

# Good Wishes Aren't Enough: Racial Disparity in Surgical Outcomes Despite Institutional Mission

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## BACKGROUND

The NSQIP Pediatric Surgical Risk Calculator (PSRC) utilizes 17 patient predictors in conjunction with the planned procedure to estimate the patient-specific likelihood of post-operative complications within 30 days. The NSQIP-P database demonstrated worse surgical outcomes in apparently healthy black patients as compared to white peers, with 3.43 times odds of death postoperatively. Causality is likely multifactorial, but poorly understood. Our institutional Mission includes improving the health status of our rural, underserved, and relatively high population of minority patients, as well as the training of minority physicians.

## PROJECT AIM

To assess pediatric surgical patients using the PSRC to validate it in our population, compare predicted to actual outcomes, identify causes of differences, and compare our outcomes with national reporting.

## METHODS

ECU Health records from 2015-2018 were queried for NSQIP-P inclusion criteria (N=2,650). PSRC variables, CPT codes, and 30-day postoperative complications were collected and entered into the PSRC. Outcome predictions were stratified by race and compared with actual outcomes. Odds ratios with 95% confidence intervals are provided as measures of strength and association, used to compare post-operative outcomes and receiver operator characteristics (ROC) analysis was used to estimate the accuracy of actual versus expected outcomes as estimated by area under the ROC curve (AUC).

## RESULTS

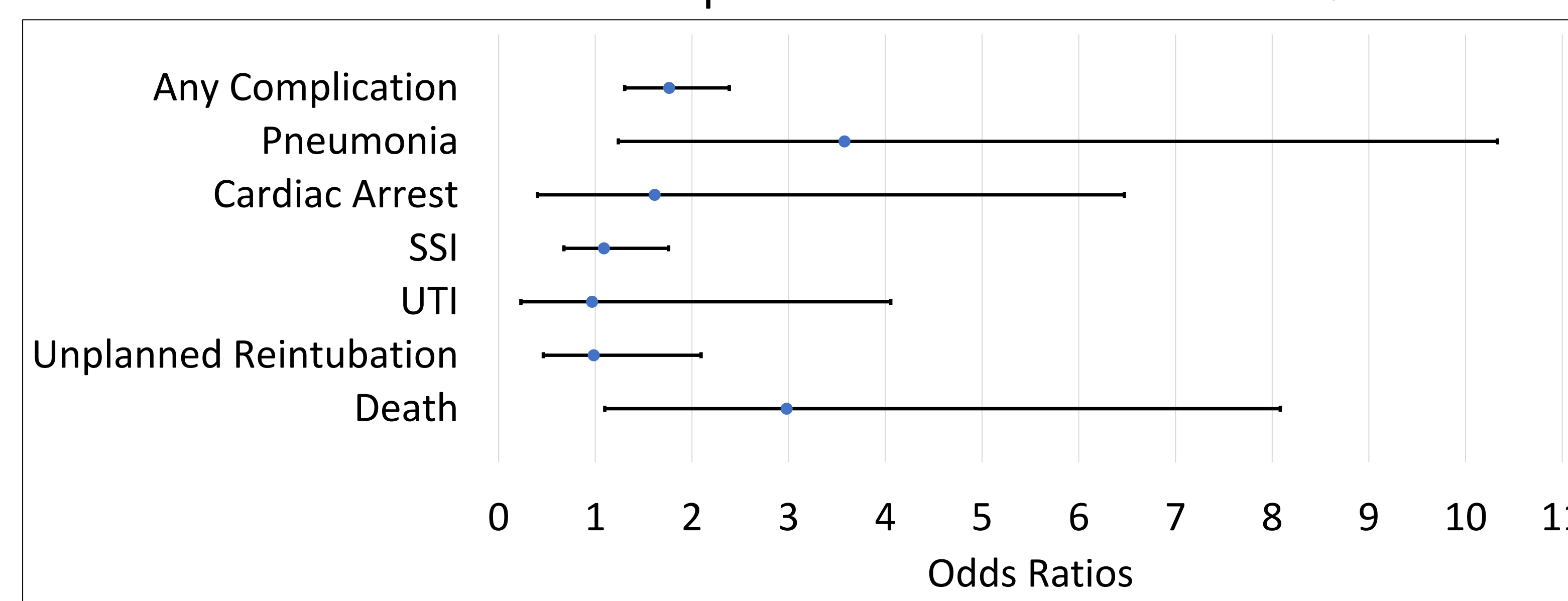
Table 1: Area Under the Curve with 95% Confidence Intervals

	Any Complication	Pneumonia	Cardiac Arrest	Surgical Site Infection	Urinary Tract Infection	Venous Thrombo-embolism	Renal Failure	Unplanned Reintubation	Death
<b>All</b>	0.818 (0.786-0.849) <b>Good</b>	0.908 (0.829-0.987) <b>Excellent</b>	0.884 (0.740-1.0) <b>Good</b>	0.799 (0.749-0.848) <b>Fair</b>	0.788 (0.662-0.912) <b>Fair</b>	0.961 (0.932-0.990) <b>Excellent</b>	0.988 (0.981-0.995) <b>Excellent</b>	0.703 (0.598-0.807) <b>Fair</b>	0.933 (0.860-1.0) <b>Excellent</b>
<b>Black</b>	0.819 (0.773-0.864) <b>Good</b>	0.841 (0.705-0.978) <b>Good</b>	0.956 (0.905-1.0) <b>Excellent</b>	0.819 (0.738-0.899) <b>Good</b>	0.840 (0.690-0.989) <b>Good</b>	0.932 (0.916-0.948) <b>Excellent</b>	0.978 (0.965-0.990) <b>Excellent</b>	0.612 (0.433-0.792) <b>Poor</b>	0.975 (0.953-0.996) <b>Excellent</b>
<b>White</b>	0.803 (0.752-0.854) <b>Good</b>	0.977 (0.966-0.988) <b>Excellent</b>	0.816 (0.546-1.0) <b>Good</b>	0.787 (0.717-0.857) <b>Fair</b>	0.862 (0.706-1.0) <b>Good</b>	0.957 (0.947-0.968) <b>Excellent</b>	0 <b>N/A</b>	0.734 (0.588-0.879) <b>Fair</b>	0.859 (0.676-1.0) <b>Good</b>

Table 2: Predicted VS actual incidence of complications

	Any Complication	Pneumonia	Cardiac Arrest	Surgical Site Infection	Urinary Tract Infection	Venous Thrombo-embolism	Renal Failure	Unplanned Reintubation	Death
<b>PREDICTED BY RISK CALCULATOR</b>									
<b>All (n=2650)</b>	145.91 (5.51%)	10.26 (0.39%)	6.04 (0.23%)	55.56 (2.10%)	8.65 (0.33%)	3.17 (0.12%)	1.98 (0.07%)	13.30 (0.50%)	14.25 (0.54%)
<b>Black (n=888)</b>	61.27 (6.90%)	4.69 (0.53%)	3.23 (0.36%)	20.11 (2.26%)	3.53 (0.40%)	1.64 (0.18%)	1.19 (0.13%)	6.64 (0.75%)	8.60 (0.97%)
<b>White (n=1431)</b>	65.71 (4.59%)	4.15 (0.29%)	2.30 (0.16%)	27.27 (1.91%)	4.15 (0.29%)	1.18 (0.08%)	0.54 (0.04%)	4.97 (0.35%)	4.60 (0.32%)
<b>ACTUAL COMPLICATIONS</b>									
<b>All (n=2650)</b>	209 (7.89%)	19 (0.72%)	8 (0.30%)	86 (3.25%)	10 (0.38%)	3 (0.11%)	3 (0.11%)	33 (1.25%)	17 (0.64%)
<b>Black (n=888)</b>	94 (10.59%)	11 (1.24%)	4 (0.45%)	29 (3.27%)	3 (0.34%)	1 (0.11%)	3 (0.34%)	11 (1.24%)	11 (1.24%)
<b>White (n=1431)</b>	90 (6.29%)	5 (0.35%)	4 (0.28%)	43 (3.0%)	5 (0.35%)	1 (0.07%)	0 (0%)	18 (1.26%)	6 (0.42%)

Table 3: Odds Ratios of black children compared to white Peers with 95% Confidence Intervals



When evaluating the PSRC for all patients, outcome prediction was Excellent for 4 outcomes, Good for 2 outcomes, and Fair for 3 outcomes (Table 1). No outcome predictions rated as poor or failed. Predicted vs actual incidence of complications can be found in Table 2. This demonstrates overall validation of the PSRC to our disparate patient population, though it could not be validated for renal failure in white patients (due to absence of this complication) and it should be used with caution in predicting unplanned intubation. For patients of all health categories, black children had 2.98 times the odds of dying within 30 days postoperatively (95% CI: 1.1, 8.08) as compared to white peers (Table 3). Black children had 1.76 times the odds of experiencing any complication (95% CI: 1.3, 2.39) as compared to white peers. The odds of mortality in our combined healthy and seriously ill population was less than reported for only the healthiest nationally (2.98 vs 3.48).

## CONCLUSION

Black children remained at greater risk of post-operative complications and mortality, although less so than national averages. This disparity was largely, but not entirely, explained by pre-operative comorbidity. Dedicated institutional mission may improve outcomes in minority children.

## ACKNOWLEDGEMENTS

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