Prostate Cancer Quality of Care Disparities and Their Impact on Patient Outcomes

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Importance

- A paucity of data exists supporting the use of expert defined prostate cancer quality indicators (QIs) for benchmarking hospital-level performance in a manner that captures disparate patient outcomes.

Objective

- To examine the association between hospital-level performance on expert-defined prostate cancer QIs and patient outcomes and subsequently utilize this data to derive and validate a composite measure of hospital-level prostate cancer quality of care.

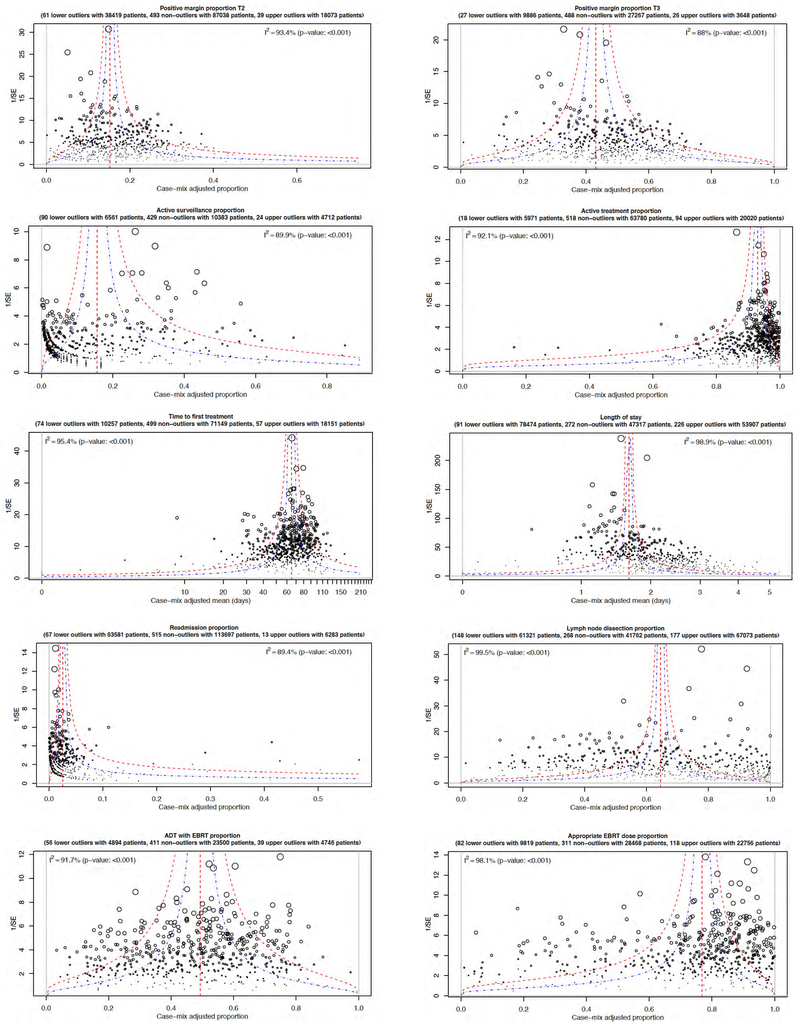

Figure 1: Benchmarking Hospital Performance

Case-mix adjusted performance for individual hospitals (circles, size proportional to hospital volume) benchmarked for quality according to disease-specific quality indicators. Vertical dashed red line represents the average nationwide hospital performance. The y-axis represents the inverse standard error of the case-mix adjusted performance measure, with the dashed red funnel giving the 95% non-rejection region for the null of equivalence between observed and expected performance (blue dashed funnel indicates bonferroni correction applied). Between hospital variance is reported on each plot as I^2.

Methodology

Participants: Men with a diagnosis of primary non-metastatic prostate cancer were identified from the United States National Cancer Database between 2004-2014. Two cohorts were evaluated: A training cohort (367016 patients across 638 hospitals), utilized to derive associations between hospital-level QI performance and patient outcomes; and a validation cohort (433325 patients across 637 hospitals), utilized to derive associations between our developed composite measure of hospital-level prostate cancer quality (the Prostate Cancer Quality Score; PC-QS) and patient outcomes.

Exposure: In the training cohort, outlier hospitals performing better (good quality) or worse (poor quality) than the national average across 10 expert-defined disease-specific QIs were identified. In the validation cohort, hospitals with a positive (good quality) vs. negative (poor quality) PC-QS were identified.

Main outcomes and measures: Patient-level outcomes, including the need for salvage (radiation or surgery) therapy, initiation of androgen deprivation therapy as well as 30-day, 90-day and overall mortality were assessed between good vs. poor quality hospitals. Hospital volume, academic affiliation and geographical location were secondary measures.

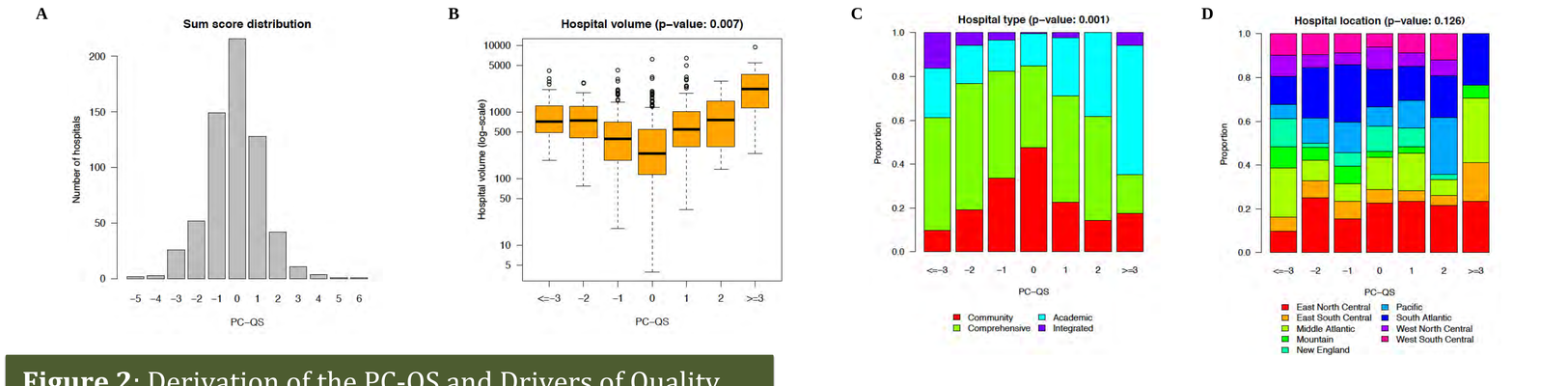

Figure 2: Derivation of the PC-QS and Drivers of Quality

A composite measure of prostate cancer quality, the PC-QS, was derived from integrating the performance of a given hospital across individual QIs. Notably, active treatment and time to treatment QIs were excluded, as superior performance was associated with inferior patient outcomes. Histogram displays the distribution of hospitals within the validation cohort by PC-QS (Panel A). Association between hospital quality, measured by the PC-QS and hospital volume (Panel B), type (Panel C) and geographical location (Panel D). Statistical significance was derived by comparing positive vs. negative PC-QS hospitals.

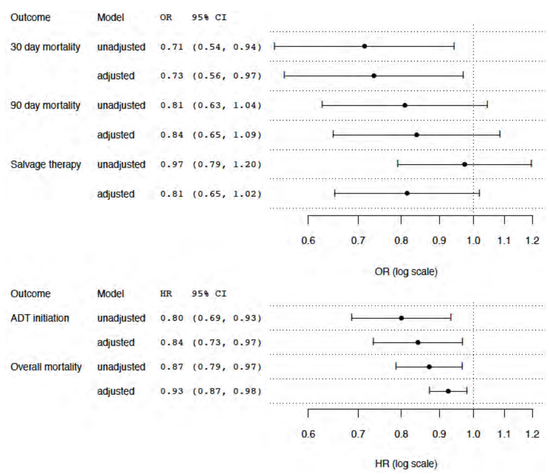

Figure 3: Impact of Hospital Quality on Patient Mortality

Unadjusted and case-mix adjusted associations between hospital-level quality, measured by the PC-QS, and the rate of salvage therapy (surgery or radiation), ADT initiation, 30-day mortality, 90-day mortality and overall mortality. Values displayed reflect odds ratio (OR) and hazard ratio (HR) when comparing hospitals with a positive vs. negative PC-QS. CI = confidence interval.

Summary

- Widespread hospital-level quality variations for prostate cancer care exist.
- The PC-QS is a composite measure of hospital-level quality, readily derived from the NCDB, that independently predicts patient outcomes.
- Poor quality hospitals are associated with higher rates of 30-day mortality, ADT initiation and overall mortality.
- Superior quality is associated with higher hospital volume and academic affiliation.
- Data-driven benchmarking approaches can identify gaps in quality care delivery and aid the prioritization of educational and policy initiatives.

Disclosures & Acknowledgements

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