Journal of Current Research in Oral Surgery
2024, Volume 4, Page No: 161-172
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Available online at: www.tsdp.net

ISSN: 3062-3480

Original Article

Emergency Department Utilization for Oral Health Complications Among Adolescents with Developmental Disabilities

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Received: 12 September 2024; **Revised:** 03 December 2024; **Accepted:** 05 December 2024

ABSTRACT

We conducted a cross-sectional analysis using Andersen's Behavioral Model to examine the predictors of emergency department (ED) visits among adolescents, with statistical adjustment for the presence of developmental disabilities (DD) and at least one oral health issue (such as toothaches, dental caries, gingival bleeding, or problems with eating/swallowing). This secondary analysis utilized data from the 2016–2019 National Survey of Children's Health (NSCH). Sample characteristics were summarized using descriptive statistics, including frequencies and percentages. Bivariate relationships were examined with chi-square tests, and multivariable logistic regression was employed to model predictors of emergency department visits among adolescents aged 10–17, adjusting for predisposing, enabling, and need-related factors. The study drew on a cohort of 68,942 adolescents, most of whom were U.S.-born, non-Hispanic White, and male. Based on parent responses, the majority (69%) did not have a developmental disability (DD) or any oral health concerns. A smaller portion—10%—experienced at least one oral problem without having a DD, while 16% were identified as having a DD alone. Only 5% were reported to have both a DD and oral complications. Among all groups, adolescents with both conditions showed the greatest reliance on emergency department (ED) care, with 33% having made an ED visit, compared with 14% in the group without either condition. Findings from the multivariable model indicated that having both a DD and an oral complication doubled the odds of an ED visit (OR = 2.0, 95% CI: 1.64–2.54, $p < 0.0001$). Adolescents with a DD alone also demonstrated elevated odds (OR = 1.45, 95% CI: 1.25–1.68, $p < 0.0001$). Lacking a Medical Home contributed to a modest but significant increase in ED use (14%, $p = 0.02$). In contrast, two factors—private insurance coverage (OR = 0.63, 95% CI: 0.53–0.75, $p < 0.0001$) and living in a household where someone had completed at least some college (OR = 0.85, 95% CI: 0.73–0.98, $p = 0.03$)—were associated with decreased likelihood of ED utilization. Adolescents who have both developmental disabilities and oral health problems visit the emergency department much more often than those with neither condition. Better integration of dental and medical care, along with stronger adoption of Patient-Centered Medical Home principles, could improve overall care quality and substantially decrease unnecessary ED visits for these adolescents.

Keywords: Children with special health care needs (CSHCN), National survey of children's health (NSCH), Medical home, Andersen's behavioral model of health services use, Emergency department use, Developmentally disabled children

How to Cite This Article: Lund NO, Romano LF, Ismail NS. Emergency Department Utilization for Oral Health Complications Among Adolescents with Developmental Disabilities. J Curr Res Oral Surg. 2024;4:161-72. https://doi.org/10.51847/eYOdHWvCGl

Introduction

Emergency department (ED) visits for preventable dental conditions continue to rise and represent a major challenge across the United States [1, 2]. Between 2000 and 2010, dental-related ED encounters doubled in volume, and their share of all dental care episodes grew markedly [1]. According to Allareddy *et al.* [3], the most common reasons young people aged 21 and under presented to EDs were caries, pulpal/periapical lesions, gingival/periodontal disorders, abscesses, and facial cellulitis. Both pediatric and adult studies confirm that emergency departments rarely provide definitive dental treatment, making office-based dental care the far more suitable setting [3, 4]. Individuals who repeatedly seek dental care in EDs include Medicaid beneficiaries, privately insured patients, the uninsured, and especially children with special health care needs (CSHCN) [5, 6].

The federal Maternal and Child Health Bureau defines CSHCN as children who have or are at elevated risk for chronic physical, developmental, behavioral, or emotional disorders and who need health-related services beyond the level typically required by children [7]. Despite their diversity, these children generally experience worse health and face frequent unmet needs for specialty care, prescription drugs, and—most prominently—dental services [5]. Barriers operate at multiple levels: financial (inability to cover out-of-pocket costs), practice-based (difficulty obtaining timely appointments), and systemic (challenges securing referrals). Lewis [8] found that dental care ranked as the single most commonly unmet need among CSHCN, with cost cited as the leading obstacle—especially for non-preventive treatment—followed by absence of dental coverage.

Parents raising children with functional limitations often describe having to reduce work hours or leave employment entirely, spending large amounts of time arranging or delivering care, incurring major financial burdens, and struggling to secure routine preventive dental visits [9, 10]. Among families of youth with disabilities, two of the most frequently mentioned gaps are effective care coordination and straightforward referral processes.

The Patient-Centered Medical Home (PCMH, often shortened to Medical Home) is widely endorsed as the optimal care model for CSHCNs and their families [11]. This approach delivers primary care that is accessible, family-centered, continuous, comprehensive, coordinated, compassionate, and culturally sensitive [11]. Lack of a Medical Home has been consistently linked to reduced dental service use and elevated unmet dental needs in this population [12, 13]. Core features include team-based delivery across preventive, acute, and chronic care; robust care coordination; improved access (including outside regular hours); and a systematic commitment to quality and safety [14].

Developmental disabilities (DDs)—a key subset of CSHCN—involve impairments in physical, learning, language, or behavioral domains that arise during childhood and frequently cause lifelong functional limitations [15]. Parent-reported data from the National Health Interview Survey (2009–2017) indicate that roughly 17% of U.S. children ages 3–17 have a diagnosed developmental disability, with prevalence climbing from 16.2% in 2009–2011 to 17.8% in 2015–2017 [16].

Adolescence marks a crucial period when lifelong health habits—both beneficial (healthy diet, consistent oral hygiene) and harmful (tobacco/vaping, alcohol use, early sexual activity)—are solidified [17]. The American Academy of Pediatrics notes that teens with developmental disabilities, particularly those from low-income households, face markedly higher oral health risks [18]. Nationally representative figures for 2015–2017 reveal that 12–17-year-olds have the highest developmental disability prevalence of any pediatric age group (21.1%) [16]. Simultaneously, adolescents aged 12–19 show the greatest lifetime caries experience (≈57%) and the highest rate of untreated decay (16.6%) of any age bracket, highlighting a profound unmet dental care burden [19].

Although prior research has established that youth with developmental disabilities use ED services more often than peers without such conditions, the extent to which concurrent oral health problems amplify ED reliance—or whether broader structural barriers play the dominant role—remains uncertain. Using nationally representative survey data, this study therefore examines predictors of ED utilization among adolescents with special health care needs, focusing especially on the separate and combined influence of developmental disabilities and oral complications.

Materials and Methods

This cross-sectional study examined how predisposing, enabling, and need-related factors—outlined in Andersen's Behavioral Model of Health Services Use [20]—interact with health system characteristics emphasized in the Patient-Centered Medical Home (PCMH) framework.

Data source

The analysis relied on four consecutive cycles (2016–2019) of the National Survey of Children's Health (NSCH), a nationwide survey administered by the U.S. Census Bureau with support from the Maternal and Child Health Bureau. The NSCH uses a combination of paper and web-based instruments. Households are first screened to determine whether they include any non-institutionalized children ages 0–17 and to identify those meeting criteria for CSHCN. From each eligible household, one child is randomly chosen to be the focus of a more extensive parent- or caregiver-reported questionnaire. The survey is representative of all states and the District of Columbia. Across the four waves, responses were collected for 131,774 children. For the purposes of this study, only adolescents between 10 and 17 years of age were included, resulting in an analytic sample of 68,942 participants.

Variables

Dependent variable

The outcome measure was based on parents' reports to the item asking how many times their child had gone to a hospital emergency room in the previous 12 months. Responses were recoded into a binary variable indicating either zero ED visits or at least one visit.

Independent variables

The key explanatory measure combined information on whether an adolescent had a developmental disability (DD) and whether the adolescent had experienced any oral health problems. Parental reports were used to determine DD status, which encompassed a range of conditions, including autism spectrum disorder, attention deficit hyperactivity disorder, blindness, cerebral palsy, hearing loss, learning or intellectual disabilities, seizures within the previous year, stuttering or stammering during the past year, and any additional developmental delay noted by parents. The final category—"any other developmental delay"—was not included in the 2019 NSCH cycle. Parents also indicated whether their child had ongoing or repeated oral health concerns in the prior 12 months, specifically tooth decay, tooth pain, bleeding gums, or difficulties eating or swallowing due to a health condition [16]. By merging DD status with oral complication status, adolescents were classified into four groups: (a) those reporting both a DD and at least one oral health issue: (b) those with a DD but no oral health problems: (c) those without a DD but with one or more oral complications; and (d) those without either condition.

Pre-disposing variables

Predisposing factors refer to demographic and social attributes that shape an individual's inclination to seek health care, whether in a dental setting or an emergency department [20]. In this study, the predisposing characteristics examined in relation to ED use included the adolescent's sex (male or female), racial or ethnic identification (Hispanic, non-Hispanic White, non-Hispanic Black, or other), the primary language spoken at home (Spanish, English, or another language), the household's highest educational attainment (less than high school, high school or GED, some college or technical training, or a college degree and above), and U.S.-birth status. Age was not incorporated into the regression models since all respondents were adolescents falling within a limited range (10–17 years).

Enabling variables

Enabling factors refer to the circumstances and resources within a family that support or hinder the ability to obtain needed health services [20]. Four such factors were drawn from the dataset. The first was the household's federal poverty level (FPL)—categorized as 0–99%, 100–199%, 200–400%, or above 400%—which is an annually updated indicator of income established by the U.S. Department of Health and Human Services; families below 100% FPL typically represent the lowest socioeconomic bracket. The second enabling factor captured the cost-related aspect of accessing care through health insurance status, classified as public only, private only, both public and private, unspecified coverage, or no insurance.

Access to a Medical Home served as the third enabling factor. The NSCH defines this construct using five components: having a personal physician or nurse, having a regular source of care when sick, receiving family-centered care, encountering no difficulties in obtaining referrals when needed, and receiving coordinated care when multiple providers are involved. The fourth enabling factor, representing access within the oral health system, indicated whether the adolescent had seen a dentist within the previous 12 months.

Health-related hardships and need

Need factors encompass both personal health circumstances and contextual conditions—such as the availability of providers or community investments in services—that may influence the use of health care [20]. They also capture two dimensions of need: what caregivers believe their child requires and what can be objectively measured. In this survey, parents indicated whether their child had experienced any of four oral health issues during the past year: tooth pain, dental decay, gum bleeding, or difficulty chewing or swallowing related to a health condition. Each was answered with a "Yes" or "No," and the responses were combined to form categories reflecting zero, one, two, or three or more oral complications.

Parents were also asked to evaluate two broader aspects of need: the reliability of their child's health insurance coverage when it was needed (Always, Usually, Sometimes, or Never) and how often they felt discouraged or impeded when seeking necessary health services for their child (Always, Usually, Sometimes, or Never).

Statistical analyses

All analyses focused exclusively on adolescents between 10 and 17 years old. To appropriately reflect the National Survey of Children's Health (NSCH) sampling approach, survey weights were applied in generating all estimates, and the designated strata and primary sampling unit variables were used to ensure proper variance adjustment. These weights allowed the results to represent the broader U.S. population of non-institutionalized adolescents in this age group. Weighted proportions were calculated to describe the sample's demographic profile, the distribution of developmental disabilities (DDs) and oral health problems, and the relevant predisposing, enabling, and need characteristics. Because listwise deletion was used for missing information, some analyses involved a slightly reduced sample size.

Chi-square tests examined whether adolescents' DD/oral complication categories were associated with emergency department (ED) use within the previous year. These tests were also used to evaluate the relationship between each individual Medical Home component and ED visits. A logistic regression model predicting any ED use in the past 12 months (one or more visits versus none) was then estimated, adjusting for all predisposing, enabling, and need factors. Statistical significance was defined as $p < 0.05$. All analyses were completed using Stata version 17 (StataCorp LLC, College Station, TX).

Results and Discussion

Characteristics of the overall sample

The study population was predominantly male (51%) and non-Hispanic White (51%), with most adolescents residing in English-speaking households (86%) and born in the United States (95%) **(Table 1)**. Parental reports indicated that nearly seven in ten adolescents (69%) had neither a developmental disability (DD) nor oral health issues. About 10% had one or more oral complications without a DD, 16% had a DD but no oral complications, and 5% had both a DD and at least one oral health problem.

Regarding insurance coverage, the majority were privately insured (59%), 4.6% had combined private and public coverage, 29% relied exclusively on public insurance, 0.5% had unspecified coverage, and 7.2% lacked any insurance. Educational attainment among parents suggested a relatively well-educated sample, with 69% reporting some college education or higher and only 11.5% having less than a high school diploma. Approximately 58% of families were living at or above 200% of the federal poverty level. Nearly half of the adolescents (46%) were reported to have a Medical Home, and most (90%) had received a dental visit in the prior year. Variables such as age, sex, household language, and U.S. birth status were not significantly related to emergency department utilization and were therefore excluded from the regression analyses.

Table 1. Emergency department visits by adolescent predisposing, enabling, and need factors.

Characteristic	Overall (%)	No ED Visit (%)	≥1 ED Visit (%)	p-value
Predisposing Variables				
Gender				0.25
Male	51.1	83.4	16.6	
Female	48.9	83.2	16.8	
Race/Ethnicity				<0.0001
Hispanic	25.5	81.7	18.3	
Non-Hispanic White	50.5	85.2	14.8	
Non-Hispanic Black	14.1	76.4	23.6	
Other	9.9	87.7	12.3	
Household Language				0.09
English	86.0	83.0	17.0	
Spanish	11.0	82.0	18.0	
Other	3.0	88.0	12.0	
Born in the U.S.				0.60
Yes	95.0	83.0	17.0	
No	5.0	83.0	17.0	
Household Education				<0.0001
<High School	11.5	78.3	21.7	
High School/GED	19.9	79.4	20.6	
Some College/Technical	22.6	81.2	18.8	
College Degree or Higher	46.0	87.3	12.7	
Enabling Variables				

Insurance Type				<0.0001
Public Only	28.8	75.9	24.1	
Private Only	58.9	87.3	12.7	
Private & Public	4.6	75.1	24.9	
Unspecified	0.5	74.5	25.5	
Uninsured	7.2	86.0	14.0	
Federal Poverty Level				<0.0001
0–99% FPL	19.8	75.6	24.4	
100–199% FPL	21.9	81.7	16.3	
200–400% FPL	27.2	85.1	14.9	
>400% FPL	31.0	87.7	12.3	
Medical Home				<0.0001
Yes	46.3	86.0	14.0	
No	53.7	81.0	19.0	
Dental Visit (past 12 months)				0.14
Yes	90.0	83.4	16.6	
No	10.0	82.9	17.1	
Need Variables				
DD and Oral Health Status				<0.0001
No DD or Oral Complications	69.0	86.0	14.0	
No DD, Oral Complications	10.0	82.0	18.0	
DD, No Oral Complications	16.0	78.0	22.0	
DD and Oral Complications	5.0	67.0	33.0	
Health Insurance Access				0.008
Always	64.0	83.6	16.4	
Usually	28.3	82.6	17.4	
Sometimes	6.3	80.6	19.4	
Never	1.3	85.0	15.0	
Frustration Accessing Care				<0.0001
Never	81.6	85.7	14.3	
Sometimes	15.4	73.9	26.1	
Usually	1.9	67.8	32.2	
Always	1.1	65.8	34.2	
Oral Health Complications				
Decayed Teeth				<0.0001
Yes	11.4	79.7	20.3	
No	88.6	83.8	16.2	
Toothaches				<0.0001
Yes	4.1	71.3	28.7	
No	95.9	83.9	16.1	
Bleeding Gums				<0.0001
Yes	2.7	72.3	27.7	
No	97.3	83.7	16.3	
Difficulty Eating/Swallowing				<0.0001
Yes	1.4	52.9	47.1	
No	98.6	83.7	16.3	
Number of Oral Complications				<0.0001
None	85.0	84.5	15.5	
1	11.3	79.0	21.0	
2	3.0	70.7	19.3	
3 or more	0.7	65.9	34.1	

[a] Chi-square tests were used to compare adolescents who had one or more ED visits versus those with no visits across predisposing, enabling, and need-related factors. P-values shown in bold denote statistically significant differences at the p < 0.05 level.

Bivariate relationships were examined comparing adolescents with no emergency department visits to those with one or more visits across a range of predisposing, enabling, and need-related factors

Analysis of predisposing factors revealed significant differences in ED use by race/ethnicity and parental education level ($p < 0.0001$) **(Table 1)**. Non-Hispanic Black adolescents had the highest proportion of one or more ED visits (23.6%), followed by Hispanic adolescents (18.3%). Higher ED use was also observed among adolescents from households with lower educational attainment: 21.7% for parents with less than a high school education and 20.6% for those with a high school diploma or GED.

Among enabling factors, insurance type, household income, and access to a Patient-Centered Medical Home (PCMH) were significantly associated with ED utilization ($p < 0.0001$). Adolescents covered by public insurance only (24.1%), a combination of private and public insurance (24.9%), or unspecified coverage (25.5%) had greater ED visit rates compared with those with private-only insurance or no insurance. Families with lower incomes also reported higher ED use: 24.4% for 0–99% FPL and 18.3% for 100–199% FPL, compared to higher-income groups. Adolescents with a Medical Home were slightly less likely to use the ED (14%) than those without (19%). Interestingly, having a dental visit in the past year was not linked to ED use.

In terms of need-related factors, the presence of a developmental disability (DD) strongly correlated with ED utilization: 55% of adolescents with a DD had one or more visits compared with 32% of those without. The highest ED use was reported among adolescents with both a DD and oral complications (33%), followed by DD only (22%), oral complications only (18%), and neither condition (14%). Parents reported unmet dental care (55%) more frequently than unmet medical care (33%) (data not shown).

Further bivariate analyses highlighted additional factors significantly associated with ED visits, including DD and oral complication status ($p < 0.0001$), consistent access to health insurance ($p = 0.008$), parental frustration in obtaining care ($p < 0.0001$), and specific oral health issues such as toothaches, decayed teeth, bleeding gums, and difficulty eating or swallowing due to health conditions (all $p < 0.0001$). Adolescents whose parents always had health insurance access reported slightly fewer ED visits (83.6%) compared to those lacking coverage (85%), and those whose parents never experienced difficulty obtaining care also had lower ED use (85.7%). Each individual oral complication was associated with elevated ED utilization, and the cumulative number of oral issues showed a clear gradient: 15.5% for no complications, 21.0% for one, 19.3% for two, and 34.1% for three or more complications.

Association between medical home components and ED visits among adolescents

Table 2 presents the bivariate relationships between adolescent ED visits and the five PCMH components included in the NSCH survey: having a personal doctor or nurse, a usual source of care when sick, receipt of family-centered care, ease of obtaining referrals, and access to care coordination. Of these five elements, three showed significant associations with ED use, whereas having a personal doctor or nurse and a usual source of sick care were not linked to ED visits.

Parents of 80% of adolescents reported that their child had received some form of health care, and only these respondents answered the follow-up questions regarding the PCMH. The remaining 20% of adolescents who had no health care were not included in these items. Among those receiving care, 68% of parents indicated that services were family-centered, while 12% reported that they were not. ED utilization was lower for adolescents whose care was family-centered (18% had one or more ED visits) compared with those whose care was not family-centered (24%).

Referral access also showed strong associations with ED visits. Among the 18% of adolescents who required a referral, most parents (14%) reported that obtaining it was “not difficult,” with 31% of these adolescents visiting the ED one or more times. A very small fraction of parents (0.2%) indicated that obtaining a referral was “not possible.” Adolescents whose parents reported difficulty obtaining necessary referrals were significantly more likely to visit the ED, with 45% having at least one visit ($p < 0.0001$).

Table 2. Relationship between PCMH components and adolescent emergency department utilization.

Medical Home Component	Proportion of children (%)	Children with NO ED visits in past year (%)	Children with 1 or more ED visits in past year (%)	p-value[a]
Has a personal doctor or nurse				0.55
Yes	72.0	83.0	17.0	
No	28.0	84.0	16.0	
Has a usual place for sick/well care				0.69
Yes	76.0	84.0	16.0	
No	24.0	83.0	17.0	

Receives family-centered care				<0.0001
Yes	68.0	83.0	18.0	
No	12.0	76.0	24.0	
No health care in the past year	20.0	91.0	9.0	
Ease of getting needed referrals				<0.0001
Did not need referrals	82.0	87.0	13.0	
Not difficult	14.0	69.0	31.0	
Somewhat difficult	3.0	62.0	38.0	
Very difficult	0.8	42.0	58.0	
Impossible to get referrals	0.2	55.0	45.0	
Effective care coordination				<0.0001
Did not need care coordination	47.0	90.0	10.0	
Received needed care coordination	37.0	80.0	20.0	
Needed but did not receive care coordination	16.0	72.0	28.0	

[a] Chi-square analyses were conducted to compare adolescents with no ED visits to those with one or more visits across each individual component of the medical home.

Bold p-values indicate statistical significance at $p < 0.05$.

Multivariable logistic regression model determining factors associated with ED visits among adolescents

To evaluate how developmental disability (DD) status and oral health complications relate to emergency department (ED) use, a multivariable logistic regression model was applied, controlling for predisposing, enabling, and need factors **(Table 3)**. Compared with adolescents without a DD or oral complications, those with a DD but no oral issues had 1.45 times higher odds of visiting the ED (95% CI: 1.25–1.68, $p < 0.0001$). The likelihood of ED visits doubled for adolescents who had both a DD and at least one oral complication (OR: 2.0, 95% CI: 1.64–2.54, $p < 0.0001$). Adolescents with only oral complications, however, did not show a significant increase in ED utilization.

Table 3. Adjusted logistic regression of factors associated with one or more adolescent ED visits in the past 12 months.

Characteristic	Adjusted Odds Ratio (95% CI)	p-value
Developmental disability and oral health problems		
Both developmental disability AND ≥1 oral health problem	2.00 (1.64–2.54)	<0.0001
Developmental disability only (no oral health problem)	1.45 (1.25–1.68)	<0.0001
Oral health problem(s) only (no developmental disability)	1.18 (0.98–1.42)	0.07
Neither developmental disability nor oral health problem (reference)	1.00 (Ref)	–
Race/Ethnicity		
Hispanic, Non-Hispanic Black, or Multiracial/Other	1.10 (0.98–1.21)	0.12
Non-Hispanic White (reference)	1.00 (Ref)	–
Type of insurance		
Private insurance only	0.63 (0.53–0.75)	<0.0001
Private + public insurance	1.03 (0.81–1.30)	0.79
Insurance type unspecified	0.94 (0.48–1.84)	0.86
Uninsured	0.27 (0.14–0.52)	<0.0001
Public insurance only (reference)	1.00 (Ref)	–
Insurance coverage adequacy		
Usually/Sometimes/Never had adequate coverage when needed	1.10 (0.99–1.23)	0.08
Always had adequate coverage (reference)	1.00 (Ref)	–
Highest household education		
Some college, technical school, or college degree+	0.85 (0.73–0.98)	0.03
High school graduate or less (reference)	1.00 (Ref)	–
Federal poverty level		
>400% FPL	0.85 (0.72–1.01)	0.07
200–400% FPL	0.92 (0.78–1.09)	0.36
0–199% FPL (reference)	1.00 (Ref)	–

Presence of a medical home		
No medical home	1.14 (1.02–1.27)	0.02
Has a medical home (reference)	1.00 (Ref)	–
Preventive dental visit in past 12 months		
No	1.19 (0.98–1.46)	0.07
Yes (reference)	1.00 (Ref)	–
Frustration obtaining needed health services		
Sometimes/Usually/Always frustrated	1.86 (1.62–2.13)	<0.0001
Never frustrated (reference)	1.00 (Ref)	–

Bold p-values indicate statistical significance at $p < 0.05$.

When compared with adolescents holding only public insurance, those with exclusively private insurance (OR: 0.63, 95% CI: 0.53–0.75, $p < 0.0001$) or without any insurance (OR: 0.27, 95% CI: 0.14–0.52, $p < 0.0001$) had a lower likelihood of visiting the emergency department. Adolescents covered by both private and public insurance, or whose insurance type was unspecified, did not show significant differences in ED use relative to the public-only group. Higher parental education—defined as some college, technical training, or above—was associated with a modest reduction in ED visits (OR: 0.85, 95% CI: 0.73–0.98, $p = 0.03$). Experiencing frustration when trying to access care for their adolescent nearly doubled the probability of an ED visit (OR: 1.86, 95% CI: 1.62–2.13, $p < 0.0001$). In addition, the absence of a Patient-Centered Medical Home (PCMH) was linked to a 14% increase in ED use (OR: 1.14, 95% CI: 1.02–1.27, $p = 0.02$). No meaningful associations were observed between ED visits and race/ethnicity, lack of a dental visit in the past year, health insurance availability when needed, or family income based on federal poverty level.

Characteristics of families having access to a medical home

To explore the role of a Patient-Centered Medical Home (PCMH) in adolescent healthcare, we compared the characteristics of adolescents reported by parents as having versus not having a PCMH. **Table 4** indicates that adolescents with a PCMH were more often without a developmental disability (47%) and more frequently identified as non-White (55%). These adolescents were also more likely to have parents or caregivers with a college education or higher (57%), be covered by private-only insurance (55%), and come from households earning more than 400% of the Federal Poverty Level (59.5%) (all $p < 0.0001$).

Table 4. Adolescent disability status, demographic characteristics, and reported Patient-Centered Medical Home.

Characteristic	Has a Medical Home (%)	Does NOT Have a Medical Home (%)	p-value[a]
Developmental disability status			<0.0001
Has developmental disability	42.0	58.0	
No developmental disability	47.0	53.0	
Race/Ethnicity			<0.0001
Non-Hispanic White	38.0	62.0	
Hispanic, Non-Hispanic Black, or Other race/ethnicity	55.0	45.0	
Highest household education level			<0.0001
Less than high school	24.0	76.0	
High school graduate/GED	36.0	64.0	
Some college or technical school	44.0	56.0	
College degree or higher	57.0	43.0	
Type of insurance coverage			<0.0001
Private insurance only	55.0	45.0	
Private + public insurance	38.0	62.0	
Public insurance only	36.0	64.0	
Uninsured	26.0	74.0	
Insurance type unspecified	25.0	75.0	
Federal poverty level			<0.0001
0–199% FPL	35.1	64.9	
200–400% FPL	48.4	51.6	

>400% FPL	59.5	40.5

[a]Chi-square tests comparing adolescents with medical home vs. medical home.
Bold p-values indicate statistical significance at $p < 0.05$.

Visits to the emergency department (ED) for dental-related issues in the U.S. nearly doubled between 2000 and 2010 [2], reflecting the inefficiency of EDs in delivering comprehensive dental care. In the current study of adolescents aged 10–17 years, nearly one-quarter (~24%) were identified as having a developmental disability (DD), and these adolescents were more likely to use the ED than their peers without a DD. ED utilization was highest among adolescents with both a DD and at least one oral complication, including decayed teeth, toothaches, or bleeding gums. Other factors contributing to higher ED use included not having a Patient Centered Medical Home (PCMH) and parental reports of difficulty or frustration in accessing healthcare. By contrast, private-only insurance, lack of insurance, and higher parental education were associated with reduced ED visits. The lower rates among uninsured adolescents may indicate limited engagement with conventional healthcare services rather than improved oral health outcomes.

Prior studies have shown that children under 21 presenting to the ED for dental problems often have dental caries, pulp or periapical conditions, periodontal diseases, or abscesses [3]. Children with special healthcare needs (CSHCN) have high dental care demands, second only to prescription medications [21], yet many experience gaps in care, particularly those from low-income households, those with unstable insurance, or children with more complex disabilities. Having a personal doctor or nurse has been linked to lower unmet dental care needs, highlighting the importance of continuous primary care.

In this analysis, logistic regression indicated that adolescents without a PCMH had a 14% higher likelihood of visiting the ED. Complementary bivariate analyses **(Table 2)** showed that three PCMH components—family-centered care, ease of obtaining referrals, and access to care coordination—were associated with lower ED use. These findings suggest that adolescents with DDs may face barriers to timely medical and dental care when essential elements of a PCMH are absent. For instance, adolescents not requiring referrals had much lower ED utilization (87% with no visits) than those unable to obtain referrals (55% with no visits). Similarly, when care coordination was not needed, 90% avoided ED visits, compared with 72% when care coordination was lacking. Care coordination is a central feature of the PCMH model [11], and prior research has shown that children with a personal doctor or nurse are significantly less likely to have unmet dental needs [21].

Despite limited literature on the application of the Medical Home concept in dental care for adolescents with DD, programs such as the Alameda County Dental Service Utilization initiative [22] and initiatives supporting transitions to adult care [23, 24] have incorporated care coordination. Turchi *et al.* [25] reported that families of CSHCN who received care coordination experienced fewer difficulties obtaining specialty referrals, more family-centered care, greater partnership with providers, higher satisfaction, fewer school absences, and reduced ED visits. Conversely, families without care coordination were more likely to be publicly insured or uninsured and had higher ED utilization. Guidelines from the American Academy of Pediatric Dentistry recommend comprehensive oral assessments and referrals to specialists when care cannot be delivered within the dental home [26]. Following these guidelines could enhance oral health outcomes for adolescents with DD and reduce reliance on the ED.

Strengths of this study include the use of a large, nationally representative survey capturing parent-reported data on adolescents' oral and physical health, healthcare access, and environmental factors, allowing analysis of a wide range of characteristics. Limitations include the cross-sectional design, which prevents causal inference, and reliance on parent-reported data, which may be imprecise regarding DD or oral health status. Insurance information was limited to broad categories, and results are generalizable only to non-institutionalized U.S. adolescents aged 10–17. International studies also document high rates of ED visits for dental issues among children and adolescents [27, 28]. Applying PCMH principles and appropriate dental referrals may reduce such visits globally. While some subgroups may have been overrepresented due to non-response, NSCH survey weights help produce nationally representative estimates.

Bivariate analysis of PCMH status **(Table 4)** indicated that adolescents with DDs were less likely to have a Medical Home. In this national sample, adolescents without DDs, with private insurance, higher household income (>400% FPL), and parents with a college degree or higher were more often reported to have a PCMH. Consequently, adolescents with the greatest need for support in navigating the healthcare system were often without access to a Medical Home. Integrating medical and dental care and incorporating

PCMH principles could be a critical step toward improving comprehensive healthcare for adolescents with DDs.

Implications

This cross-sectional study examined emergency department (ED) use among adolescents with special health care needs through the lens of the Andersen Behavioral Model. The results showed that adolescents who had both developmental disabilities and oral health problems were substantially more likely to have frequent ED visits. Overall, not having a medical home was linked to a greater number of ED visits; however, access to a comprehensive medical home was disproportionately concentrated among more socioeconomically advantaged adolescents (those from higher-income, higher-educated, privately insured, and non-Hispanic White families).

Acknowledgments: None

Conflict of Interest: None

Financial Support: This project was supported by the Health Resources and Services Administration (HRSA) of the U.S. Department of Health and Human Services (HHS) under [R41MC42491] the Autism Secondary Data Analysis Research (SDAR) Program.

Ethics Statement: The studies involving human participants were reviewed and approved by the UCLA Office of the Human Research Protection Program determined that this secondary data analysis study did not meet the definition of human subjects research (IRB#21-00167). Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

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