

**Women's and Children's Health Policy Center
Johns Hopkins University**

**Strengthen the Evidence for
Maternal and Child Health Programs**

**National Performance Measure 13B
Oral Health in Childhood
Evidence Review**

August 2017

**Yu-Hsuan Lai, MSPH
Stephanie Garcia, MPH
Donna Strobino, PhD
Cynthia Minkovitz, MD, MPP**

Table of Contents

EXECUTIVE SUMMARY	1
ACKNOWLEDGEMENTS	3
INTRODUCTION	4
BACKGROUND	4
METHODS	8
RESULTS	11
Search Results	11
Characteristics of Studies Reviewed	12
Intervention Components	12
Summary of Study Results	13
Evidence Rating & Evidence Continuum	15
IMPLICATIONS	15
FIGURES AND TABLES	20
Figure 1. Flow Chart of the Review Process and Results.	20
Figure 2. Evidence Continuum.	21
Table 1. Detailed Search Strategies.	22
Table 2. Evidence Rating Criteria	24
Table 3. Study Characteristics.	25
Table 4. Data Sources & Outcome Measures.	27
Table 5. Intervention Description.	28
Table 6. Intervention Components	31
Table 7. Study Results.	32
Table 8. Summary of Study Results	34
REFERENCES	35

EXECUTIVE SUMMARY

Oral health is one of fifteen Maternal and Child Health National Performance Measures (NPMs) for the State Title V Maternal and Child Health (MCH) Services Block Grant program. One of the goals is to increase the percentage of children, ages 1 through 17, who had a preventive dental visit in the past year. The purpose of this evidence review is to identify evidence-informed strategies that State Title V programs might consider implementing to address NPM 13B Oral Health in Childhood.

Seventeen peer-reviewed studies and three gray literature sources met study inclusion criteria and informed the review. These sources described school/preschool interventions, caregiver education/counseling, home visits and dental practice outreach, public insurance coverage, and Medicaid reforms. Studies were grouped by target audience. Examples of each intervention and its evidence rating are shown below.

Target Audience	Intervention	Example(s)	Evidence Rating
School	School/preschool intervention	School-based oral health services; Head Start participation	Moderate Evidence
Caregiver	Caregiver education/counseling	Informational postcards; motivational interviewing	—
Caregiver and Provider	Home visit and dental practice outreach	Home visit by oral health care coordinator and recruitment of dental practices to provide care	—
State	Public insurance coverage	Medicaid/CHIP enrollment	Moderate Evidence
	Medicaid reforms	Increased provider reimbursement; administrative changes; enhanced benefits; health plan incentives	Moderate Evidence

— indicates insufficient number of studies to assign evidence rating

Four key findings emerged regarding utilization of preventive dental visits by children:

1. School/preschool interventions appear to be effective.
2. Public insurance coverage appears to be effective.
3. Medicaid reforms appear to be effective.

4. There is insufficient evidence of the effectiveness for caregiver education/counseling and home visits and dental practice outreach.

The evidence review categorized these interventions along an evidence continuum from *Evidence Against* (least favorable) to *Scientifically Rigorous* (most favorable). *Moderate Evidence* was identified for school/preschool interventions, public insurance coverage, and Medicaid reforms. Caregiver education/counseling and home visits and provider outreach were not assigned evidence ratings due to the limited number of studies assessing these strategies.

Additional strategies to facilitate utilization of preventive oral health services were beyond the scope of this review and include providing oral health services for children by non-oral health care providers, integrating oral health care into primary medical care settings, adopting state oral health plans, facilitating preventive oral health service delivery by dental managed care organizations and incorporating oral health services into community-based programs such as Head Start and the Supplemental Nutrition Program for Women, Infants and Children (WIC). Revisions to the 2016 NSCH include capturing receipt of services from dentists or other health care providers rather than dentists alone. As a result, these additional strategies, although beyond the scope of this evidence review, may support improvements in this broader conceptualization of preventive oral health visits.

Future evaluation is needed to assess the effectiveness of interventions aimed at increasing children's utilization of preventive oral health services by type of dental visit (preventive, diagnostic, restorative), in varied settings, among children of varied ages, and by a broad array of health care providers. In addition, although there was insufficient evidence for caregiver-based interventions to assign a rating, further efforts are needed to assess the effectiveness of involving parents and other family members in oral health care for their children as children's attendance at dental visits is dependent upon their caregivers.

ACKNOWLEDGEMENTS

This evidence review is based on research conducted by the Strengthen the Evidence for Maternal and Child Health Programs team under grant number U02MC28257 from the Health Resources and Services Administration (HRSA) of the U.S. Department of Health and Human Services (HHS).

We are thankful to our colleague Lori Rosman, MLS, AHIP at the Welch Medical Library who provided expertise in constructing search strategies. We also express gratitude to Sylvia Sosa, MSc, Reem Ghandour, DrPH, MPA and Michael Kogan, PhD in the Office of Epidemiology and Research and Pamela Vodicka, MS, RD and Maria Canto, DDS, MPH in the Division of Child, Adolescent and Family Health, Maternal and Child Health Bureau, HRSA. Additionally, we extend thanks to Anna Watson, MPH and Iliana White, MPH, CHES, CPH at AMCHP, Christina Mullins, MA and Jason Roush, DDS from West Virginia's Office of Maternal, Family and Child Health and Lynne Nilson, MPH from Utah's Title V Program. Thank you as well as to Burton Edelstein, DDS, MPH and Katrina Holt, MPH, MS, RD for comments provided on earlier drafts. The findings and conclusions presented in this document are those of the authors, who are responsible for its contents; the findings and conclusions do not necessarily represent the view of HRSA or of individual reviewers.

Suggested Citation: Lai Y, Garcia S, Strobino D, Minkovitz C. National Performance Measure 13B Oral Health in Childhood Evidence Review. Strengthen the Evidence Base for Maternal and Child Health Programs. Women's and Children's Health Policy Center, Johns Hopkins University, Baltimore, MD. 2017.

INTRODUCTION[†]

Strengthen the Evidence Base for Maternal and Child Health Programs is a Health Resources and Services Administration (HRSA)-funded initiative that aims to support states in their development of strategies to promote the health and well-being of maternal and child health (MCH) populations in the United States. This initiative, carried out through a partnership among Johns Hopkins Women's and Children's Health Policy Center, the Association of Maternal and Child Health Programs, and Welch Library at Johns Hopkins, was undertaken to facilitate implementation of the transformed Title V MCH Services Block Grant Program.

One goal of the Strengthen the Evidence project is to conduct reviews that provide evidence of the effectiveness of possible strategies to address the National Performance Measures (NPMs) selected for the 5-year cycle of the Title V MCH Services Block Grant Program, beginning in fiscal year 2016. States are charged to select eight NPMs and incorporate evidence-based or evidence-informed strategies to achieve improvement for each NPM selected.

BACKGROUND

Oral health is one of the fifteen MCH National Performance Measures (NPMs). Thirty-one states and jurisdictions selected NPM 13, including Alabama, Alaska, American Samoa, Connecticut, Delaware, District of Columbia, Federal States of Micronesia, Georgia, Hawaii, Idaho, Illinois, Iowa, Kentucky, Marshall Islands, Maryland, Massachusetts, Michigan, Montana, New Jersey, New Mexico, New York, North Dakota, Northern Mariana Islands, Oregon, Puerto Rico, Rhode Island, South Dakota, Utah, Vermont, Virgin Islands, and West Virginia.¹

NPM 13 focuses on women (13A), as well as children and adolescents ages 1 through 17 (13B). This evidence review addresses only NPM 13B, with the goal of identifying interventions

[†] The language used in the Introduction section was crafted by the Strengthen the Evidence team and is consistent across all evidence reviews within this project.

to increase the percentage of children, ages 1 through 17, who had a preventive dental visit in the past year.^{2,3} The National Survey of Children's Health (NSCH) is used to monitor the progress toward achieving this goal. According to the 2011-12 NSCH, parents reported that 77.2% of children ages 1 through 17 had one or more preventive dental care visit(s), including check-ups and dental cleanings, in the past year (ranging from 67.0% in Florida to 87.8% in Vermont).⁴ The NSCH, based on parent report, yields higher estimates of dental care utilization than other national surveys likely due, in part, to social desirability bias; results from the Medical Expenditure Panel Survey, which includes additional probes and follow-up questions to verify utilization, indicated that only 54.6% of children ages 2-17 had dental visits in 2014.^{5,6}

The 2011-12 NSCH also highlighted variability in receipt of dental visits by age, race/ethnicity and insurance status. Among children 1 to 5 years, only 54.3% had at least one preventive dental visit in the past year; the percentage increased to 87.6% for 6 to 11 year old and 85.1% for 12 to 17 year children. Comparable percentages for male and female children were 76.6% and 77.6% respectively. The respective percentages by race/ethnicity who had at least one preventive dental visit in the past year were 79.7%, 75.9%, 73.9%, and 73.5% for white, black, Hispanic and other children. The receipt of preventive dental visits in children also varied by insurance status. Children who were insured (79.0%) were more likely to have preventive dental visits than those not insured (47.7%). Utilization rates also differed between children with public insurance, such as Medicaid or the State Children's Health Insurance Program (CHIP), (73.5%) and those with private insurance (82.5%).⁴ Utilization among children with public and private insurance, however, has been shown to be comparable after adjusting for sociodemographic characteristics and health status.⁷

Oral diseases are among the most prevalent health problems facing children and youth in

the United States.⁸ Poor oral health has been linked to school absenteeism and poor academic performance.^{9,10} Preventive oral health care in children is critical as early detection of oral diseases and conditions and management of oral health can improve a child's general health as well as school readiness.⁸ Having more preventive dental visits has been associated with fewer subsequent dental treatments.¹¹ Delayed diagnosis in young children of oral health problems can result in increased severity of problems and lead to more extensive and more expensive treatments.¹² Dental caries is one of the most costly and uncontrolled diseases of childhood; the estimated annual cost to restore children's decayed teeth exceeds \$2 billion.¹³ Furthermore, dental caries in the primary teeth is highly predictive of caries in the permanent teeth.⁸

The 2013 American Academy of Pediatric Dentistry policy guideline, *Guideline on Periodicity of Examination, Preventive Dental Services, Anticipatory Guidance/Counseling, and Oral Treatment for Infants, Children, and Adolescents*, recommends a first examination at the time of the eruption of the first tooth and no later than 12 months of age.⁸ This recommendation is consistent with that of the American Academy of Pediatrics¹⁴ and Bright Futures Guidelines for Health Supervision,¹⁵ the American Dental Association¹⁶ and the American Association of Public Health Dentistry.¹⁷ The recommended interval of oral examination is six months with variation depending on patient history.⁸

Given concerns about underutilization of oral health care in children, it is critical to identify factors associated with adherence to regular dental visits for children. A recent systematic review identified factors at the patient, provider, and system levels.¹⁸ Adherence to regular dental visits for their children appears to be related to parents' level of education, economic status, and marital status. Parents' lack of knowledge regarding oral health recommendations, perceived low priority of oral health care, previous negative experience with

dental visits, and children's aversion to oral health care can directly influence parents' intentions to adhere to dental visits for their children. In addition, perceived barriers to regular dental visits include high cost of oral health care, time constraints, difficulty with accessing oral health care, and communication difficulties with oral health providers. Parent adherence to their own oral health care also is related their seeking care for their children regardless of insurance status; results from a national survey demonstrated that U.S. children were more likely to have a dental visit in the previous 12 months if their parents also had a visit.¹⁹

Provider-level factors may influence parental adherence to oral health care for their children including providers' communication and professional skills, availability of services for young children and children with disabilities and attitudes toward patients using publicly funded oral health services.¹⁸ General dentists may not be willing to treat young children. Among those who treat young children, pediatric dentists were more likely to provide preventive services than general dentists.²⁰

System-level factors also may influence adherence to regular dental visits. These factors include referrals from family physicians and pediatricians, collaboration between communities and health care professionals, community-based education of parents about children's oral health, perceived discrimination in the Medicaid system, and trust in the quality of the Medicaid system.¹⁸ Although states are required to provide dental benefits to children covered by Medicaid and CHIP, participation of dentists in public insurance is limited. Only 38% of dentists in general practice participate in Medicaid or CHIP,²¹ limiting receipt of dental visits for children with public insurance.

As a vehicle to support states and jurisdictions in their work related to oral health in children, the current review synthesizes the evidence about interventions to increase the receipt

of preventive dental visits in children. A previously published review assessed the effectiveness of integrating promotion of oral health of young children and their mothers into nursing and midwifery practice. The review assessed caries experience, oral health knowledge and practice, and utilization of oral health care as outcome measures.²² To our knowledge, the current review is the first to focus exclusively on interventions to increase the receipt of preventive dental visits among children.

METHODS

Studies were identified for review by searching through the PubMed, Cochrane Library, and CINAHL Plus databases. Search strategies varied depending on the database due to differences in controlled vocabulary, indexing, and syntax. Table 1 provides detailed search strategies used for each database. The same three concepts informed search strategies in each database: children, oral health, and intervention/evaluation. A library specialist (informationist) at Welch Medical Library provided consultation regarding database selection and adequacy of the search strategies. The following inclusion criteria were used:

1. The study evaluated the effectiveness of an intervention aimed at increasing the percentage of children, ages 1 through 17, who receive an annual preventive dental visit. The components of the intervention and the results were clearly described.
2. The receipt of a preventive dental visit was one of the outcome measures. Studies measuring the receipt of problem-based or symptom-driven visits or those that did not specify the type of dental visit were excluded. Studies measuring only unmet oral health need, appointment-keeping behavior, intention or willingness of seeking preventive visit, knowledge about oral health care recommendations, oral hygiene status or practices, or clinical oral health status were also excluded.

3. The preventive dental visit was provided by an oral health provider, including a dentist or dental hygienist. Studies reporting the use of medical providers, such as physicians or nurses, or other non-oral health providers were excluded.
4. The study described interventions that fall within the scope of Title V as deemed by the authors and reviewers.
5. At a minimum, the study included a control and intervention group, an appropriate comparison group, or a pretest-posttest design to assess intervention effectiveness.
6. The study was conducted in the United States or in another high-resource country that is a member of the Organization for Economic Cooperation and Development (OECD).
7. The study was published in the English language.
8. The study was published in a peer-reviewed journal.

The results of each database were evaluated systematically for relevant studies.

Duplicates were removed before beginning title screening. Each article's title was reviewed and if the title appeared related to the NPM, the abstract was then screened. If the abstract did not indicate whether the study met the inclusion criteria or the abstract was not available, full-text of the article was reviewed. All articles remaining after title and abstract screening were retrieved for detailed full-text review to assess their eligibility for inclusion. In addition, the reference lists of relevant previously published review articles were reviewed to identify potential articles to be included in the current review.²²⁻²⁴ In addition to peer-reviewed literature, three gray literature sources were included: 1) *Policy on Mandatory School-Entrance Oral Health Examinations* by the American Academy of Pediatric Dentistry (AAPD)²⁵; 2) *Medicaid Contracting Strategies to Improve Children's Oral Health Access* by the Center for Health Care Strategies²⁶; and 3) *An Innovative Project Breaks Down Barriers to Oral Health Care for Vulnerable Young Children in*

Los Angeles County by UCLA Center for Health Policy Research.²⁷

The lead author (YL) extracted data pertaining to the study characteristics (setting, sample, and design), intervention (components and study period), data sources and outcome measures for assessing preventive dental visits, and results. The study team met regularly to review interim extractions and resolve items in question. Interventions were characterized by target audience: patient, caregiver, provider, and state. Studies were categorized into five groups based on their primary intervention: “School/Preschool Intervention,” “Caregiver Education/Counseling,” “Home Visit and Dental Practice Outreach,” “Public Insurance Coverage,” and “Medicaid Reforms.”

An evidence continuum was created to assess evidence-informed strategies, along with criteria for each category along the continuum. The Robert Wood Johnson Foundation *What Works for Health* evidence ratings were adapted to create our evidence continuum tailored toward the Strengthen the Evidence project.²⁸ The evidence rating categories include: *Evidence Against*, *Mixed Evidence*, *Emerging Evidence*, *Expert Opinion*, *Moderate Evidence*, and *Scientifically Rigorous*. Strategies that are characterized by *Emerging Evidence* or more favorable ratings are considered evidence-informed. Table 2 shows the detailed evidence rating criteria for both study type and study results for each rating.

Interventions identified through assessment of both peer-reviewed and gray literature were placed along the evidence continuum. Assignment to the continuum required that interventions or intervention categories be evaluated in 4 or more peer-reviewed studies or in the gray literature selected for the evidence review. In addition, interventions or intervention categories that were evaluated in 3 peer-reviewed studies with expert opinion from gray literature were also assigned an evidence rating and placed on the evidence continuum.

Interventions or intervention categories that were evaluated in 3 peer-reviewed studies without expert opinion from gray literature were neither assigned an evidence rating, nor placed on the evidence continuum. A team of three project members independently assigned ratings to the interventions or intervention categories. The members then compared their assessments and discrepancies, and the full project team discussed the interventions until a consensus was reached.

RESULTS

Search Results

Searches in the PubMed, Cochrane Library, and CINAHL Plus databases were performed on January 18, 2017. In total, the systematic search identified 13,211 records. The search in PubMed, Cochrane Library, and CINAHL Plus yielded 9710, 2261, and 1240 records respectively. No records were identified from searching through previously published review articles.²²⁻²⁴

Title and abstract screening was conducted for 10,551 records after 2660 duplicates were removed from the total records. During title and abstract review, 10,340 records were excluded due to their failure to meet certain inclusion criteria. The most common reason for not meeting the inclusion criteria was that studies were irrelevant to the purpose of this review; namely, they were not evaluations of interventions aimed to increase the receipt of preventive dental visits by children. Full-text articles were assessed for eligibility for 211 records, and 194 were excluded due to failure to meet all inclusion criteria. Main reasons for excluding studies included: did not evaluate intervention; did not measure the outcome of interest; and did not include an appropriate comparison group or pretest-posttest design. Seventeen records were included in the current review. A total of 20 sources were included in this review, combining the 17 peer-reviewed

studies with 3 gray literature sources. Figure 1 displays the flow chart for the study selection process.

Characteristics of Studies Reviewed

The 17 articles included in this review varied in study setting and design, intervention type, and data source. The detailed characteristics of the studies are reported in Table 3. Of the 17 studies, 3 studies were randomized controlled trials²⁹⁻³¹; 12 quasi-experimental studies (3 pretest-posttest nonequivalent control group design,³²⁻³⁴ 6 nonequivalent control group design,³⁵⁻⁴⁰ and 3 pretest-posttest design⁴¹⁻⁴³); 1 prospective cohort study⁴⁴; and 1 time trend analysis.⁴⁵ In terms of setting, 15 studies were conducted in the United States^{29-42,45} and 2 in Canada.^{43,44} Although all studies reported the receipt of a preventive dental visit as an outcome, the data source used to measure the outcome varied. The data sources used included parent report,^{31,33,35-39,43-45} Medicaid claims,^{29-31,40-42} NSCH,³⁴ and electronic medical record and administrative data.³² Table 4 provides details regarding data sources and outcome measures.

Intervention Components

Table 5 includes a detailed description of the intervention implemented in each study. The nature of the comparison group varied by study design. Table 6 summarizes the intervention components each study contained. “School/Preschool Interventions,” “Caregiver Education/Counseling,” “Home Visit and Dental Practice Outreach,” “Public Insurance Coverage,” and “Medicaid Reforms” included 3, 3, 1, 6, and 4 studies respectively.

“School/Preschool Interventions” included 2 studies focused on access to school-based health center/school-based oral health care (e.g., screening and referral)^{38,43} and 1 study assessing Head Start participation.⁴⁰ “Caregiver Education/Counseling” included 1 study assessing educational materials (informational postcards),³⁰ 1 study assessing education (group

presentation),⁴⁴ and another study focusing on the combination of one-to-one education, educational materials and motivational interviewing/counseling.³¹ “Home Visit and Dental Practice Outreach” only included one study focused on home visit provided by a dental care coordinator who provided education, educational materials, oral health products, and patient navigation in combination with recruitment of dental practices to provide care for children who did not already have a dentist.²⁹

“Public Insurance Coverage” included 6 studies assessing enrollment in Medicaid,³⁹ CHIP,^{32,33,35,39,45} the Highmark Blue Cross Blue Shield Caring Program,⁴⁵ and/or Healthy Kids.³⁷ One of the studies also included outreach efforts to bring children into the insurance program.³⁷ Studies categorized as “Medicaid Reforms” mainly focused on increased provider reimbursement,^{34,36,41,42} administrative changes (e.g., streamlining of billing process),^{36,41,42} and enhanced benefits.³⁶

Summary of Study Results

Study results are presented in detail in Table 7. Table 8 summarizes study findings. Tables 7 and 8 display studies organized by interventions as described previously. The results presented in Table 8 for receipt of preventive dental visits by children demonstrate a mix of favorable and non-significant findings.

With support from the gray literature source, “School/Preschool Interventions” appear to be effective in increasing the receipt of preventive dental visits by children. All three studies had favorable results,^{38,43,46} although one did not report statistical significance.⁴³ One gray literature source, *Policy on Mandatory School-Entrance Oral Health Examinations* released by AAPD, recommended that schools mandate oral health examinations prior to matriculation and subsequent examinations at period intervals to provide opportunity for diagnosis and treatment.

Such policies are likely to be most successful when accompanied by requirements and funding to track referrals for further evaluation or treatment.⁴⁷ Public insurance coverage also appears to be effective as all six studies demonstrated favorable findings.^{32,33,35,37,39,45}

In addition, Medicaid reforms appear to be effective as the majority of the studies had favorable results.^{34,36,41,42} A gray literature source focused on Medicaid reform highlights the use of financial incentives for health plans; these include rewarding plans based on achieving minimum standard (e.g., percentage of children with annual dental visit), demonstrating improvements over prior year's performance, and performing better than other contracted plans.²⁶ Three of the peer-reviewed studies also included other interventions along with the Medicaid reforms; these included caregiver education,³⁶ caregiver outreach,^{36,41} provider training,³⁶ provider outreach,^{41,42} and patient navigation/patient compliance.⁴²

“Caregiver Education/Counseling” and “Home Visit and Dental Practice Outreach” contained three and one studies respectively. Due to the limited number of studies focusing on these interventions, conclusions cannot be drawn for either intervention.

Integration of oral health and primary care services has been the study of multiple interventions in Federally Qualified Health Centers (FQHCs)⁴⁸; however, our review did not identify a body of peer-reviewed literature reporting on changes in children's preventive dental visits. A comprehensive initiative with 12 FQHC's in Los Angeles found an increase in the numbers of preventive dental visits for children.²⁷ Components of the intervention included infrastructure enhancements (e.g., oral health coordinator, part-time dentist, supplies), learning collaboratives, community systems development (e.g., enhanced referrals, resource guides) and policy analyses to address barriers (e.g., reimbursement and payment challenges).

Evidence Rating & Evidence Continuum

Assignments of evidence ratings were based on the synthesis of study results for the 17 studies (Tables 7 and 8). “Caregiver Education/Counseling” contained only three peer-reviewed studies. “Home Visit and Dental Practice Outreach” contained only one study. Therefore, these two interventions were not assigned evidence ratings or placed on the continuum.

“School/Preschool Intervention” was placed on the evidence continuum as it received support from the gray literature source in addition to the three peer-reviewed studies. Based on the evidence rating criteria (Table 2), *Moderate Evidence* was identified for “School/Preschool Intervention,” “Public Insurance Coverage,” and “Medicaid Reforms.” Figure 2 displays the evidence-informed interventions along the evidence continuum for NPM 13B.

IMPLICATIONS

Over 30 states and jurisdictions selected NPM 13 as a programmatic focus for the current 5-year cycle of the Title V MCH Services Block Grant Program beginning in fiscal year 2016. The purpose of this review was to identify evidence-based and evidence-informed strategies that state Title V programs might consider implementing to increase the percentage of children, ages 1 through 17, who had a preventive dental visit in the past year.

Findings from this review suggest that school/preschool interventions, public insurance coverage, and Medicaid reforms appear to be effective in increasing the receipt of preventive dental visits by children. It was not possible to draw conclusions about caregiver education/counseling and home visits and dental practice outreach due to the limited number of studies evaluating these strategies.

This evidence review is the first to focus exclusively on the receipt of preventive dental visits by children. It, nevertheless, has several limitations that warrant comment. First, only 17

peer-reviewed studies and 3 gray literature sources met inclusion criteria. The small number of sources limits the conclusions that may be drawn regarding interventions. Second, search results were screened and interpreted by one reviewer, although a consistent protocol was followed and issues that arose during the search were addressed with the study team. Third, the ability to compare and synthesize studies was limited due to variations in study setting, sample, and design. Lastly, the review excluded studies in which the preventive dental visit was provided by healthcare professionals other than dental health providers, limiting the breadth of interventions to increase the receipt of preventive dental visits by children.

Studies that assessed any type of dental visit (including preventive, diagnostic, restorative) were excluded from this review since the measure was not specific to preventive visits. Some excluded studies also did not examine results separately for children. Interventions to increase dental visits for any age group, however, may be generalizable to the receipt of preventive dental visits by children. These interventions include text message reminders about dental visits,^{49,50} assistance with obtaining insurance by parent mentors,⁵¹ case management,⁵² and provision of advice for dental checkup by medical providers.⁵³

This review focused on interventions with rigorous evaluations of effective interventions to increase utilization of preventive dental visits among children based on data from the 2011-12 NSCH. Revisions to the 2016 NSCH include capturing receipt of services from dentists or other health care providers rather than dentists alone. As a result, additional strategies, although beyond the scope of this evidence review, may support improvements in this broader conceptualization of preventive oral health visits.

Efforts have been made to encourage non-oral health providers to provide oral health services for children. Between 2002 and 2008, the percentage of states offering Medicaid

reimbursement to non-oral health providers for application of fluoride varnish increased from 7.8% to 66.7%.⁵⁴ In addition, several programs demonstrated success in providing preventive oral health services (fluoride applications, oral health education, and oral health screening and referral) during well-child visits.⁵⁵⁻⁵⁷ These efforts, such as *From the First Tooth* which operates in five states, often are supported by public-private collaborations.⁵⁸ The delivery of preventive oral health services by non-oral health providers has been shown to increase the receipt of preventive oral services among children enrolled in Medicaid⁵⁹ and increase geographic availability of preventive oral health services.⁶⁰

The integration of oral health care into primary care settings is another approach to promote receipt of oral health care services among children. Co-location of primary care and dental practices and the joint use of patient record systems appear to aid in coordination and integration of functions between the oral health and primary care teams.⁶¹ The placement of dental hygienists in primary care practices has been shown to reduce barriers to preventive oral health services for children in low-income families.⁶² One gray literature source identified in our review reported increased preventive dental visits following integration of oral health and primary care services in 12 FQHCs in a large urban area.²⁷

Integration of oral health care into primary care can be difficult. Barriers to integration include limited provider time, lack of physician and dentist training to treat infants and toddlers, dentist's reluctance to coordinate with physician counterparts, electronic health record incompatibility and low Medicaid reimbursement rates for physicians.^{13,63} Continuing medical education about provision of preventive oral health services for medical care providers appears to support integration of oral health and primary care.^{57,64} Financial incentives in remuneration systems also may influence clinical behavior of general dentists.⁶⁵ A comparison

of Medicaid and CHIP plans showed that children enrolled in plans with open provider networks that reimbursed dentists' full charges were more likely to have a dental visit soon after enrollment than children enrolled in plans with closed panels and lower payments.⁶⁶

Other strategies shown to promote receipt of preventive oral health services include adoption of state oral health plans in 36 states⁶⁷, facilitating preventive oral health service delivery by dental managed care organizations, and incorporating oral health services into other community-based programs serving pregnant women and young children, including Head Start and the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). These strategies were included in our review when they were implemented in combination with other strategies such as Medicaid reforms. For example, the Access to Baby and Child Dentistry (ABCD) program in Washington state, improved access to oral health services for young children enrolled in Medicaid using a multicomponent program involving dentist and dental staff training, case managers, enhanced Medicaid oral health benefits and reimbursement, and partnerships with community-based organizations.³⁶ Another example not included in this review is WIC Dental Days in California.⁶⁸

In recognition of the role of both dentists and other health care professionals in meeting the preventive oral health needs of children, the 2016 NSCH newly asks about receipt of services from a dentist or other oral health care provider. It also differentiates between “any kind of dental or oral health care” and “preventive dental care, such as check-ups, dental cleanings, dental sealants, or fluoride treatments.”⁶⁹ Future efforts are needed to examine the effectiveness of a broad array of opportunities to promote preventive oral health services for children as well as the effectiveness of involving parents and other family members in oral health care for their

children. Children's utilization of oral health care is dependent on their parents, and parents' oral health habits influence their children's oral health⁷⁰, highlighting the importance of the family.

FIGURES AND TABLES

Figure 1. Flow Chart of the Review Process and Results.

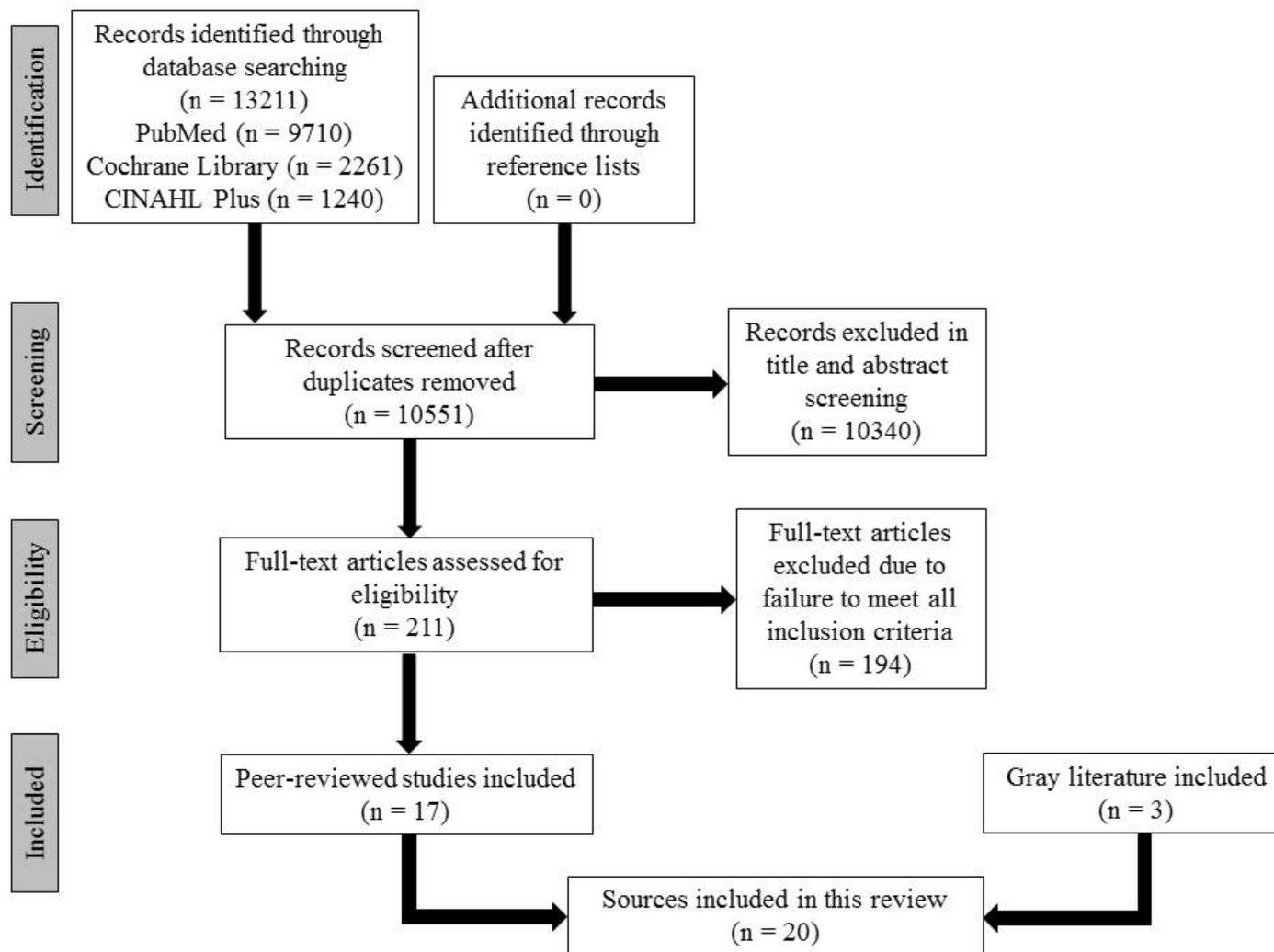


Figure 2. Evidence Continuum.

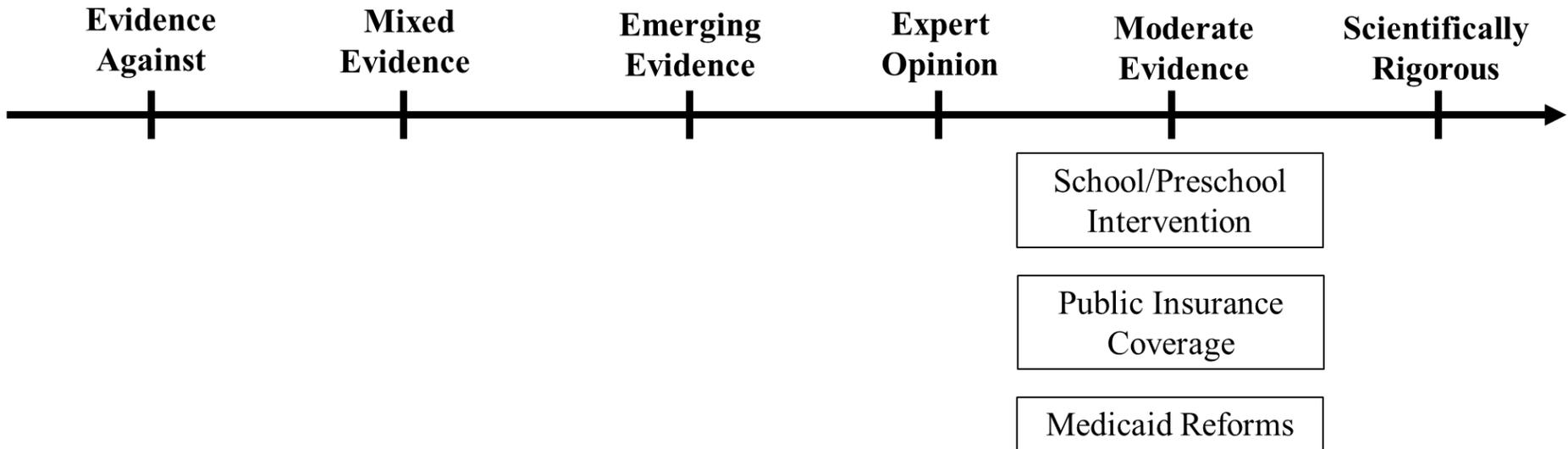


Table 1. Detailed Search Strategies.

Database		Search Strategies
PubMed	#1	“Infant”[Mesh] OR “Child”[Mesh] OR “Adolescent”[Mesh] OR “Infant Health”[Mesh] OR “Child Health”[Mesh] OR “Adolescent Health”[Mesh] OR infant*[tw] OR infancy[tw] OR baby[tw] OR babies[tw] OR child*[tw] OR toddler*[tw] OR adolescen*[tw] OR teen*[tw] OR youth*[tw]
	#2	“Pediatric Dentistry”[Mesh] OR “Dental Care for Children”[Mesh] OR “Preventive Dentistry”[Mesh] OR “Public Health Dentistry”[Mesh] OR “School Dentistry”[Mesh] OR “Oral Health”[Mesh] OR “Dental Service, Hospital” [Mesh] OR “Dental Clinics”[Mesh] OR “Dental Offices”[Mesh] OR “Dentition”[Mesh] OR dentist*[tw] OR oral health[tw] OR oral hygien*[tw] OR dental[tw] OR dentition[tw] OR tooth[tw] OR teeth[tw] OR gingiva*[tw] OR periodont*[tw]
	#3	“Child Health Services”[Mesh:NoExp] OR “Adolescent Health Services”[Mesh] OR “Mass Screening”[Mesh:NoExp] OR “Preventive Medicine”[Mesh:NoExp] OR “Community Health Services”[Mesh:NoExp] OR “Referral and Consultation”[Mesh] OR prevention[tw] OR preventive[tw] OR check up*[tw] OR checkup*[tw] OR screening*[tw] OR cleaning*[tw] OR attendance[tw] OR utilization[tw] OR referral*[tw]
	#4	“Program Evaluation”[Mesh] OR “Health Promotion”[Mesh] OR “Evaluation Studies as Topic”[Mesh] OR “Evaluation Studies”[Publication Type] OR evaluat*[tw] OR health promotion*[tw] OR assessment*[tw] OR impact*[tw] OR effective*[tw] OR intervention*[tw] OR campaign*[tw] OR strateg*[tw] OR best practice*[tw]
	#5	#1 AND #2 AND #3 AND #4
Cochrane Library	#1	MeSH descriptor: [Infant] explode all trees
	#2	MeSH descriptor: [Child] explode all trees
	#3	MeSH descriptor: [Adolescent] explode all trees
	#4	MeSH descriptor: [Infant Health] explode all trees
	#5	MeSH descriptor: [Child Health] explode all trees
	#6	MeSH descriptor: [Adolescent Health] explode all trees
	#7	infant* or infancy or baby or babies or child* or toddler* or adolescen* or teen* or youth*
	#8	OR #1-#7
	#9	MeSH descriptor: [Dental Care for Children] explode all trees
	#10	MeSH descriptor: [Pediatric Dentistry] explode all trees
	#11	MeSH descriptor: [Preventive Dentistry] explode all trees
	#12	MeSH descriptor: [Public Health Dentistry] explode all trees
	#13	MeSH descriptor: [School Dentistry] explode all trees
	#14	MeSH descriptor: [Oral Health] explode all trees
	#15	MeSH descriptor: [Dental Service, Hospital] explode all trees
	#16	MeSH descriptor: [Dental Clinics] explode all trees
	#17	MeSH descriptor: [Dental Offices] explode all trees
	#18	MeSH descriptor: [Dentition] explode all trees
	#19	dentist* OR (oral NEXT health) OR (oral NEXT hygien*) OR dental OR dentition OR tooth OR teeth OR gingiva* OR periodont*
	#20	OR #9-#19

	#21	MeSH descriptor: [Child Health Services] this term only
	#22	MeSH descriptor: [Adolescent Health Services] explode all trees
	#23	MeSH descriptor: [Mass Screening] this term only
	#24	MeSH descriptor: [Preventive Medicine] this term only
	#25	MeSH descriptor: [Community Health Services] this term only
	#26	MeSH descriptor: [Referral and Consultation] explode all trees
	#27	prevention OR preventive OR (check NEXT up*) OR checkup* OR screening* OR cleaning* OR attendance OR utilization OR referral*
	#28	OR #21-#27
	#29	MeSH descriptor: [Program Evaluation] explode all trees
	#30	MeSH descriptor: [Health Promotion] explode all trees
	#31	MeSH descriptor: [Evaluation Studies as Topic] explode all trees
	#32	MeSH descriptor: [Evaluation Studies] explode all trees
	#33	evaluat* OR (health NEXT promotion*) OR assessment* OR impact* OR effective* OR intervention* OR campaign* OR strateg* OR (best NEXT practice*)
	#34	OR #29-#33
	#35	#8 AND #20 AND #28 AND #34
CINAHL Plus	#1	((MH "Infant+") OR (MH "Child+") OR (MH "Adolescence+") OR (MH "Child Health") OR (MH "Adolescent Health")) OR TI (infant* OR infancy OR baby OR babies OR toddler OR adolescen* OR teen* OR youth*) OR AB (infant* OR infancy OR baby OR babies OR toddler OR adolescen* OR teen* OR youth*)
	#2	((MH "Dental Care for Children") OR (MH "Pediatric Dentistry") OR (MH "Preventive Dentistry+") OR (MH "Public Health Dentistry+") OR (MH "Oral Health") OR (MH "Dental Health Services") OR (MH "Dental Clinics") OR (MH "Dental Offices") OR (MH "Dentition+")) OR TI (dentist* OR (oral W0 health) OR (oral W0 hygien*) OR dental OR dentition OR tooth OR teeth OR gingiva* OR periodont*) OR AB (dentist* OR (oral W0 health) OR (oral W0 hygien*) OR dental OR dentition OR tooth OR teeth OR gingiva* OR periodont*)
	#3	((MH "Child Health Services") OR (MH "Adolescent Health Services") OR (MH "Health Screening") OR (MH "Preventive Health Care") OR (MH "Community Health Services") OR (MH "Referral and Consultation+")) OR TI (prevention OR preventive OR (check W0 up*) OR checkup* OR screening* OR cleaning* OR attendance OR utilization OR referral*) OR AB (prevention OR preventive OR (check W0 up*) OR checkup* OR screening* OR cleaning* OR attendance OR utilization OR referral*)
	#4	((MH "Program Evaluation") OR (MH "Health Promotion+") OR (MH "Evaluation Research+")) OR TI (evaluat* OR (health W0 promotion*) OR assessment* OR impact* OR effective* OR intervention* OR campaign* OR strateg* OR (best W0 practice*)) OR AB (health W0 promotion*) OR assessment* OR impact* OR effective* OR intervention* OR campaign* OR strateg* OR (best W0 practice*))
	#5	S1 AND S2 AND S3 AND S4

Table 2. Evidence Rating Criteria.

Evidence Rating	Evidence Criteria: Type	Evidence Criteria: Study Results
Scientifically Rigorous	<ul style="list-style-type: none"> • Peer-reviewed study results are drawn only from: <ul style="list-style-type: none"> ○ Randomized controlled trials, and/ or ○ Quasi-experimental studies with pre-post measures and control groups 	<ul style="list-style-type: none"> • Preponderance of studies have statistically significant favorable findings
Moderate Evidence	<ul style="list-style-type: none"> • Peer-reviewed study results are drawn from a mix of: <ul style="list-style-type: none"> ○ Randomized controlled trials ○ Quasi-experimental studies with pre-post measures and control groups ○ Quasi-experimental studies with pre-post measures without control groups ○ Time trend analyses 	<ul style="list-style-type: none"> • Preponderance of studies have statistically significant favorable findings
Expert Opinion	<ul style="list-style-type: none"> • Gray literature 	<ul style="list-style-type: none"> • Experts deem the intervention as favorable based on scientific review
Emerging Evidence	<ul style="list-style-type: none"> • Peer-reviewed study results are drawn from a mix of: <ul style="list-style-type: none"> ○ Randomized controlled trials ○ Quasi-experimental studies with pre-post measures and control groups ○ Quasi-experimental studies with pre-post measures without control groups ○ Time trend analyses ○ Cohort studies 	<ul style="list-style-type: none"> • Studies with a close-to-evenly distributed mix of statistically significant favorable and non-significant findings • Only cohort studies with preponderance of statistically significant favorable findings
	<ul style="list-style-type: none"> • Gray literature 	<ul style="list-style-type: none"> • Experts deem the intervention as favorable
Mixed Evidence	<ul style="list-style-type: none"> • Peer-reviewed study results are drawn from a mix of: <ul style="list-style-type: none"> ○ Randomized controlled trials ○ Quasi-experimental studies with pre-post measures and control groups ○ Quasi-experimental studies with pre-post measures without control groups ○ Time trend analyses ○ Cohort studies 	<ul style="list-style-type: none"> • Studies with a close-to-evenly distributed mix of statistically significant favorable, unfavorable, and non-significant findings
	<ul style="list-style-type: none"> • Gray literature 	<ul style="list-style-type: none"> • Experts deem the intervention as having mixed evidence
Evidence Against	<ul style="list-style-type: none"> • Peer-reviewed study results are drawn from a mix of: <ul style="list-style-type: none"> ○ Randomized controlled trials ○ Quasi-experimental studies with pre-post measures and control groups ○ Quasi-experimental studies with pre-post measures without control groups ○ Time trend analyses ○ Cohort studies 	<ul style="list-style-type: none"> • Preponderance of studies have statistically significant unfavorable or non-significant findings
	<ul style="list-style-type: none"> • Gray literature 	<ul style="list-style-type: none"> • Experts deem the intervention as being ineffective or unfavorable

Table 3. Study Characteristics.¹

Study	Country	Setting	Study Sample		Study Design
			Target Sample	Sample Size	
Bailey et al. (2016)	US	Community health centers (CHC) in Oregon	Patients aged 2-18 years who were not pregnant and did not have insurance other than Medicaid/CHIP with ≥ 1 visit before and after their 'start date'	Newly insured (n=3,054) Continuously insured (n=10,946) Continuously uninsured (n=10,307)	QE: pretest-posttest nonequivalent control group
Beazoglou et al. (2015)	US	Connecticut	Children continuously enrolled in Medicaid (Healthcare for Uninsured Kids and Youth A program) for at least 11 months and 1 day within a calendar year	2006 (n=161,130) 2009 (n=166,787) 2010 (n=204,550) 2011 (n=215,377) 2012 (n=214,680)	QE: pretest-posttest
Binkley et al. (2010)	US	Jefferson County in Louisville, KY	Children aged 4-15 years who currently or for 2 years prior had Medicaid insurance but have not had Medicaid dental claims filed for the previous 2 years	Intervention (n=68) Control (n=68)	RCT
Chalmers (2003)	Canada	All elementary schools in the Capital Health District of Nova Scotia	Students in grades primary to grade 4 in 2001 who progressed to grades 1 to 5 in 2002	n=105	QE: pretest-posttest
Clemans-Cope et al. (2015)	US	AL, CA, FL, LA, MI, NY, OH, TX, UT, VA	Children aged 18 years or younger enrolled in CHIP	Established enrollees (n=5,518) Recent enrollees (n=4,142)	QE: nonequivalent control group
Dela Cruz et al. (2012)	US	Yakima County in WA	Children aged 12-36 months enrolled in Medicaid and Basic Health Plus as of September 30, 2002	Group 1 (n=2,014) Group 2 (n=2,014) Group 3 (n=1,779)	RCT
Grembowski & Milgrom (2000)	US	Spokane County in WA	Children aged 12-36 months enrolled in Medicaid as of August 31, 1997	Intervention (n=228) Control (n=237)	QE: nonequivalent control group
Howell et al. (2010)	US	Los Angeles, San Mateo, and Santa Clara, CA	Children aged 1-5 years in Los Angeles and those aged 1-18 years in San Mateo and Santa Clara enrolled in the Healthy Kids program	Established enrollees (n=1,842) New enrollees (n=1,879)	QE: nonequivalent control group
Kaplan et al. (1999)	US	One intervention school and one comparison school in Denver, CO	All elementary school students (pre-K to fifth grade) enrolled in the schools	Intervention (n=728) Control (n=571)	QE: nonequivalent control group
Kenney (2007)	US	CA, CO, FL, IL, LA, MO, NJ, NY, NC, TX	Children older than 3 years enrolled in SCHIP in 2002	Intervention (n=4,953) Control (n=840)	QE: pretest-posttest nonequivalent control group
Kenney et al. (2007)	US	CA and NC	Children older than 3 years enrolled in Medicaid or SCHIP in 2002	Established enrollees (n=830) Recent enrollees (n=332)	QE: nonequivalent control group
Kulkarni (2013)	Canada	City-operated child care centers or Ontario Early Years Centers in Toronto	Young children (no exclusion criteria)	Study group (n=161) Control group (n=181)	Prospective cohort

Study	Country	Setting	Study Sample		Study Design
			Target Sample	Sample Size	
Lave et al. (1998)	US	Western PA	Children up to 19 years in families with incomes less than 235% FPL enrolled in the Children's Health Insurance Program of Pennsylvania (BlueCHIP) and the Highmark Blue Cross Blue Shield Caring Program (Caring)	Study group (n=1,031) Comparison group (n=460)	Time trend analysis
Martin et al. (2012)	US	7 counties in SC	Children enrolled in Medicaid for at least 9 of 12 months for each year of the study period	Exposed (n=985) Unexposed (n=1,969)	QE: nonequivalent control group
Nasseh & Vujicic (2015)	US	Intervention: CT, MD, TX Control: CA, FL, HI, IL, MA, ME, MO, MI, ND, OR, PA, UT, WA, WI	Children aged 1-17 years eligible for Medicaid	NR	QE: pretest-posttest nonequivalent control group
Nietert et al. (2005)	US	South Carolina	Children aged 2-21 years enrolled in Medicaid	1998 (n=377,690) 1999 (n=447,069) 2000 (n=504,642)	QE: pretest-posttest
Riedy et al. (2015)	US	Four rural counties in OR	Children of pregnant women aged ≥ 15 years in their first or second trimester eligible for Medicaid	Prenatal MI/Postpartum MI (n=121) Prenatal MI/Postpartum HE (n=50) Prenatal HE/Postpartum MI (n=134) Prenatal HE/Postpartum HE (n=44)	RCT

¹ Abbreviations used in this table: RCT (randomized controlled trial); QE (quasi-experimental study); NR (not reported)

Table 4. Data Sources & Outcome Measures.

Study	Data Source	Outcome Measure
Bailey et al. (2016)	CHC EHR data; state administrative data	Adjusted rate ratio post-period versus pre-period mean preventive dental visits per patient per year
Beazoglou et al. (2015)	Medicaid enrollment and encounter data	Percentage of children receiving preventive dental visits
Binkley et al. (2010)	Medicaid claims	Percentage of children utilizing preventive and/or routine dental care
Chalmers (2003)	Parent self-report	Percentage of students who received an examination with a dentist in the past 12 months
Clemans-Cope et al. (2015)	Parent telephone survey	Percentage of children with any dental visit for checkup or cleaning
Dela Cruz et al. (2012)	Medicaid claims	Percentage of children utilizing preventive dental services
Grembowski & Milgrom (2000)	Parent survey	Mean number of preventive dental services
Howell et al. (2010)	Parent telephone survey	Percentage of children having had a preventive dental visit in the past 6 months
Kaplan et al. (1999)	Parent questionnaire	Percentages of students obtaining a yearly dental examination
Kenney (2007)	Parent telephone survey	Percentages of children with any dental visit for checkup/cleaning
Kenney et al. (2007)	Parent telephone survey	Percentages of children with a dental visit for checkup/cleaning
Kulkarni (2013)	Parent questionnaire	Percentage of children with a dental visit ¹
Lave et al. (1998)	Parent telephone survey	Percentage of children with any preventive dental visit
Martin et al. (2012)	Medicaid claims and enrollment data	Mean number of preventive dental visits
Nasseh & Vujicic (2015)	2007 and 2011-2012 National Survey of Children's Health	Percentage of children with preventive dental care utilization in the past 12 months
Nietert et al. (2005)	Medicaid claims	Number of preventive dental services per enrollee
Riedy et al. (2015)	Medicaid claims; maternal self-report	Percentage of children with a preventive dental visit by 18 months of age

¹ Email correspondence with first author (GK) clarified that the dental visit was the child's first dental visit, which typically included history taking, examination, provision of guidance, and referral as necessary for further care.

Table 5. Intervention Description.

Study	Comparison Group(s)¹	Intervention	Study Period
Bailey et al. (2016)	<ul style="list-style-type: none"> • Group 1: continuous insurance throughout study period • Group 2: no insurance throughout study period 	Public insurance coverage during Oregon's 2009-2010 CHIP expansion (new insurance)	<p>Intervention implementation: 2009-2010</p> <p>Pretest: ≥ 1 year prior to gaining public coverage between 9/1/9 and 12/31/10</p> <p>Posttest: ≥ 1 after coverage start date</p>
Beazoglou et al. (2015)	N/A	<ul style="list-style-type: none"> • Increase in Medicaid reimbursement rate • Administrative changes • Outreach programs to increase number of dentists participating in Medicaid and encourage patients to seek care 	<p>Intervention implementation: Dec 2007-Jun 2009</p> <p>Pretest: 2006</p> <p>Posttest: 2009-2010</p>
Binkley et al. (2010)	No intervention	<p>45-60 min in-person home visit (or telephone and mailings) by the dental care coordinator</p> <ul style="list-style-type: none"> • Verbal information about Medicaid services and providers and oral health supplemented with pamphlets and oral care products • Provision of oral hygiene instruction • Assistance with finding a dentist and scheduling dental appointments • Assistance with transportation <p>Recruitment of dental practices to provide care for children without a dentist</p> <ul style="list-style-type: none"> • Reminder calls for appointments 	Apr 2004-Mar 2005
Chalmers (2003)	N/A	<ul style="list-style-type: none"> • School dental screening by public health hygienists (Enhanced Screening and Referral Program) • Educational materials about COHP for parents • Assistance with scheduling appointments for parents 	<p>Intervention implementation: Jun 2001-Jun 2002</p> <p>Pretest: 2001</p> <p>Posttest: 2002</p>
Clemans-Cope et al. (2015)	<ul style="list-style-type: none"> • Group 1: recent CHIP enrollment (no insurance for 5-12 months before enrollment) • Group 2: recent CHIP enrollment (private insurance for 5-12 months before enrollment) 	Established CHIP enrollment (enrollment for ≥ 12 consecutive months)	Jan 2012-Mar 2013
Dela Cruz et al. (2012)	No intervention	<ul style="list-style-type: none"> • Intervention group 1: postcard with information on how to enroll in the Mom and Me program 	Intervention implementation: Jul 14, 2003 (first corrected mailing)-Jul 16, 2004 (last

Study	Comparison Group(s) ¹	Intervention	Study Period
		<ul style="list-style-type: none"> Intervention group 2: three postcards with enrollment information and information about fluoride varnish and early dental appointments 	mailing) Data collection: Jul 2003-Jan 2005 (18 months following study initiation)
Grembowski & Milgrom (2000)	No intervention	Access to Baby and Child Dentistry Program <ul style="list-style-type: none"> Outreach to clients through community organizations and agencies and the media; orientation and follow-up to ensure families understood how to identify a provider and use care appropriately Training and certification of dental professionals Enhanced dental benefits Enhanced dental fees & administrative management 	Intervention implementation: Sep 1, 1997-Aug 31, 1998 Pretest: Oct 1997 Posttest: Oct 1998
Howell et al. (2010)	Recent enrollment in Healthy Kids	Established enrollment in Healthy Kids (insurance program) <ul style="list-style-type: none"> Generous benefit packages, limited cost-sharing Outreach to bring children into the program Management by managed care plan 	Intervention implementation <ul style="list-style-type: none"> Los Angeles: Jul 2003 San Mateo: Jan 2003 Santa Clara: Jan 2001 Data collection <ul style="list-style-type: none"> Los Angeles: Apr 2005-Dec 2005 San Mateo: Apr 2006-May 2007 Santa Clara: Aug 2003-Jul 2004
Kaplan et al. (1999)	No intervention	Access to school-based health center- limited dental services	Spring 1997
Kenney (2007)	Recent enrollment in SCHIP	Established enrollment in SCHIP	2002
Kenney et al. (2007)	Recent enrollment in Medicaid or SCHIP	Established enrollment in Medicaid or SCHIP	2002
Kulkarni (2013)	No intervention	Anticipatory guidance: interactive presentation by dentist including the use of the “Baby Oral Health” DVD about tooth development, early childhood caries, oral hygiene, first dental visit, regular dental visits, etc.	Follow-up: 18 months after baseline
Lave et al. (1998)	Recent enrollment in BlueCHIP and Caring programs (health insurance coverage)	Established enrollment in BlueCHIP and Caring programs	Intervention implementation <ul style="list-style-type: none"> Intervention: Aug-Dec 1995 Control: Aug-Dec 1996 Data collection

Study	Comparison Group(s) ¹	Intervention	Study Period
			<ul style="list-style-type: none"> • Intervention: at enrollment, 6 months and 12 most post-enrollment • Control: at enrollment
Martin et al. (2012)	No intervention (no enrollment in Head Start)	Enrollment in Head Start	Jul 1, 2007-Jun 30, 2008
Nasseh & Vujicic (2015)	No intervention (little or no change in Medicaid policy)	Medicaid policy reform: increased reimbursement paid to providers	Pretest: 2007-2008 Posttest: 2011-2012
Nietert et al. (2005)	N/A	Medicaid system reform <ul style="list-style-type: none"> • Increased reimbursement rates • Development of a children’s oral health coalition to secure funding • Recruitment of dentists to participate in Medicaid • Streamlining of billing process • Addition of dental component to Family Support Services to address patient compliance with appointments and treatment 	Intervention implementation: ~Jan 2000 Pretest: 1998 and 1999 Posttest: 2000
Riedy et al. (2015) ²	Postpartum intervention: health education (HE) ³ <ul style="list-style-type: none"> • Video and written educational materials 	Postpartum intervention: motivational interviewing (MI) ⁴ <ul style="list-style-type: none"> • Video and written educational materials; counseling on navigating barriers to care and personal hygiene • Written plans, follow-up phone calls to encourage dental attendance 	Intervention implementation: May 6, 2010-Aug 2, 2011 Data collection: May, 1 2010-Oct 31, 2013
	Prenatal HE-Postpartum MI	Prenatal MI-Postpartum MI	

¹ “No intervention” refers to the comparison group not having received an intervention. “N/A” (not applicable) refers to quasi-experimental studies with pretest-posttest designs.

² Both prenatal and postpartum interventions were delivered to pregnant women. However, prenatal materials focused on oral health care during pregnancy and postpartum materials focused on care in children.

³ Postpartum HE includes both Prenatal MI-Postpartum HE and Prenatal HE-Postpartum HE groups.

⁴ Postpartum MI includes both Prenatal HE-Postpartum MI and Prenatal MI-Postpartum MI groups.

Table 6. Intervention Components.

Study	School		Caregiver							Provider		State	
	School-based dental services (screening, referral)	Head Start participation	Home visit	Education	Educational material	Oral health product	Patient navigation (assistance with finding dentist/scheduling appointments, assistance with transportation, patient compliance)	Outreach	Motivational interviewing/counseling	Training	Outreach/recruitment	Public insurance coverage	Medicaid reform (increased reimbursement, administrative changes, enhanced benefits)
School/Preschool Intervention (n=3)													
Chalmers (2003)	X				X		X						
Kaplan et al. (1999)	X												
Martin et al. (2012)		X											
Caregiver Education/Counseling (n=3)													
Dela Cruz et al. (2012)					X								
Kulkarni (2013)				X									
Riedy et al. (2015)				X	X				X				
Home Visit and Provider Outreach (n=1)													
Binkley et al. (2010) ¹			X	X	X	X	X				X		
Public Insurance Coverage (n=6)													
Bailey et al. (2016)												X	
Clemans-Cope et al. (2015)												X	
Howell et al. (2010)								X				X	
Kenney (2007)												X	
Kenney et al. (2007)												X	
Lave et al. (1998)												X	
Medicaid Reforms (n=4)													
Beazoglou et al. (2015)								X			X		X
Grembowski & Milgrom (2000)				X				X		X			X
Nasseh & Vujicic (2015)													X
Nietert et al. (2005)							X				X		X

¹ Components of the home visit included other components: education, educational materials, oral health products, and patient navigation.

Table 7. Study Results.

Study	Results
School/Preschool Intervention	
Chalmers (2003)	<ul style="list-style-type: none"> Between pretest and posttest, the percentage of students who received an examination with a dentist in the past 12 months increased from 71% to 83% for the same group of students. However, statistical testing was not performed in the study.
Kaplan et al. (1999)	<ul style="list-style-type: none"> Independent of confounders, access to a school-based health center was significantly associated with a greater likelihood of the child having received a yearly dental examination (OR=1.36, 95% CI: 1.91=1.83, p<0.05). Stratifying the sample by insurance status revealed that among insured students, a higher percentage of students in the comparison school without a school-based health center (65.0%) obtained a yearly dental examination compared to the intervention school with a school-based health center (53.4%) (p<0.05). Among uninsured students, a significantly higher percentage of those in the intervention school (36.5%) obtained a yearly dental examination compared to the comparison school (18.5%) (p<0.01).
Martin et al. (2012)	<ul style="list-style-type: none"> Head Start participants had a significantly higher average of preventive dental visits (1.07) than non-Head Start participants (0.46) (p<0.001). Controlling for age, race, and gender, Head Start participants had significantly more preventive visits to dentists than the unexposed group at the end of the study year. The incidence rate ratio was 2.31 (p<0.001). The adjusted odds ratio was 5.17 (p<0.001).
Caregiver Education/Counseling	
Dela Cruz et al. (2012)	<ul style="list-style-type: none"> There was no significant difference in the utilization of preventive dental services between intervention group 1 (61%) and the control group (60%) or between intervention group 2 (62%) and the control group (60%).
Kulkarni (2013)	<ul style="list-style-type: none"> There was a significantly higher degree of utilization of dental services by the study group participants (43.5%) as compared to those in the comparison group (17.1%) (p=0.02).
Riedy et al. (2015)	<ul style="list-style-type: none"> No significant differences were found between the postpartum motivational interviewing (MI) and the postpartum health education (HE) groups for children's dental attendance (RR=1.03, 95% CI: 0.82-1.28). No significant differences were found between prenatal MI-postnatal MI and prenatal HE-and postnatal MI groups (RR=0.97, 95% CI: 0.77-1.22).
Home Visit and Provider Outreach	
Binkley et al. (2010)	<ul style="list-style-type: none"> Preventive and/or routine dental utilization during the study period was 43% for children in the intervention group and 26.5% for those in the control group (p=0.047). Subgroup analysis by income level revealed that the difference in dental utilization was driven by children in poor households with income under \$15,000 (43% in intervention group and 20% in control group; p=0.014). Children in households with income over \$15,000 had the same utilization between the two groups.
Public Insurance Coverage	
Bailey et al. (2016)	<ul style="list-style-type: none"> Among the newly insured group, utilization rates of preventive dental visits increased significantly from 0.24 to 0.63 encounters per patient per year between pretest and posttest (adjusted rate ratio=2.56, 95% CI: 2.38-2.75). Between-group pretest-posttest differences in rate ratios revealed that changes in utilization of preventive dental visits were significantly different from those of the continuously insured and continuously uninsured groups (p<0.001).
Clemans-Cope et al. (2015)	<ul style="list-style-type: none"> The percentage of established CHIP enrollees (continuously enrolled for at least 12 months) having had a dental visit for checkup or cleaning in the past year was 38% higher (p≤0.01) than recent enrollees who were uninsured for 5 to 12 months before enrollment and 5.3% higher (p≤0.05) than recent enrollees who were privately insured for 12 months before enrollment.

Howell et al. (2010)	<ul style="list-style-type: none"> • In the San Mateo study, 25% of new enrollees had a preventive dental visit in the six months prior to enrolling; 65% of established enrollees in Healthy Kids for a year had a preventive dental visit ($p<0.01$). • Similarly, in the Santa Clara study, 22% of new enrollees had a preventive dental visit in the six months prior to enrolling; 61% of established enrollees in Healthy Kids for a year had a preventive dental visit ($p<0.01$).
Kenney (2007)	<ul style="list-style-type: none"> • In the bivariate model, established enrollees had greater service use of dental visits for checkup/cleaning compared to all recent enrollees and recent enrollees who were uninsured for 6 months prior to enrollment ($p<0.01$), but not different than recent enrollees who were insured for some or all of the 6 months prior to enrollment. • The multivariate model showed the same results; established enrollees were more likely to receive preventive dental care than recent enrollees as well as recent enrollees who were uninsured for 6 months prior to enrollment, but not different than recent enrollees who were insured for some or all of the 6 months prior to enrollment ($p<0.01$).
Kenney et al. (2007)	<ul style="list-style-type: none"> • Established Medicaid enrollees were 12 and 16 percentage points more likely to receive a dental visit for checkup/cleaning than all recent enrollees and recent enrollees who were previously uninsured for 6 months prior to enrollment ($p<0.05$). Established enrollees were not more likely to receive preventive dental visits than recent enrollees who were insured for some or all of the 6 months prior to enrollment.
Lave et al. (1998)	<ul style="list-style-type: none"> • Among the continuously enrolled children, preventive dental visits increased from 34.2% to 55.6% between enrollment and 6 months post-enrollment ($p<0.005$). Between 6 months post-enrollment and 12-months post-enrollment, it increased from 55.6% to 61.5% ($p<0.005$). The increase from enrollment to 12-months post enrollment was significant ($p<0.005$). • Comparison children at enrollment (28.5%) had a lower percentage of preventive dental visits than continuously enrolled children at enrollment (34.2%); therefore, the changes observed in the study group were attributable to the insurance programs rather than to other environmental trends.
Medicaid Reforms	
Beazoglou et al. (2015)	<ul style="list-style-type: none"> • The percentage of preventive dental services among continuously enrolled children stayed relatively constant from pretest to posttest (24.1% in 2006 at pretest and 22.7%, 23.1%, 23.3%, and 24.4% in 2009, 2010, 2011, and 2012 respectively).
Grembowski & Milgrom (2000)	<ul style="list-style-type: none"> • Children in the ABCD program had a mean of 10.27 preventive dental services compared to 0.24 among children not in the ABCD program ($p=0.00$).
Nasseh & Vujicic (2015)	<ul style="list-style-type: none"> • Among Medicaid-eligible children, preventive dental care utilization increased from 74.9% to 81.1% in Connecticut, 69.9% to 71.9% in Maryland, and 65.9% to 80.7% in Texas. In the control states, preventive dental care utilization decreased from 66.8% to 65.2%. Relative to the control states, preventive dental care utilization significantly increased by 7.8% and 16.4% in Connecticut and Texas respectively, and insignificantly increased by 3.6% in Maryland. • The multivariate analysis revealed similar changes in preventive dental care utilization in Medicaid-eligible children comparing the three study states and control states (significant increases in Connecticut and Texas and insignificant change in Maryland). • The difference in observations between Maryland and the two other study states can be attributed to a more modest increase in the Medicaid-to-private insurance fee ratio in Maryland.
Nietert et al. (2005)	<ul style="list-style-type: none"> • The number of preventive dental procedures per Medicaid enrollee was 0.72, 0.61, and 0.74 for 1998, 1999, and 2000 respectively. Comparing 2000 to 1998/1999, the average percent increase per enrollee was 10.8%. For both age groups 0-2 years and 3-21 years, the reform had a statistically significant impact on the number of preventive dental services provided per Medicaid enrollee on a monthly basis. Comparing 2000 and 1998/1999, for the younger age group, preventive services rose by 0.003 units per enrollee per month ($p<0.001$) and 0.018 units in the older age group ($p<0.001$).

Table 8. Summary of Study Results.¹

Study	Preventive Dental Visit
School/Preschool Intervention	
Chalmers (2003) ²	+
Kaplan et al. (1999)	+
Martin et al. (2012)	+
Caregiver Education/Counseling	
Dela Cruz et al. (2012)	ns
Kulkarni (2013)	+
Riedy et al. (2015)	ns
Home Visit and Provider Outreach	
Binkley et al. (2010)	+
Public Insurance Coverage	
Bailey et al. (2016)	+
Clemans-Cope et al. (2015)	+
Howell et al. (2010)	+
Kenney (2007)	+
Kenney et al. (2007)	+
Lave et al. (1998)	+
Medicaid Reforms	
Beazoglou et al. (2015)	ns
Grembowski & Milgrom (2000)	+
Nasseh & Vujicic (2015) ³	+, ns
Nietert et al. (2005)	+

¹ The symbol “+” refers to a statistically significant favorable outcome on a p=0.05 level; “ns” refers to a non-significant outcome.

² Although the receipt of preventive dental visit increased, the authors did not conduct statistical analysis to determine statistical significance of results.

³ Study yielded favorable results in Connecticut and Texas but non-significant results in Maryland.

REFERENCES

1. National Performance Measure distribution. U.S. Department of Health and Human Services website. <https://mchb.tvisdata.hrsa.gov/PrioritiesAndMeasures/NPMDistribution>. Accessed May 3, 2017.
2. Kogan MD, Dykton C, Hirai AH, et al. A new performance measurement system for maternal and child health in the United States. *Matern Child Health J*. 2015;19(5):945-957.
3. Lu MC, Lauver CB, Dykton C, et al. Transformation of the Title V Maternal and Child Health Services Block Grant. *Matern Child Health J*. 2015;19(5):927-931.
4. National Survey of Children's Health. NSCH 2011/12. Data query from the Child and Adolescent Health Measurement Initiative, Data Resource Center for Child and Adolescent Health website. www.childhealthdata.org. Accessed May 3, 2017.
5. Romaine MA, Bell JF, Huebner CE. Variations in children's dental services use based on four national health surveys. *Pediatrics*. 2012;130(5):e1182-1189.
6. Oral Health. Healthy People 2020. Office of Disease Prevention and Health Promotion website. <https://www.healthypeople.gov/2020/data-search/Search-the-Data#objid=5028>. Accessed July 31, 2017.
7. Shariff JA, Edelstein BL. Medicaid meets its equal access requirement for dental care, but oral health disparities remain. *Health Aff (Millwood)*. 2016;35(12):2259-2267.
8. American Academy of Pediatric Dentistry. Guideline on periodicity of examination, preventive dental services, anticipatory guidance/counseling, and oral treatment for infants, children, and adolescents. *Pediatr Dent*. 2016;38(6):133-141.
9. Jackson SL, Vann Jr WF, Kotch JB, Pahel BT, Lee JY. Impact of poor oral health on children's school attendance and performance. *Am J Public Health*. 2011;101(10):1900-1906.
10. Seirawan H, Faust S, Mulligan R. The impact of oral health on the academic performance of disadvantaged children. *Am J Public Health*. 2012;102(9):1729-1734.
11. Sen B, Blackburn J, Morrissey MA, et al. Effectiveness of preventive dental visits in reducing nonpreventive dental visits and expenditures. *Pediatrics*. 2013;131(6):1107-1113.
12. Bruen BK, Steinmetz E, Bysshe T, Glassman P, Ku L. Potentially preventable dental care in operating rooms for children enrolled in Medicaid. *J Am Dent Assoc*. 2016;147(9):702-708.
13. Berg JH, Stapleton FB. Physician and dentist new initiatives to jointly mitigate early childhood oral disease. *Clin Pediatr (Phila)*. 2012;51(6):531-537.
14. American Academy of Pediatrics. Recommendations for Preventive Pediatric Health Care. https://www.aap.org/en-us/Documents/periodicity_schedule.pdf. Accessed July 31, 2017.
15. Hagan JF, Shaw JS, Duncan PM, eds. *Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents*. 4th ed. Elk Grove Village, IL: American Academy of Pediatrics 2017.
16. American Dental Association. Statement on Early Childhood Caries. <http://www.ada.org/en/about-the-ada/ada-positions-policies-and-statements/statement-on-early-childhood-caries>. Accessed July 31, 2017.
17. American Association of Public Health Dentistry. First Oral Health Assessment. <http://www.aaphd.org/oral-health-assessment-policy>. Accessed July 31, 2017.
18. Badri P, Saltaji H, Flores-Mir C, Amin M. Factors affecting children's adherence to regular dental attendance: a systematic review. *J Am Dent Assoc*. 2014;145(8):817-828.
19. Isong IA, Zuckerman KE, Rao SR, Kuhlthau KA, Winickoff JP, Perrin JM. Association between parents' and children's use of oral health services. *Pediatrics*. 2010;125(3):502-508.
20. Garg S, Rubin T, Jasek J, Weinstein J, Helburn L, Kaye K. How willing are dentists to treat young children?: A survey of dentists affiliated with Medicaid managed care in New York City, 2010. *J Am Dent Assoc*. 2013;144(4):416-425.
21. American Dental Association. Dentist Participation in Medicaid or CHIP. http://www.ada.org/~media/ADA/Science%20and%20Research/HPI/Files/HPIGraphic_0217_1.pdf?la=en. Accessed July 5, 2017.

22. El Fadl RA, Blair M, Hassounah S. Integrating maternal and children's oral health promotion into nursing and midwifery practice-a systematic review. *PLoS One*. 2016;11(11):e0166760.
23. Fox C. Evidence summary: what is the effectiveness of alternative approaches for increasing dental attendance by poor families or families from deprived areas? *Br Dent J*. 2010;208(4):167-171.
24. Joury E, Bernabe E, Sabbah W, Nakhleh K, Gurusamy K. Systematic review and meta-analysis of randomised controlled trials on the effectiveness of school-based dental screening versus no screening on improving oral health in children. *J Dent*. 2017;58:1-10.
25. American Academy of Pediatric Dentistry. Policy on mandatory school-entrance oral health examinations. *Pediatr Dent*. 2008;30(7 Suppl):26.
26. Chazin S. *Medicaid Contracting Strategies to Improve Children's Oral Health Access*. Center for Health Care Strategies. 2014.
27. Crall JJ, Illum J, Martinez A, Pourat N. *An Innovative Project Breaks Down Barriers to Oral Health Care for Vulnerable Young Children in Los Angeles County*. Los Angeles, CA: UCLA Center for Health Policy Research. 2016.
28. Aljafari A, Gallagher JE, Hosey MT. Can oral health education be delivered to high-caries-risk children and their parents using a computer game? - A randomised controlled trial. *Int J Paediatr Dent*. 2017.
29. Binkley C, Garrett B, Johnson K. Increasing dental care utilization by Medicaid-eligible children: a dental care coordinator intervention. *J Public Health Dent*. 2010;70(1):76-84.
30. Dela Cruz A, Mueller G, Milgrom P, Coldwell S. A community-based randomized trial of postcard mailings to increase dental utilization among low-income children. *J Dent Child (Chic)*. 2012;79(3):154-158.
31. Riedy C, Weinstein P, Mancl L, et al. Dental attendance among low-income women and their children following a brief motivational counseling intervention: a community randomized trial. *Soc Sci Med*. 2015;144:9-18.
32. Bailey SR, Marino M, Hoopes M, et al. Healthcare utilization after a Children's Health Insurance Program expansion in Oregon. *Matern Child Health J*. 2016;20(5):946-954.
33. Kenney G. The impacts of the State Children's Health Insurance Program on children who enroll: findings from ten states. *Health Serv Res*. 2007;42(4):1520-1543.
34. Nasseh K, Vujicic M. The impact of Medicaid reform on children's dental care utilization in Connecticut, Maryland, and Texas. *Health Serv Res*. 2015;50(4):1236-1249.
35. Clemans-Cope L, Kenney G, Waidmann T, Huntress M, Anderson N. How well is CHIP addressing oral health care needs and access for children? *Acad Pediatr*. 2015;15(3 Suppl):S78-84.
36. Grembowski D, Milgrom PM. Increasing access to dental care for Medicaid preschool children: the Access to Baby and Child Dentistry (ABCD) program. *Public Health Rep*. 2000;115(5):448-459.
37. Howell E, Trenholm C, Dubay L, Hughes D, Hill I. The impact of new health insurance coverage on undocumented and other low-income children: lessons from three California counties. *J Health Care Poor Underserved*. 2010;21(2 Suppl):109-124.
38. Kaplan DW, Brindis CD, Phibbs SL, Melinkovich P, Naylor K, Ahlstrand K. A comparison study of an elementary school-based health center: effects on health care access and use. *Arch Pediatr Adolesc Med*. 1999;153(3):235-243.
39. Kenney G, Rubenstein J, Sommers A, Zuckerman S, Blavin F. Medicaid and SCHIP coverage: findings from California and North Carolina. *Health Care Financ Rev*. 2007;29(1):71-85.
40. Martin AB, Hardin JW, Veschusio C, Kirby HA. Differences in dental service utilization by rural children with and without participation in Head Start. *Pediatr Dent*. 2012;34(5):107-111.
41. Beazoglou T, Douglass J, Myne-Joslin V, Baker P, Bailit H. Impact of fee increases on dental utilization rates for children living in Connecticut and enrolled in Medicaid. *J Am Dent Assoc*. 2015;146(1):52-60.
42. Nietert PJ, Bradford WD, Kaste LM. The impact of an innovative reform to the South Carolina dental Medicaid system. *Health Serv Res*. 2005;40(4):1078-1091.

43. Chalmers D. An enhanced screening and referral program: a community dental hygiene pilot project. *Probe*. 2003;37(1):35-37.
44. Kulkarni GV. Long-term effectiveness of parent education using the "baby oral health" model on the improvement of oral health of young children. *Int J Dent*. 2013;2013:137048.
45. Lave JR, Keane CR, Lin CJ, Ricci EM, Amersbach G, LaVallee CP. Impact of a children's health insurance program on newly enrolled children. *JAMA*. 1998;279(22):1820-1825.
46. Martin A, Vyavaharkar M, Veschusio C, Kirby H. Rural-urban differences in dental service utilization among an early childhood population enrolled in South Carolina Medicaid. *Matern Child Health J*. 2012;16(1):203-211.
47. Association of State and Territorial Dental Directors and Children's Dental Health Project. State Laws on Dental "Screening" for School-Aged Children. <http://www.astdd.org/docs/final-school-screening-paper-10-14-08-9-21-2015-edits.pdf>. Accessed July 31, 2017. .
48. Langelier M MJ, Baker BK, Mertz E. *Case Studies of 8 Federally Qualified Health Centers: Strategies to Integrate Oral Health with Primary Care*. Rensselaer, NY: Center for Health Workforce Studies, School of Public Health, SUNY Albany. 2015.
49. Downer SR, Meara JG, Da Costa AC. Use of SMS text messaging to improve outpatient attendance. *Med J Aust*. 2005;183(7):366.
50. Storrs MJ, Ramov HM, Lalloo R. An investigation into patient non-attendance and use of a short-message reminder system at a university dental clinic. *J Dent Educ*. 2016;80(1):30-39.
51. Flores G, Lin H, Walker C, et al. Parent mentors and insuring uninsured children: a randomized controlled trial. *Pediatrics*. 2016;137(4):e20153519.
52. Greenberg BJ, Kumar JV, Stevenson H. Dental case management: increasing access to oral health care for families and children with low incomes. *J Am Dent Assoc*. 2008;139(8):1114-1121.
53. Beil HA, Rozier RG. Primary health care providers' advice for a dental checkup and dental use in children. *Pediatrics*. 2010;ped. 2009-2311.
54. Mandal M, Edelstein BL, Ma S, Minkovitz CS. Changes in state policies related to oral health in the United States, 2002-2009. *J Public Health Dent*. 2014;74(4):266-275.
55. Dooley D, Moultrie NM, Heckman B, Gansky SA, Potter MB, Walsh MM. Oral health prevention and toddler well-child care: routine integration in a safety net system. *Pediatrics*. 2016;137(1):e20143532.
56. Wawrzyniak MN, Boulter S, Giotopoulos C, Zivitski J. Incorporating caries prevention into the well-child visit in a family medicine residency. *Fam Med*. 2006;38(2):90.
57. Wysen KH, Hennessy PM, Lieberman MI, Garland TE, Johnson SM. Kids get care: integrating preventive dental and medical care using a public health case management model. *J Dent Educ*. 2004;68(5):522-530.
58. From the First Tooth website. <http://www.fromthefirsttooth.org/about/>. Accessed August 1, 2017.
59. Arthur T, Rozier RG. Provision of preventive dental services in children enrolled in Medicaid by nondental providers. *Pediatrics*. 2016;137(2):2015-3436.
60. Kranz AM, Lee J, Divaris K, Baker AD, Vann Jr W. North Carolina physician-based preventive oral health services improve access and use among young Medicaid enrollees. *Health Aff*. 2014;33(12).
61. Haughney M, Devennie J, Macpherson L, Mason D. Integration of primary care dental and medical services: a three-year study. *Br Dent J*. 1998;184(7):343-347.
62. Braun PA, Kahl S, Ellison MC, Ling S, Widmer-Racich K, Daley MF. Feasibility of colocating dental hygienists into medical practices. *J Public Health Dent*. 2013;73(3):187-194.
63. Bernstein J, Gebel C, Vargas C, et al. Integration of oral health into the well-child visit at federally qualified health centers: study of 6 clinics, August 2014–March 2015. *Prev Chronic Dis*. 2016;13.
64. Slade GD, Rozier RG, Zeldin LP, Margolis PA. Training pediatric health care providers in prevention of dental decay: results from a randomized controlled trial. *BMC Health Serv Res*. 2007;7(1):176.
65. Brocklehurst P, Price J, Glenny AM, et al. The effect of different methods of remuneration on the behaviour of primary care dentists. *Cochrane Database Syst Rev*. 2013;(11).

66. Damiano PC, Momany ET, Carter KD, Jones MP, Askelson NM. Time to first dental visit after initially enrolling in Medicaid and S-SCHIP. *Med Care*. 2008;46(12):1234-1239.
67. Centers for Disease Control and Prevention. State Oral Health Plans. https://www.cdc.gov/oralhealth/state_programs/oh_plans/index.htm. Accessed August 1, 2017. .
68. First 5 Sonoma County. WIC Dental Days. <http://first5sonomacounty.org/Programs/WIC-Dental-Days/>. Accessed August 1, 2017.
69. 2016 National Survey of Children's Health. Guide to topics & questions asked. Data Resource Center for Child and Adolescent Health website. http://childhealthdata.org/docs/default-source/nsch-docs/2016-nsch-guide-to-topics-and-questions_05-15-17.pdf?sfvrsn=2. Accessed August 1, 2017.
70. Poutanen R, Lahti S, Tolvanen M, Hausen H. Parental influence on children's oral health-related behavior. *Acta Odontol Scand*. 2006;64(5):286-292.