

Does Medicaid improve utilization of medical and dental services and health outcomes for Medicaid-eligible children in the United States?

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Abstract - Background: Data are lacking to support the contention that Medicaid services improve utilization of healthcare services and result in better health. Objective: To compare sociodemographic, utilization of healthcare services and health status characteristics among Medicaid-eligible children. Methods: The third National Health and Nutrition Examination Survey included 2821 children 2-16 years of age eligible for Medicaid. The main outcome measures are annual physician visit, annual dentist visit, general health status, oral health status, asthma (second most common childhood disease), dental caries (most common childhood disease), asthma treatment needs, and dental treatment needs. We quantified the association of these outcome measures with Medicaid insurance status and sociodemographic status using multiple logistic regression modeling, taking into account the complex survey design and sample weights. Results: Among Medicaid-eligible children, 27% were uninsured. Among uninsured Medicaid-eligible children, 62% had an annual physician visit, 32% had an annual dentist visit, 10% needed asthma treatment, and 57% needed dental treatment. Among insured Medicaideligible children, 81% had an annual physician visit, 39% had an annual dentist visit, 13% needed asthma treatment, and 42% needed dental treatment. After simultaneously taking into account other characteristics, uninsured Medicaideligible children were more likely to not have an annual physician visit $(OR_{NoMDvisit} = 2.21; 1.26-3.90)$, and to need dental treatment $(OR_{DentalNeed} = 1.57; 1.13-2.18)$. Conclusions: This USA population-based study found disparities exist within Medicaid's services between utilization of dental and medical services. Medicaid insurance improved utilization of medical services, but did not improve the utilization of dental services. This suggests that Medicaid insurance does not improve access to dental services for poor children.

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Health disparities affecting disadvantaged children are a national concern (1–4). The higher disease burden among the poor compared to the nonpoor has resulted in much discussion of access to healthcare and utilization of health service problems across the nation. An assessment of the impact of public insurance, namely, Medicaid on the health status and utilization of health services for the poorest of the poor is notably lacking. Medicaid is an entitlement program with open-ended financing because the Federal law prohibits arbitrary exclusions and limitations, and provides more extensive coverage than private insurance plans. Moreover, Medicaid must maintain open enrollment even when it is not financially feasible, which is a critical barrier in the ability to control the related federal expenditures (5). 'Medicaid is technically not insurance at all but instead a mechanism for financing many forms of health care that would be considered uninsurable and beyond the reach of the commercial market (5)'.

An additional complexity associated with health disparities among the USA population, is that many more individuals are uninsured for dental services than medical services. Over two and half times more children are uninsured for dental care (36%) than for medical care (14%) (6). Health disparities can be assessed by focusing on poor children eligible for Medicaid because Medicaid coverage includes unlimited medical and dental preventive, therapeutic and emergency services through the federal mandate for unlimited Early and Periodic Screening, Diagnostic and Treatment (EPSDT) services. Despite the federal mandate for unlimited dental care, only a small proportion of children receive dental services (2). Dental disease is a chronic problem among the disadvantaged, low income and vulnerable populations (1).

The objectives of this study were to: (i) describe the sociodemographic attributes, utilization of health services, and health status in Medicaid insured and uninsured Medicaid-eligible children; and (ii) compare these characteristics between both groups of children with respect to utilization of health services (e.g. dental and medical care), health status (e.g. oral health and general health status, asthma and dental caries experience), and treatment need for the two health conditions that affect the most children: dental caries with a prevalence of 59% and asthma with a prevalence of 11% (7).

Methods

Study population

We used data from the third National Health and Nutrition Examination Survey (NHANES), 1988– 1994, a complex, multistage, stratified clustered sample of the civilian noninstitutionalized population residing in the USA (8). We identified 2821 children aged 2–16 years, eligible for Medicaid.

Medicaid insurance status

The main process outcome or exposure variable was receipt of Medicaid insurance. We defined Medicaid-eligibility by identifying children from families with income at, or below the 100% federal poverty level. This conservative definition of Medicaid eligibility met the Medicaid-eligibility criteria for children in every state. Medicaid insurance status for Medicaid-eligible children was reported by the responding adult and defined as: (i) Medicaid insured – those children covered by Medicaid; or (ii) uninsured – those children neither covered by Medicaid nor by private insurance.

Health outcomes and healthcare needs

The general health outcomes of interest included: (i) Parent-reported poor general health status, defined by combining general health categories of fair or poor; (ii) asthma, defined as being told by a doctor that their child had asthma; (iii) asthma treatment need, defined as: (a) parent-reported wheezing or whistling in their child's chest in the past 12 months, and doctor said their child had asthma, but their child was never treated for asthma; or (b) parent-reported wheezing or whistling in their child's chest in the past 12 months, but never told by a doctor that their child had asthma. This definition addresses the potential misclassification if the child was never diagnosed by a doctor he/she would never had been treated for asthma.

The oral health outcomes were defined to be comparable with the general health outcomes: (i) poor oral health status, defined by combining the parent-reported categories of the child's teeth as fair or poor; (ii) dental caries experience derived from dentist-reported oral health examination defined as having at least one tooth either decayed, missing or filled; (iii) dental treatment need was based on dentist examination finding untreated dental caries (similar to the doctor's diagnosis of asthma), or parent-report that their child needed a filling, extraction or pain relief (similar to the parent's reporting the symptoms of wheezing or whistling in their child's chest, but the child was never diagnosed by a physician as having asthma).

Utilization of healthcare service

Utilization of healthcare service was assessed as a main outcome variable, and as a potential explanatory variable in the multivariable logistic regression models of the health outcomes. Utilization of healthcare service included: (i) utilization of medical services, defined as having a physician visit in the past 12 months (i.e. annual physician visit or MD visit); (ii) utilization of dental services, defined as having a dentist visit in the past 12 months (i.e. annual dentist visit or DDS visit).

Other explanatory variables

Other explanatory variables included: age (2–8 or 9–16 years old) urban residency (yes or no), highest education of responding parent (high school graduate or not a high school graduate), gender (male or female), race/ethnicity (non-Hispanic white, non-Hispanic black or Mexican American), and region of residence in the USA (west, south, midwest or northeast).

Statistical analyses

The NHANES III complex survey design and sample weights were taken into account in the data analyses using the statistical analysis software (SUDAAN) (9). The benefits (utilization of healthcare services, health outcomes and lack of healthcare treatment needs) of the Medicaid mandate for unlimited EPSDT services was evaluated by calculating the odds ratio (OR) to quantify the association of Medicaid insurance status with: (i) utilization of healthcare service, namely annual physician and dentist visit; (ii) health status, namely poor general health and poor oral health; (iii) the two most prevalent childhood diseases, namely, asthma and dental caries experience; and (iv) treatment need for the two most prevalent childhood diseases, namely asthma treatment needs and dental treatment needs. Separate multiple logistic regression models were used for each specific outcome, simultaneously taking into account the potential explanatory variables with statistical significance reported as 95% confidence interval (CI).

Results

Medicaid insurance status

As shown in Table 1, 27% of the Medicaid-eligible children were uninsured. Among uninsured Medicaid-eligible children 60% were older, 47% were non-Hispanic white, 22% were non-Hispanic black, 31% were Mexican American, 33% of their parents graduated from high school, and 53% lived in southern USA. Among Medicaid insured children, 41% were older, 37% were non-Hispanic white,

Explanatory variables	Uninsured		Medicaid insured		
	n (759)	27.4%	n (2062)	72.6%	OR _{Uninsured} (95% CI
Sociodemographics					
Age					
9–16 years old	385	59.5%	644	40.8%	2.14 (1.42–3.22) ^a
2–8 years old	374	40.5%	1418	59.2%	1.00
Race/ethnicity					
Non-Hispanic white	69	47.0%	169	36.9%	3.37 (1.95–5.82) ^a
Non-Hispanic black	187	22.0%	1020	44.5%	1.00
Mexican American	469	31.0%	711	18.6%	3.01 (1.34–6.75) ^a
Gender					
Female	384	53.3%	1025	50.8%	1.14 (0.83–1.56)
Male	375	46.7%	1037	49.2%	1.00
Parent graduated from high	h school				
Yes	208	33.2%	847	49.0%	1.00
No	540	66.8%	1199	51.0%	1.88 (0.94-3.76)
Urban residency					
Yes	373	46.8%	1064	48.6%	0.96 (0.56-1.65)
No	386	53.2%	998	51.4%	1.00
Region in the USA					
West	221	24.8%	610	27.3%	2.28 (0.54-9.72)
South	447	53.2%	825	32.3%	3.65 (1.33–10.02) ^a
Midwest	58	12.7%	348	19.1%	1.76 (0.64-4.85)
Northeast	33	9.3%	279	21.3%	1.00

Table 1. Number, percent distribution, and association of sociodemographics with uninsured Medicaid status among Medicaid-eligible children in the USA

 $OR_{Uninsured}$, odds ratio for the association between the explanatory variable and uninsured Medicaid status, simultaneously adjusting for all sociodemographic variables listed in the table. ^ap < 0.05. 44% were non-Hispanic black, 19% were Mexican American, 49% of their parents graduated from high school, and 32% lived in southern USA. Medicaid-eligible older children $(OR_{Uninsured} = 2.14; 95\% CI = 1.42-3.22), non-$ Hispanic white children ($OR_{Uninsured} = 3.37$; 1.95-5.82), Mexican American children (OR_{Uninsured} = 3.01; 1.34–6.75), and children living in the South ($OR_{Uninsured} = 3.65; 1.33-10.22$) were more likely to be uninsured than younger children, non-Hispanic black children, and children living in the Northeast, respectively, after adjusting for age, race/ethnicity, gender, parent's education, urban residency and region in the USA.

Utilization of healthcare service

Half as many Medicaid-eligible children visited the dentist in the past year (32% of the Medicaid uninsured and 39% of the Medicaid insured) than visited the physician (62% of the uninsured and 81% of the Medicaid insured) (Table 2). Uninsured Medicaid-eligible children were more than twice as likely to not visit the physician in the

past year ($OR_{NoMDvisit} = 2.21$; 1.26–3.90) than Medicaid insured children (Table 3). Girls were less likely to not have an annual dentist visit ($OR_{NoDDSvisit} = 0.71$; 0.54–0.93) than boys; and children living in the southern region were more likely to not have an annual dentist visit ($OR_{NoDDSvisit} = 2.99$; 1.59–5.62) than children living in the Northeast, after adjusting for Medicaid insurance status, age, race/ethnicity, gender, parent's education, urban residency, and region in the USA. No association was found between Medicaid insurance coverage and not having an annual dentist visit ($OR_{NoDDSvisit} = 1.26$; 0.68–2.32, Table 3).

General health and oral health

A greater proportion of the Medicaid-eligible children had poor oral health (27% of the Medicaid uninsured and 22% of the Medicaid insured) than poor general health (16% of the Medicaid uninsured and 11% of the Medicaid insured) (Table 2).

As given in Table 3, after taking into account other characteristics, Medicaid insurance status was not associated with poor general health

Table 2. Number, percent distribution, and association of utilization of healthcare services, health outcomes, and treatment needs with uninsured Medicaid status among Medicaid-eligible children in the USA

	Uninsured	Uninsured		Medicaid insured	
Outcome variables	n (759)	27.4%	n (2062)	72.6%	OR _{Crude} (95% CI)
Utilization of healthcare	services				
Physician visit in past year	ar				
No	300	37.6%	368	19.1%	$2.54 (1.66 - 3.90)^{a}$
Yes	450	62.4%	1690	80.9%	1.00
Dentist visit in past yea	ar				
No	583	68.0%	1382	61.5%	1.33 (0.81-2.18)
Yes	164	32.0%	670	38.5%	1.00
Health outcomes					
General health					
Poor	131	16.1%	277	10.6%	1.62 (1.02–2.58) ^a
Good	628	83.9%	1785	89.4%	1.00
Oral health					
Poor	278	26.8%	536	21.8%	1.32 (0.89–1.96)
Good	481	73.2%	1521	78.2%	1.00
Asthma					
Yes	53	11.3%	210	12.4%	0.89 (0.37-2.18)
No	705	88.7%	1851	87.6%	1.00
Caries experience					
Yes	411	62.1%	1007	54.3%	1.38 (1.03–1.87) ^a
No	326	37.9	987	45.7	1.00
Treatment needs					
Asthma					
Yes	93	9.9%	283	12.5%	0.77 (0.50-1.18)
No	666	90.1%	1779	87.5%	1.00
Dental					
Yes	421	56.6%	877	42.0%	1.78 (1.32–2.42) ^a
No	338	43.4%	1185	58.0%	1.00

 OR_{Cruder} unadjusted odds ratio for the association between the outcome variable and uninsured Medicaid status. $^{a}p < 0.05$.

Explanatory variables	OR _{NoMDvisit} (95% CI) ^a	OR _{NoDDSvisit} (95% CI) ^a	OR _{PoorGeneralHealth} (95% CI) ^a	OR _{PoorOralHealth} (95% CI) ^a
Uninsured	2.21 (1.26–3.90) ^b	1.26 (0.68–2.32)	1.13 (0.66–1.94)	1.22 (0.79–1.89)
Older (9–16 years old)	0.50 (0.32–0.78) ^b	1.00 (0.73-1.37)	1.45 (0.98-2.16)	1.15 (0.87-1.53)
Race/ethnicity				
Non-Hispanic white	1.00	1.00	1.00	1.00
Non-Hispanic black	1.37 (0.59-3.16)	1.25 (0.80-1.94)	1.55 (0.82-2.95)	1.31 (0.92–1.86)
Mexican American	1.32 (0.65-2.66)	1.93 (0.82-4.53)	4.16 (2.30–7.51) ^b	2.64 (1.43–4.86) ^b
Female	1.02 (0.75-1.37)	0.71 (0.54–0.93) ^b	1.04 (0.65-1.56)	0.90 (0.64–1.26)
Parent did not graduate from high school	1.27 (0.79–2.06)	0.76 (0.49–1.19)	1.31 (0.82–2.10)	1.52 (1.10–2.09) ^b
Urban residency	0.78 (0.40-1.53)	0.93 (0.61-1.41)	0.92 (0.58-1.44)	1.00 (0.67-1.50)
Region				
West	1.45 (0.50-4.23)	1.79 (0.73-4.39)	1.78 (0.84-3.77)	1.99 (0.87-4.58)
South	1.79 (0.51-6.33)	2.99 (1.59–5.62) ^b	1.68 (0.67-4.24)	1.83 (0.96-3.47)
Midwest	1.48 (0.50-4.34)	1.50 (0.88-2.56)	2.67 (1.08–6.61) ^b	2.29 (1.15–4.58) ^b
Northeast	1.0	1.00	1.0	1.00
Utilization of health services				
No physician visit in past year			0.98 (0.65-1.46)	
No dentist visit in past year				1.04 (0.76–1.42)

Table 3. Association of uninsured Medicaid status and sociodemographics with utilization of healthcare service and with poor general health and poor oral health among Medicaid-eligible children in the USA

^aAll the above odds ratios for the association between the explanatory variable and utilization of healthcare services (No MD visit and No DDS visit), and between the explanatory variable and health status are simultaneously adjusted for all the other explanatory variables indicated in the table. ^bp < 0.05.

 $(OR_{PoorGeneralHealth} = 1.13; 0.66-1.94)$, but Mexican American children were more likely to have poor general health ($OR_{PoorGeneralHealth} = 4.16$; 2.30–7.51) than non-Hispanic white children, and children who lived in the midwestern USA were more likely to have poor general health ($OR_{PoorGeneralHealth} = 2.67$; 1.08–6.61) than children living in the Northeast.

Medicaid insurance coverage was not associated with poor oral health ($OR_{PoorOralHealth} = 1.22$; 0.79–1.89, Table 3). After adjusting for the explanatory variables, Mexican American children $(OR_{PoorOralHealth} = 2.64;)$ 1.43-4.86), children whose parent did not graduate from high school $(OR_{PoorOralHealth} = 1.52; 1.10-2.09),$ and children who lived in the midwestern USA $(OR_{PoorOralHealth} = 2.29; 1.15 - 4.58)$ were more likely to have poor oral health compared with non-Hispanic white children, children whose parent graduated from high school, and children living in the Northeast, respectively (Table 3).

Asthma and dental caries

The prevalence of dental caries experience (62% of the Medicaid uninsured and 54% of the Medicaid insured) was approximately five times more than the prevalence of asthma (11% of the Medicaid uninsured and 12% of the Medicaid insured) (Table 2), suggesting that dental caries is the more common chronic disease.

As shown in Table 4, after simultaneously adjusting for all the listed explanatory variables, Medicaid insurance coverage was not associated with asthma (OR_{Asthma} = 1.49;0.58–3.86), but older children were one and half times more likely to have asthma (OR_{Asthma} = 1.56; 1.06–2.28) than younger children, and children who did not have an annual physician visit were half as likely to have asthma (OR_{Asthma} = 0.53; 0.29–0.98) compared with children who had an annual physician visit; and children living in southern USA were onethird as likely to have asthma (OR_{Asthma} = 0.37; 0.15–0.92) than children living in the Northeast.

After simultaneously adjusting for the other characteristics, Medicaid insurance status was not associated with dental caries experience $(OR_{Caries} = 1.08; 0.78-1.50)$, but children who did not visit the dentist in the past year were about half as likely to have dental caries experience $(OR_{Caries} = 0.43; 0.31-0.60)$ than children with an annual dental visit. Older children $(OR_{Caries} = 2.59; 2.02-3.32), girls (OR_{Caries} = 1.46;$ 1.12-1.91), and children whose parent did not graduate from high school ($OR_{Caries} = 1.48$; 1.12-1.96) were more likely to have dental caries experience than younger children, boys, and

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	Health outcomes		Treatment need	
Explanatory variable	Asthma OR _{Asthma} (95% CI) ^a	Dental caries OR _{Caries} (95% CI) ^a	Asthma OR _{AsthmaNeed} (95% CI) ^a	Dental OR _{DentalNeed} (95% CI) ^a
Uninsured	1.49 (0.58–3.86)	1.08 (0.78-1.50)	0.79 (0.48–1.29)	1.57 (1.13–2.18) ^b
Utilization of health services				
No physician visit in past year	0.53 (0.29–0.98) ^b		0.38 (0.21–0.69) ^b	
No dentist visit in past year	, ,	0.43 (0.31–0.60) ^b	. ,	1.25 (0.83-1.89)
Older (9–16 years old)	1.56 (1.06–2.28) ^b	2.59 (2.02–3.32) ^b	0.36 (0.22–0.66) ^b	1.69 (1.25–2.27) ^b
Race/ethnicity				
Non-Hispanic white	1.00	1.00	1.00	1.00
Non-Hispanic black	1.10 (0.58-2.11)	0.79 (0.48-1.30)	0.44 (0.29–0.68) ^b	1.08 (0.69–1.69)
Mexican American	0.70 (0.37-1.32)	1.13 (0.74–1.73)	0.97 (0.53-1.77)	1.24 (0.79–1.94)
Female	0.92 (0.52-1.61)	1.46 (1.12–1.91) ^b	0.82 (0.59-1.13)	1.23 (0.95-1.59)
Parent did not graduate from high school	0.80 (0.43–1.47)	1.48 (1.12–1.96) ^b	1.24 (0.86–1.78)	1.65 (1.19–2.30) ^b
Urban residency	0.81 (0.41-1.60)	0.93 (0.64–1.36)	0.94(0.58 - 1.52)	0.95 (0.67-1.35)
Region	0101 (0111 1100)	0170 (0101 1100)	0.01 (0.000 1.02)	0.50 (0.07 1.00)
West	0.44 (0.14-1.36)	1.23 (0.66-2.27)	3.86 (0.90-16.65)	1.57 (0.73-3.37)
South	0.37 (0.15–0.92) ^b	1.14 (0.60-2.14)	5.68 (1.39–23.14) ^b	1.44 (0.68-3.03)
Midwest	0.44 (0.16-1.25)	1.00 (0.53-1.88)	3.55 (0.82-15.36)	1.33 (0.64-2.76)
Northeast	1.00	1.00	1.00	1.00

Table 4. Association of uninsured Medicaid status, utilization of healthcare services, and sociodemographics with health outcomes and treatment needs among Medicaid-eligible children: USA, 1988–1994

^aAll the above odds ratios for the association between the explanatory variable and health outcome or treatment need are simultaneously adjusting for all the other explanatory variables listed in the table. ^bp < 0.05.

children whose parent graduated from high school, respectively (Table 4).

Treatment needs

Asthma treatment needs (10% of the Medicaid uninsured and 13% of the Medicaid insured) were three to six times less than dental treatment needs (57% of the Medicaid uninsured and 42% of the Medicaid insured, Table 2). Medicaid insurance status was not associated with asthma treatment needs $(OR_{AsthmaNeed} = 0.79;$ 0.48 - 1.29in Table 4). After simultaneously taking into account explanatory variables in Table 4, children who did not visit the physician in the past vear $(OR_{AsthmaNeed} = 0.38; 0.21-0.69), were$ older $(OR_{AsthmaNeed} = 0.36; 0.22-0.60)$ or non-Hispanic black ($OR_{AsthmaNeed} = 0.44; 0.29-0.68$) were approximately one-third as likely to need asthma treatment compared with children who had an annual physician visit, younger children, and non-Hispanic white children, respectively. Those who live in the south were over five times more likely to need asthma treatment ($OR_{Asthma} = 5.68$; 1.39– 23.14) than children living in the Northeast.

After simultaneously adjusting for explanatory variables in Table 4, uninsured Medicaid-eligible children ($OR_{DentalNeed} = 1.57$; 1.13–2.18), older children ($OR_{DentalNeed} = 1.69$; 1.25–2.27), and chil-

dren whose parent did not graduate from high school ($OR_{DentalNeed} = 1.65$; 1.19–2.30) were more likely to need dental treatment than Medicaid insured children, younger children, and children whose parent graduated from high school, respectively.

Discussion

In 2002, one in every seven Americans, or 51 million beneficiaries received healthcare and social services through the federal-state Medicaid program (10). Our study found 27% of the poorest Medicaid-eligible children were uninsured which is similar to previous reports that 12–25% of Medicaid-eligible children were uninsured during 1989–2001 (11–16). In this large population-based study, non-Hispanic white and Mexican American Medicaid-eligible children were three times more likely to be uninsured than non-Hispanic black Medicaid-eligible children.

Utilization of medical services versus utilization of dental services disparity

Despite the federal mandate for unlimited EPSDT services, national data reported herein indicate that there are disparities between utilization of medical

services and dental services. Our findings further substantiate the problem of utilization of dental care services for children with Medicaid coverage (2) while indicating Medicaid insurance improves utilization of medical care services (17), but did not improve the poor utilization of dental care services. The primary barrier to utilization of dental services for Medicaid-eligible recipients is limited dentist participation (2). Less than half of the dentists in 59% of the states saw at least one Medicaid patient during 1999, and there was no state in which more than half of the dentists saw at least 100 Medicaid patients (100 patients represents about 10% of the number of patients a dentist generally attends per year) (2). Dentists indicate that they do not treat more patients with Medicaid coverage due to low payment rates, administrative requirements, and frequently missed appointments (2). Although utilization of dental services is a problem for Medicaid dental programs, utilization of dental services improved in one state when children with Medicaid received the same insurance coverage as privately insured children (18).

When discussing access to healthcare and utilization of services using the standard measure of an annual visit it should be acknowledged that this measure does not indicate if there is any unmet treatment need (19). In order to assess quality of care, one suggestion was to link access to care to processes of care (20). Hence, to address this weakness in the annual visit measure we evaluated the role of Medicaid in children's health outcomes: general health status, oral health status, asthma, dental caries and healthcare needs (asthma treatment and dental treatment).

Poor general health versus poor oral health disparity

To further assess the role of Medicaid beyond the problems of access to care and utilization of health services, we will first discuss the role of Medicaid in general health and oral health status. Using a representative sample of USA children eligible to receive Medicaid we found disparities between poor general health and poor oral health. Twice as many Medicaid-eligible children had poor oral health compared with poor general health (Table 2). After taking into account the explanatory variables, Medicaid status was neither associated with poor general health nor poor oral health (Table 3). This finding that the poorest children covered by Medicaid insurance were not more likely to have poor general health than uninsured Medicaid-eligible children is contrary to previous reports that poor Medicaid-eligible children with better health status were less likely to be covered by Medicaid or public health insurance (16, 21).

Asthma versus dental caries disparity

Our findings that among Medicaid insured children 54% had dental caries experience and 12% had asthma, and among uninsured Medicaideligible children 62% had dental caries experience and 11% had asthma, are in agreement with the Surgeon General's Report on Oral Health that dental caries is about four to five times more common than asthma (7).

While it has been reported that children with health insurance were more likely to be diagnosed and receive treatment for asthma (22), we did not find this to be the case among the poorest children in the USA. Our study indicates that there is a disparity in the impact of Medicaid on the two most prevalent childhood diseases. That is, after simultaneously taking into account the potential explanatory variables, Medicaid insurance status was not associated with asthma treatment need, with uninsured Medicaid-eligible children not any more likely to need asthma treatment than Medicaid-insured children. Conversely, uninsured Medicaid-eligible children were more likely to need dental treatment than Medicaid insured children. This agrees with other studies that have shown that insurance can lead to improved oral health (23). Although receipt of Medicaid did not decrease the proportion of children with poor oral health or who did not have an annual dentist visit, this may be explained in part by parents (both insured and uninsured) bringing their child in for emergency care of a painful condition, but not returning for follow-up care or routine check-up (24).

In summary, although the NHANES III data used in the current study are several years old and there have been substantial expansions to Medicaid, with the addition of State Children's Health Insurance Program, we believe that the Medicaid program was uniquely evaluated through our assessment of poor children eligible for Medicaid, and our results are relevant and have policy implications. To the best of our knowledge, this is the first report of nationally representative data that simultaneously assessed whether receipt of Medicaid improves utilization of medical or dental health services, medical or dental health, and health outcomes for the poorest of the poor children. Furthermore, more recent national data are not currently available to compare uninsured Medicaid-eligible versus Medicaid insured children's healthcare access and health outcomes. This study approach addressed the limitation of previous studies, due to the confounding by income status, when children with Medicaid are compared to non-poor children with private insurance coverage. Our assessment of Medicaid-eligible rather than Medicaid enrolled children addressed the previous concern that Medicaid itself is an indicator of access and utilization of care among the poor (25).

Our findings contribute scientific data for current and/or future health policy debates regarding the health disparities among the poorest children eligible for Medicaid. While the Medicaid mandate appears to have improved utilization of medical care services with 81% of Medicaid insured children having an annual physician visit compared with 62% of uninsured Medicaid-eligible children, it does not seem to improve the poor utilization of dental care services with 39% of Medicaid insured children having an annual dentist visit compared to 32% of uninsured Medicaid-eligible children. This suggests that the Medicaid mandate should reconsider medical and dental healthcare separately to address the disparity between access to care and utilization of medical versus dental services, and the disparity between the needed treatment for the two most common childhood diseases.

Parental education and involvement is important for the daily implementation of preventive measures, and for the enrollment in Medicaid. Outreach programs in local communities must be cognitive of the literacy level used in all communications regarding the Medicaid program, and should not only continue the efforts for young children but should also be directed toward adolescents because: (i) families are confused about eligibility, find the enrollment process difficult, do not perceive a need when their child is healthy or perceive a stigma to participate in public welfare programs;(12, 26, 27); (ii) uninsured children's parents have lower education and lower healthcare utilization rates (28, 29); and (iii) older children were less likely to be enrolled in Medicaid (16, 26).

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