

Do Unpaid Children's Hospital Account Balances Correlate with Family Income or Insurance Type?

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Background: Current understanding of medical debt among various income ranges and insurance carriers is limited. We analyzed median household incomes, insurance carriers, and medical debt of plastic surgery patients at a major metropolitan children's hospital.

Methods: A retrospective chart review for zip codes, insurance carriers, and account balances was conducted for 2018–2021. All patients were seen by members of the Division of Pediatric Plastic Surgery at Ann and Robert H. Lurie Children's Hospital of Chicago. Blue Cross was reported separately among other commercial insurance carriers by the hospital's business analytics department. Median household income by zip code was obtained. IBM SPSS Statistics was used to perform chi-squared tests to study the distribution of unpaid account balances by income ranges and insurance carriers.

Results: Of the 6877 patients, 630 had unpaid account balances. Significant differences in unpaid account balances existed among twelve insurance classes ($P < 0.001$). There were significant differences among unpaid account balances when further examined by median household income ranges for Blue Cross ($P < 0.001$) and other commercial insurance carriers ($P < 0.001$).

Conclusions: Although patients with insurance policies requiring higher out-of-pocket costs (ie, Blue Cross and other commercial insurance carriers) are generally characterized by higher household incomes, these patients were found to have higher unpaid account balances than patients with public insurance policies. This suggests that income alone is not predictive of unpaid medical debt and provides greater appreciation of lower income families who may make a more consistent effort in repaying their medical debt. (*Plast Reconstr Surg Glob Open* 2023; 11:e5310; doi: 10.1097/GOX.0000000000005310; Published online 4 October 2023.)

INTRODUCTION

Insurance payers cover pediatric procedures to various extents, and hospitals' financial management must adjust for the difference. Prior studies have shown that children's hospitals are not being properly compensated for the care provided for the sickest pediatric patients, and families must also deal with the financial burden of their child's hospital bills.^{1–5} Although outcomes for common procedures may be the same across all hospital types, patients

at children's hospitals have higher disease severity, commonly associated with longer length of stay and more occurrences of major surgical procedures compared with patients from nonchildren's hospitals.^{1,4,6–14} Children's hospitals are better equipped with specialized teams and resources to provide higher quality care for medically complex pediatric patients, and the proportion of surgical cases being performed at children's hospitals is increasing.^{15,16} Previous studies analyzed household income and resource utilization for common inpatient pediatric conditions, demonstrating that lower income zip code groups are associated with higher hospital costs, often due to extra care essential for safe discharge but ineligible for reimbursement.^{12,17,18}

Costs of common pediatric surgical procedures are higher at children's hospitals compared with nonchildren's hospitals, though clinical outcomes are the same irrespective of hospital type.^{1,2,15} Reasons for this include the fact that patients at children's hospitals tend to have a higher severity of illness and more medical comorbidities, thus requiring more specialized, intensive care.

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Approximately half of these patients are covered by public insurance carriers, characterized by lower payment and reimbursement rates compared with private insurance carriers.^{4,5,10,18–22} Furthermore, children’s hospitals are more likely to be academic institutions, supporting research advancements as well as resident education, resulting in higher costs.^{11,12}

The purpose of our study was to analyze financial and insurance carrier data on pediatric plastic surgery patients treated at a major metropolitan children’s hospital, and to investigate correlations between median household income, private versus public health insurance carriers, and patient compliance in payment of medical bills. In addition to the aforementioned factors in driving high costs at specialized children’s hospitals, it is our hypothesis that patients from lower income households have less ability to pay for outstanding medical charges.

METHODS

A retrospective chart review of patients who had an operative procedure done through the division of pediatric plastic surgery at Ann and Robert H. Lurie Children’s Hospital of Chicago (LCH) was conducted. Approval for this study’s exemption from review was obtained from the Lurie Children’s Hospital institutional review board. Patients were selected based on CPT codes for all procedures done within the division from 2018 to 2021. Information on each patient’s zip code and health insurance carrier was requested from the Department of Data Analytics & Reporting and Business Analytics at LCH. Zip-code-based median household incomes were obtained from the US Census Bureau’s 2020 American Community Survey 5-year estimates.²³ Health insurance carriers and median incomes served as independent variables for study, with the primary outcome being the proportion of unpaid hospital account balances. IBM SPSS Statistics software was used to perform descriptive analysis and chi-square tests to evaluate for significant differences in proportion of unpaid account balances by median household incomes and insurance financial classes; data were further grouped by pre-COVID-19 (2018–2019) and

Takeaways

Question: How do household income and insurance type correlate with medical debt?

Findings: Our single institution study demonstrated that although patients with insurance policies requiring higher out-of-pocket costs (ie, commercial insurance carriers) are generally characterized by higher household incomes, these patients were found to have higher unpaid account balances than patients with public insurance policies.

Meaning: Income alone is not predictive of unpaid medical debt, suggesting that healthcare policy reforms should focus on lowering high costs of surgical care and improving insurance coverage and reimbursement for pediatric surgical procedures to make the delivery of healthcare less of a burden for all involved parties.

post-COVID-19 (2020–2021) years to analyze the influence of the COVID-19 pandemic on pediatric medical debt.²⁴

RESULTS

A total of 6881 patients with 7871 pediatric plastic surgery encounters were identified from 2018 to 2021. Only the most recent encounter was included for each patient. One patient was excluded due to lack of zip code information, and three patients were excluded due to lack of zip code-based median household income information. In total, 6877 patients were included in the study, spanning 792 zip codes across 26 states. Insurance coverage comprised 103 different payers, which were categorized into 12 insurance financial classes by the medical billing team at LCH (Table 1). In total, 6608 patients (96.09%) were from Illinois, with the remaining 269 patients (3.91%) from²⁵ other states. In total, 4487 (65.25%) and 2390 (34.75%) had median household incomes above and below Illinois’ median household income of \$68,428, respectively.²⁵ In total, 2528 patients (36.76%) were covered by Blue Cross, 2508 (36.47%) by Medicaid Replacement, 1103 (16.04%) by other commercial insurance plans, and 738 (10.73%) by other insurance carriers.

Table 1. Number of Paid and Unpaid Account Balances within Each of the 12 Insurance Classes for Pediatric Plastic Surgery Patients at LCH from 2018 to 2021 (P < 0.001)

| Insurance Financial Class | Account Balance | | Total | Percentage Unpaid (%) | P |
|---------------------------|-----------------|--------|-------|-----------------------|--------|
| | Paid | Unpaid | | | |
| Blue Cross | 2208 | 320 | 2528 | 12.7% | <0.001 |
| Commercial | 918 | 185 | 1103 | 16.8% | |
| Government | 1 | 0 | 1 | 0.0% | |
| International services | 5 | 1 | 6 | 16.7% | |
| Managed care | 93 | 14 | 107 | 13.1% | |
| Medicaid | 338 | 5 | 343 | 1.5% | |
| Medicaid Managed Care | 215 | 0 | 215 | 0.0% | |
| Medicaid Replacement | 2420 | 88 | 2508 | 3.5% | |
| Medicare | 2 | 1 | 3 | 33.3% | |
| Other | 6 | 1 | 7 | 14.3% | |
| Self-pay | 23 | 7 | 30 | 23.3% | |
| Tricare | 18 | 8 | 26 | 30.8% | |

Table 2. Number of Paid and Unpaid Account Balances within Each Income Range for Pediatric Plastic Surgery Patients at LCH from 2018 to 2021 ($P = 0.077$)

| Median Income Range (US\$) | Account Balance | | Total | Percentage Unpaid (%) | P |
|----------------------------|-----------------|--------|-------|-----------------------|-------|
| | Paid | Unpaid | | | |
| 15,000–24,999 | 10 | 0 | 10 | 0.0% | 0.077 |
| 25,000–34,999 | 185 | 8 | 193 | 4.1% | |
| 35,000–49,999 | 657 | 49 | 706 | 6.9% | |
| 50,000–74,999 | 1865 | 199 | 2064 | 9.6% | |
| 75,000–99,999 | 1716 | 180 | 1896 | 9.5% | |
| 100,000–149,999 | 1523 | 165 | 1688 | 9.8% | |
| 150,000–199,999 | 210 | 22 | 232 | 9.5% | |
| 200,000+ | 81 | 7 | 88 | 8.0% | |
| Total | 6247 | 630 | 6877 | 9.2% | |

Overall, 630 patients (9.16%) had unpaid account balances. There was no significant difference in the distribution of unpaid account balances among the eight income range groups (Table 2; $P = 0.077$). There was a significant difference in proportion of unpaid account balances among the 12 insurance classes (Table 1; $P < 0.001$). Blue Cross carriers accounted for 320 (50.79%) of unpaid account balances, other commercial insurance carriers for 185 (29.37%), and Medicaid Replacement carriers for 88 (13.97%; Fig. 1). Families in the three insurance classes with the greatest proportions of unpaid account balances fell in the following ranges for median household income: \$100,000–149,999 for Blue Cross, \$150,000–199,999 for other commercial insurance carriers, and \$35,000–49,999 for Medicaid Replacement carriers (Fig. 2). There were significant differences in the distribution of median household income for patients with unpaid account balances within both Blue Cross and other commercial insurance classes ($P < 0.001$); however, this difference was not

significant for patients within Medicaid Replacement insurance class ($P = 0.263$).

Median values with first and third interquartile ranges (IQRs) for total charges, out-of-pocket payments, and unpaid account balances for each of the 12 insurance financial classes are described in Table 3. Government and Medicare were excluded from this descriptive analysis due to insufficient number of patients. The insurance financial classes with the greatest total charges were other, with a median (IQR) of \$34,296.38 (\$24,384.32–\$37,447.67), and self-pay, with a median (IQR) of \$27,954.99 (\$16,777.61–\$31,576.98). The insurance financial classes with the lowest total charges were Tricare, with a median (IQR) of \$13,498.80 (\$11,848.67–\$20,487.33), and managed care, with a median (IQR) of \$15,379.23 (\$12,595.44–\$18,942.46). The insurance financial classes with the greatest out-of-pocket payments were managed care, with a median (IQR) of \$8,491.35 (\$6,678.49–\$11,981.00), and international services, with a

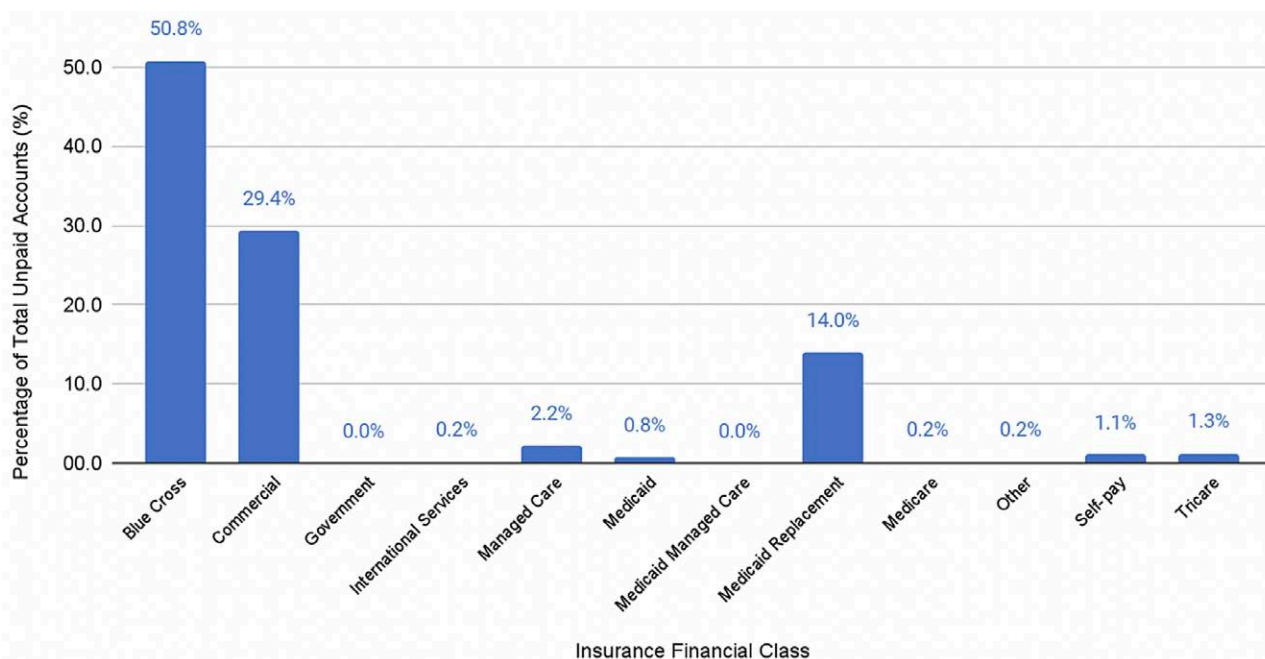


Fig. 1. Total unpaid accounts by insurance financial classes.

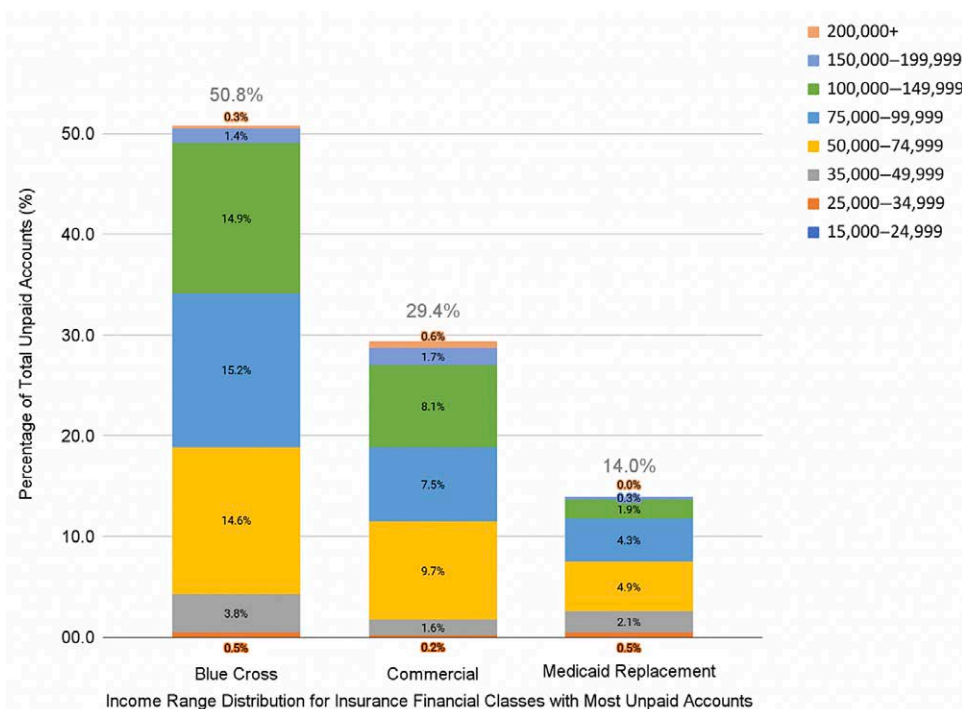


Fig. 2. Total unpaid accounts by income ranges for the three insurance financial classes with the most unpaid accounts. Asterisks indicate significant differences in the distribution of median household income for patients with unpaid account balances: Blue Cross, $P < 0.001$; Commercial, $P < 0.001$; Medicaid Replacement, $P = 0.263$.

Table 3. Median Values in United States Dollars (US\$) for Total Charges, Out-of-Pocket Payments, and Account Balances by Insurance Financial Class

| Insurance Financial Class | Median (IQR) Total Charges (US\$) | Median (IQR) Out-of-Pocket Payments (US\$) | Median (IQR) Unpaid Account Balances (US\$) |
|---------------------------|------------------------------------|--|---|
| Blue Cross | 15,425.64 (11,693.70–22,193.30) | 5780.00 (5216.08–5780.00) | 754.07 (419.34–1694.15) |
| Commercial | 15,970.09 (11,526.73–22,309.53) | 7195.00 (5748.06–11,526.19) | 1680.20 (572.51–2962.50) |
| Government | n/a* | n/a* | n/a† |
| International services | 15,534.16 (10,836.41–25,631.92) | 7,822.28 (5,807.37–18,787.68) | n/a† |
| Managed care | 15,379.23 (12,595.44–18,942.46) | 8,491.35 (6,678.49–11,981.00) | 1048.42 (550.83–2400.63) |
| Medicaid | 17,287.04 (12,756.82–23,993.60) | 1346.62 (673.31–2105.79) | 211.00 (136.00–432.52) |
| Medicaid Managed Care | 15,879.44 (12,431.51–18,169.34) | 1063.57 (517.55–1734.31) | n/a† |
| Medicaid Replacement | 16,948.19 (12,808.66–22,595.75) | 1338.76 (673.31–2017.55) | 20.05 (12.97–316.44) |
| Medicare | n/a* | n/a* | n/a† |
| Other | 34,296.38 (24,384.32–37,447.67) | 4798.49 (1673.17–7132.85) | n/a† |
| Self-pay | 27,954.99 (16,777.61–31,576.98) | 5238.00 (5082.00–7030.75) | 19,032.99 (8823.73–22,430.77) |
| Tricare | 13,498.80 (11,848.67–20,487.33) | 2736.75 (1280.69–7464.01) | 3313.05 (2241.99–4255.56) |

*No IQR was included due to insufficient number of patients for analysis.

†Excluded from analysis due to insufficient number of patients in unpaid group.

median (IQR) of \$7,822.28 (\$5,807.37–\$18,787.68). The insurance financial classes with the lowest out-of-pocket payments were Medicaid Managed Care, with a median (IQR) of \$1,063.57 (\$517.55–\$1734.31), and Medicaid

Replacement, with a median (IQR) of \$1338.76 (\$673.31–\$2017.55). The insurance financial classes with the greatest unpaid account balances were self-pay, with a median (IQR) of \$19,032.99 (\$8823.73–\$22,430.77) and Tricare,

Table 4. Number of Paid and Unpaid Account Balances for Pediatric Plastic Surgery Patients at LCH Grouped by Pre-COVID-19 and Post-COVID-19 Cohorts ($P = 0.049$)

| Years | Account Balance | | Total | Percentage Unpaid (%) | P |
|---------------------------|-----------------|--------|-------|-----------------------|-------|
| | Paid | Unpaid | | | |
| Pre-COVID-19 (2018–2019) | 2967 | 273 | 3240 | 9.20% | 0.049 |
| Post-COVID-19 (2020–2021) | 3280 | 357 | 3637 | 10.88% | |

Pre-COVID-19 pandemic years were defined as 2018–2019, and post-COVID-19 pandemic years were defined as 2020–2021.

with a median (IQR) of \$3313.05 (\$2241.99–\$4255.56). The insurance financial classes with the lowest unpaid account balances were Medicaid Replacement, with a median (IQR) of \$20.05 (\$12.92–\$316.44), and Medicaid, with a median (IQR) of \$211.00 (\$136.00–\$432.52).

When data were further analyzed by pre-COVID-19 (2018–2019) and post-COVID-19 (2020–2021) pandemic years, the post-COVID-19 pandemic cohort (10.9%) had a greater proportion of unpaid account balances compared with the pre-COVID-19 pandemic cohort (9.2%), indicating the COVID-19 pandemic significantly impacted pediatric medical debt (Table 4, $P = 0.049$).

DISCUSSION

Previous studies demonstrated that common surgical procedures at children's hospitals are associated with greater costs compared with nonchildren's hospitals, and identified insurance type, sociodemographic factors, and medical complexity as major contributing factors.^{1,4–14,17–22} Our single institution study examined the association between insurance carriers, zip-code-based household incomes, and unpaid account balances. Although public insurance carriers are known to pay less than private-insurance carriers for costly surgical procedures, our results showed that the proportion of unpaid account balances was greater for the cohort of patients covered by private insurance. Moreover, the income range of that cohort of patients was higher than we expected, demonstrating that lower income patients are successfully covered by their insurance and are more likely to meet their out-of-pocket expenses than are patients in a higher income range.

High-level, high-volume hospitals have lowest risk-adjusted mortality rates, with recent regionalization of neonatal intensive care and pediatric trauma care to specialized children's hospitals in efforts to provide high-quality, cost-efficient health care to the greatest number of patients in need with the optimization of available resources.^{6,16,26–28} Similarly, readmission rates and surgery-related complications are lower for higher level institutions and surgeons with higher procedure-specific case volumes.^{29–33} although regionalization of specialized care may improve outcomes for those patients who have access to such care, this may pose ethical challenges, including barriers to care for those patients who are less likely to access regionalized health centers due to lack of proximity, poor access to transportation, or limited time in which they can travel to a regionalized health center. Patients of higher socioeconomic status are more likely to be treated at high-volume hospitals associated with

earlier age at surgery and decreased hospital admission charges.³⁴ For non-White patients who are living in an underserved area, treatment at high-volume hospitals is associated with a longer length of stay, possibly secondary to longer travel times and subsequent prolonged observation status in the hospital.^{35,36} Increased travel time may strain a family's resources due to expenses and time away from work, and may ultimately lead to delay in necessary care and difficulties with follow-up care.³⁷ With the trend of regionalization, even low-risk procedures that were traditionally performed by general surgeons are being referred to subspecialized providers or pediatric surgeons, which carries implications for fewer pediatric cases logged by general surgery trainees and fewer general surgeons who may feel capable of handling such cases where they may end up practicing, such as a low-volume center.^{28,37}

Insurance type further complicates equal access to quality value care. Patients with private insurance coverage reported more instability in insurance coverage, more difficulty in seeing a physician because of costs, and are more likely to report medical debt.^{38,39} On the other hand, Medicaid patients have greater difficulty in obtaining specialty appointments compared with privately insured patients.⁴⁰ Medicaid and Health Maintenance Organizations are also more likely to inappropriately deny payments and have the lowest reimbursement rates for pediatric surgical cases, resulting in financial losses for hospitals.^{5,19} Unfortunately, recent budget plans from Congress propose tightening eligibility requirements for public insurance in efforts to cut down on short-term federal health care spending, which would further aggravate major longer-term financial consequences for children's hospitals and widen healthcare disparities for pediatric patients and their families.⁴¹

Prior studies also examined interhospital variation in disease prevalence and costs, emphasizing the need for standardization of high-value, quality care across children's hospitals through evidence-based quality improvement initiatives.^{42–45} Measures taken to mitigate high costs at children's hospitals include more conscientious utilization of low-value services, with decrease in duration of intravenous antibiotic therapy, reduction in laboratory tests, and use of X-rays.^{27,44,46} Additionally, with increased use of telemedicine in the setting of the COVID-19 pandemic, a single institution study demonstrated that surgical specialty telehealth visits are associated with lower hospital charges compared with in-person encounters, though reimbursements were not significantly different.⁴⁷ The introduction of evidence-based clinical care and/or enhanced recovery after surgery protocols for common

surgical procedures such as cleft palate repair, appendicitis, and blunt abdominal trauma have also effectively decreased length of stay and costs.^{27,42,48} These efforts by hospitals are evidence of attempts to maintain high-quality care while optimizing cost efficiency.

We are not aware of any sources of alternative funding currently available for families of children who accrue unpaid medical debt. However, this is a call to action for all health care providers to advocate for reform in coverage of pediatric surgical care, and for the treatment of congenital anomalies in particular. As an example, the Ensuring Lasting Smiles Act is a bill that has been lingering in Congress for over two years, and has been a “white hat issue” for the American Society of Plastic Surgeons in prior legislative advocacy sessions.^{49,50} This bill advocates for comprehensive coverage of congenital anomalies not only from a surgeon’s perspective, but from the perspective of comprehensive health care for congenital disorders, to include speech therapy, orthodontic treatment, social services, and more.⁴⁹ Surgeons should be aware that their care is fragmented without comprehensive coverage for these children, and we would advocate that all health-care providers work in unison to develop effective advocacy for this and other health care legislation that would improve outcomes for pediatric patients without increasing the debt burden incurred by families.

The results of this study must be viewed with acknowledgement of the accompanying limitations. Although patients included were from a total of 26 states, median household income was defined by demographic data of Illinois for simplicity of data analysis. We also recognize that our data fail to account for certain disease processes (eg, chronic versus acute), which may lead to more unpaid bills. Given the retrospective design of our study, association between satisfaction levels and unpaid accounts was also not studied. The present analysis highlights these factors that should be explored in greater detail going forward. Continued investigation of the impact of recent healthcare reform efforts and impending physician payment cuts are necessary to identify fair and effective methods to reduce the imbalance in insurance coverage and payments to lower financial stress on patients, their families, and providers, without compromising quality of care.

CONCLUSIONS

Although patients with insurance carriers requiring higher out-of-pocket costs (ie, Blue Cross, other commercial insurance carriers) are generally characterized by higher household incomes, they contribute to a greater proportion of unpaid account balances than patients covered by public insurance carriers. This suggests that income alone is not predictive of unpaid medical debt and provides greater appreciation of lower income families who may make a more consistent effort in repaying their medical debt. In addition, healthcare policy reforms should focus on lowering high costs of surgical care and improving insurance coverage and reimbursement for pediatric surgical procedures to alleviate the financial burden on both patients and the children’s hospital serving

these patients. Advocating for passage of the Ensuring Lasting Smiles Act is one such mechanism by which to implement these reforms. By focusing attention on these issues, medical burden on both patients and the health-care system, as reflected by unpaid medical bills, would drop to make the delivery of healthcare less of a burden for all involved parties.

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

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