

Operational Hospital Metrics and Healthcare Delivery: Exploring Disparities in Communities of Focus



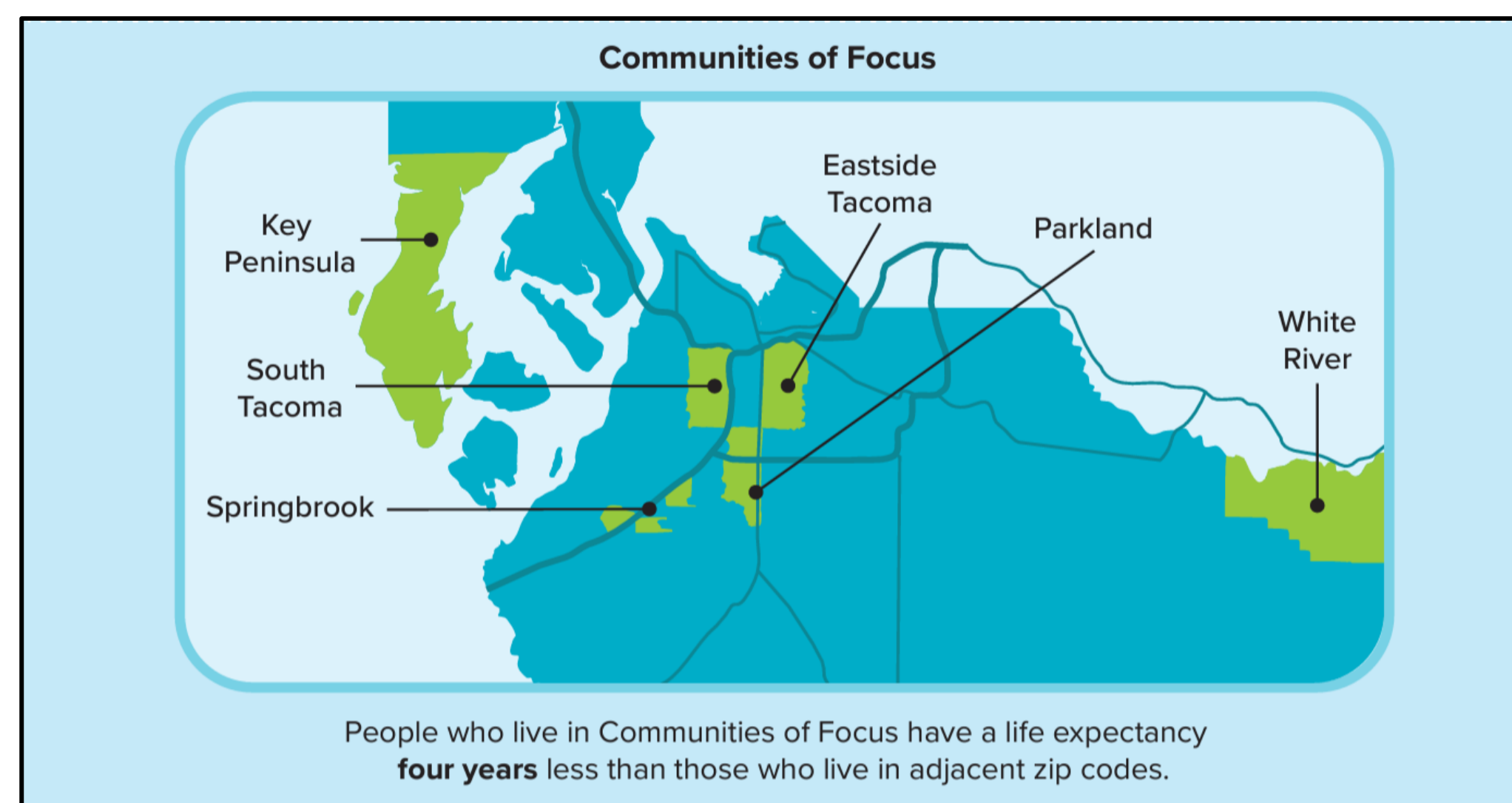
Student Presenters: CJ James (Senior), Biomedical Sciences and Ahmed Ahmed (Junior), Milgard School of Business
 Faculty Mentors: Alireza Bolori, PhD, Milgard School of Business and Sharon Laing, PhD, UWT School of Nursing

Background

- Two measures often used to determine hospital quality include patient length of stay (LOS) and cause-specific 30-day readmission rate (CSR)-
- Higher LOS and CSR metrics are indicators for a low-quality hospital and are costly for the hospital system with around 20% of patients being readmitted—costing the US healthcare system over \$17 billion annually.⁷ As a result, hospitals strive to lower both of these metrics^{1,7}.
- Because length of stay is the only controllable factor of the two, attempts have been made to establish LOS as an associated predictor for CSR, but the consensus has been unclear¹⁻⁷ due to disease complications³, risk factors, and regionality differences that confound their relationship^{2-4,6}.
- To establish a more holistic understanding between the relationship of LOS and CSR, we investigated 6 areas in Pierce County that the Tacoma-Pierce County Health Department (TPCHD) designated as Communities of Focus (CoF): East Tacoma, South Tacoma, Springbrook, Key Peninsula, Parkland, and White River.
- In Pierce County, these 6 communities face some of the worst health outcomes and limited opportunities to improve life expectancy, poverty, unemployment, high school graduation, frequency of mental distress, smoking, obesity, diabetes, and Adverse Childhood Experiences (ACEs)⁸. By comparing these communities across Washington state, we can granularize our identification for groups at higher risk of CSR to promote future policy changes at the county level.

Purpose

- The objective of this study is to evaluate the relationship between LOS and CSR among Communities of Focus and to compare those findings across Washington state.



Methods

- This work is led by a group of multidisciplinary researchers from UW Tacoma's School of Nursing & Healthcare Leadership, Milgard School of Business, and School of Interdisciplinary Arts & Sciences.

Variables

- Length of stay (Independent Variable):** duration of time from patient hospital admission to patient hospital discharge, in days.
- Cause-specific 30-day readmission (Dependent Variable):** a patient's admission and subsequent readmission, within 30 days, for the same primary diagnosis made for one of 6 primary diagnoses.
- Control Variables:** Age, ethnicity, geographical area, and the multidimensional deprivation index (MDI) which accounts for a county's standard of living, health, education, economic security, housing quality, and neighborhood quality.

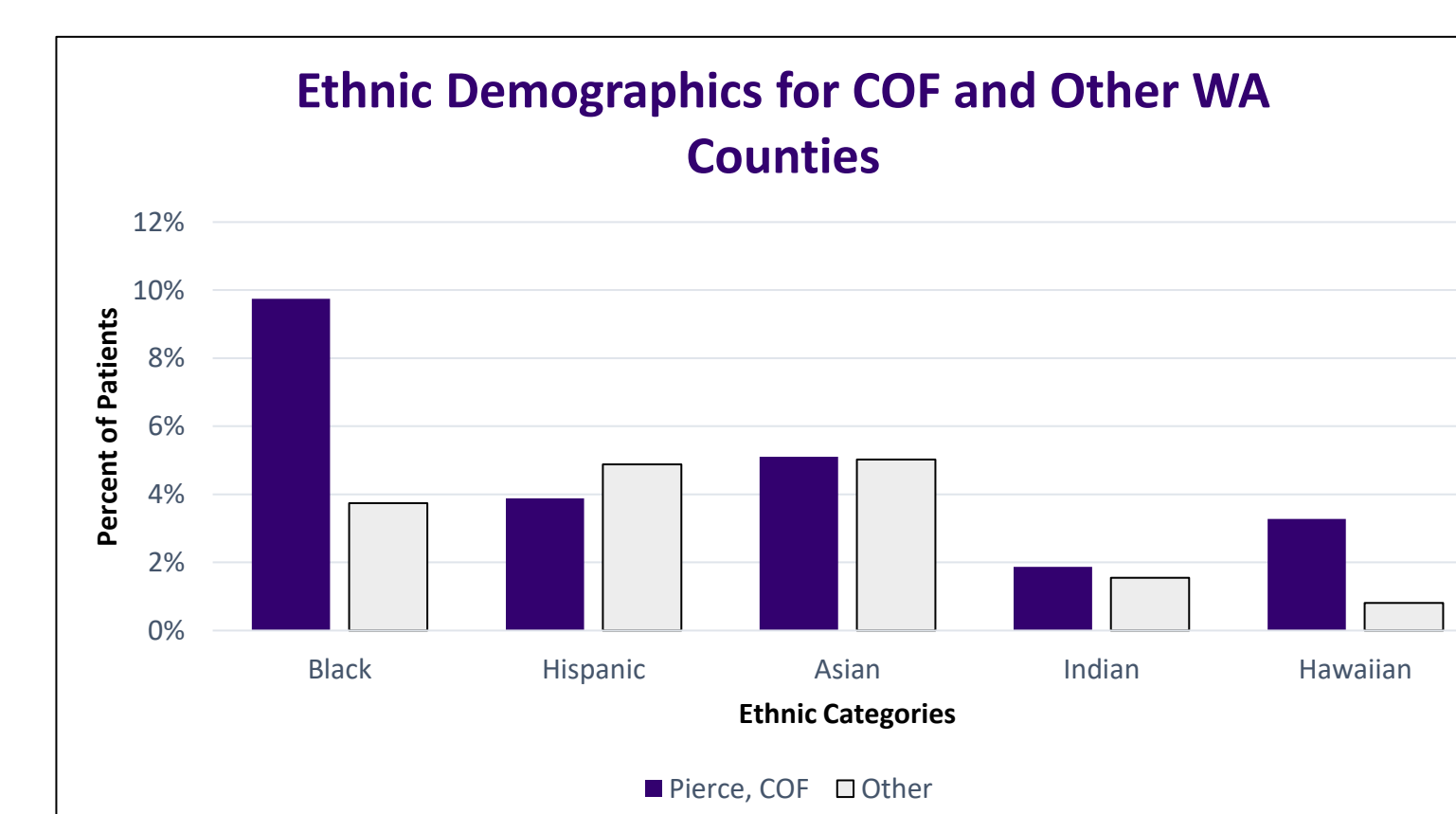
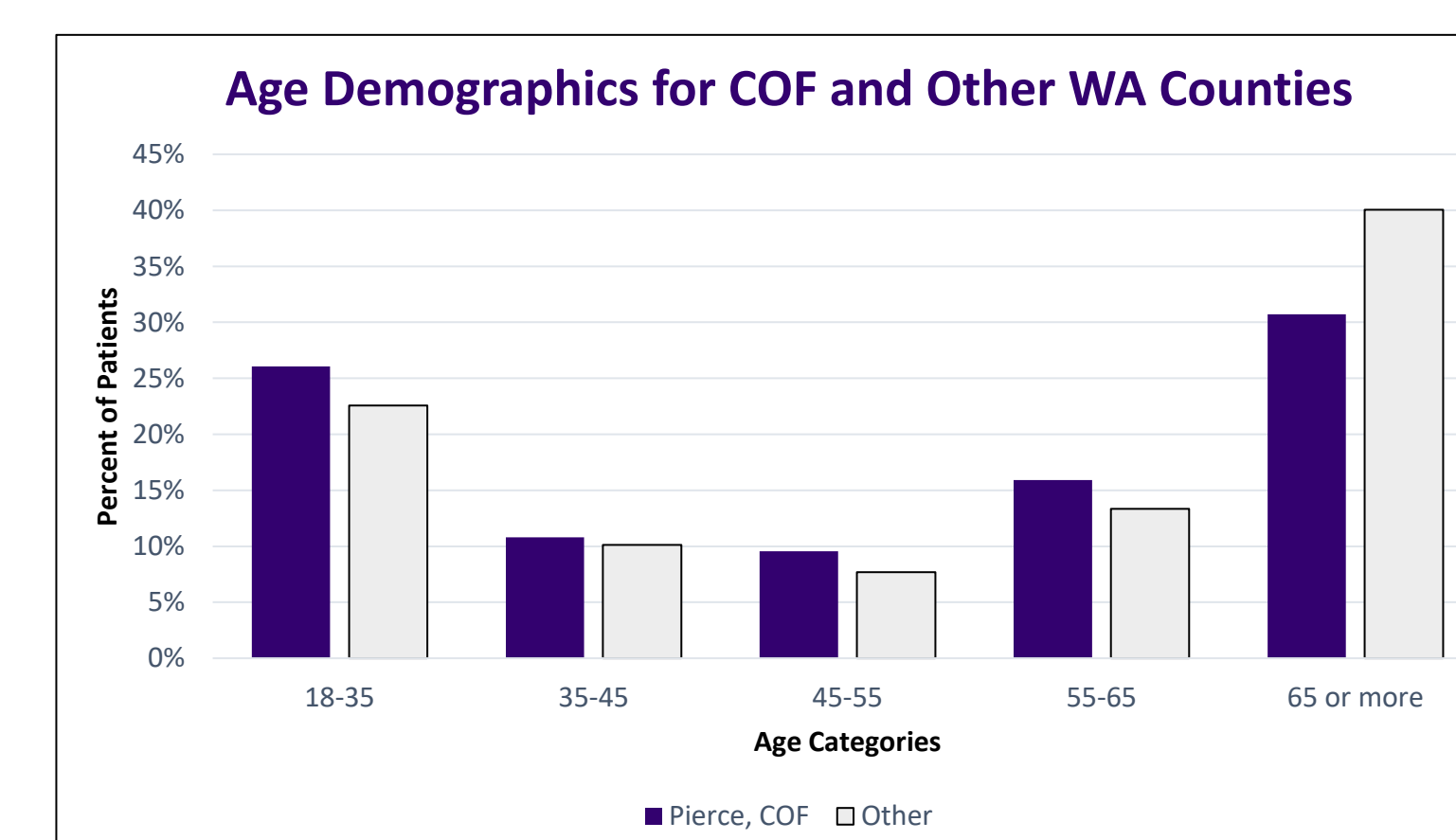
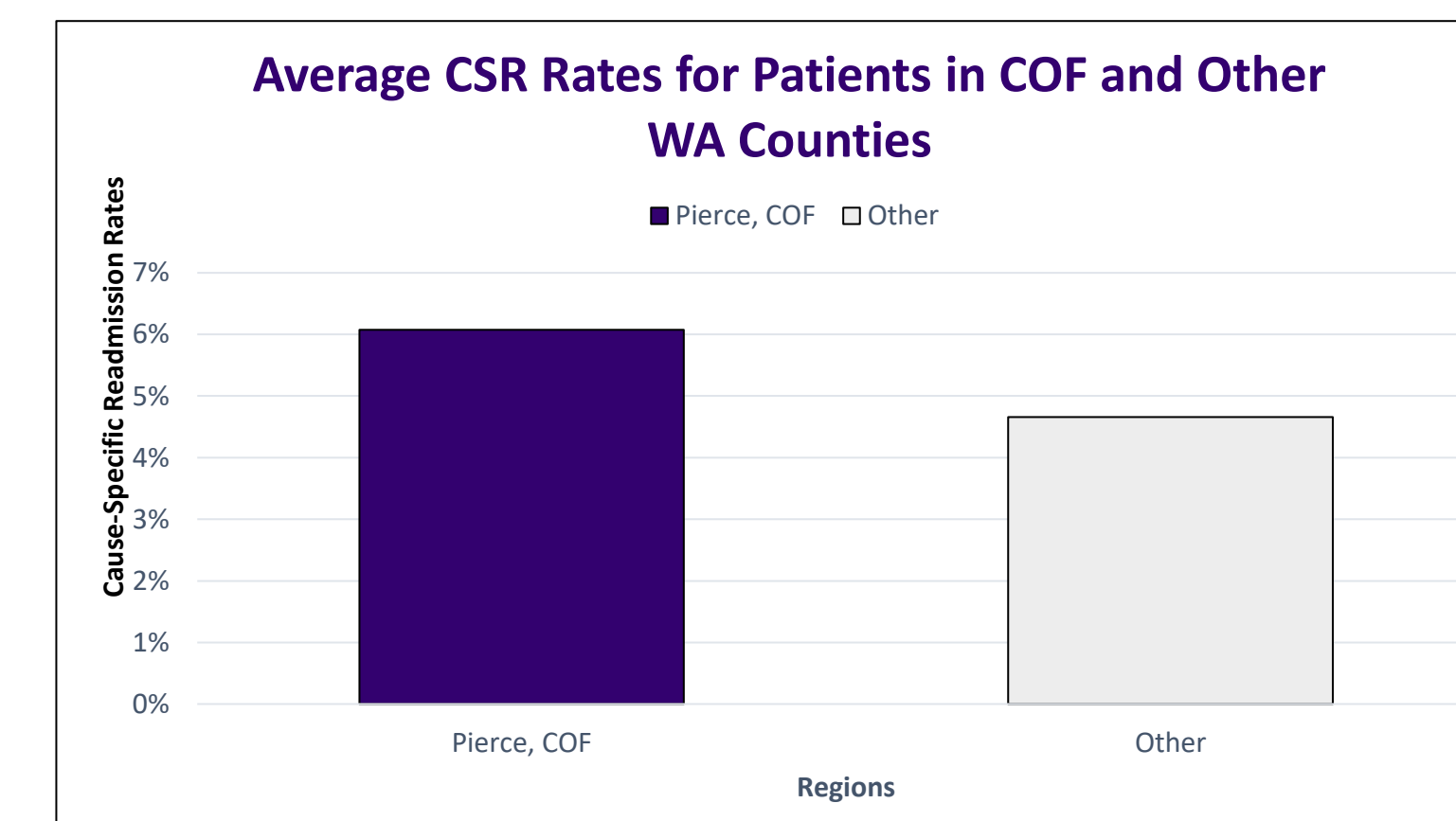
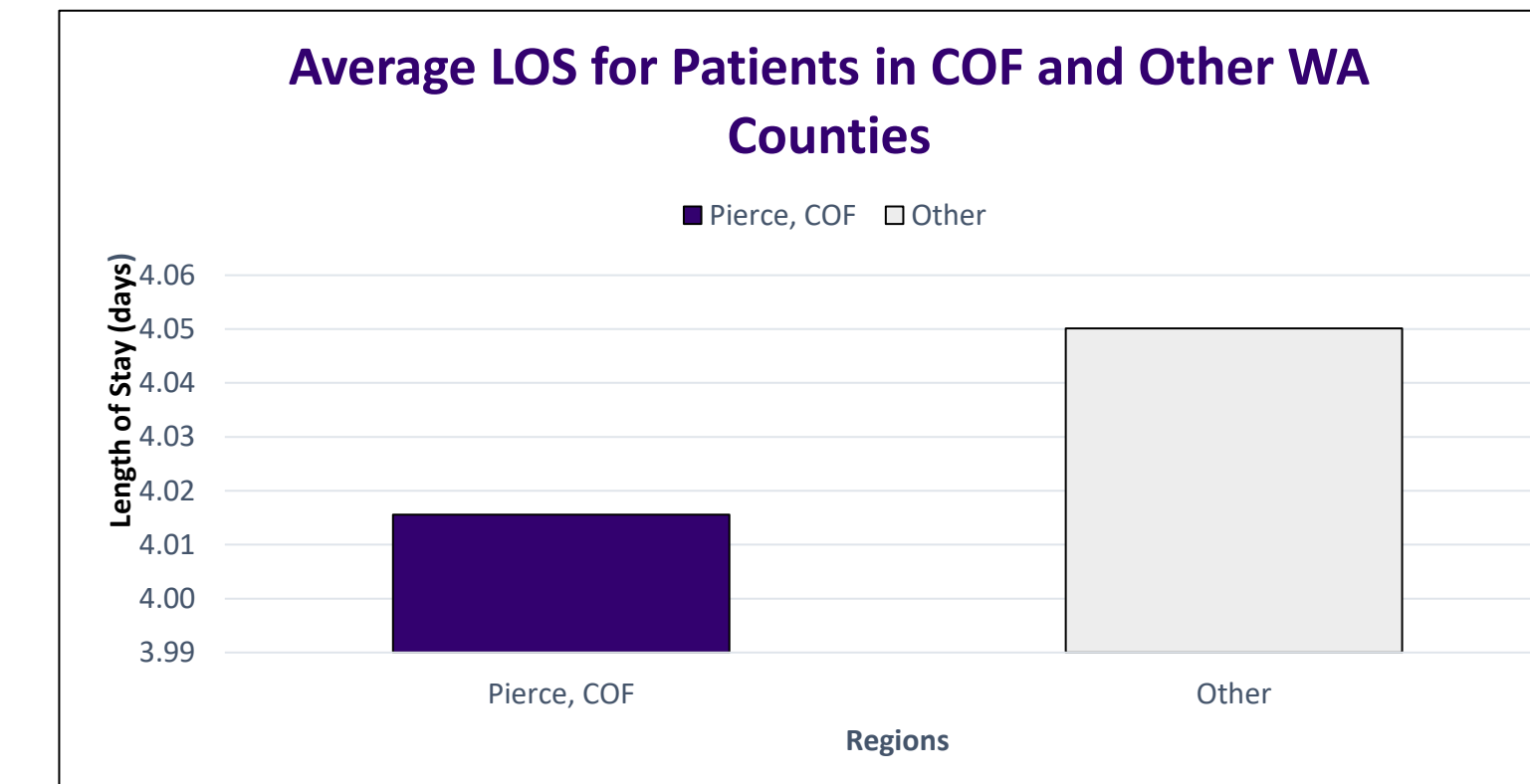
Study Design

- Data was acquired by the Washington State Department of Health, Center for Health Statistics.
- Comprehensive Hospital Abstract Reporting System (CHARS) database was used.
- Our analysis includes 1,508,866 patients collected between January 2018 to December 2022.

Data Analysis

- We imported the raw data into SAS for data preprocessing/curation/characterization.
- We imported the curated data into R for logistic regression and collected Odds Ratios (ORs), 95% Confidence Intervals (CI), and P-values.

Results



Odds Ratios of LOS and Various Factors on CSR

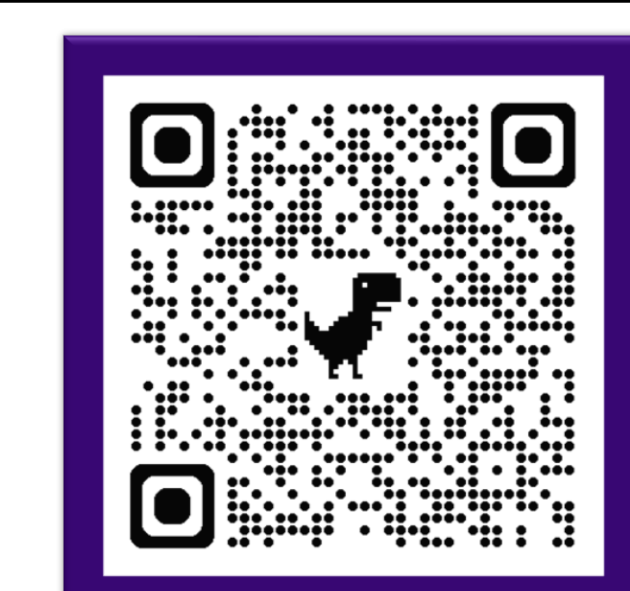
Variable/Description	Hospital Readmission (30-days, cause-specific)
Independent Variable	
Length of stay (days)	1.005 (1.00-1.01) ***
Control: Geographical area, Reference category (RC) = Other counties in WA state (excluding Pierce county)	
Pierce county, communities of focus (CoF)	3.973 (3.77-4.19) ***
Pierce county, other areas (excluding CoF)	3.834 (3.68-4.00) ***
Control: Age, RC = 0-18	
18-35	1.680 (1.53-1.84) ***
35-45	2.213 (2.02-2.43) ***
45-55	2.905 (2.66-3.17) ***
55-65	3.477 (3.19-3.79) ***
65 or more	3.161 (2.89-3.45) ***
Control: Gender, RC = Male	
Female	0.816 (0.80-0.83) ***
Control: Race, RC = White	
Black	1.050 (1.00-1.10) *
Hispanic	1.009 (0.96-1.06)
Asian	0.838 (0.80-0.88) ***
Indian	1.120 (1.04-1.20) **
Hawaiian	1.157 (1.06-1.26) ***
Control: Multi-dimensional deprivation index (continuous)	1.360 (1.35-1.37) ***

SOURCE: Authors' analysis of the CHARS data, 2018–22 (results are obtained from logistic regression models).
 NOTES: * p < 0.1, ** p < 0.05, *** p < 0.01, **** p < 0.001.

Discussion

- Our findings suggest that our CoF are at higher chance for increased CSR due to identified risks from age, gender, race, geographical differences, and multi-dimensional deprivation index.
- Though this analysis establishes a statistically significant positive correlation between LOS and CSR, our findings suggest that several other factors have associations with increased readmission risks.
- As a result, further work is needed to conclude a causal connection between LOS and CSR, as many potential variables exist that may confound the relationship.

References



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