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Disparities in Dental Insurance Coverage and Dental Care Among US Children: The National Survey of Children's Health

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ABSTRACT

OBJECTIVES. We sought to understand disparities in dental insurance coverage and dental care among US children by race/ethnicity, urban/rural residence, and socioeconomic status.

METHODS. Linked data from the National Survey of Children's Health and Area Resource File were analyzed ($N = 89\,071$). Multiple logistic regression analysis was used to adjust for confounders.

RESULTS. A total of 22.1% of US children lacked parentally reported dental insurance coverage in the preceding year, 26.9% did not have a routine preventive dental visit, and 5.1% had parentally perceived unmet need for preventive dental care. US-born minority children were less likely to lack dental insurance than US-born white children; however, foreign-born Hispanic children were more likely to be uninsured. Rural children were more likely to be uninsured than urban children. Children with health insurance were more likely to have dental coverage. Children who lacked dental insurance were less likely to have received preventive care and more likely to have unmet need for care. Compared with US-born white children, all minority children were less likely to receive preventive care. These disparities were exacerbated among foreign-born children. Fewer race-based disparities were found for unmet need for dental care. Only black children, both US- and foreign-born, had higher odds of unmet need for preventive services than US-born white children. Poor dental health was strongly associated with unmet need. Disparities in dental insurance coverage and dental care are also evident by family socioeconomic status.

CONCLUSIONS. Poor and minority children were less likely to receive preventive dental care, even when insurance status was considered. Rural children were less likely to have dental insurance than urban children. Foreign birth affected insurance status for Hispanic children and use of preventive services for all minority children.

CHILDREN'S ORAL HEALTH in the United States has improved over recent decades, yet numerous studies have documented profound disparities.[1] Eighty percent of dental disease among children is found in 20% to 25% of children (~18 million), and these are primarily children from black, Hispanic, American Indian/Alaskan Native, and low-income families.[2] Poor children experience nearly 12 times as many restricted activity days from dental diseases as do children from higher income families.[3]

Disparities in access to dental care reflect family income, parental education, race/ethnicity, and urban/rural residence.[4-6] In 2004, an estimated 6.6% of American children 2 to 17 years of age had an unmet dental need, and 13.1% had not seen a dentist in >5 years.[7] Dental care was identified as the most prevalent unmet health need in US children,[8] and rural children have greater unmet dental need than do their urban peers.[4,6] Failure to obtain preventive dental care was more common among the children who came from low-income families, who were uninsured and non-Hispanic white, and who had a parent with less than a college education.[9,10] Yet, *Oral Health in America: A Report of the Surgeon General*[1] specifically calls for more data on dental care among diverse segments of the US population to eliminate health disparities, including racial and ethnic minorities, rural population, individuals with disabilities, immigrants, migrant workers, and the very young.

Our research examined disparities in dental insurance coverage and dental care among US children by race/ethnicity, socioeconomic status, and urban/rural residence. Our secondary goal was to examine factors associated with dental care among US children. Dental care is a major component of child health care costs, representing approximately one quarter of US dental spending.[11] Better understanding of disparities in access to care among children, and subsequent development of intervention programs, will ultimately help save health costs and improve overall health for the next generation.

DATA AND METHODS

Data Sources and Population
We used cross-sectional data from the National Survey of Children's Health (NSCH) ($N = 102 353$), a telephone survey described briefly by Kogan and Newacheck in this issue,[12] with in-depth information available elsewhere.[13] To obtain information on the supply of dentists at county level, we supplemented the NSCH with the data from the Area Resource File (ARF).

Children 1 through 17 years of age who had natural teeth at the interview time were the population of interest. We excluded 5873 children who were <1 year old or had no natural teeth, 2769 with no parental responses to dental outcomes, and 3619 with missing information on any covariates except household income. After linking the NSCH data to the ARF data, another 1021 children were excluded because of missing data on the urban/rural residence definition in the ARF. No significant changes in sample characteristics before and after this ARF linkage were observed. Thus, the final sample included 89 071 children. Human subjects review was not required for this study.

Outcome Measures

Dental Insurance Coverage
Parents or guardians of the child were asked whether the child has insurance that helps pay for routine dental care, including cleanings, radiographs, and examinations. Although health insurance was characterized in the NSCH as public, private, and none, information on type of coverage was not available for dental insurance.

Preventive Dental Care
The respondents were asked "during the past 12 months . . . did the child see a dentist for any routine preventive dental care, including checkups, screenings, and sealants? Include all types of dentists such as orthodontists, oral surgeons and all other dental specialists." A negative response was classified as failure to receive preventive dental care in the past 12 months.

Parentally Perceived Unmet Need for Dental Care
This measure combined responses to 2 questions. The first question is "during the past 12 months . . . , was there any time when the child needed routine preventive health care?" An affirmative response was followed with another question "did he/she receive all the routine preventive dental care he/she needed?" A child was determined as having parentally perceived unmet need for preventive dental care if parents answered that the child needed the care but did not receive it.

Primary Independent Variables

Race/Ethnicity
Children were grouped into Hispanic, non-Hispanic white, non-Hispanic African American, and non-Hispanic others (hereafter, Hispanic, white, black, and others, respectively).[13]

Urban/Rural Residence
Residence information is not available in the public use data set to protect respondent confidentiality. We accessed residence data through the Research Data Center at the National Center for Health Statistics. "Urban" was defined as living in a metropolitan statistical area; all other places were classified as "rural".

TABLE 1 Factors Associated With Lack of Dental Insurance Coverage in Children 1 to 17 Years of Age: National Survey of Children's Health (*N* = 89 071)

	Lack of Dental Insurance Coverage		Bivariate Model		Multivariate Model[a]	
	%	*P*	Crude OR	95% CLs	aOR[a]	95% CLs
Total	22.07		—	—	—	—
Predisposing factors						
Age, y		.0002				
1–5	23.04		1.00	1.00, 1.00	1.00	1.00, 1.00
6–11	20.67		0.87	0.81, 0.93	0.81	0.75, 0.87
12–17	22.66		0.98	0.91, 1.05	0.91	0.84, 0.98
Gender		.6718				
Male	21.97		1.00	1.00, 1.00	1.00	1.00, 1.00
Female	22.18		1.01	0.96, 1.07	1.02	0.96, 1.09
Race/ethnicity and nativity		<.0001				
White, US born	21.24		1.00	1.00, 1.00	1.00	1.00, 1.00
White, foreign born	17.92		0.81	0.60, 1.09	0.70	0.52, 0.95
Hispanic, US born	25.31		1.26	1.15, 1.37	0.76	0.67, 0.87
Hispanic, foreign born	66.78		7.45	6.22, 8.93	2.09	1.59, 2.76
Black, US born	15.32		0.67	0.60, 0.75	0.60	0.54, 0.68
Black, foreign born	22.25		1.06	0.59, 1.90	0.87	0.45, 1.68
Other, US born	17.76		0.80	0.69, 0.93	0.75	0.64, 0.88
Other, foreign born	23.08		1.11	0.72, 1.72	0.94	0.62, 1.44
Total No. of children in the household		.5345				
0–2	22.21		1.00	1.00, 1.00	1.00	1.00, 1.00
≥3	21.86		0.98	0.92, 1.04	0.87	0.81, 0.94
Family structure		<.0001				
2 parents, biological	22.94		1.00	1.00, 1.00	1.00	1.00, 1.00
2 parents, step	17.71		0.72	0.65, 0.81	0.70	0.62, 0.79
Single mother	21.08		0.90	0.84, 0.96	0.87	0.80, 0.95
Other	23.86		1.05	0.93, 1.19	1.01	0.88, 1.17
Highest education in the household		<.0001				
Less than high school	35.92		2.28	2.02, 2.57	1.26	1.07, 1.48
High school	24.19		1.30	1.21, 1.38	1.00	0.93, 1.08
More than high school	19.76		1.00	1.00, 1.00	1.00	1.00, 1.00
Primary language spoken at home		<.0001				
English	19.82		1.00	1.00, 1.00	1.00	1.00, 1.00
Not English	38.74		2.56	2.33, 2.82	1.33	1.12, 1.56
Need factors						
Child's dental health		<.0001				
Fair, poor	31.66		1.73	1.57, 1.92	1.27	1.12, 1.44
Good, excellent	21.09		1.00	1.00, 1.00	1.00	1.00, 1.00
CSHCN		<.0001				
Yes	18.11		0.74	0.69, 0.80	0.92	0.85, 0.99
No	22.97		1.00	1.00, 1.00	1.00	1.00, 1.00
Enabling factors						
Household poverty status		<.0001				
<100%	27.79		1.85	1.68, 2.04	1.61	1.39, 1.87
100%–200%	24.62		1.57	1.45, 1.70	1.31	1.18, 1.45
200%–400%	19.79		1.18	1.10, 1.27	1.11	1.02, 1.20
>400%	17.25		1.00	1.00, 1.00	1.00	1.00, 1.00
Missing	28.57		1.92	1.72, 2.14	1.44	1.27, 1.63
Parent's health		<.0001				
Fair, poor	25.68		1.26	1.15, 1.37	1.01	0.91, 1.12
Good, excellent	21.54		1.00	1.00, 1.00	1.00	1.00, 1.00
Types of health insurance		<.0001				
Private	17.52		1.31	1.21, 1.42	1.64	1.48, 1.81
Public	13.96		1.00	1.00, 1.00	1.00	1.00, 1.00
None	79.34		23.66	20.82, 26.90	22.61	19.75, 25.87

Socioeconomic Status

Socioeconomic status (SES) was measured by household poverty status and the highest level of parental educa-

tion. Poverty status used 4 categories based on the federal poverty guidelines: poor (<100% of the federal poverty level), near poor (100%–199%), middle income

TABLE 1 Continued

	Lack of Dental Insurance Coverage		Bivariate Model		Multivariate Model[a]	
	%	P	Crude OR	95% CLs	aOR[a]	95% CLs
Residence		<.0001				
Rural	25.26		1.25	1.18, 1.33	1.27	1.19, 1.36
Urban	21.24		1.00	1.00, 1.00	1.00	1.00, 1.00
Region		<.0001				
Northeast	17.50		1.00	1.00, 1.00	1.00	1.00, 1.00
Midwest	20.82		1.24	1.14, 1.34	1.16	1.06, 1.27
South	24.65		1.54	1.43, 1.67	1.35	1.24, 1.48
West	22.73		1.39	1.26, 1.53	1.05	0.94, 1.17
Dentist shortage in the county[b]		.0003				
Whole	27.88		1.37	1.18, 1.60	1.06	0.89, 1.27
One or more parts	21.83		0.99	0.94, 1.05	0.97	0.91, 1.04
None	21.95		1.00	1.00, 1.00	1.00	1.00, 1.00

[a] All variables listed were adjusted in the model.

[b] This information was based on the designation of the Dental Professional Shortage Area in 1998 and 2000–2002 for each county from the ARF.

(200%–399%), and higher income (≥400%). A fifth category, missing, was used to retain approximately 9% of children with missing information on household income. Parental education was examined in 3 categories: low (less than high school), medium (high school), and high (above high school).

Analytical Model

We adopted the health behavior model proposed by Aday and Andersen as the conceptual framework for the analysis.[14] According to this model, the use of health services depends on characteristics that predispose individuals to use services, enable individuals to secure services, or create a need for their use. In our analysis, the predisposing factors included were age, gender, race/ethnicity, total number of children in the household, family structure, parental education, nativity, and primary language spoken at home. For enabling factors, we included household poverty status, parent's health status, dental health insurance, presence and type of health insurance, urban/rural residence, region of residence, and dentist shortage at county level. Two need factors were considered: child's reported dental health and whether the child had special health care needs (CSHCN). CSHCN was selected because they have been found to have greater unmet dental need, particularly for rural residents.[6]

Statistical Analysis

Analyses were performed by using SAS-callable SUDAAN to account for the complex survey design.[15] All descriptive analyses report weighted percentages, and all bivariate and multivariate statistics reflect survey weights. The χ^2 statistic was used to assess whether the sample characteristics differed by race/ethnicity. Multiple logistic regression models were used to examine disparities in dental insurance coverage, receipt of preventive dental care, and unmet need for dental care by race/ethnicity, urban/rural residence, and SES after adjustment for other covariates.

We anticipated that the effect of race/ethnicity would vary by the nativity of the child, because Medicaid eligibility depends on citizenship or legal residency status.[16] Immigrant children who entered the United States after August 22, 1996, are not eligible for Medicaid.[17] Preliminary analyses revealed a statistically significant interaction between race and nativity of the child (US- versus foreign-born). To present the results of this interaction clearly, race-nativity was combined into a single, 8-category variable.

We conducted collinearity diagnostic analyses between independent variables according to standard approaches before examining the logistic regression models. We first estimated crude odds ratios (ORs) for each variable. Then, a forward modeling strategy was used, adding predisposing factors, need factors, and enabling factors into the models sequentially. Because estimates from the first 2 incremental models were not substantially different from those in the full model, we only present crude ORs, plus adjusted ORs (aORs) and 95% confidence limits (CLs) from the full model.

RESULTS

In 2003, ~1 of 10 children in the United States reported having self-reported fair or poor dental health (9.4%). The prevalence of fair or poor dental health was the highest among Hispanic children (21.6%), followed by non-Hispanic black children (11.1%), and non-Hispanic white children (5.8%). Among children with reported dental problems, 78.3% had 1 problem, 17.5% had 2, and 4.1% had ≥3 problems (data not shown).

Dental Insurance

Approximately 1 in every 5 children were reported to lack dental insurance in the preceding year (22.1%;

	Failure to Receive Preventive Care		Bivariate Model		Multivariate Model[a]	
	%	P	Crude OR	95% CLs	aOR	95% CLs
Total	26.89		—	—	—	—
Predisposing factors						
Age, y						
1–5	50.94	<.0001	1.00	1.00, 1.00	1.00	1.00, 1.00
6–11	15.48		0.18	0.16, 0.19	0.15	0.14, 0.17
12–17	19.15		0.23	0.21, 0.24	0.20	0.18, 0.21
Gender		.0244				
Male	27.49		1.00	1.00, 1.00	1.00	1.00, 1.00
Female	26.27		0.94	0.89, 0.99	0.91	0.86, 0.97
Race/ethnicity and nativity		<.0001				
White, US born	22.40		1.00	1.00, 1.00	1.00	1.00, 1.00
White, foreign born	14.42		0.58	0.40, 0.85	0.73	0.48, 1.11
Hispanic, US born	35.48		1.91	1.75, 2.07	1.06	0.93, 1.21
Hispanic, foreign born	48.72		3.29	2.76, 3.92	1.51	1.17, 1.95
Black, US born	32.99		1.71	1.57, 1.85	1.47	1.33, 1.63
Black, foreign born	32.81		1.69	1.00, 2.88	2.25	1.40, 3.62
Other, US born	29.26		1.43	1.27, 1.62	1.36	1.18, 1.57
Other, foreign born	34.23		1.80	1.19, 2.72	2.11	1.27, 3.52
Total No. of children in the household		.9774				
0–2	26.88		1.00	1.00, 1.00	1.00	1.00, 1.00
≥3	26.90		1.00	0.94, 1.06	0.86	0.80, 0.92
Family structure		<.0001				
2 parents, biological	26.13		1.00	1.00, 1.00	1.00	1.00, 1.00
2 parents, step	22.58		0.82	0.74, 0.92	1.23	1.10, 1.39
Single mother	30.77		1.26	1.18, 1.34	1.04	0.96, 1.13
Other	26.04		1.00	0.88, 1.13	1.07	0.93, 1.23
Highest education in the household		<.0001				
Less than high school	44.77		2.83	2.52, 3.18	1.67	1.43, 1.95
High school	33.91		1.79	1.68, 1.90	1.42	1.32, 1.53
More than high school	22.27		1.00	1.00, 1.00	1.00	1.00, 1.00
Primary language spoken at home		<.0001				
English	24.74		1.00	1.00, 1.00	1.00	1.00, 1.00
Not English	42.84		2.28	2.08, 2.51	1.10	0.93, 1.30
Need factors						
Child's dental health		.0001				
Fair, poor	30.83		1.24	1.12, 1.37	0.90	0.79, 1.03
Good, excellent	26.49		1.00	1.00, 1.00	1.00	1.00, 1.00
CSHCN		<.0001				
Yes	20.59		0.66	0.61, 0.71	0.82	0.75, 0.90
No	28.33		1.00	1.00, 1.00	1.00	1.00, 1.00
Enabling factors						
Household poverty status		<.0001				
<100%	41.13		3.34	3.04, 3.66	2.20	1.92, 2.51
100%–200%	33.21		2.37	2.19, 2.57	1.90	1.71, 2.10
200%–400%	22.51		1.39	1.29, 1.49	1.35	1.25, 1.46
>400%	17.32		1.00	1.00, 1.00	1.00	1.00, 1.00
Missing	30.71		2.12	1.90, 2.36	1.53	1.35, 1.74
Parent's health		<.0001				
Fair, poor	32.67		1.38	1.27, 1.50	1.19	1.08, 1.32
Good, excellent	26.03		1.00	1.00, 1.00	1.00	1.00, 1.00
Dental insurance coverage		<.0001				
Yes	22.57		1.00	1.00, 1.00	1.00	1.00, 1.00
No	42.13		2.50	2.35, 2.65	2.17	2.02, 2.34
Types of health insurance		<.0001				
Private	21.50		0.55	0.52, 0.59	1.03	0.94, 1.13
Public	33.12		1.00	1.00, 1.00	1.00	1.00, 1.00

TABLE 2 Continued

	Failure to Receive Preventive Care		Bivariate Model		Multivariate Model[a]	
	%	P	Crude OR	95% CLs	aOR	95% CLs
None	49.34		1.97	1.77, 2.18	1.67	1.46, 1.91
Residence		.0265				
Rural	27.89		1.07	1.01, 1.13	1.06	0.99, 1.13
Urban	26.63		1.00	1.00, 1.00	1.00	1.00, 1.00
Region		<.0001				
Northeast	22.79		1.00	1.00, 1.00	1.00	1.00, 1.00
Midwest	24.51		1.10	1.02, 1.19	1.03	0.94, 1.12
South	29.74		1.43	1.33, 1.55	1.18	1.08, 1.29
West	27.90		1.31	1.19, 1.44	1.08	0.97, 1.20
Dentist shortage in the county[b]		.0008				
Whole	28.52		1.15	1.00, 1.33	0.81	0.67, 0.97
≥1 part	27.67		1.11	1.05, 1.17	0.99	0.93, 1.06
None	25.70		1.00	1.00, 1.00	1.00	1.00, 1.00

[a] All variables listed were adjusted in the model.

[b] This information was based on the designation of the Dental Professional Shortage Area in 1998 and 2000–2002 for each county from the ARF.

Table 1). In multivariable analysis, all US-born minority children were less likely to lack dental insurance than white children. However, foreign-born Hispanics were more likely to be uninsured (aOR: 2.1; 95% CLs: 1.6, 2.8). Children from poor or near poor households, children of less-educated parents, and rural children were less likely to have dental insurance. Lack of health insurance coverage was strongly associated with lacking dental coverage (aOR: 22.6; 95% CLs: 19.8, 25.9). Children with private health insurance were more likely to lack dental insurance than those with public health insurance (aOR: 1.6; 95% CLs: 1.5, 1.8). Dental health and primary language spoken at home were significantly associated with lack of dental insurance. CSHCN had slightly lower odds of lacking dental insurance than children without SHCN.

Preventive Dental Care
Slightly more than a quarter of children (26.9%) did not receive preventive dental care in the preceding year (Table 2). Adjusted analysis, holding constant income, insurance status, and other covariates, showed US-born Hispanic children to be as likely as their white peers to receive preventive care. All other minority children were more likely to lack a preventive visit. The disparities were exacerbated among foreign-born children such as Hispanic (aOR: 1.5; 95% CLs: 1.2, 1.9), black (aOR: 2.3; 95% CLs: 1.4, 3.6), and other children (aOR: 2.1; 95% CLs: 1.3, 3.5).

Even adjusting for insurance status, poverty was significantly associated with receipt of preventive dental care (Table 2). Low parental education was associated with higher odds of receiving no preventive dental care. Children's insurance status (both dental and health coverage) was a significant predictor of receiving preventive dental care. Other characteristics of the child associated with failure to receive preventive care included young age (1–5 years old), non-CSHCN status, fair or poor parental health, and living in the South.

Overall, 5.1% of children had parentally perceived unmet need for preventive dental care (Table 3). In both crude and adjusted analysis, the strongest predictor of perceived unmet need was parentally reported poor dental health (aOR: 5.1; 95% CLs: 4.4, 5.9). Poverty was also associated with perceived unmet need; children in families at all income levels <400% of poverty had greater adjusted odds for unmet need than wealthier children. In adjusted analysis, black children had significantly higher odds of having unmet need than white children, with the highest adjusted odds among foreign-born black children (aOR: 3.8; 95% CLs: 1.9, 7.5). Children whose parents had high school education had moderately lower odds of having unmet need than the children whose parents had at least 12 years of education. Lack of dental insurance coverage was also a strong predictor of unmet need. CSHCN had higher odds of having unmet needs for preventive dental care than did children without SHCN.

DISCUSSION
We found disparities in dental insurance coverage and dental care among US children by race/ethnicity, residence, family income, and parental education. Rural children were less likely to have dental insurance than their urban peers. Compared with US-born white children, foreign-born minorities were worse off in terms of dental insurance coverage (Hispanics only) and preventive dental care use. Health insurance coverage was the strongest predictor of dental coverage. Parentally reported dental insurance coverage was associated with higher odds for receipt of preventive dental care and lower odds of parentally perceived dental unmet need.

TABLE 3 Factors Associated With Parentally Perceived Unmet Dental Need in the Past 12 Months in Children 1 to 17 Years of Age: National Survey of Children's Health (*N* = 89 071)

	Reporting Unmet Need		Bivariate Model		Multivariate Model[a]	
	%	P	Crude OR	95% CLs	aOR	95% CLs
Total	5.09		—	—	—	—
Predisposing factors						
Age, y		<.0001				
1–5	3.54		1.00	1.00, 1.00	1.00	1.00, 1.00
6–11	5.27		1.52	1.26, 1.82	1.24	1.02, 1.50
12–17	6.14		1.79	1.50, 2.13	1.56	1.30, 1.86
Gender		.1196				
Male	5.32		1.00	1.00, 1.00	1.00	1.00, 1.00
Female	4.86		0.91	0.80, 1.03	0.93	0.82, 1.05
Race/ethnicity and nativity		<.0001				
White, US born	4.00		1.00	1.00, 1.00	1.00	1.00, 1.00
White, foreign born	2.78		0.68	0.29, 1.60	0.66	0.27, 1.60
Hispanic, US born	5.82		1.48	1.22, 1.79	0.85	0.65, 1.12
Hispanic, foreign born	13.38		3.70	2.80, 4.90	0.99	0.62, 1.58
Black, US born	7.13		1.84	1.56, 2.17	1.27	1.04, 1.55
Black, foreign born	13.65		3.79	1.95, 7.37	3.80	1.93, 7.50
Other, US born	5.74		1.46	1.13, 1.89	1.23	0.95, 1.60
Other, foreign born	6.67		1.71	0.67, 4.39	1.66	0.61, 4.53
Total No. of children in the household		.0001				
0–2	4.55		1.00	1.00, 1.00	1.00	1.00, 1.00
≥3	5.93		1.32	1.17, 1.50	1.07	0.94, 1.23
Family structure		<.0001				
2-parent, biological	3.99		1.00	1.00, 1.00	1.00	1.00, 1.00
2-parent, step	6.67		1.72	1.42, 2.09	1.26	1.02, 1.56
Single mother	7.19		1.86	1.63, 2.14	1.21	1.03, 1.42
Other	6.48		1.67	1.30, 2.14	1.15	0.88, 1.51
Highest education in the household		<.0001				
Less than high school	8.78		2.12	1.71, 2.65	0.76	0.57, 1.01
High school	6.05		1.42	1.24, 1.62	0.77	0.66, 0.90
More than high school	4.33		1.00	1.00, 1.00	1.00	1.00, 1.00
Primary language spoken at home		<.0001				
English	4.70		1.00	1.00, 1.00	1.00	1.00, 1.00
Not English	8.03		1.77	1.45, 2.16	0.78	0.54, 1.12
Need factors						
Child's dental health		<.0001				
Fair, poor	20.00		6.76	5.91, 7.74	5.10	4.36, 5.97
Good, excellent	3.56		1.00	1.00, 1.00	1.00	1.00, 1.00
CSHCN		<.0001				
Yes	7.08		1.56	1.36, 1.79	1.41	1.22, 1.64
No	4.64		1.00	1.00, 1.00	1.00	1.00, 1.00
Enabling factors						
Household poverty status		<.0001				
<100%	8.35		4.85	3.91, 6.00	2.26	1.70, 3.01
100%-200%	8.02		4.64	3.84, 5.62	2.90	2.32, 3.63
200%-400%	4.23		2.35	1.93, 2.86	2.03	1.67, 2.48
>400%	1.84		1.00	1.00, 1.00	1.00	1.00, 1.00
Missing	5.02		2.81	2.13, 3.71	1.74	1.32, 2.30
Parent's health		<.0001				
Fair, poor	10.04		2.45	2.12, 2.82	1.30	1.11, 1.54
Good, excellent	4.36		1.00	1.00, 1.00	1.00	1.00, 1.00
Dental insurance coverage		<.0001				
Yes	3.58		1.00	1.00, 1.00	1.00	1.00, 1.00
No	10.44		3.14	2.77, 3.55	2.66	2.28, 3.11
Types of health insurance		<.0001				
Private	3.28		0.45	0.39, 0.52	0.73	0.60, 0.88
Public	6.94		1.00	1.00, 1.00	1.00	1.00, 1.00
None	13.41		2.08	1.75, 2.47	1.23	0.98, 1.54

TABLE 3 Continued

	Reporting Unmet Need		Bivariate Model		Multivariate Model[a]	
	%	P	Crude OR	95% CLs	aOR	95% CLs
Residence		.1830				
Rural	5.43		1.09	0.96, 1.23	0.96	0.84, 1.11
Urban	5.01		1.00	1.00, 1.00	1.00	1.00, 1.00
Region		<.0001				
Northeast	3.47		1.00	1.00, 1.00	1.00	1.00, 1.00
Midwest	4.07		1.18	0.98, 1.42	1.04	0.86, 1.26
South	5.73		1.69	1.42, 2.01	1.30	1.08, 1.56
West	6.33		1.88	1.53, 2.31	1.51	1.22, 1.88
Dentist shortage in the county[b]		.0408				
Whole	5.48		1.19	0.91, 1.54	0.81	0.61, 1.10
≥1 part	5.40		1.17	1.03, 1.32	1.01	0.88, 1.16
None	4.66		1.00	1.00, 1.00	1.00	1.00, 1.00

[a] All variables listed were adjusted in the model.

[b] This information was based on the designation of the Dental Professional Shortage Area in 1998 and 2000–2002 for each county from the ARF.

Some of these findings parallel other research on preventive dental care[9,10,18–21] and dental unmet need.[8]

The finding that all US-born minorities were more likely to have dental coverage than were white children suggests that public dental insurance such as Medicaid and the State Children's Health Insurance Program may have helped reduce coverage disparities. Our finding parallels other research noting that children in poverty had the highest rate of no dental insurance coverage.[5] However, public dental insurance does not necessarily increase preventive service receipt and decrease perceived unmet need[22] in all cases. Although we found that privately insured children were slightly less likely than publicly insured to receive preventive care, privately insured children were, nonetheless, less likely to have unmet need for care. At least in dental markets where well-insured or private-pay patients are common, Medicaid coverage alone will be insufficient to remove race-based disparities in dental utilization. For example, in many locales, dentists who accept Medicaid are rare.[23]

Both the American Academy of Pediatric Dentistry and *Bright Futures* recommend 2 visits per year to a dental professional beginning at age 1.[24,25] We found that at least 1 of 4 children aged 1 through 17 years old and more than half of children aged 1 to 5 years old in the United States did not even see a dentist once in the preceding year. Foreign-born minority children were particularly vulnerable to failure to receive preventive care. Because this vulnerability persisted even when income and insurance status were held constant, there may be cultural issues pertaining to the importance of preventive care, or lack of understanding of how to access US dentists, that impede care.

In terms of SES, the associations of poverty with preventive dental care suggest that low-income parents may still have problems with access even holding insurance status constant. Difficulties may stem from the paucity of providers who take Medicaid,[23] difficulty

meeting the deductibles associated with private insurance, or problems finding the time for preventive visits. Previous research documented that almost half of dental expenditures were paid out-of-pocket and only one third by dental insurance,[26] supporting an independent effect for income. Furthermore, parental education may suggest pathways related to health knowledge. Reducing unmet needs for dental care requires addressing both access issues and parents' understanding of dental care need.

Our study adds new information regarding dental care needs among CSHCN, who account for 5% to 18% of the pediatric population in the United States.[6,27,28] We found a protective effect for CSHCN status with regard to dental insurance coverage and preventive dental care. We speculate that parents' more frequent contact with the health care system may improve their knowledge of dental needs, services covered by dental insurance, and how to access pediatric dentists. Nevertheless, CSHCN had a higher prevalence of unmet need, even after adjusting for potential confounders.

Ecological variables, including rural residence and dentist availability, had limited effects. Rural residence was associated with slightly increased odds for lacking dental insurance. Regarding preventive care, rural residence was not significant when other characteristics of the child were held constant. Dentist availability, measured "whole county" or "partial county" dentist shortage area designation, had no effect on insurance or unmet need. Slightly increased unadjusted odds for lack of preventive care were absent in adjusted analysis. Surprisingly, children living in whole county dentist shortage areas had slightly reduced odds for lacking preventive dental care when all factors were held constant.

Several potential limitations should be noted. First, the NSCH is a telephone survey with a modest response rate (55%). It is possible that minorities or foreign-born children remain underrepresented, even after weight-

ing. Second, although 95.8% of respondents were parents, information may be underreported if parents are not fully informed about their children's visits to nontraditional settings, such as school-based health centers or teen clinics. Third, dental insurance coverage was parentally reported; parents may be unclear or inaccurate in their understanding of dental coverage. However, our estimate of uninsured children (22%) is somewhat close to the levels found in the 2002 the National Survey of America's Families (26%)[9] and in the 2001 California Health Interview Survey (23.6%).[18] Finally, the unmet need measure is subject to recognition and recall error, because it assumes that parents all recognize dental need and can recall this need at the interview time. Reporting bias would occur if parents think that the unmet need is a socially undesirable concept and are not willing to acknowledge this. Using standard questions that have been used elsewhere, our results on unmet need can be compared with previous findings.[6,8,29] The positive association between perceived poor dental health and unmet need indicates that the data has its own face validity despite potential limitations.

CONCLUSIONS

Eliminating race and economic and geographical disparities in dental insurance and dental care requires additional efforts in removing both financial and nonfinancial barriers to dental utilization improving dental insurance coverage for foreign-born minority children and improving parents' understanding of dental care need. All of these will be critical to improving American children's oral health.

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