

Pediatric Odontogenic Facial Cellulitis: Incidence, Hospitalizations, and Medicaid Impact

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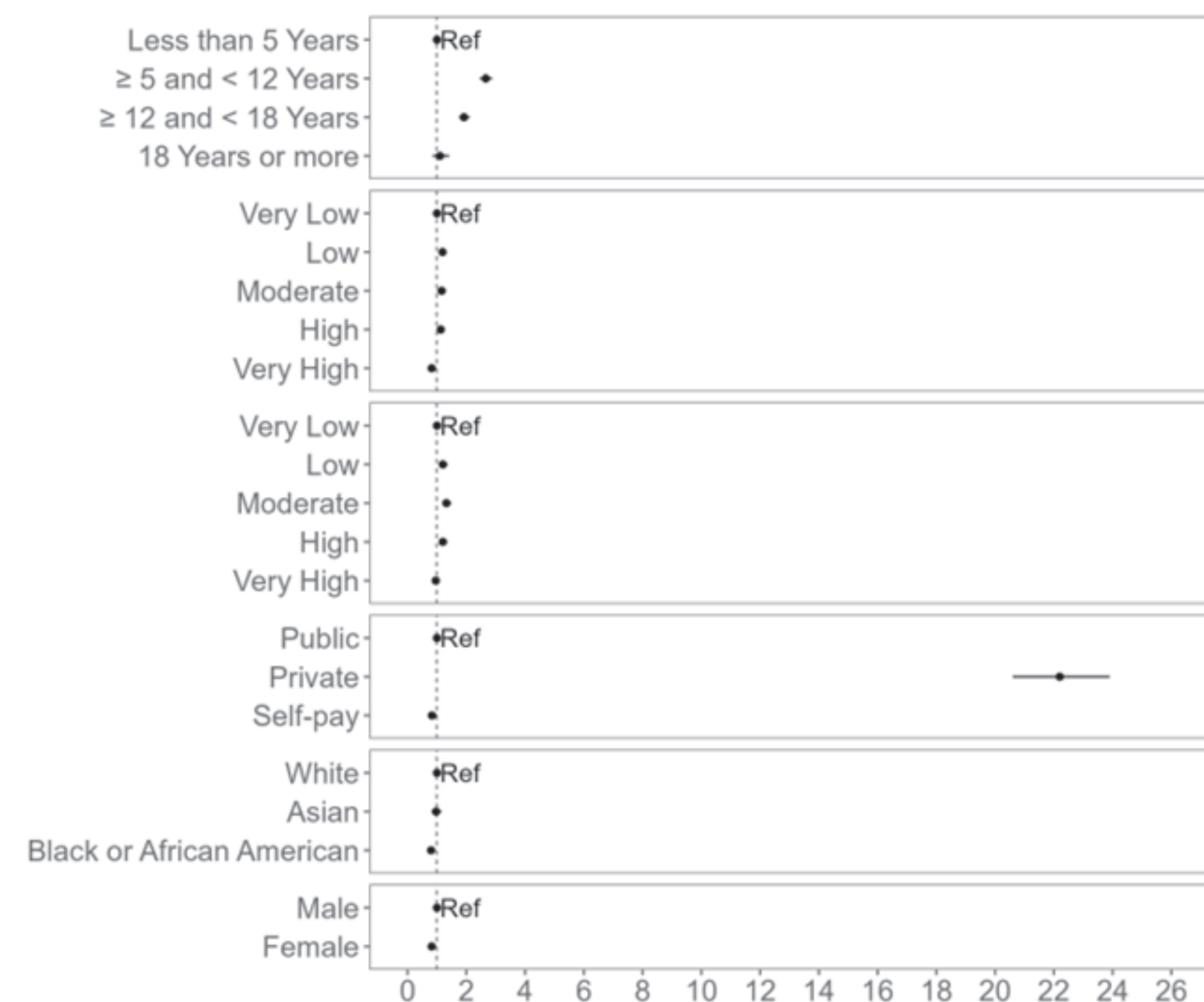
Purpose

- Pediatric odontogenic facial cellulitis (POFC) is a deep tissue infection primarily caused by untreated dental caries frequently requiring hospitalization, intravenous antibiotics, and surgical intervention.
- Children living below the federal poverty line experience untreated caries at three times the rate of their peers.² Driven by socioeconomic status (SES) disparities, children insured by Medicaid are disproportionately overrepresented in emergency departments (ED) for preventable odontogenic infections.^{9,11}
- This study aims to analyze trends at Children's Healthcare of Atlanta in the annual incidence and hospitalization rates, stratified by insurance type, with a focus on the proportion of Medicaid covered admissions.

Methods

- **Study Design:** Retrospective cohort study of pediatric ED visits extracted via Epic SlicerDicer. Variables included age, sex, race, zip code, insurance type, admission status, & surgical intervention. Study patient population is limited to those in 239 zip codes that comprise the Metropolitan Statistical Area (MSA) of Atlanta, GA.
- From 1.45M screened encounters, n=3,427 children with POFC requiring surgical intervention (I&D, extraction) were identified using ICD-10 codes for odontogenic infection (K02.9, K04.7, K12.2) combined with facial soft tissue involvement (L03.211, R22.0)
- **Analysis:** Incidence calculated per 10,000 ED visits. Geographic mapping assessed Child Opportunity Index (COI) and POFC associations. Chi-square/Fisher's tests and logistic regression (OR, 95% CI) evaluated demographic associations with POFC admission (p<0.05, two-sided; R v4.5.1).

Figure 1: Odds Ratio for POFC Admission by Demographic Characteristics



Children aged 5-12 and 12-18 years had increased odds of POFC compared to those <5 years. Private insurance was associated with increased odds relative to public insurance. National and state COI, race, sex showed minimal differences

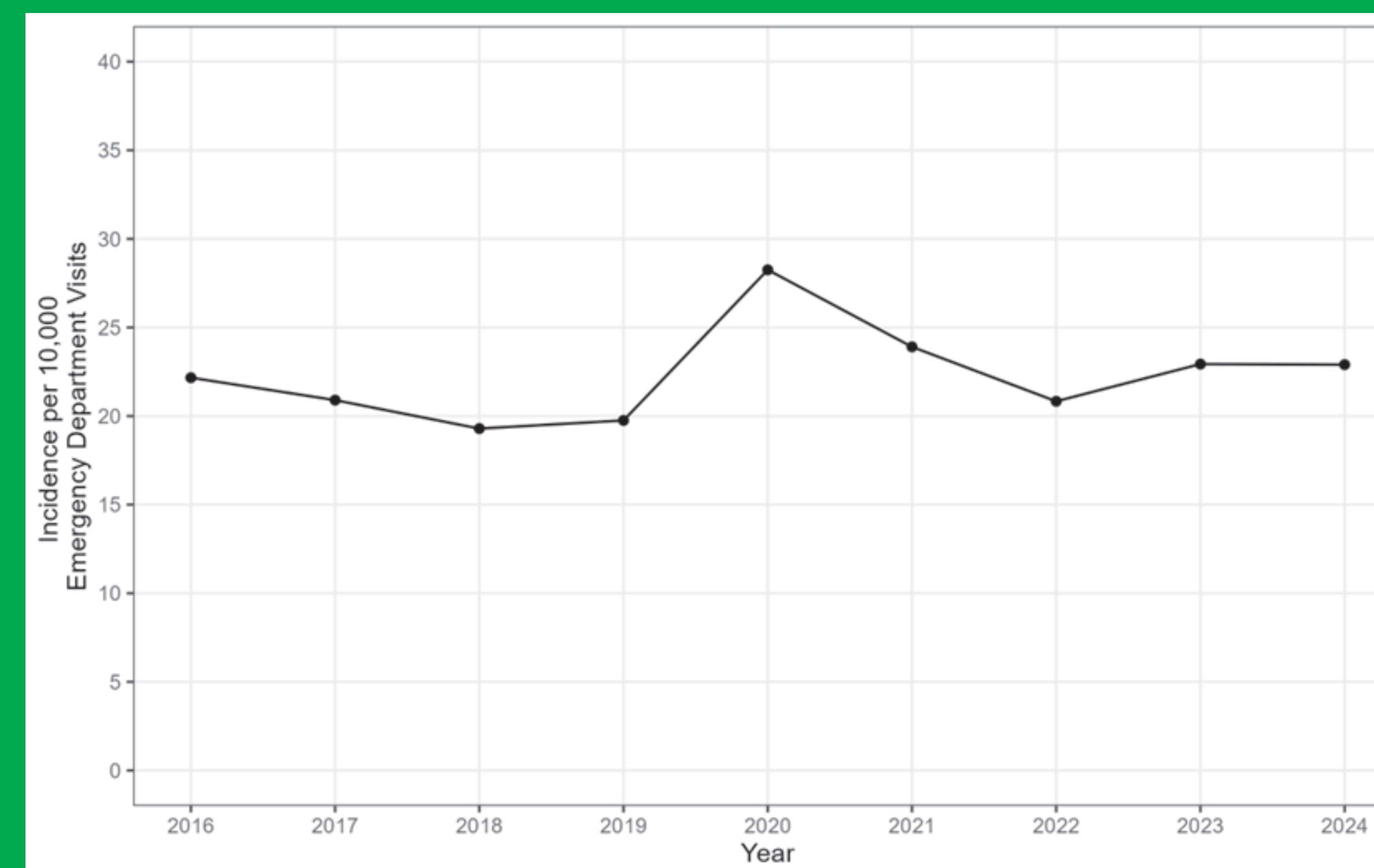


Figure 2: Incidence of POFC per 10,000 ED Visits by Demographics, 2016-2024



Top Left: By race, Asian children had the highest incidence with a declining trend, while Black or African American and White children showed stable rates. *Top Right:* By age, children aged 5-12 years had the highest and increasing incidence, peaking in 2020; the 12-18 group showed a stable trend, while <5 years and >18 years remained lowest. *Bottom left:* Males had consistently higher incidence than females, with both groups peaking in 2020. *Bottom right:* Privately insured children had higher incidence compared to publicly insured and self-pay patients, with a spike in 2020.

Figure 3: Incidence of POFC Requiring Surgical Intervention per 10,000 ED Visits, 2016-2024

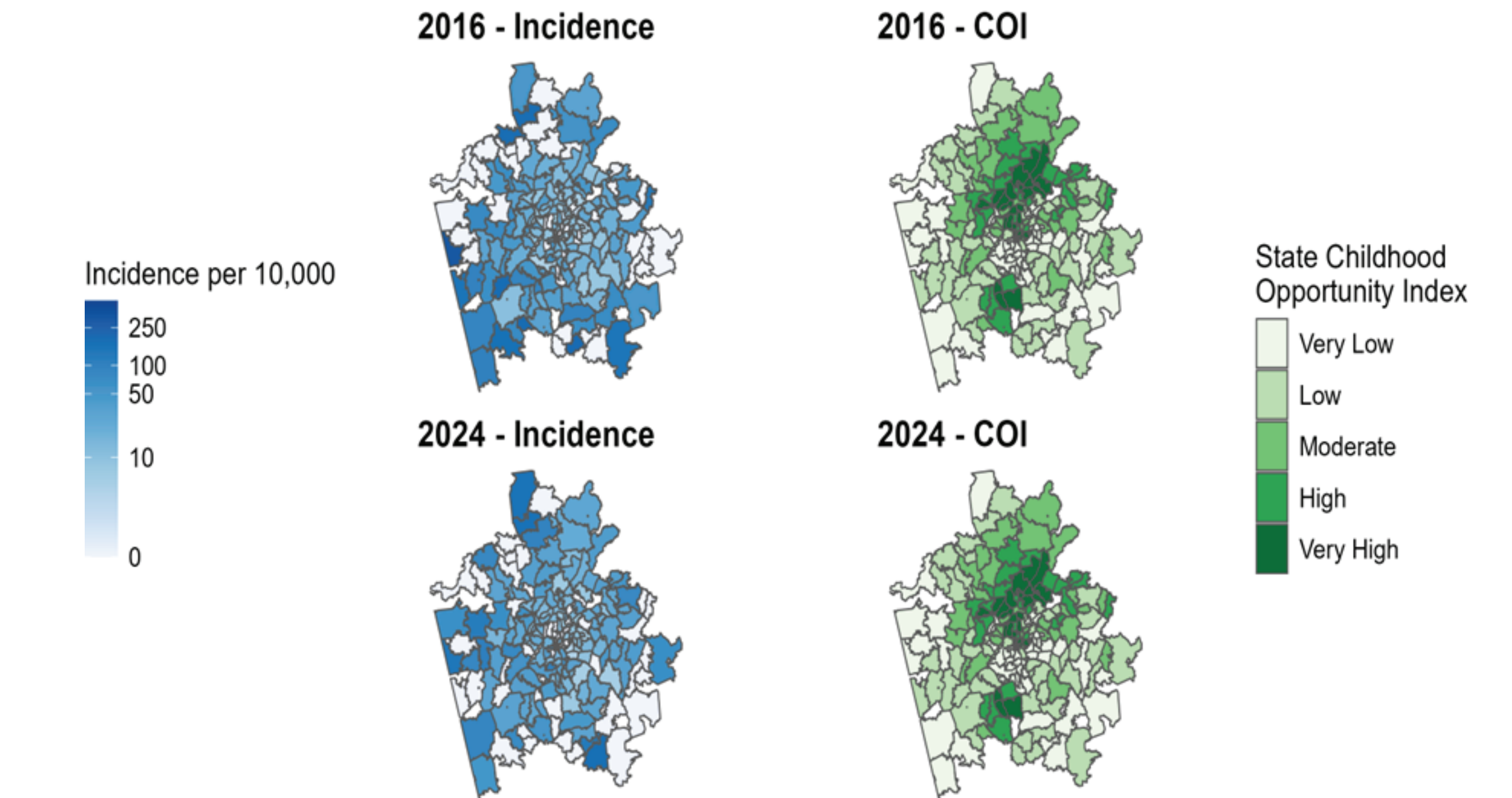


Incidence remained stable from 2016 to 2019 (19-22 per 10,000), peaked sharply in 2020 (28 per 10,000), and returned to pre-pandemic baseline levels by 2022-2024.

Results & Discussion

- **Age:** highest risk in children ages 5-12 years (OR 2.66, 95% CI 2.46-2.88), correlating with the mixed dentition phase
- **2020:** Incidence remained stable but peaked in 2020 (28 per 10,000 visits), reflecting deferred dental care during the COVID-19 pandemic
- **Insurance:** 66% of patients with POFC were Medicaid insured and 30% of patients with POFC were privately insured. Privately insured children had 22x higher odds (OR 22 95% CI 20.6-23.9) of requiring surgical intervention for POFC despite representing <9% of ED visits. This finding does not indicate higher disease incidence but reflects differences in healthcare utilization patterns and presentation timing.
- **Neighborhood Opportunity (COI):** COI calculates composite resource availability for every census tract in the United States across three standardized domains: educational access and outcomes, neighborhood health and environmental conditions, and local social and economic resources. Our results indicated that those with low, medium, and high COI had higher odds of POFC requiring surgery than those with very low opportunity. When using nationally normalized values, we found that children with high COI had 18% (95% CI 6-28) lower odds of POFC than those with very low COI.

Figure 4: Geographic Distribution of POFC Incidence and State COI by Zip Code, 2016 vs 2024



Left: POFC incidence per 10,000 ED visits mapped by zip code, showing geographic spread and increased incidence in zip codes of the MSA of Atlanta, GA by 2024 compared to 2016. *Right:* State normed COI quintiles, with higher opportunity (darker green) concentrated centrally and lower opportunity (lighter green) in the outer regions of the MSA of Atlanta, GA. Higher POFC incidence in zip codes with very low to low COI, especially in the periphery of the MSA of Atlanta, GA; this pattern remains stable throughout the time period.

Conclusions

- POFC incidence remained stable (2016–2024) but peaked in 2020, coinciding with COVID-19 pandemic disruptions to routine dental care.
- Patients aged 5–12 carry the highest clinical risk, correlating with increased caries risk during the mixed dentition stage
- Privately insured children, despite representing <9% of ED visits, were over-represented among cases that required admission/surgical intervention for POFC compared to patients with Medicaid. This does not indicate higher disease incidence but reflects differences in healthcare access patterns and presentation timing.
- High-opportunity neighborhoods show protective effects, highlighting the role of dental care access

Scan for references

