

# Children's Access to Dental Care Affected by Reimbursement Rates, Dentist Density, and Dentist Participation in Medicaid

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**Objectives.** To assess the relation between Medicaid reimbursement rates and access to dental care services in the context of dentist density and dentist participation in Medicaid in each state.

**Methods.** Data were from Early and Periodic Screening, Diagnostic, and Treatment reports for 2014, Medicaid reimbursement rate in 2013, dentist density in 2014, and dentist participation in Medicaid in 2014. We assessed patterns of mediation or moderation.

**Results.** Reimbursement rates and access to dental care were directly related at the state level, but no evidence indicated that higher reimbursement rates resulted in overuse of dental services for those who had access. The relation between reimbursement rates and access to care was moderated by dentist density and dentist participation in Medicaid. We estimate that more than 1.8 million additional children would have had access to dental care if reimbursement rates were higher in states with low rates.

**Conclusions.** Children who access the dental care system receive care, but reimbursement may significantly affect access. States with low dentist density and low dentist participation in Medicaid may be able to improve access to dental services significantly by increasing reimbursement rates. (*Am J Public Health.* 2017;107:1612–1614. doi:10.2105/AJPH.2017.303962)

Children younger than 21 years enrolled in Medicaid are entitled to coverage for dental services under the Early and Periodic Screening, Diagnostic, and Treatment (EPSDT) benefit. Significant disparities in access to this benefit exist across states. States with high Medicaid reimbursement rates or states that increased Medicaid reimbursement rates have higher use of pediatric dental care services.<sup>1–4</sup> The most frequently cited mechanism for this relation is that higher reimbursement rates lead to increased dentist participation in Medicaid, creating greater ability to access care for beneficiaries<sup>3,4</sup> (Appendix A; available as a supplement to the online version of this article at <http://www.ajph.org>). However, this hypothesized relation has not been systematically tested at the national level.<sup>3</sup> Limited evidence from surveys of dental providers suggests that this relation may be moderated by dentist participation in Medicaid.<sup>5</sup> In addition, the capacity of the dental delivery system to provide

services has not been considered, and a potential concern is that increasing the reimbursement fees will lead to overuse of services.<sup>6</sup>

We assessed the relation between reimbursement rates and access to and delivery of dental care at the state level, in the context of the density of dentists in the population and the number of dentists participating in Medicaid.

## METHODS

The data used in our analysis were from 50 states and the District of Columbia. The

Centers for Medicare and Medicaid Services<sup>7</sup> report (CMS416) provided the total count of individuals eligible for EPSDT services for 90 continuous days, the total eligible count receiving any dental services, and the total eligible count receiving preventive dental services in 2014. We created 2 indexes with these data: access rate and prevention ratio. Access rate measures access to dental care as a percentage of those eligible for EPSDT services. Prevention ratio measures those who received preventive dental services as a percentage of those who accessed dental care. A report by the American Dental Association served as the data source for the Medicaid fee-for-service reimbursement, defined as a percentage of private dental benefit plan reimbursement for child dental services in 2013.<sup>8</sup> A related report provided data on the dentist density (i.e., the rate of dentists per 100 000 of the population in 2014) and the percentage of dentists participating in Medicaid for child dental services in 2014.<sup>8–10</sup> Median household income and an oral health index were used to account for potential intervening supply and demand factors (for variable definitions and data sources, see Appendix B; available as a supplement to the online version of this article at <http://www.ajph.org>).

Previous literature suggests that Medicaid reimbursement rates affect the access rate by increasing dentist participation in Medicaid.<sup>1–4</sup> Therefore, we used linear regression with nested model building to test for a mediating relation between reimbursement rates in 2013 and dentist participation in

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2014. However, previous reports have not tested this hypothesized relation or included measures of system capacity. Therefore, we tested the potential moderating effects of dentist density and dentist participation on the relation between Medicaid reimbursement rates<sup>5</sup> and the access rate.<sup>11</sup> We hypothesized that no relation exists between reimbursement rates and the prevention ratio, because once children have access to the delivery system, clinicians follow clinical guidelines and provide prevention services.

## RESULTS

In 2014, the access rate, the proportion of Medicaid-eligible children who had access to oral health services, was 47% nationally. Of those, 90% received prevention services (i.e., prevention ratio; Appendix C; available as a supplement to the online version of this article at <http://www.ajph.org>). We estimated the effect of Medicaid reimbursement rates in 2013 on the access rate and prevention ratio in 2014 with linear regression. A significant ( $P < .05$ ) positive relation was seen between Medicaid reimbursement rates and access rate (for all regression results, see Appendix D; available as a supplement to the online version of this article at <http://www.ajph.org>). However, the magnitude and

significance of this relation were not reduced with the inclusion of dentist participation in Medicaid in the model for access rate.

Moreover, no significant bivariate relation was found between reimbursement rates and dentist participation in Medicaid (Appendix E; available as a supplement to the online version of this article at <http://www.ajph.org>). Combined, these findings provided no evidence of a mediating relation in which states with high Medicaid reimbursement rates had high access rates because of high levels of dentist participation in Medicaid, or vice versa.

As expected, no significant relation was found between Medicaid reimbursement rates and the prevention ratio. In fact, no variables significantly affected the prevention ratio, either alone or in interaction.

The second and third models added interactions to assess moderating relations. The 3-way interaction was significant in the model predicting access rate ( $P < .05$ ; Appendix D). Thus, the relation between Medicaid reimbursement rates and the access rate was moderated by dentist participation in Medicaid and dentist density. The predicted and observed effects of this 3-way interaction are shown in Table 1. Among states with high dentist density (above average), states with low reimbursement rates (39%) in 2013 were predicted by the model

to have access rates between 2.3 and 4.6 percentage points higher in 2014 if they had high reimbursement rates (54%). Among states in which dentist density and dentist participation were low, the model predicted that states with low reimbursement rates (41%) would have had access rates 11.7 percentage points higher if they had high reimbursement rates (56%). Finally, among states where dentist density was low and dentist participation was high, higher Medicaid reimbursement rates were not significantly associated with access to care. To determine the potential effect of changes in the reimbursement rate, we estimated that an additional 1.8 million children nationwide would have had access to dental care in 2014 if states with low reimbursement rates in 2013 had higher reimbursement rates (Appendix F; available as a supplement to the online version of this article at <http://www.ajph.org>).

## DISCUSSION

We assessed the effect of Medicaid reimbursement rates on access to dental care and the percentage of those receiving preventive care in the context of dentist participation in Medicaid and dentist density. Counter to expectations from most previous research,<sup>1-4</sup>

**TABLE 1—Relation Between Medicaid Reimbursement Rate in 2013 and Access to Dental Care in US States in 2014, as Moderated by Dentist Density and Dentist Participation in Medicaid in 2014**

2014 Dentist Density	2014 Dentists Participating in Medicaid, %	2013 Reimbursement Rate, %	No. of States	States	2014 Observed Access Rate, %	Difference in Observed Access Rate From High Reimbursement Rate States, %	Predicted Access Rate if Low Reimbursement Rate States Had High Reimbursement Rates, % <sup>a</sup>	Difference in Predicted Access Rate From Observed Access Rate, % <sup>a</sup>	Predicted No. of Additional Children With Access With High Reimbursement Rates
Low	Low	Low (41)	10	FL, KS, KY, ME, MO, NC, NV, OH, RI, WI	40.2	-9.1	51.9	11.7	1 048 724
Low	High	Low (45)	3	IA, ID, MS	51.0	...	...	...	...
High	Low	Low (39)	9	CA, HI, IL, MD, NH, NY, OR, VA, WA	50.2	-3.9	54.8	4.6	506 442
High	High	Low (39)	6	CO, MI, MN, NE, PA, UT	45.7	-2.5	48.0	2.3	299 807

Note. High = above the mean; low = below the mean.

<sup>a</sup>Access rate predicted with linear regression estimating effect of 3-way interaction of reimbursement rate, dentist density, and Medicaid dentists on access rate while controlling for median household income and an oral health index.

we did not find evidence that Medicaid reimbursement rates mediate access to dental care through differences in dentist participation in Medicaid.

Instead, dentist density and dentist participation in Medicaid moderated the relation between access to dental care and Medicaid reimbursement rates. States with high dentist densities had a moderate and positive relation between Medicaid reimbursement rates and access to care, and the proportion of dentists accepting Medicaid mattered relatively little. In states with low dentist densities and few dentists participating in Medicaid, higher reimbursement rates were associated with significantly better access to dental care. In states with low dentist densities but high participation in Medicaid, reimbursement rates had no effect on access to care. Longitudinal data are imperative to clarify and strengthen the understanding of these relationships.

## PUBLIC HEALTH IMPLICATIONS

Early access to dental care services for children has a long-term effect on oral health and Medicaid expenditures.<sup>12</sup> We estimated that in states with fewer dentists in the population and low provider participation in Medicaid, relatively small increases in Medicaid reimbursement rates may potentially yield large effects. States with above average numbers of dentists also may see benefits from increasing reimbursement rates, whereas states with fewer dentists and high percentages already participating in Medicaid may not see any benefit from increasing reimbursement rates. We also found that once children have access to the delivery system, clinicians provide prevention services regardless of the reimbursement rate. **AJPH**

## CONTRIBUTORS

Both authors contributed equally to the article.

## HUMAN PARTICIPANT PROTECTION

No institutional review board approval was required because this study did not involve human participants.

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