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Disparities in Regular Source of Dental Care among Mothers of Medicaid-Enrolled Preschool Children

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Abstract

For mothers of Medicaid children aged 3 to 6 years, we examined whether mothers' characteristics and local supply of dentists and public dental clinics are associated with having a regular source of dental care. Disproportionate stratified sampling by racial/ethnic group selected 11,305 children aged 3 to 6 in Medicaid in Washington state. Mothers (N=4,373) completed a mixed-mode survey that was combined with dental supply measures. Results reveal 38% of mothers had a regular dental place and 27% had a regular dentist. Dental insurance, greater education, income, and length of residence and better mental health were associated with having a regular place or dentist for Black, Hispanic and White mothers, along with increased supply of private dentists and safety net clinics for White and Hispanic mothers. Mothers lacking a regular source of dental care may increase oral health disparities in their children.

Keywords

Access to dental care; regular source of dental care; dental insurance; Medicaid; mothers; oral health

The oral health of preschool children is a growing public health and policy issue in the U.S. *Healthy People 2010* and the U.S. Surgeon General's report, *Oral Health in America*, indicate that tooth decay, or caries, is a severe problem among low-income, minority preschool children that is compounded by limited access to dental care.[1,2] The problem is becoming worse: National Health and Nutrition Examination Surveys in 1988–1994 and 1999–2002 indicate that dental caries has increased for preschool and low-income children.[3]

Solutions to this problem may exist through the biological connection between mother and child oral health and the mother's access to dental care.[4] Mothers are the primary source of the dental caries bacteria infection in their children,[5–7] with mother-to-child caries transmission occurring before a child is 2 years old.[8–12] Several studies indicate that caries-preventive technologies delivered to mothers effectively reduce their cariogenic bacteria and the caries experiences of their infants.[13–18] If low-income mothers have a regular source of dental care (RSDC) and receive preventive services, oral health benefits may accrue to both mother and child through biological and dental care mechanisms. Having a RSDC also can

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build positive dental knowledge and attitudes and self- and child-care practices that can have oral health benefits for mother and child.[19]

Unfortunately, at least half of low-income mothers of preschool children do not have a RSDC. In a convenience sample only 51% of Washington state low-income mothers with preschool children reported having a dentist to go to with a dental problem.[20] However, this result is likely too large because the measure lacks the essential elements of a regular source of care: one place, one provider, over time (or, *longitudinality*) for preventive and therapeutic care.[21] Findings also cannot distinguish mothers who have a regular place of dental care, such as a public dental clinic, but see different dentists from mothers seeing the same dentist at a public or private dental clinic.

Based on Grembowski, Andersen, and Chen's[19] conceptual model of dental care, low-income mothers with preschool children face several barriers to having a RSDC, which in turn reduce the likelihood of regular dental visits.[22] Insurance is a fundamental requirement for establishing a regular source of care,[21] and a major barrier is the erosion of public dental insurance for low-income mothers over the past decade. When Congress approved the Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (widely referred to as welfare reform), Medicaid eligibility was no longer tied to cash assistance, and work requirements were imposed after disenrollment from welfare.[23] Pregnant women qualify for Medicaid if their family incomes are below 133% of the federal poverty level (FPL) or higher in some states, but at 60 days postpartum eligibility reverts to the FPL.[24] As a result, low-income parents, particularly women, have experienced loss and instability of Medicaid coverage and less dental utilization.[25–28] In short, a policy paradox exists: low-income mothers are a primary source of caries infection in their preschool children yet have very restrictive Medicaid income eligibility, which limits access to dental care that can prevent infection.

Another barrier is that most private dentists do not see adult patients with Medicaid coverage for a variety of reasons.[29] The supply of community health centers and other safety net clinics is insufficient to treat the majority of low-income patients,[30, 31] and a minority of active private dentists typically serve the majority of Medicaid adults and children.[32, 33] Consequently, finding a RSDC may be difficult everywhere for low-income mothers, regardless of local dentist and clinic supply.[26, 34]

Other potential barriers include the characteristics of the mother and her family, including lower education and family income, unemployment, severe depressive symptoms, residence changes, and being a smoker or an immigrant.[19, 35–37] Given evidence of discrimination based on low income (Medicaid) and race/ethnicity in dental care,[4, 38] the percentage of low-income mothers with a RSDC may vary across racial/ethnic groups.

Our purposes are to estimate the percentage of Black, Hispanic, and White mothers of Medicaid preschool children with a regular place of dental care and a regular dentist in Washington state, and determine whether personal characteristics, dental insurance coverage, and the number of local dentists and public dental clinics are associated with mothers having a regular place and dentist.

Methods

Population and Sample

The population consisted of 108,151 children enrolled in Medicaid aged 3 to 6 years and their mothers in Washington state (children's household income eligibility for Medicaid is 250% of FPL). We chose children aged 3–6 rather than below age 3 because another aim of the larger study was to determine whether children who had mothers with a RSDC had greater dental

utilization than children who had mothers without a RSDC. Annual dental utilization for Medicaid children below age 3 was 12% in Spokane county in Washington state, and about 16–18% of Medicaid-eligible U.S. children received preventive dental care in 1992–1993.[39, 40] In contrast, Washington state Medicaid records indicate that dental utilization for children aged 3–6 ranged between 39–50% in 2002, which increases the likelihood of detecting an association between mothers' RSDC and their children's dental utilization. In addition, the primary dentition in children aged 3–6 is erupted fully in a period when tooth decay incidence rises dramatically in underserved populations, which may lead to reparative dental care.

On April 30, 2004, a disproportionate stratified random sample of 11,305 preschool children aged 3 to 6 was selected from the Medicaid Management Information System, a computer database containing eligibility information for the Early and Periodic Screening, Diagnosis, and Treatment (EPSDT) Program and the State Children's Health Insurance Program, in the following four racial/ethnic groups: 3,791 Black; 1,902 White; 2,806 Hispanic (Medicaid's name for this group); and 2,806 other racial/ethnic groups. If a household had more than one child in the age range, one child was selected randomly. Study protocols were approved by the Washington State Institutional Review Board which had jurisdiction over the Medicaid Program (Application No. B-091503-S). In 2000 about 4% of Washington state's population was Black, 9% was Hispanic and 77% was White (non-Hispanic), and in 2004 about 7% of adults in Washington state were covered by Medicaid.[41, 42] In 2003 about 2% of Washington state's dentists were Black or Hispanic and 88% were White, and 16% of dentists were female.[43]

Measures

Regular dental place and regular dentist—Measures were based on Starfield's[21] definition of a regular source of care: one place, one provider, over time for preventive and therapeutic care. Measures of a regular dental place and regular dentist that satisfied Starfield's definition were constructed from usual source of health care items in the Community Tracking Study and Medical Expenditure Panel Survey, as well as survey items in the Access to Baby and Child Dentistry (ABCD) Study.[40, 44, 45]

A mother had a regular place of dental care if all of the following four conditions were met: a) she responded *yes* to "Is there a particular dental office, clinic, health center or other place that you usually go to for dental care?" and b) the place where the mother goes was *not* a hospital emergency room; and c) she went to the place for one year or more; and d) the place was a source of preventive services, measured by having teeth cleaned in the past two years. Parts (a) to (c) are structure components of the definition, while part (d) reflects service delivery. As a sensitivity analysis, we estimated the contribution of the structure components alone by calculating the percentage of mothers with a regular place based on parts (a), (b) and (c). We performed the sensitivity analysis because a mother may satisfy the structure components of the definition, but having teeth cleaned may be the decision of the dentist or office staff rather than the mother.

Mothers had a regular dentist if all of the following three conditions were met: a) items (a), (b) and (d) for a regular dental place were all met; and b) mothers reported seeing the same dentist each time they went there; and c) mothers went to that dentist for one year or more.

Mother and family characteristics—Determinants of a RSDC are based on Grembowski et al.'s[19] conceptual model of the dental care process, which indicates individual, family, and environmental characteristics, or *structural factors*, associated with having a RSDC.

Race/ethnicity was measured by mothers' response to: "What race or ethnic background best describes you?," with responses of Hispanic, Latino, or Spanish; White, not Hispanic; Black

or African American; American Indian; Alaska Native; Asian (such as Vietnamese, Korean, Japanese, Filipino, Chinese, Asian Indian); Pacific Islander (such as Hawaiian or Samoan); or some other race indicated by the mother. We also asked whether the mother was born in the U.S.

Socioeconomic status was measured by the mother's highest educational degree, employment status, and family income in 2003, measured as less than $10,000, between $10,000 and $20,000, and over $20,000. Employment status was measured by the mother's self-report if she was employed full-time, part-time or in school, homemaker, disabled or unemployed.

Dental insurance was measured by whether the mother had no dental insurance, Medicaid, or private dental insurance from an employer. Mother characteristics included mother's age, single parent, current cigarette smoker,[46–48] number of other preschool and school-aged or older children, years lived at current address, years lived in current county, and whether the mother completed the Web, mail, or telephone instrument (to adjust for potential survey mode effects). Acculturation was measured by whether the mother was an immigrant (not born in the U.S.), and (for Hispanic mothers) whether the Spanish instrument was completed. Mental health symptoms in the past 4 weeks were assessed by the 5-item mental health scale with scores ranging from 1 (best) to 6 (worst).[49] Due to the small number of mothers with severe symptoms, we combined categories 5 and 6. Average scores were rounded and recoded as five binary variables for each value, ranging from 1 (best) to 5 (worst).

Dentists, public dental clinics and county characteristics—From the conceptual model, environmental characteristics may be associated with having a RSDC, such as the supply of dentists and public dental clinics may be related to having a RSDC. Dentist supply in the mother's county was measured by the number of active licensed dentists in Washington counties in 2003.[43] The number of county dentists submitting Medicaid claims in 2004 was obtained from Medicaid records. The number of public dental clinics submitting Medicaid claims in each county was obtained from Medicaid records. Population of mother's county was measured by the 2000 U.S. Census. We also measured whether the mother lived in an urban area, large rural city/town, or small rural town using the mother's ZIP code and 2000 rural-urban commuting area (RUCA) codes, because rural/urban setting may create a spurious relationship between dentist/clinic supply and RSDC.[50]

Data Collection

On June 11, 2004, the Department of Social and Health Services (DSHS), which administers the Medicaid Program, mailed the parents of sampled children letters in English, Spanish, Vietnamese, and Russian, the most prevalent primary languages in the population based on Medicaid records, describing the study and containing instructions to notify DSHS if they did not want to participate. By the July 14 deadline, 396 parents opted out of the study or had nondeliverable letters, leaving 10,909 participants.

The Social and Economic Science Research Center (SESRC) at Washington State University performed a mixed-mode, web-mail-telephone survey of mothers using methods developed by Dillman,[51] probably the first time the three-mode approach was used in a Medicaid population.[52] Medicaid eligibility files contained a child's name, address, telephone number, and primary language but did not indicate the mother's name. Contact materials were addressed "To the Mother of [child's full name]," and all letters and instruments were at the 6–8th grade reading level. English letters and instruments were translated into Spanish, Russian, and Vietnamese by certified translators at Academy of Languages.[53] All modes of the instrument contained the same 66 questions with 109 items.

Starting September 3, SESRC mailed invitation letters to the 10,909 mothers to complete the Web survey, with a Spanish letter also included for families with that primary language. Each letter contained a unique password for accessing the Web survey, and respondents were entered into a drawing for 25 $50 grocery certificates. The Web survey was closed on November 3.

Beginning September 27, mothers who had not completed a Web questionnaire were sent a mail questionnaire with letters in English and Spanish to everyone with a $2 bill incentive in the first mailing. Follow-ups to nonrespondents included a thank you/reminder postcard mailed two weeks later to everyone, and replacement questionnaires and cover letter mailed to nonrespondents of the Web and mail questionnaire four weeks later by U.S. Priority Mail. Questionnaires received by January 31, 2005 were included in the study.

Starting November 3, SESRC mailed letters in English and Spanish to mothers who had not responded to the Web or mail questionnaires that invited them to complete a telephone interview in English, Spanish, Russian, or Vietnamese. If a contacted parent refused to participate, refusal conversions were not attempted, and calling ended on December 31, 2004. Completed instruments from the three modes were combined for the analysis.

Data Analysis

Descriptive statistics were calculated for study measures. Pearson chi square tests were computed to determine whether race/ethnicity was associated with having a regular place of dental care or a regular dentist, as well as the components for constructing the measures, for Blacks, Whites, and Hispanics. Bivariate statistical tests were performed to determine whether personal characteristics were significantly different across the three racial/ethnic groups. Mothers reporting two or more racial/ethnic groups were excluded from statistical tests comparing characteristics between groups.

We computed logistic regression models to estimate whether the personal characteristics and the supply of dentists and public dental clinics were related to having a regular place of dental care or a regular dentist. Separate models were estimated for Black, White, and Hispanic mothers, and Wald tests were performed to determine whether the associations were significantly different across the three racial/ethnic groups. To avoid spurious correlation and interpretation problems related to dentist-to-population ratios in regression models,[54] dentist supply was entered into the models as an interaction variable and a main effect (number of county dentists per 10,000 population + number of county dentists + 1/county population).

Models were estimated with *R version 2.2.1*© 2005 statistical software using general estimating equations (GEE) to adjust for correlations among mothers living in the same ZIP codes. We chose ZIP codes rather than counties because ZIP codes accounted for more variation in the dependent variables.

Analyses were repeated for two racial/ethnic groups, American Indians and Asian mothers, in the other racial/ethnic group of the study's four-group disproportionate stratified sample. Analyses were exploratory due to small sample sizes.

Results

Mixed-mode Survey Response Rates

In total, 4,762 parents completed either the Web (n=306), mail (n=3,329) or telephone (n=1,127) instruments. Of the remaining 6,147 parents (10,909 – 4,762= 6,147), 695 parents refused to participate, 86% of those when contacted by telephone after the Web and mail surveys. Another 4,387 households had non-deliverable addresses, non-working telephone numbers, or ineligible individuals; and 1,065 parents were unreachable (no response to Web

or mail questionnaire and telephone calls had no answer, busy signal, answering machine, parent not available), unable to interview (due to hearing difficulty, language barrier or disability), or deceased. The unadjusted response rate is 44% (4,762/10,909), and excluding the 4,387 households with ineligible individuals or inaccurate contact information, the adjusted response rate is 73% (4,762/6,522).

Excluding 389 respondents who were not mothers and 140 who did not specify a race/ethnicity, the sample consisted of 4,233 mothers. Of the 161 mothers indicating more than one racial ethnic group, 14 mothers reported Black and Hispanic, 25 mothers reported Black and White, 21 mothers reported Hispanic and White, and 4 mothers reported all three groups. Altogether, 890 mothers reported at least one of their racial/ethnic groups as Black, 1,365 mothers reported Hispanic, and 1,468 mothers reported White. Among the other racial/ethnic groups, the largest categories were Asian (n=268) and American Indian (n=177) mothers.

Personal Characteristics of Mothers by Racial/Ethnic Group

Table 1 compares the personal characteristics of mothers across racial/ethnic groups. Statistically significant differences exist for almost all of the characteristics across Black, White, and Hispanic groups. While mother's age and number of school-aged children are similar across groups, Hispanic mothers are more likely to be immigrants, to live with another adult, and to have slightly more preschool children than Black and White mothers. While Black mothers have lived slightly more years in their current county, they have lived fewer years at their current address than other mothers.

The percentage of Hispanic mothers without a high school education (47%) was about four times higher than that of Black and White mothers. A lower percentage of Black mothers are homemakers and a greater percentage are unemployed, have less than $10,000 annual household income, and have Medicaid coverage than of other mothers. The percentage without public or private dental insurance is greatest for Hispanic mothers (69%), followed by White mothers (46%), followed by Black mothers (23%). About 9 to 37% of the mothers smoke some or all days; with Hispanic mothers having the lowest smoking prevalence. Mental health scores are better for Hispanic mothers than for Black or White mothers. A higher percentage of Hispanic mothers than of other mothers participated in the telephone interviews.

Like Hispanic mothers, a high percentage of Asian mothers are immigrants and live with other adults. Asian mothers have the greatest percentage with college education and private dental insurance, and completing the mail questionnaire. The percentage of Asian mothers who smoke is low, while American Indians have higher smoking prevalence that is similar to Black and White mothers. Similar to Black mothers, American Indian mothers have high percentages of unemployment and low incomes, with 40% lacking public or private dental insurance. About 20% of American Indian mothers had worse mental health scores of 4–6, which is greater than the other racial/ethnic groups.

Regular Place of Dental Care and Regular Dentist

Table 2 indicates that less than half of mothers had either a regular place of dental care or a regular dentist. The percentage of mothers with a regular place of dental care ranges between 37 to 38% ($p = .78$) for most racial/ethnic groups but is higher (48%) for American Indians. About 54% of Hispanic mothers reported that a dental clinic in a community health center, farmworker clinic, or local health department was their regular place, which was greater than other racial/ethnic groups (Asian, 27%; American Indian, 39%, Black, 26%; White, 11%; $p<.001$).

The percentage of mothers with a regular dentist is lower than the percentage having a regular place, ranging between 25 to 32% across racial/ethnic groups ($p<.001$). A lower percentage of Black and Hispanic mothers have a regular dentist than White mothers.

For the components of the RSDC measures, about two-thirds of the mothers across racial/ethnic groups report having a place they usually go to for dental care and having their teeth cleaned in the past two years. However, only about half of the mothers (46–53%) have gone to that place for more than a year, except American Indians (62%). Hispanics are more likely to have a place for a year or more than Blacks and Whites. Less than 1% of mothers report hospital emergency rooms as their regular place of dental care.

Less than half of the mothers across racial/ethnic groups (42–53%) see the same dentist at each visit, and smaller percentages (31–40%) have seen that dentist for one year or more. White mothers are more likely to report having a regular dentist for one year or more than Black and Hispanic mothers.

Mother Characteristics and Regular Source of Dental Care

Tables 3 and 4 present odds ratios indicating whether personal characteristics are associated with having a regular place of dental care and a regular dentist for White, Hispanic, and Black mothers. For most characteristics, the associations are not significantly different across racial/ethnic groups.

Some indicators of socioeconomic status are associated strongly with having a RSDC. Household income and education are related to having a regular place of dental care, particularly for Hispanic and White mothers. The relationship is a gradient, where odds ratios increase in size with each step up the income or education ladder. In contrast, income and education have a gradient relationship with having a regular dentist only for White mothers; the relationships for Black and Hispanic mothers are similar but not significant. Employment is not related to having a RSDC.

Dental insurance also has a gradient relationship. Compared with those mothers without dental insurance, the odds of having a regular place are greater for mothers with Medicaid dental insurance, and even greater with private dental insurance, particularly for Hispanic and White mothers. Results are similar for having a regular dentist.

For mothers' characteristics, a gradient generally exists for mental health scores and having a RSDC for Hispanic and White mothers: the odds of having a regular place and a regular dentist decline with each incremental decline in mothers' mental health. A similar but nonsignificant pattern exists for Black mothers. Being single and number of preschool or school aged children are not related to having a regular place or a regular dentist.

Associations for age, smoking, and immigrant status differed significantly across racial/ethnic groups. Being older has a moderate association with having a regular dentist for Black mothers, a weak association for Hispanic mothers, and no association for White mothers. Smoking was associated weakly with lower odds of having a regular place or regular dentist for White and Black mothers but greater odds for Hispanic mothers. For immigrants, the odds of having a regular dentist are lower for Black mothers and higher for Hispanics, compared with White mothers. However, Hispanic mothers who completed the Spanish instrument, an indicator of acculturation, have lower odds of having a regular dentist than Hispanic mothers completing the English instrument.

Compared with mothers living less than one year in a county, mothers with longer county residencies had greater odds of having a regular place, particularly Black mothers, but findings

were inconsistent for having a regular dentist. When we examined length of residence at current address, strong associations for White mothers were found for both RSDC measures, and a weak association existed for Black mothers and having a regular dentist.

Survey mode effects were not detected for Black and White mothers, but survey mode was associated with having a regular place of dental care for Hispanic mothers.

Asian and American Indian mothers—Few personal characteristics had statistically significant associations with having a RSDC for Asian and American Indian mothers, likely due to smaller sample sizes. For Asian mothers, dental insurance had a gradient association with having a regular place of dental care (p=.06). Dental insurance and income had gradient relationships with having a regular dentist ($p \leq .01$). Longer residence at current address also was associated with greater odds of having a regular dentist (p=.05).

American Indian mothers with longer county residence had greater odds of having a regular place of dental care (p=.01). Mothers who smoked had lower odds of having a regular place (p=.06) and a regular dentist (p=.14). Mothers with more school-age children had lower odds of having a regular dentist (p=.08).

Context and Regular Source of Dental Care

For some racial/ethnic groups the county supply of dentists is related to whether mothers have a RSDC (see Tables 3 and 4). White mothers living in counties with more dentists were more likely to have a regular place and a regular dentist. The results imply that if a White mother lives in a county with 10,000 residents, an additional dentist would increase the odds of having a regular place of dental care by 0.17. If a White mother lives in a county with 50,000 residents, an additional five dentists would increase the odds by the same amount. For Hispanic mothers, greater numbers of dentists and public dental clinics in the county were associated with greater odds of having a regular dentist. Compared with urban places, living in a large rural city or town was associated with greater odds of having a regular place and dentist for White mothers. Small numbers of Black mothers live in Washington's rural areas, and place associations were not estimated.

Because not all dentists treat low-income adults, we re-estimated the models with the number of Medicaid dentists, and no significant associations were obtained for having a regular place of dental care. The number of Medicaid dentists in the mother's county was not significant for Hispanic and White mothers (p=.11 – .14) but was significant for Black mothers (OR: 1.01, p=.04). For American Indian mothers, we found no association between the number of Indian Health clinics in the mothers' counties and having a RSDC. For Asian and American Indian mothers, none of the contextual characteristics were associated with having a RSDC.

Discussion

This is the first study comparing the percentage of low-income mothers of Medicaid preschool children that have a regular source of dental care across different racial/ethnic groups in a representative, population-based sample. Among Black, Hispanic and White mothers of Medicaid preschool children in Washington state, less than 4 in 10 had a regular source of dental care. About 38% of the mothers had a regular place of dental care, which showed little variation across racial/ethnic groups. Between 25 and 32% of mothers had a regular dentist across racial/ethnic groups. Similar ranges were found for Asian and Native American mothers, though almost half of Native American mothers had a regular place of dental care.

Our estimates are based on Starfield's[21] definition of a regular place of medical care, or the concept that a mother has one place and one provider over a period of time for preventive and

treatment services. When estimates of a RSDC are based solely on the structural elements (one place, one provider, over time) and the preventive service criterion is excluded, the percentage of mothers with a regular place of dental care remains low (44–51%), and the percentage for having a regular dentist is smaller (28–40%). These estimates are far lower than corresponding rates for a regular source of medical care, where 67% of uninsured adults report having a usual physician and place of medical care, and 75% of adults below 200% of FPL report having a usual physician and place.[44]

The findings have substantial public health implications for low-income mothers *and* their preschool children. Mothers are the major source of caries-causing bacteria in their children. If low-income mothers have a regular source of dental care and receive caries-preventive services, oral health benefits may accrue to both mother and child through biological and dental care mechanisms. Evidence about individual, family and environmental characteristics associated with having a RSDC may inform policy development to increase the percentage of low-income mothers with a RSDC.

Dental Insurance

Compared with low-income mothers without dental insurance, Medicaid and private dental insurance are associated independently and strongly with having a regular place of dental care and a regular dentist for Black, Hispanic, and White mothers, and for a small sample of Asian mothers. The relationship is also a gradient, where odds for private dental insurance generally are greater than the odds for Medicaid dental insurance. The same finding was obtained in a Seattle area study examining the determinants of a regular source of medical care among clients recruited in the waiting rooms of public clinics and welfare offices.[55] Findings also are consistent with evidence that health insurance is a determinant of having a source of primary care in low income populations.[56]

Public and private dental insurance is an enabling resource that low-income mothers can exchange for services from a regular source of dental care.[19, 57] Exchange theory and past studies suggest that dentists are more likely to accept low-income patients with private dental plans than Medicaid partly because dentists receive greater payments (rewards) and experience fewer administrative burdens (costs) from the private plans, as well as other reasons.[32, 33, 58] The reward-cost disparities between the private and Medicaid dental plans likely explain why low-income mothers with private plans have greater odds of having a RSDC than those with Medicaid.

Policy implications of these findings are to expand Medicaid and private dental insurance coverage and to increase Medicaid fees. Both would reverse an unintended consequence of the welfare reforms mandated by the Personal Responsibility and Work Opportunity Reconciliation Act, which increased the percentage of women who are uninsured.[25, 27, 28, 59] Higher Medicaid payments increased the likelihood of having a usual source of care among Medicaid adults.[60] Study findings and evidence about the biological connection between mother and child oral health implies that Medicaid coverage should be similar for low-income women and their children, who now enjoy the highest rates of dental insurance coverage in the country through Medicaid and the State Children's Health Insurance Program.[61]

Socioeconomic Status

While public and private dental insurance reduces the out-of-pocket costs of dental care, it does not eliminate socioeconomic status differences in having a RSDC within a low-income population. Income and education indicators of socioeconomic status also were related strongly to some RSDC measures for Hispanic and White mothers, and income was associated with having a regular dentist among Asian mothers. The relationships are gradients, where odds

ratios generally increase with each step up the education and income ladder. Out-of-pocket costs are typically higher in dental plans than in medical plans, although most dental plans offer first-dollar coverage for diagnostic and preventive services. Low income and the higher out-of-pocket costs for treatment may reduce the likelihood of maintaining a RSDC over time.

Education may be related to having a RSDC because education is likely correlated with knowledge about dental care and diseases, which may motivate care-seeking behavior. Education also builds resources and problem-solving skills within individuals that are requisite for establishing a regular source of dental care in a market-oriented delivery system, which is not designed to treat individuals with the greatest needs for care.[62, 63] Employment status was not associated with having a RSDC, likely because of its correlation with income and education and being the source of private dental insurance.

Decoupling Medicaid coverage from welfare reform and raising income eligibility for mothers beyond the 100% FPL may increase mothers' having a RSDC, which may have oral health benefits for mother and child. Policies that increase the socioeconomic status of low-income women also may improve access to dental care and oral health.[19] Because education is a determinant of income, educational interventions that increase years and quality of schooling may be effective mechanisms for achieving this long-term goal.[4, 62, 64]

Mental Health and Other Characteristics

Mental health scores were better for Hispanic mothers than for Black or White mothers, which is consistent with studies reporting lower rates of mental health problems among Hispanic populations compared to Whites.[65] Controlling for socioeconomic status and other characteristics, severity of mental distress has an independent, gradient association with having a RSDC, where each decrement in the mental health score has lower odds of having a RSDC, particularly for Hispanic and White mothers. The finding is important because the odds ratio of having a RSDC (0.37 – 0.40) is very small for mothers with the greatest mental distress. Although mental health status was not associated with having a regular source of dental care in a convenience sample of low-income mothers,[20] worse mental health scores were associated with lower odds of having a usual source of medical care in a representative sample of Ohio residents.[34] Given the barriers that low-income adults face in obtaining dental care, this association implies mental distress is reducing a mother's ability to navigate barriers in the dental delivery system and establish a RSDC.

Findings suggest that improvements in low-income mothers' mental health may improve the likelihood of having a RSDC, regardless of where the mother is in the mental health distribution, for those mothers below the best mental health. Primary and secondary prevention is one way to shift the distribution of mental health in the population.[66] Providing mental health services to women with severe mental disorders requires policies that remove barriers to care, particularly for racial/ethnic minorities, who are less likely than non-Hispanic Whites to use mental health services.[65, 67] In addition, qualitative and quantitative research is needed to identify the mental disorders and explain their potential causal relationships with having a RSDC.

Hispanic mothers who completed the Spanish questionnaire had lower odds of having a regular dentist than those who completed the English one, which is consistent with previous studies indicating that less acculturated Hispanic adults have less access than others to health care, particularly that bilingual and primarily Spanish-speaking Hispanics have fewer dental check-ups than others.[68] Smoking had weak associations with having a RSDC, and these associations differed across racial/ethnic groups, perhaps because a much smaller percentage of Hispanic mothers smoked than other mothers. Length of residence in a county or at current address is

related to having a RSDC for some racial/ethnic groups likely because staying in one place is requisite to establishing a RSDC over time.[69]

Few studies have conducted a Web-mail-telephone survey in a Medicaid population. Survey mode was associated only with having a regular place of dental care for Hispanic mothers, suggesting that regression models should correct for potential survey mode effects in studies of Hispanic mothers.

Context and Regular Source of Dental Care

We found that numbers of county dentists and public dental clinics are associated with having a regular dentist for Hispanic mothers, and an association between dentist supply and a regular dentist also exists for White mothers. The supply of public dental clinics is related to having a regular dentist for Hispanic mothers probably because over half of Hispanic mothers obtained dental care at public clinics. We also found that the number of Medicaid dentists in a county was associated with having a regular dentist only for Black mothers. This association may exist because more Black mothers reported being enrolled in Medicaid than Hispanic or White mothers. Given Litaker et al.'s[34] results that physician supply is not associated with having a regular source of health care in a representative sample of Ohio adults, our findings suggest that associations between supply and a regular source of care may be limited to low-income populations.[34] Given that the majority of Washington state and U.S. dentists are White and male, further studies are recommended to examine whether access to dental care among minority low-income mothers is greater in areas with a higher percentage of female, minority dentists.

If these associations are causal, a policy implication is to increase the number of dentists and public health clinics in counties with high percentages of low-income women of child-bearing age, which may increase the likelihood of having a RSDC for some racial/ethnic groups of women. In addition to expanding public health clinics, the National Health Service Corps, a scholarship and loan repayment program in exchange for health care in designated underserved areas, could be amended to offer greater financial incentives for dentists to practice in these areas.[31]

Limitations and Conclusions

Our findings are limited to low-income mothers of preschool children aged 3–6 who are enrolled in Medicaid dental insurance in Washington state, and to those sampled mothers who responded to our survey. Findings may not be generalizable to other states. Because low-income mothers are not randomly assigned to the three dental insurance groups, the dental insurance odds ratios may be too large. However, given that mothers typically do not control employment and therefore, coverage by private dental insurance, this concern may be reduced but not eliminated.[70] Findings are based on cross-sectional survey data, which do not indicate causal relationships.

We conclude that less than 4 in 10 low-income mothers with children aged 3 to 6 covered by Medicaid have a RSDC. Mothers' income, education, dental insurance and mental health were associated with having a RSDC among Black, Hispanic, and White racial/ethnic groups. Local supply of dentists and public dental clinics are related to having a regular dentist for Hispanic and White mothers. These associations suggest policies for increasing the percentage of low-income mothers having a RSDC.

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Table 1

Personal Characteristics of Mothers by Racial/Ethnic Group (Averages and Percentages)

	African American (n=890)	Hispanic (n=1365)	White (n=1468)	p- value	Asian (n=268)	Native American (n=177)
Average age	30.5 ± 6.0	30.7 ± 6.0	31.1 ± 6.3	.08	32.9 ± 6.4	31.1 ± 6.0
Children in Household						
Number pre-school children	0.8 ± 0.7	1.0 ± 0.9	0.8 ± 0.8	<.001	0.8 ± 0.7	0.9 ± 0.9
Number school-aged or older children	1.7 ± 1.4	1.7 ± 1.4	1.6 ± 1.3	.10	1.4 ± 1.5	1.9 ± 1.4
Living Status						
Living alone	68	29	38	<.001	27	44
Not living alone	32	76	62		73	56
Immigration Status						
Percent immigrants	9	73	6	<.001	83	1
Average years in U. S. for immigrants	17.7 ± 7.1	12.1 ± 5.8	11.3 ± 9.1	.16	14.4 ± 7.6	6.5 ± 2.1
Length of Residence						
Years lived in county						
<1 year	3	3	4	.006	5	3
Between 1–2 years	9	9	10		8	11
Between 3–5 years	13	19	5		16	13
>5 years	75	69	71		71	73
Years lived at current address						
<1 year	26	19	23	<.001	19	24
Between 1–2 years	39	32	33		29	29
Between 3–5 years	23	28	24		27	21
>5 years	12	22	21		25	26
Education						
Did not finish high school	12	47	11	<.001	13	16
High school diploma or GED	34	34	32		31	37
Some college or 2-year associate degree	49	16	48		37	39
4-year college degree or higher	5	3	9		19	5
Employment Status						
Employment full-time	37	31	32	<.001	41	79
Employed part-time or in school	26	24	26		26	24
Homemaker	12	28	29		22	17
Disabled	6	2	4		3	5
Unemployed	19	15	9		9	25
Dental Insurance						
None	23	69	46	<.001	47	40
Medicaid	55	15	32		20	45
Private	22	16	22		32	15
Annual Household Income						
<$10,000	57	45	39	<.001	39	52
$10,000–$20,000	25	31	27		27	24
>$20,000	18	24	34		34	24
Cigarette Smoking						
Not at all	66	91	63	<.001	85	66
Some days or everyday	34	9	37		15	34
Mental health score						
1 (Best)	16	18	9	<.001	13	10
2	38	41	44		37	47

	African American (n=890)	Hispanic (n=1365)	White (n=1468)	p- value	Asian (n=268)	Native American (n=177)
3	28	28	30		36	23
4	13	9	13		12	11
5–6 (Worst)	5	3	4		2	9
Survey Mode						
Web	5	3	10	<.001	5	4
Mail	74	64	72		84	73
Telephone	21	33	18		11	23
Percent completing Spanish survey	0	54	0	<.001	0	0

Table 2

Regular Place of Dental Care and Regular Dentist Measures: Descriptive Statistics by Racial/Ethnic Group and for Components of each Measure

	Racial/Ethnic Group					
	African American (n= 890)	**Hispanic (n= 1365)**	**White (n= 1468)**	***p*-value**	**Asian (n= 268)**	**Native American (n= 177)**
Percent of mothers having a regular place of dental care (%) [#]	37	38	38	.78	37	48
Percent of mothers having a regular dentist (%) [#]	25	25	32	< 0.001	28	31
Components						
1) Percent mothers having a particular dental office, clinic, health center or other place they usually go to for dental care	67	69	65	.08	66	75
2) Percent of mothers who have gone to the same place for dental care for 1 year or more	46	53	49	.002	48	62
3) Percent mothers who usually go to the hospital emergency room for dental care	0.8	0.1	0.4	.02	0.4	0.6
4) Percent mothers who usually see the same dentist each time they go there	44	42	53	< 0.001	48	44
5) Percent mothers who have gone to that same dentist for dental care for 1 year or more	31	36	40	< 0.001	37	37
6) Percent mothers who had teeth cleaned in the past 2 years	69	64	64	0.02	69	66

[#]A mother had a regular place of dental care if components 1, 2, 3 and 6 were all met. A mother had a regular dentist if components 1, 3, 4, 5, 6 were all met.

Table 3

Personal Characteristics of Mothers and Contextual Characteristics Associated with Having a Regular Place of Dental Care: Multivariable Logistic Regression Odds Ratios (OR) by Racial/Ethnic Group [#]

	Black (n=739) OR	p-value*	Hispanic (n=983) OR	p value*	White (n=1275) OR	p-value*	p-value**
Insurance							
No insurance	1	.04	1	<.001	1	<.001	.35
Medicaid insurance	1.50		1.89		1.86		
Private insurance	1.80		2.80		2.64		
Income							
Income less than $10,000	1	.15	1	<.001	1	.03	.37
Income $10,000 – $20,000	1.33		1.52		1.14		
Income over $20,000	1.46		1.66		1.58		
Education							
Did not finish high school	1	.13	1	.02	1	<.001	.64
High school grad or GED	1.37		0.97		1.43		
Some college	1.51		1.18		1.81		
4-year college degree	1.88		2.59		2.37		
Age							
18–23	0.86	.12	0.98	.97	0.78	.30	.38
24–39	1		1		1		
40–52	1.62		1.00		1.08		
Survey mode							
Web	1	.51	1	<.001	1	.79	.07
Mail	0.86		0.80		1.04		
Phone	1.10		1.34		1.15		
Immigration status	0.88	.64	1.18	.42	1.20	.50	.66
Years lived in county							
< 1 yr	1	.01	1	.07	1	.04	.81
1–2 yrs	4.69		1.58		1.09		
3–5 yrs	8.18		2.82		2.05		
> 5 yrs	8.08		3.18		2.01		
Years lived at current address							
<1 yr	1	.23	1	.30	1	.01	.10
1–2 yrs	0.70		1.11		1.37		
3–5 years	0.88		1.23		1.20		
> 5 yrs	0.64		1.27		1.82		
Living status							
Single	1.01	.98	1.41	.09	1.18	.30	.17
Children in household							
School age or older children	1.11	.16	1.08	.26	0.98	.73	.36
Preschool –age children	0.97	.80	1.06	.59	0.95	.65	.32
Employment							
Full-time	1	.44	1	.30	1	.61	.11
Part-time or school	1.40		0.96		1.13		
Homemaker	1.12		0.69		0.98		
Disabled	1.46		0.55		1.14		
Unemployed	0.98		0.87		0.76		
Cigarette smoking	0.90	.55	1.53	.09	0.81	.10	.01
Mental health score							
1 (Best)	1	.140	1	.006	1	.004	.63
2	0.86		0.93		1.01		
3	0.60		0.70		0.81		
4	0.77		0.56		0.52		
5–6 (Worst)	0.56		0.39		0.38		
Availability of dentists							

	Black (n=739) OR	p-value*	Hispanic (n=983) OR	p value*	White (n=1275) OR	p-value*	p-value**
Licensed dentists per 10,000 people	---		1.01	.86	1.16	.02	.80
Number of dentists in county	1.00	.42	1.00		1.00		
1/population	---		1.85		3.38		
Urban/Rural							
Urban	---		1	. 27	1	.03	.02
Large rural city/town	---		1.03		1.57		
Small rural town	---		1.44		0.97		
Clinics in county	0.93	.44	1.01	.88	1.06	.15	.63
Spanish speaking	--		1.14	. 53	---		

#A separate multivariable logistic regression model was estimated for each racial/ethnic group.

*Wald test for linear association (contrast) performed for income, education, age, years lived in county and at current address, and mental health score. Wald test for all coefficients equal to zero performed for insurance, survey mode, immigration status, living status, children in household employment, smoking, dentist supply, urban/rural, and county clinics.

**Wald test for whether associations are significantly different across racial/ethnic groups.

Table 4

Personal Characteristics of Mothers and Contextual Characteristics Associated with Having a Regular Dentist: Multivariable Logistic Regression Odds Ratios (OR) by Racial/Ethnic Group [#]

	Black (n=739) OR	p-value*	Hispanic (n=983) OR	p value*	White (n=1275) OR	p-value*	p-value**
Insurance							
No insurance	1	.10	1	<.001	1	<.001	.16
Medicaid insurance	1.59		1.96		1.55		
Private insurance	1.70		3.31		2.39		
Income							
Income less than $10,000	1	.16	1	.24	1	<.001	.35
Income $10,000 – $20,000	1.20		1.03		1.27		
Income over $20,000	1.49		1.25		1.88		
Education							
Did not finish high school	1	.30	1	.14	1	.02	.74
High school grad or GED	1.54		0.87		1.31		
Some college	1.75		1.22		1.56		
4-year college degree	1.67		1.85		1.96		
Age							
18–23	0.56	.01	0.60	.12	0.85	.56	.05
24–39	1		1		1		
40–52	1.79		1.34		1.03		
Survey mode							
Web	1	.34	1	.10	1	.96	.24
Mail	0.65		1.05		0.98		
Phone	0.77		1.53		0.94		
Immigration status	0.53	.08	1.26	.34	0.97	.91	.05
Years lived in county							
< 1 yr	1	.22	1	.24	1	.09	.16
1–2 yrs	1.39		1.15		1.06		
3–5 yrs	2.64		1.43		2.07		
> 5 yrs	1.96		2.06		1.71		
Years lived at current address							
<1 yr	1	.08	1	.17	1	.00	.21
1–2 yrs	1.21		1.36		1.61		
3–5 years	1.55		1.36		1.20		
> 5 yrs	1.56		1.50		2.40		
Living status							
Single	1.23	.34	1.06	.76	1.19	.29	.37
Children in household							
School age or older children	1.13	.15	1.06	.45	.92	.27	.07
Preschool –age children	0.91	.56	1.11	.36	0.94	.52	.22
Employment							
Full-time	1	.88	1	.31	1	.43	.29
Part-time or school	1.15		0.94		1.08		
Homemaker	1.10		0.65		0.88		
Disabled	1.09		0.38		1.17		
Unemployed	0.89		0.78		0.68		
Cigarette smoking	0.89	.49	1.53	.10	0.81	.14	.02
Mental health score							
1 (Best)	1	.10	1	.02	1	.01	.52
2	0.75		0.74		0.96		
3	0.63		0.53		0.92		
4	0.88		0.42		0.56		
5–6 (Worst)	0.41		0.40		0.37		
Availability of dentists							

	Black (n=739) OR	p-value*	Hispanic (n=983) OR	p value*	White (n=1275) OR	p-value*	p-value**
Licensed dentists per 10,000 people	---		1.17	.03	1.17	.04	.80
Number of dentists in county	1.00	.18	1.00		1.00		
1/population	---		2.20		2.18		
Urban/Rural							
Urban	---		1	.90	1	.00	.02
Large rural city/town	---		1.09		1.99		
Small rural town	---		1.07		1.10		
Clinics in county	0.85	.21	1.12	.00	1.04	.39	.79
Spanish speaking	--		0.59	. 03	---		

#A separate multivariable logistic regression model was estimated for each racial/ethnic group.

*Wald test for linear association (contrast) performed for income, education, age, years lived in county and at current address, and mental health score. Wald test for all coefficients equal to zero performed for insurance, survey mode, immigration status, living status, children in household employment, smoking, dentist supply, urban/rural, and county clinics.

**Wald test for whether associations are significantly different across racial/ethnic groups.