# Factors influencing dentists' willingness to treat Medicaid-enrolled adolescents

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## Abstract

**Objectives:** To identify factors influencing dentists' willingness to treat Medicaid-enrolled adolescents with intellectual and developmental disabilities in Washington state.

**Data sources:** Primary data were collected by a survey instrument administered in 2017 to general and pediatric dentists who were Medicaid providers ($N = 512$).

**Methods:** We administered a 40-item survey, which included 20 hypothetical scenarios involving a 12-year-old Medicaid-enrolled adolescent. Based on the characteristics of the potential patient, dentists were asked to rate their willingness to treat (1 = very likely; 5 = very unlikely). We used conjoint analytic techniques to examine the relative importance of six adolescent- and family-level factors (e.g., severity of intellectual and/or developmental disability [IDD], sugar intake, toothbrushing, caregiver beliefs about fluoride, restorative needs, appointment keeping) and state Medicaid reimbursement level (35 percent, 55 percent, 85 percent of usual, customary, and reasonable amount). Analyses focused on data from 178 dentists with complete and varied responses to the scenarios.

**Results:** The mean age of participants was $53.8 \pm 10.5$ years and 10.7 percent were pediatric dentists. The holdouts correlation statistics indicated excellent fit for the conjoint model (Pearson's R = 0.99, $P < 0.0001$; Kendall's tau = 0.89, $P < 0.0001$). Reimbursement level and appointment keeping were the most important factors in dentists' willingness to treat Medicaid-enrolled adolescents (importance scores of 26.7 and 25.7, respectively). Restorative needs, caregiver beliefs about fluoride, and IDD severity were the next most important (importance scores of 15.4, 10.6, and 8.1, respectively). Sugar intake and toothbrushing behaviors were the least important.

**Conclusions:** Reimbursement and appointment keeping were the most important determinants of dentists' willingness to treat Medicaid-enrolled adolescents with IDD.

## Introduction

Low-income adolescents with intellectual and developmental disabilities (IDD) are at increased risk for poor oral health. Factors that lead to poor oral health include high sugar diet, inconsistent hygiene habits, and inadequate exposure to topical fluoride.[1] Another contributor is limited access to dental care. Medicaid-enrolled adolescents with IDD have noted difficulties obtaining dental care when needed.[2]

There are many reasons dentists chose not to treat Medicaid-enrolled adolescents with IDD. Dentists are generally less willing to treat patients with public insurance like Medicaid because of low reimbursement rates, especially when compared to private plans.[3] Studies also highlight inadequate clinical training in dental school, resulting in dentists who are uncomfortable managing patients with IDD who cannot cooperate.[4] As a result, dental care remains one of the most common unmet health care needs for adolescents with IDD.[5]

While previous work has identified barriers to dental care for children with IDD,[6] the relative importance of the various known barriers to care have not been assessed for adolescents. This gap in knowledge is a barrier to developing comprehensive strategies to improve dental care access for Medicaid-enrolled adolescents with special health care needs. Conjoint analytic techniques are available to assess the relative importance of the various barriers to care[7] but are underutilized in dental health services research.

In this study, we used a conjoint model to identify the relative importance of factors that influence dentists' willingness to treat Medicaid-enrolled adolescents. This study is the first step in developing comprehensive policies and programs aimed at improving access to dental care, preventing dental diseases and improving the oral health of low-income adolescents, particularly those with cognitive limitations.

## Methods

### Study population

We focused on general and pediatric dentists in Washington state who submitted at least one dental claim on behalf of a Medicaid enrollee ages 12–17 years in calendar year 2015. There were 1,048 unique provider identification numbers in the 2015 Washington Medicaid dental claims file. We used online telephone directories to contact each dentist's office by telephone, confirm that the dentist was a general or pediatric dentist, and obtain their email address if available. After removing nongeneral and pediatric dentists, repeat dentists, and group practices without a specific dentist who could be contacted, there were 512 eligible participants. The study was classified as exempt by the Washington State Institutional Review Board.

### Study design and conceptual model

We used a metric conjoint experimental analytic design involving factors hypothesized as affecting dentists' willingness to treat Medicaid-enrolled adolescents. Conjoint designs extract preferences of a decision over a range of factors and levels that define the scenarios used in the conjoint task questions and statistical efficiency requires the use of a limited number of factors. [8,9]

We generated a preliminary conceptual model with seven factors based on previously published recommendations[10] (Table 1). The model includes three factors from the dental literature: IDD severity,[2] likelihood of no-shows,[7] and Medicaid reimbursement level.[11] We included four exploratory factors: restorative treatment needs,

**Table 1** Preliminary Conceptual Model of Factors Related to Dentists' Willingness to Treat Medicaid-Enrolled Adolescents

| Factors | Levels |
|---|---|
| Intellectual or developmental disability (IDD) severity | No IDD |
| | Mild IDD |
| | Severe IDD |
| Likelihood of no-showing for dental appointments | Never no shows (always shows) |
| | Sometimes no shows |
| | Frequently no shows |
| Restorative treatment needs | No restorative treatment needs |
| | One or two quadrants |
| | Three or four quadrants |
| Toothbrushing frequency | Always |
| | Sometimes |
| | Never |
| Amount of sugar intake | Low |
| | Average |
| | High |
| Degree of topical fluoride hesitancy of caregiver | Totally okay and accepts |
| | Somewhat okay and accepts |
| | Absolutely not okay and refuses |
| Medicaid reimbursement level | 35% of usual, customary, and reasonable (UCR) amount |
| | 55% of UCR amount |
| | 85% of UCR amount |

toothbrushing frequency, amount of sugar intake, and the degree of topical fluoride hesitancy of caregiver. Each of the factors had three levels.

### Conjoint scenarios

We constructed 20 scenarios using an orthogonal fractional factorial design[12] consisting of 18 conjoint scenarios and two holdout scenarios. Holdout scenarios are used to assess the predictive validity of the model. The SPSS conjoint task uses these scenarios to estimate the respondent's willingness to accept new Medicaid-enrolled adolescents based on model predictions.[13] This design allowed for estimations of the main effect of the utility for each level within the seven factors.

For all scenarios, the following factors remained constant: an English-speaking parent of a 12-year-old adolescent calls a dental office to make an appointment for their child. The child had received regular dental care out-of-state before moving to the community. The child is enrolled in the Washington Medicaid program and eligible for Medicaid for the next 12 months. Respondents rated the likelihood of accepting the patient in each scenario on a five-point scale (1 = "extremely unlikely" to 5 = "extremely likely"). Scenarios were produced using SPSS Conjoint 20.

## Survey development and administration

We used the Tailored Design Method[14] to develop a 40-item Internet and paper mixed-mode survey that included questions on demographic factors (e.g., birth year, sex, race, ethnicity, annual net income from practice, satisfaction with income), confidence in communicating with and treating adolescents, and practice characteristics (e.g., policies in seeing adolescents in Medicaid). We mailed all dentists an introductory letter or postcard that included a link to the Internet survey in February 2017. Subsequent reminders were sent by postcard or email. A paper questionnaire was mailed to dentists who did not respond to the initial email and post card reminders.

## Sample size

Our model contained 15 parameters. The rule of thumb for the ratio of the number of respondents to the number of parameters in a metric conjoint design is between 5 and 10.[15] This corresponds to a minimum sample size of 75–150 participants. The number of eligible participants would be sufficient for our analyses if the response rate exceeded 29.3 percent.

## Data management and analyses

We restricted our analyses to dentists who provided a response to all 20 scenarios. Consistent with the literature, we excluded respondents with no variation in their ratings for the different scenarios (e.g., respondents who rated all 20 scenarios as "extremely unlikely to accept this patient" or "extremely likely to accept this patient").[16] We generated descriptive statistics and compared general dentists and pediatric dentists on descriptive characteristics using the chi-square test or Fisher's exact test for categorical variables or the t-test for continuous variables. The conjoint analysis was completed using the conjoint command in SPSS, with uses each dentist's rating of a patient's conjoint scenarios (dependent variable) to generate the conjoint utility scores (β coefficients in a regression model) for each factor level (independent variables) through a series of linear regression models. Model fit was assessed using the holdout correlation statistics (e.g., Pearson's $R$ and Kendall's tau) with significant correlations ($\alpha = 0.05$) indicating excellent fit.[15]

A relative importance score for each factor was calculated in percentages based on the beta weights. SPSS computes the importance score by taking the range of utility scores for any attribute level (highest minus lowest), dividing by the sum of all the utility ranges, and multiplying by 100. To compare between levels within each factor, we calculated utility values and 95% confidence intervals by estimating the relative utility of a level compared to the base level set to zero within the same factor. Significance testing was conducted by assessing for overlap between confidence intervals. Nonoverlapping confidence intervals are considered statistically significant.[17] Finally, we used the conjoint utility values to develop a prediction model to run simulations. The relative weights of the conjoint utility values are expressed in a common unit, which allows for a total utility to be calculated for a particular patient scenario by adding the individual utilities for all levels in the scenario. We ran multiple simulations: a best case scenario that would optimize a dentist's willingness to treat a Medicaid-enrolled adolescent, a worst case scenario, optimizations to the worst case scenario, and a scenario that would maximize dentists' willingness to treat a Medicaid-enrolled adolescent with severe IDD.

# Results

## Participants

Of the 512 dentists who were surveyed, we excluded data for 19 dentists who were not a general dentist or pediatric dentist and three dentists who practiced outside of Washington state. Of the 490 remaining dentists who were sent a survey, we received 255 responses. Of these respondents, we excluded 50 who did not complete all 20 conjoint scenarios and 27 who did not provide varied responses to the 20 scenarios. There were no significant differences in mean age ($P = 0.70$), sex ($P = 0.56$), or ethnicity ($P = 0.14$) between the 178 dentists who were part of the final conjoint analyses and the 77 excluded dentists. However, there was a difference in race. A significantly higher proportion of dentists in the final conjoint analyses self-identified as white than those who were excluded ($P < 0.001$).

## Descriptive data

In our final analytic sample, 89.3 percent were general dentists and 10.7 percent were pediatric dentists. The mean age of participants was 53.8 ± 10.5 years (range: 33–75 years). About 20.2 percent were female, 66.9 percent were white, and < 1 percent identified as Hispanic or Latino. Annual net income for 20.2 percent of dentists was $300,000 or more. About 50 percent had an annual income of $100,000 to $300,000, 9.6 percent earned less than $100,000, and 20.2 percent had missing income data. In terms of satisfaction with practice income, 25.3 percent of participants were satisfied, 33.1 percent were somewhat satisfied, 15.7 percent were somewhat unsatisfied, 14.6 percent were unsatisfied, and 11.1 percent had missing data. Pediatric dentists were younger than general dentists (47.2 ± 11.7 and 53.9 ± 10.1 years, respectively; $P = 0.04$). A significantly larger proportion of pediatric dentists had

an annual income greater than $300,000 compared to general dentists (50 percent and 22 percent, respectively; $P = 0.03$). Otherwise, there were no differences in sex, race, ethnicity, or income satisfaction.

Regarding the ability to communicate with adolescents during routine dental check-ups and chairside management of adolescent behaviors, 55.6 percent and 35.4 percent of dentists, respectively, were extremely confident. This dropped to 11.4 percent for management of adolescents with IDD. About one-in-five participants were extremely confident in their ability to motivate adolescents to be better about toothbrushing or eating less sugar.

About 50.6 percent of study participants practiced in offices that were currently accepting new Medicaid-enrolled adolescents ages 12 to 17 years, of which 45.6 percent accepted all Medicaid-enrolled adolescents and 54.4 percent accepted only Medicaid-enrolled adolescents who met certain requirements. Of those who accepted select Medicaid-enrolled adolescents, 71.4 percent would accept an adolescent who was referred by another dentist or physician, 66.7 percent only accepted a set number of new adolescents in Medicaid, 62 percent would accept an adolescent with a special health care need, 60 percent would accept an adolescent with IDD, and 32.7 percent would accept an adolescent from their county.

### Conjoint model fit and importance scores

The holdouts correlation statistics indicated excellent fit for the conjoint model (Pearson's $R = 0.99$, $P < 0.0001$; Kendall's tau $= 0.89$, $P < 0.0001$). Of the seven factors,

Medicaid reimbursement level and likelihood of no-showing for dental appointments were the most important factors, as indicated by the highest importance scores (Figure 1). These were followed by restorative treatment needs, degree of topical fluoride hesitancy of caregiver, and IDD severity. Amount of sugar intake and toothbrushing frequency were least important for dentists' decision to accept a new Medicaid-enrolled adolescent.

### Conjoint utility values

The mean utility values of levels within each factor and corresponding 95% confidence intervals are presented in Table 2. Dentists were more willing to treat a Medicaid-enrolled adolescent when the Medicaid reimbursement rate was 85 percent of the usual, customary, and reasonable (UCR) amount than when it was 55 percent or 35 percent UCR (Figure 2). The differences between the three levels were significant. Similarly, dentists were significantly more willing to treat adolescents who always show for appointments than those who sometimes or frequently no show. In addition, dentists were significantly more willing to treat adolescents who sometimes no show for scheduled dental appointments than those who frequently no show. Dentists were most willing to treat adolescents with no restorative treatment needs. There was no difference in willingness to treat Medicaid-enrolled adolescents with one of two quadrants versus three to four quadrants of restorative treatment needs.

Regarding IDD severity, dentists were the least willing to treat a new Medicaid-enrolled adolescent with severe
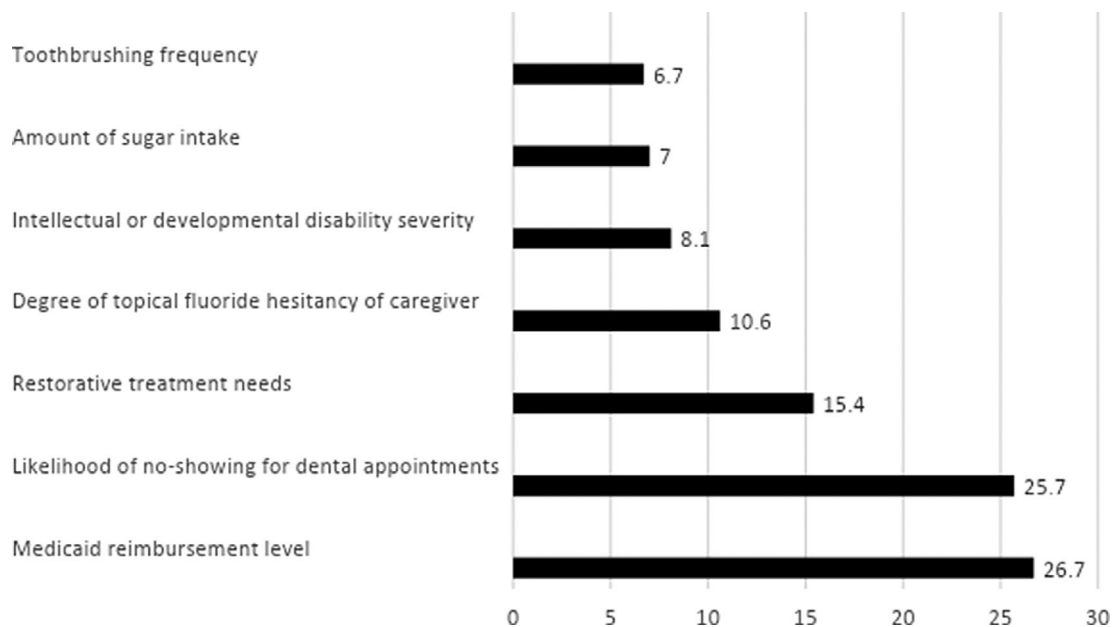


**Figure 1** Importance scores associated with factors in Washington state dentists' willingness to treat Medicaid-enrolled adolescents, with higher scores indicating greater importance.

**Table 2** Mean Utility Values of Levels Within Each Factor and Corresponding 95% Confidence Intervals to Assess the Relative Importance of Intra-Factor Levels in Dentists' Willingness to Treat Medicaid-Enrolled Adolescents

| Factor | Intra-factor level | Lower 95% CI | Mean utility | Upper 95% CI |
|---|---|---|---|---|
| Medicaid reimbursement level | 35% of usual, customary, and reasonable (UCR) amount | −0.51 | −0.407 | −0.30 |
| | 55% of UCR amount | −0.15 | −0.047 | 0.06 |
| | 85% of UCR amount | 0.35 | 0.454 | 0.56 |
| Likelihood of no-showing for dental appointments | Frequently no shows | −0.57 | −0.463 | −0.36 |
| | Sometimes no shows | −0.01 | 0.095 | 0.20 |
| | Never no shows (always shows) | 0.26 | 0.368 | 0.47 |
| Restorative treatment needs | No restorative treatment needs | 0.20 | 0.306 | 0.41 |
| | One or two quadrants | −0.29 | −0.19 | −0.09 |
| | Three or four quadrants | −0.22 | −0.117 | −0.01 |
| Degree of topical fluoride hesitancy of caregiver | Absolutely not okay and refuses | −0.29 | −0.188 | −0.08 |
| | Somewhat okay and accepts | −0.07 | 0.033 | 0.14 |
| | Totally okay and accepts | 0.05 | 0.155 | 0.26 |
| Intellectual or developmental disability severity | Severe IDD | −0.27 | −0.167 | −0.06 |
| | Mild IDD | −0.09 | 0.016 | 0.12 |
| | No IDD | 0.05 | 0.151 | 0.256 |
| Amount of sugar intake | High | −0.20 | −0.1 | 0.01 |
| | Average | −0.13 | −0.027 | 0.08 |
| | Low | 0.02 | 0.127 | 0.23 |
| Toothbrushing frequency | Never | −0.21 | −0.105 | −0.001 |
| | Sometimes | −0.11 | −0.004 | 0.10 |
| | Always | 0.01 | 0.11 | 0.21 |
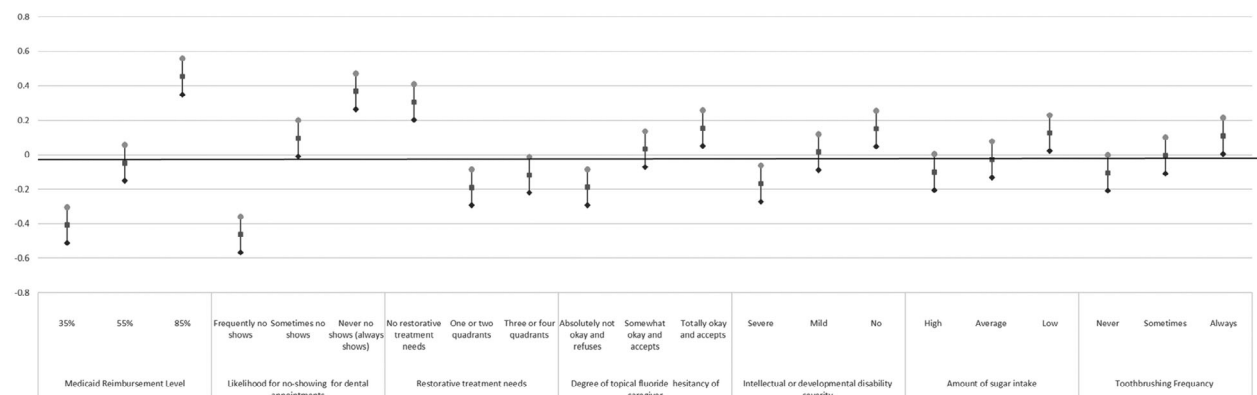


**Figure 2** Utility values for each intra-factor level and corresponding 95% confidence intervals in factors related to dentists' willingness to treat Medicaid-enrolled adolescents.

IDD. However, willingness to treat adolescents with mild IDD did not differ significantly from those with no IDD. A significant difference was found based on the topical fluoride hesitancy of the caregiver. Dentists were the least likely to treat adolescents whose caregivers refused topical fluoride. However, there was no difference in willingness to treat across the other two levels within topical fluoride hesitancy. There was no significance difference in willingness to treat by toothbrushing frequency, but dentists were more likely to treat adolescents who consumed low amounts of sugar.

## Prediction model and simulations

Based on our prediction model, the total utility ranged from 1.09 (worst case) to 4.38 (best case). In the best case scenario – which represents the combination of factors dentists would be the most willing to treat – is one in which the Medicaid-enrolled adolescent has no IDD, has no restorative treatment needs, never no shows, always brushes, has low sugar intake, has a caregiver who is totally okay with topical fluoride, and the Medicaid reimbursement rate is 85 percent UCR. The worst case scenario

corresponds to a scenario in which the factors are set to the lowest levels (e.g., severe IDD, frequently no shows, has three to four quadrants of restorative treatment needs, never brushes, high sugar intake, caregiver refuses topical fluoride, 35 percent reimbursement). In terms of optimizing the worst case scenario, if the Medicaid reimbursement rate increased from 35 percent to 55 percent and all other parameters remained constant, the total utility would increase to 1.45. If Medicaid reimbursement was further increased to 85 percent, the total utility would increase to 1.95. Under the worst case scenario, if Medicaid reimbursement is kept at 35 percent and the patient always showed for appointments, the total utility would increase to 1.92, holding all other factors constant.

To maximize the total utility for a Medicaid-enrolled adolescent with severe IDD and one to two quadrants of treatment need and a Medicaid reimbursement rate of 35 percent UCR, the adolescent would need to always show for appointments, always toothbrush, have low sugar intake, and having a caregiver who is totally okay with fluoride. The total utility for this scenario is 2.78. Total utility would increase to 3.14 if the reimbursement rate increased to 55 percent UCR and 3.64 if reimbursement increased to 85 percent UCR.

## Discussion

We used conjoint analytic methods to evaluate the relative importance of factors that influence dentists' willingness to treat Medicaid-enrolled adolescents. There are three main findings. First, the most important factors were related to income: Medicaid reimbursement rates, appointment keeping behaviors, and restorative need. Second, caregiver beliefs about fluoride and IDD severity were of moderate importance. Third, behaviors like sugar intake and toothbrushing were the least important. Collectively, our findings suggest that dentists' willingness to treat Medicaid-enrolled adolescents is a complex process driven primarily by factors that influence income and less by caregiver beliefs, the child's IDD severity, and at-home preventive behaviors.

Income-related factors were most important to dentists' decision to treat Medicaid-enrolled adolescents. Not surprisingly, there was a preference for adolescents who showed up for all their scheduled appointments. Past work shows that children in Medicaid are more likely to no show for dental appointments than privately insured children.[18] We also observed a linear relationship in which willingness to treat was positively associated with reimbursement level. This finding is consistent with past studies on low reimbursement as a barrier to dental care for children and adolescents in Medicaid.[11] In 2016, Washington state was in the bottom three for Medicaid dental reimbursement rates among states

with fee-for-service programs.[19] Medicaid rates in Washington are about 32.5 percent of UCR charged by dentists and 40.4 percent of private insurance rates.

The next most important factor was restorative need, which is also related to income. Anecdotal evidence suggests that most dental practice income is derived from patients who only require preventive care, like examinations and cleanings, every 6 months. While restorative treatment (e.g., fillings, crowns, root canals, extractions) is part of the standard care dentists provide, it demands more chairside time than preventive care. This in combination with low reimbursement may be a reason why dentists are less willing to treat publicly-insured individuals with restorative treatment needs. Furthermore, most general dentists do not have access to operating rooms to provide care under general anesthesia. Pediatric dentists may be reluctant to treat adolescents with adult restorative needs because of the potentially extended operating room time required.

In addition to reimbursement rates, it is important to target the family-level barriers to care. Our simulations indicate that increasing reimbursement rates to 85 percent UCR would have the same effect as an adolescent showing for all scheduled dental appointments (total utility 1.95 and 1.92, respectively). Reasons for no shows include competing medical care needs that make dental care a lower priority; inability of caregivers to take off from work for appointments; caregiver stress; and transportation barriers.[20,21] Potential solutions include polices that provide caregivers with respite care, care coordination, and support services to help arrange and reschedule appointments if necessary as well as assistance with transportation. Family friendly policies are likely to have broader benefits beyond dentistry. Service co-location is promising approach.[22] A number of smaller studies have evaluated use of privately operated ride share programs to improve use of health care services.[23,24] Future research should continue to explore ways to address family-level barriers to dental care.

Caregiver beliefs about fluoride ranked fourth, which is an indication that dentists may not be comfortable with caregivers who challenge clinical advice. Furthermore, findings regarding IDD severity raise questions on whether past studies have overemphasized inadequate knowledge, training, or experience as the main reasons dentists are unwilling to treat individuals with IDD.[4] Dental schools and residency programs should continue to train students on how to manage and treat patients with IDD and ensure that students have adequate clinical experiences.

The least important factors from our model were behaviors. A potential explanation is that dentists may not view patient behavior change as part of their role as health providers, but rather the caregiver's responsibility to enforce healthy behaviors at home. An alternative approach is to

shift delivery of behavioral interventions to community-based settings like schools and homes. Such interventions could be administered by lay health workers from the communities. State Medicaid programs could fund demonstrations projects to support innovative, evidence-based interventions aimed at improving oral health behaviors, which would help to prevent disease, reduce restorative dental care costs, and improve the oral and systemic health of beneficiaries.

The study had three main limitations. First, findings are based on responses from active Medicaid dentists in Washington state, which means findings are not generalizable to all dentists. Second, the study was based on data from one state, which limits external generalizability. A state's Medicaid reimbursement level could be a factor that influences dentists' willingness as reported in response to hypothetical scenarios. Third, there may be differences in the relative importance of factors by dentist characteristics like specialty status (general dentist versus pediatric dentists), age, and sex. The limited number of pediatric dentist respondents precluded subgroup analyses in the current study. However, we re-ran our model with only general dentists ($N = 159$) and there was no difference in the relative importance of the factors. Future research should continue to examine how willingness to see Medicaid enrollees differs based on dentist characteristics.

## Conclusions

We used conjoint analytic techniques and scenario simulations to identify the relative importance of factors that influence dentists' willingness to treat Medicaid-enrolled adolescents. Factors related to income were the most important. Least important were preventive behaviors related to diet and toothbrushing. Future interventions should focus on making it easier for families in Medicaid to attend scheduled dental appointments. Behavioral interventions could help reduce dental disease risk and optimize the oral health adolescents in Medicaid.

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