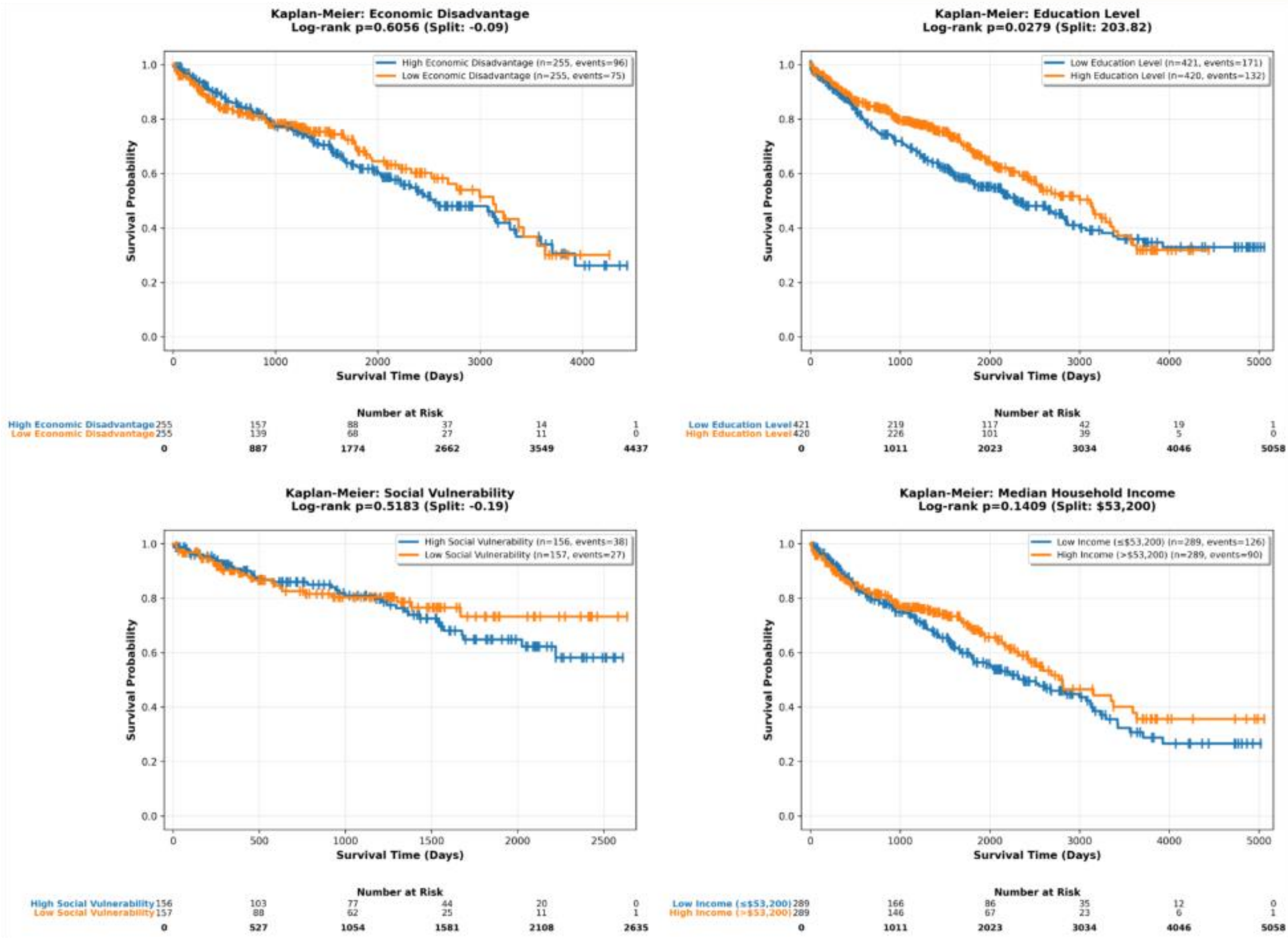


Figure 2: Kaplan-Meier Overall Survival Curves.



USF Health

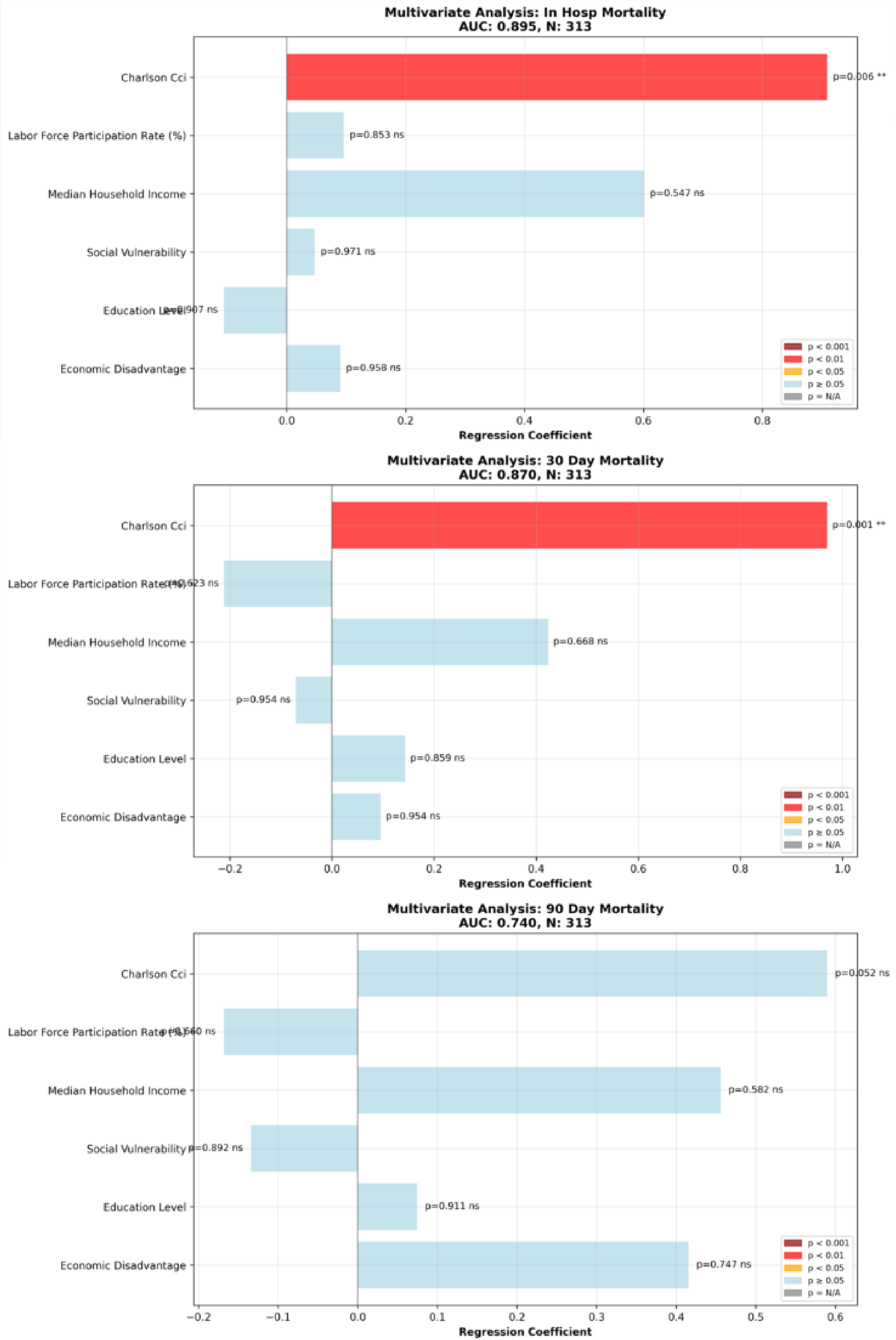


Figure 3: Multivariate Regression Results, with P-values

Results:

- Among 807 patients with stage data, 61% were early stage (I–II) and 39% late stage (III–IV). Tumor stage showed no significant association with composite socioeconomic scores or individual variables (all $p > 0.05$), except for a small correlation with unemployment rate ($p \approx 0.01$, very small effect).
- Mortality rates were 1.5% (in-hospital), 1.8% (30-day), and 3.6% (90-day). Across univariate and multivariate analyses, Charlson Comorbidity Index was the only consistent independent predictor ($p = 0.024$ for in-hospital mortality; $p = 0.007$ for 30-day mortality).
- Kaplan-Meier curves showed no overall survival difference by SES measures (all $p > 0.1$) except for higher education level, which was associated with longer overall survival (log-rank $p = 0.028$). In Cox regression, CCI remained the only significant covariate (HR 1.225, $p = 0.0015$).

Conclusions:

- In this surgical cohort, socioeconomic indicators were not associated with tumor stage or immediate postoperative mortality.
- The Charlson Comorbidity Index remained the strongest predictor of early and short-term mortality, with higher education level showing a modest association with improved overall survival.
- Among patients treated at a tertiary cancer center, where socioeconomic gradients were relatively constrained, SES measures provided limited prognostic value for short-term outcomes beyond comorbidity burden.