

Socioeconomic Disparities in Pediatric Scoliosis Surgery

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INTRODUCTION

Multiple studies have been published which investigate the effects of patient demographics on elective orthopedic operations. While this research demonstrates disparities in health care delivery in other states and in single center practices, there are large administrative databases that can be used to examine patient demographics and their influence on health care delivery. We queried the State of California Office of Statewide Health Planning and Development (OSHPD) database to compare the proportions of patients undergoing surgery for scoliosis by gender, race, and ethnicity and to determine if there were underlying differences in social determinants of health as measured by the child opportunity index (COI), social deprivation index (SDI), and insurance type among these patients in order to create a foundation of knowledge for future research on health disparities in the realm of orthopaedic surgery.

METHODS AND MATERIALS

Patient data were derived from California's Office of Statewide Health Planning and Development (OSHPD). COI data were retrieved from the Child Opportunity Index 2.0 Database via the Institute for Child, Youth and Family Policy at the Heller School for Social Policy and Management. SDI data was obtained through the Robert Graham Center for Policy Studies. California Census data was used as a comparison to the patient population. California residents ≤ 20 years old undergoing surgery for all types of scoliosis between 2015 to 2019 in California were included. Patients who were not from California were excluded. Basic demographics including age, gender, ethnicity, race, and payer category were obtained. Primary outcomes were COI and SDI using aggregated Zip Code Tabulation Area (ZCTA). Secondary outcomes were length of stay (LOS) and total charge.

RESULTS

Between 2015-2019, 4542 patients underwent surgery for scoliosis in California. Mean age was 13.5±3.7 years, with 67.5% females. 36.4% were Hispanic, while 62.3% were non-Hispanic. Race distribution was 52.4% White, 7.7% Black, and 10.3% Asian/Pacific Islander, forming a difference between census and operative data of -19.5% White, +1.2% Black, and -5.7% Asian/Pacific Islander. Mean LOS was 5.4 days. Mean charge was \$276603. Mean state and nationally-normed COI was 53.1 and 49.2, respectively. Mean SDI was 60.6. The female cohort had significantly higher COI compared to males. SDI was significantly lower among females. Hispanics had lower COI compared to non-Hispanics. SDI were higher among Hispanics. Black patients had significantly lower COI and higher SDI compared to Asians and Whites. Medi-Cal patients had longer LOS, lower COI, and higher SDI.

DISCUSSION

In our effort to examine social determinants of health in the care of children and adolescents with scoliosis we have verified that race and gender are associated with the rate of scoliosis surgery and socioeconomic status variables (reflected in the surrogates of COI, SDI, and insurance type) are associated with differing LOS outcomes. Significant underlying differences in social determinants of health among patients ≤ 20 years undergoing surgery for scoliosis in the state of California were demonstrated. In particular, lower social determinants of health (lower COI, higher SDI) were observed among males, Hispanics, and Blacks, and these patients were more likely to be covered by Medi-Cal. This plays a role in access to resources and patient treatment venues.

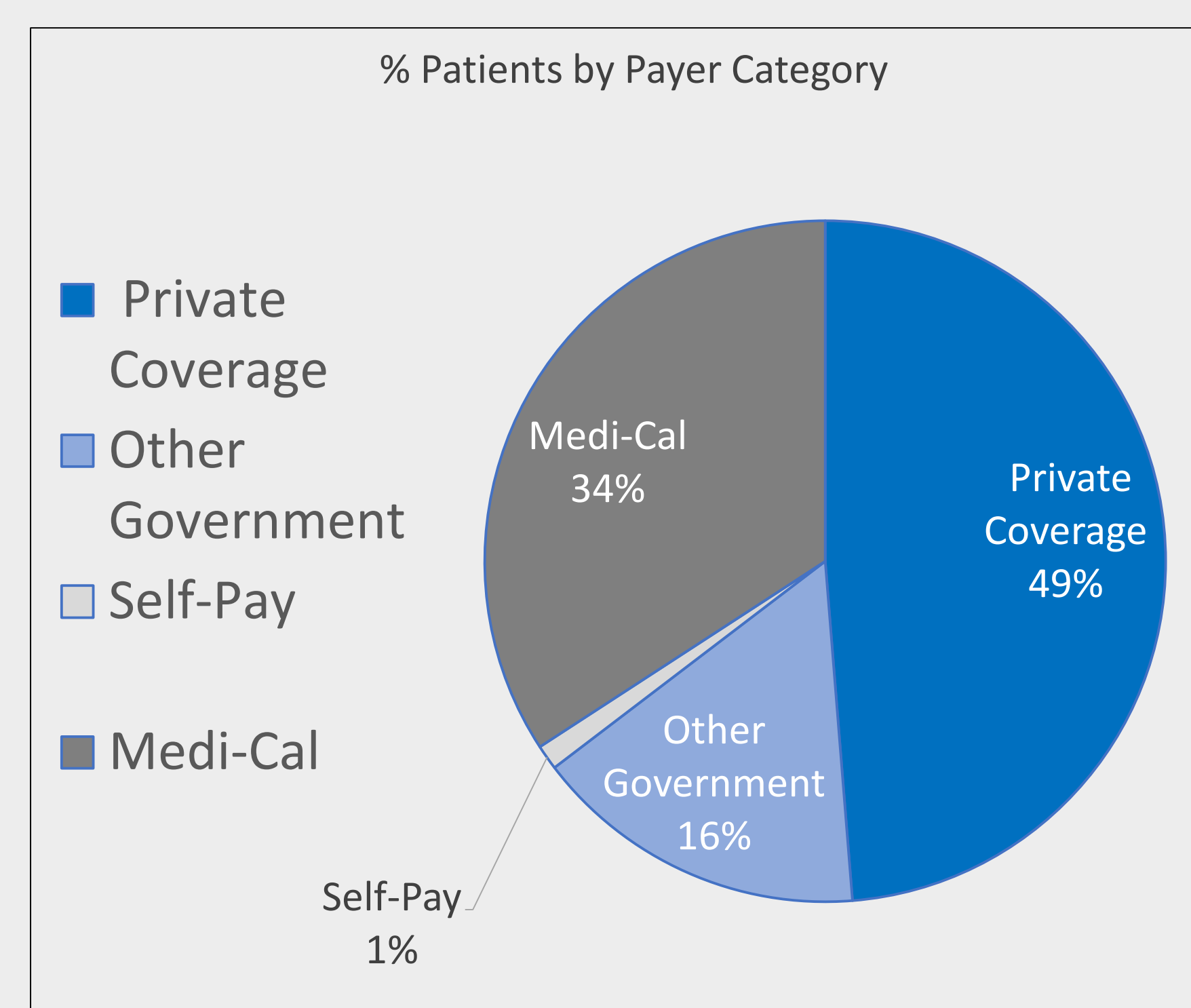
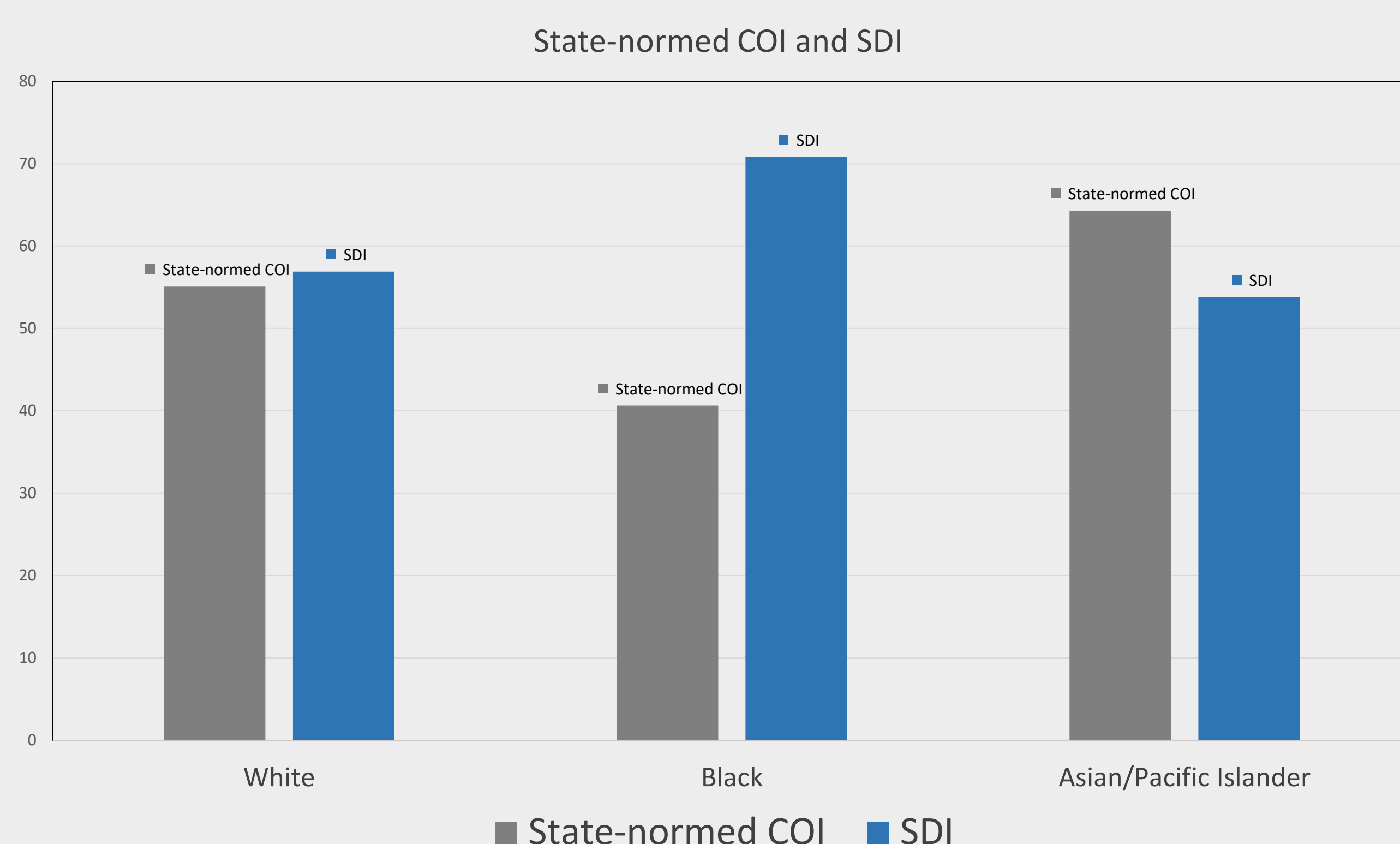


Table 6. Comparison by Payer Category

| Variable | Medi-Cal | Private Coverage | p-Value |
|--------------------------------|---------------|------------------|---------|
| Sample size | 1533 | 2214 | |
| Age (years, SD) | 13.1±4.4 | 13.9±3.2 | <0.001 |
| Female (n, %) | 973 (63.5%) | 1573 (71.0%) | <0.001 |
| Ethnicity | | | |
| · Hispanic | 853 (55.6%) | 461 (20.8%) | <0.001 |
| · Non-Hispanic | 659 (43.0%) | 1724 (77.9%) | <0.001 |
| Race | | | |
| · White | 736 (48.0%) | 1300 (58.7%) | <0.001 |
| · Black | 144 (9.4%) | 136 (6.1%) | <0.001 |
| · Asian/Pacific Islander | 110 (7.2%) | 277 (12.5%) | <0.001 |
| Length of stay (days, SD) | 5.3±5.4 | 4.6±5.4 | <0.001 |
| Total charge (\$, SD) | 246917±193888 | 273543±210781 | <0.001 |
| Overall COI, nationally-normed | 33.9±24.8 | 60.9±28.6 | <0.001 |
| Overall COI, state-normed | 38.2±25.5 | 64.3±26.5 | <0.001 |
| SDI | 75.4±23.3 | 49.2±28.2 | <0.001 |

Table 1. Basic Demographics

| Variable | Value |
|------------------------------------|---------------|
| Total sample size | 4542 |
| Age (years, SD) | 13.5±3.7 |
| Gender | |
| · Female | 3064 (67.5%) |
| · Male | 1478 (32.5%) |
| Ethnicity | |
| · Hispanic | 1652 (36.4%) |
| · Non-Hispanic | 2831 (62.3%) |
| · Unknown | 59 (1.3%) |
| Race | |
| · White | 2379 (52.4%) |
| · Black | 351 (7.7%) |
| · Native American / Eskimo / Aleut | 11 (0.2%) |
| · Asian / Pacific Islander | 467 (10.3%) |
| · Other | 947 (20.8%) |
| · Unknown | 387 (8.5%) |
| Payer category | |
| · Invalid / Blank | 2 (<0.1%) |
| · Medicare | 5 (0.1%) |
| · Medi-Cal | 1533 (33.8%) |
| · Private Coverage | 2214 (48.7%) |
| · County Indigent Programs | 3 (<0.1%) |
| · Other Government | 723 (15.9%) |
| · Self-Pay | 54 (1.2%) |
| · Other Pay | 8 (0.2%) |
| Length of stay (days, SD) | 5.4±7.3 |
| Total charge (\$, SD) | 276603±221766 |

Table 5. Comparison by Race

| Variable | White | Black | Asian / Pacific Islander | p-Value |
|--------------------------------|---------------|---------------|--------------------------|---------|
| Sample size | 2379 | 351 | 467 | |
| Age (years, SD) | 13.6±3.7 | 13.6±3.7 | 13.7±3.5 | 0.78 |
| Female (n, %) | 1622 (68.2%) | 210 (59.8%) | 327 (70.0%) | 0.004 |
| Length of stay (days, SD) | 5.1±6.9 | 5.4±5.6 | 5.8±8.0 | 0.18 |
| Payer category | | | | |
| · Medi-Cal | 736 (30.9%) | 144 (41.0%) | 110 (23.6%) | <0.001 |
| · Private coverage | 1300 (54.6%) | 136 (38.7%) | 277 (59.3%) | <0.001 |
| Total charge (\$, SD) | 272524±210658 | 243807±167608 | 318948±239956 | <0.001 |
| Overall COI, nationally-normed | 51.3±30.2 | 36.4±26.4 | 61.0±29.3 | <0.001 |
| Overall COI, state-normed | 55.1±29.0 | 40.6±26.7 | 64.3±27.1 | <0.001 |
| SDI | 56.9±29.3 | 70.8±25.3 | 53.8±29.1 | <0.001 |

CONCLUSIONS

Our study examined a large pediatric population focusing on the proportions of various demographics that have an intersectional role in health-related outcomes. The data demonstrated significant underlying differences in social determinants of health as measured by race, ethnicity, gender, insurance type, COI, and SDI among patients ≤ 20 years undergoing surgery for idiopathic scoliosis in the state of California. The noted differences in SES and insurance are known and/or expected to have an impact on access to quality health care, exposing a need for future studies to determine whether COI and SDI influence patient outcomes after scoliosis surgery.

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