

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

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

**National Performance Measure 13A
Oral Health in Pregnancy
Evidence Review**

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EXECUTIVE SUMMARY

Oral health is one of fifteen Maternal and Child Health National Performance Measures (NPMs) for the State Title V Block Grant program. One of the goals is to increase the percent of pregnant women who had a dental visit during pregnancy. The purpose of this evidence review is to identify evidence-informed strategies that State Title V programs might consider implementing to address NPM 13A: Oral Health in Pregnancy.

Three peer-reviewed and five gray literature sources met study inclusion criteria and informed the review. These sources were categorized into interventions that focused on patients and states. Examples of each type of intervention are shown below. Given the limited number of studies meeting the inclusion criteria, it was not possible to generate evidence ratings.

Intervention Category	Example	Evidence Rating
Patients	Oral health education or counseling	--
States	Medicaid managed care expansion	--

-- Indicates insufficient number of studies to assign evidence rating

Three key findings emerged:

1. There is limited rigorous evidence about effective interventions to increase dental visits during pregnancy.
2. Two studies evaluating education or counseling interventions targeting pregnant women lack sufficient evidence to assess effectiveness in increasing the receipt of dental visits.
3. Due to identifying only one study related to state policy regarding the receipt of dental visits by pregnant women, conclusions cannot be drawn regarding the effectiveness of Medicaid interventions.

Despite recommended strategies to improve oral health during pregnancy, few studies in

this review included three critical components: an intervention strategy, the outcome measure of dental visits, and a robust study design. The limited rigorous literature focuses on educating women about oral health during pregnancy and providing Medicaid coverage, emphasizing the importance of ensuring that women have access to information on oral health and insurance during pregnancy. The inclusion of five gray literature sources supplemented the limited evidence found in peer-reviewed literature. These sources outlined approaches targeting patients, providers, and communities or states to increase the receipt of dental visits by pregnant women. Examples of interventions targeting patients include patient education and patient navigation. Examples of interventions targeting providers include integrating oral health care into prenatal care and increasing the availability of providers accepting insurance. Examples of community- and state-level interventions include insurance expansion and guidelines promulgation.

The limited number of sources limits the conclusions that may be drawn regarding interventions identified. Moreover, the available evidence focused on different interventions, study settings, and designs. This review indicates the need for rigorous evaluations of interventions aimed at increasing dental visits by pregnant women.

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INTRODUCTION*

Strengthen the Evidence Base for Maternal and Child Health (MCH) Programs is a Health Resources and Services Administration (HRSA)-funded initiative that aims to support states in their development of evidence-based or evidence-informed strategies to promote the health and well-being of 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 MCH Title V 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, beginning in fiscal year 2016. States are charged to select eight NPMs and incorporate evidence-based or evidence-informed strategies in order to achieve improvement for each NPM selected.

BACKGROUND

Oral health is one of the fifteen maternal and child health (MCH) National Performance Measures (NPMs). Thirty-one states and jurisdictions selected NPM 13 Oral Health, 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 both pregnant women and children ages 1 to 17. This evidence

* 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.

review focuses on NPM 13A, with the goal of identifying strategies that increase the percentage of women who have a dental visit during pregnancy.² Oral health during pregnancy is an essential public health issue, as physiological changes during pregnancy and poor oral health practices can adversely affect health outcomes for mothers and their children.³ Dental visits can address oral health needs and promote oral hygiene.^{4,5} A report from the Surgeon General in 2000 noted oral health's link to birth outcomes and to nutritional status during pregnancy.⁶

Between 2006 and 2016, guidelines and recommendations on oral health during pregnancy were developed by several organizations. In 2006, the New York State Department of Health convened an expert panel of health professionals involved in promoting oral health for pregnant women that resulted in state guidelines.⁷ In 2010, national and state experts assembled in California to develop guidelines on oral health services for prenatal, oral health, and child health care providers.⁸ Following these publications, several other states developed guidelines for perinatal oral health care. In 2012, a national consensus statement resulted from an expert workgroup meeting convened by HRSA in collaboration with the American College of Obstetricians and Gynecologists (ACOG), the American Dental Association (ADA), and the National Maternal and Child Oral Health Resource Center. The consensus statement provides guidance for oral health professionals and messages on oral health during pregnancy to share with women.⁹ In 2013, ACOG emphasized that oral health care during pregnancy is safe and that poor oral health had been linked to adverse birth outcomes.¹⁰ ACOG's recommendations for providers included counseling pregnant women about good oral health practices, conducting an oral health evaluation at the initial prenatal appointment, and developing a network of local dentists for referrals. Between 2012 and 2016, the American Academy of Pediatric Dentistry (AAPD), the American College of Nurse-Midwives, and the Association of State and Territorial

Dental Directors also issued guidance to their members and promoted initiatives and coalitions to strengthen efforts to improve oral health during pregnancy.¹¹⁻¹⁵

The Pregnancy Risk Assessment Monitoring System (PRAMS) collects state-specific data related to maternal health and monitors dental visits during pregnancy in a growing number of states.^{16,17} By 2015, states are required to include dental care utilization in PRAMS surveys at least every five years under the Patient Protection and Affordable Care Act (ACA).¹⁸ Based on PRAMS data from 28 states in 2013, 59% of women had their teeth cleaned during the prior 12 months; 51% of women had their teeth cleaned during pregnancy; and 74% had dental insurance during pregnancy.¹⁹ The percentage of women with visits to a dentist or dental clinic during the most recent pregnancy rose from 38% in 2000 to 49% in 2011.²⁰

PRAMS analyses revealed variation in receipt of dental visits by demographic characteristics and insurance status. Higher dental visits were associated with higher income (64% of women with incomes of at least \$50,000 and 37% of women with incomes less than \$10,000) and educational attainment (56% of women with more than 12 years of education and 36% of women with less than 12 years of education). More than half (53%) of white non-Hispanic women received dental visits compared to black non-Hispanic women or Hispanic women, each at 41%. Dental visits were reported by 39% of women who were Medicaid recipients at any time and 40% of women enrolled in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), compared to 57% of women not receiving Medicaid and 55% not enrolled in WIC.

Preventive oral health practices and visits to a dental clinic are beneficial to pregnant women.²¹ Studies have indicated an association between periodontal disease and adverse birth outcomes.^{3,22,23} National policies and initiatives, including the ACA and *Healthy People 2020*,

have increased awareness of the importance of oral health during pregnancy and access to oral health services paid by Medicaid. However, states are not required to provide Medicaid coverage for pregnant women and coverage varies by state.^{14,24-26} In FY 2014-2015, 47% of states provided comprehensive Medicaid dental benefits for pregnant women, 22% of states provided limited benefits, 2% of states provided emergency only benefits, and 28% of states provided no dental benefits.²⁷ The participation of dentists in Medicaid is limited,²⁸ in part due to low reimbursement rates, complex administrative processes, and delays in payment^{29,30}; unfavorable attitudes toward the program and patient population^{31,32} and social stigma³³ also may contribute to low participation.

Receipt of oral health services by pregnant women has been constrained by barriers to care that include women's lack of knowledge about oral health coupled with lack of health insurance coverage, access to care, providers who serve pregnant women, and integration with prenatal care.^{13,34,35} In surveys, pregnant women noted: 1) a belief that oral health care during pregnancy is unsafe, too expensive, or not covered by insurance; 2) that finding dentists was difficult; and 3) a perceived lack of need in the absence of a problem.³⁶⁻³⁹ Surveys of dentists reported inadequate compensation for time spent counseling pregnant women and incorrect knowledge about routine and emergency procedures as barriers toward provision of care to pregnant women.^{40,41} Referrals to oral health services by prenatal care providers were often not provided due to lack of time, awareness of oral health care, available dentists, or Medicaid coverage policies.⁴²⁻⁴⁴

Initiatives have suggested an array of strategies to overcome these barriers. Collaboration between prenatal care and oral health care providers has been used by the Prenatal Care Assistance Program in New York and by medical and dental students in North Carolina's

prenatal oral health program.^{45,46} The Rochester Adolescent Maternity Program uses a combination of education, screening, and referral to dentists to promote oral health in pregnancy.⁴⁷ Centering Pregnancy Smiles incorporates oral health assessment, education, and treatment into an established prenatal group care model.^{48,49} British Columbia's Healthiest Babies Possible program refers pregnant women to a prenatal dental clinic.⁵⁰ Baby Smiles, a community-based partnership, provides oral health education to providers and education on oral health and substance use, as well as child care to pregnant women.^{51,52} In addition, as reviewed by the Children's Dental Health Project's Oral Health and Pregnant Women Resource Center, multiple states have released guidelines specific to oral health care for pregnant women.⁵³

The current review assesses the evidence regarding strategies to increase dental visits by pregnant women. One systematic review of oral health interventions during pregnancy focused on outcomes related to knowledge, attitudes, and behaviors.⁵⁴ Other reviews have focused on treatment options.¹³ To our knowledge, this is the first literature review focused on studies evaluating interventions to increase the receipt of dental visits by pregnant women.

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: pregnancy, oral health, and intervention/strategy. A library specialist (informationist) at Welch Medical Library was consulted in selecting appropriate databases and ensuring the adequacy of the search strategies. The following inclusion criteria were used:

1. The study evaluated the effectiveness of an intervention aimed to increase the percentage

of pregnant women who had a dental visit during pregnancy. The components of the intervention and the results were clearly described.

2. The study described interventions that fall within the scope of Title V as deemed by the authors and reviewers.
3. The receipt of a dental visit was measured. Studies measuring only knowledge of oral health care or improved oral health were excluded.
4. At a minimum, the study included a control and intervention group, an appropriate comparison group, or a pretest-posttest design to assess intervention effectiveness.
5. The study was published in the English language between 1985 and 2016.
6. 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, reference lists of relevant previously published review articles were reviewed to identify potential articles to be included in the current review.^{54,55}

The lead author (SH) extracted data pertaining to the study characteristics (setting, sample, and design); intervention (components, implementation and, data collection); data sources and outcome measures for assessing dental visits; and results. The study team met to review interim extractions and resolve items in question. Interventions meeting review criteria were characterized by target audience: patients and states. Patients in the current review refer to

pregnant women seeking oral health care. Due to the small number of interventions meeting eligibility criteria, unlike prior evidence reviews conducted by the Strengthen the Evidence team (<http://semch.org/evidence-reviews.html>), no evidence continuum was constructed.

In addition to peer-reviewed literature, five gray literature sources were included: 1) *Oral Health Care During Pregnancy and Through the Lifespan* published by ACOG with representation from ADA, HRSA, and the National Maternal and Child Oral Health Resource Center¹⁰; 2) *Guideline on Perinatal and Infant Oral Health Care* published by AAPD¹²; 3) *Access to Oral Health Care During the Perinatal Period* published by the National Maternal and Child Oral Health Resource Center²⁹; 4) *Improving the Oral Health of Pregnant Women and Young Children: Opportunities for Policymakers* published by the National Maternal and Child Oral Health Policy Center²¹; and 5) *Improving Access to Perinatal Oral Health Care: Strategies & Considerations for Health Plans* published by the National Institute for Health Care Management and the Children's Dental Health Project.⁵⁶

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 7,559 records. The search in PubMed, Cochrane Library, and CINAHL Plus yielded 502, 90, and 6,967 records, respectively. One additional record was identified from searching through previously published review articles prior to duplicate removal.

Title and abstract screening was conducted for 7,416 records after 144 duplicates were removed from the total records. During title and abstract review, 7,269 were excluded due to failure to meet certain inclusion criteria. The most common reason for not meeting the inclusion

criteria was that studies were not relevant to the purpose of this review, namely, that they were not focused on interventions to increase dental visits among pregnant women. Full-text articles were assessed for eligibility for 147 records, and 144 were excluded due to failure to meet all inclusion criteria. Major reasons for excluding studies included: did not measure the outcome of interest; did not evaluate interventions; or did not include an appropriate comparison group or pretest-posttest study design. Three records were included in the current review. A total of eight sources were included in the review after combining these three peer-reviewed articles with the five aforementioned gray literature sources. The figure displays the flow chart for the study selection process.

Characteristics of Studies Reviewed

The three articles included in this review varied in study setting and design, intervention type and duration, and data source. The detailed characteristics of the studies are reported in Table 3. Of the three studies, two studies were randomized controlled trials^{57,58} and one study was a quasi-experimental study with a pretest-posttest design.⁵⁹ All three studies were conducted in the United States, with two set in Oregon^{58,59} and one in Missouri.⁵⁷ Although all three studies reported dental visits during the prenatal period, the data source used to measure the level of dental visits during pregnancy varied. The data sources included participant pretest and posttest questionnaires and Medicaid enrollment and claims records. 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. The “Patients” and “States” categories included two and one

peer-reviewed studies respectively.

Patient-level interventions included the receipt of oral health education through instructive materials, provision of dental supplies (e.g., a toothbrush or mouthwash) to improve daily practices and potentially encourage dental visits, and the receipt of counseling and motivational interviewing to help pregnant women navigate available services. The state-level intervention focused on Medicaid delivery system changes (i.e., fee-for-service vs. managed care).

Summary of Study Results

Study results organized by groups are presented in Table 7 and summarized in Table 8. The results presented in Table 8 demonstrate a mix of favorable, unfavorable, and non-significant findings. Among the two studies categorized as “Patients,” Cibulka et al. (2011) reported that a significantly larger percentage of the experimental group received dental visits compared to the control group (57% versus 33%); Riedy et al. (2015) found non-significant findings between experimental and control groups. Interventions in Cibulka et al. (2011) included oral health education, provision of dental supplies to improve oral health practices, assistance with scheduling appointments, and reminder postcards. Riedy et al. (2015) compared motivational interviewing to health education and found that motivational interviewing did not significantly increase dental visits when compared to health education. The two interventions yielded comparable results.

The one study, Milgrom et al. (2010), included in the “States” category showed unfavorable results comparing dental utilization before and after Medicaid reforms in Oregon. The study focused on Oregon's efforts to reform Medicaid policy in 2004-2005 for pregnant women with household incomes below 100% of the federal poverty guidelines. The goal of the

reform was to expand eligibility, reverse decreasing enrollment, and address barriers to care, including confusion over payment of premiums. Pregnant women enrolled in Medicaid were assigned to a fee-for-service system with the option to switch to a managed care provider. Despite Medicaid eligibility and enrollment, utilization of oral health care dropped among low-income pregnant women, from an adjusted proportion of 0.36 to 0.22.⁵⁹ Due to the limited number of studies in both the “Patients” and “States” categories, conclusions cannot be drawn for either category.

In addition to strategies identified from the peer-reviewed literature, the five gray literature sources recommended additional interventions to increase dental visits by pregnant women.^{10,12,21,29,56} These interventions mainly targeted patients, providers, and communities/states. Interventions targeting patients include patient education about importance of oral hygiene and oral health care during pregnancy and patient outreach/navigation (encouragement to visit a dentist, assistance with scheduling appointments, and reminder phone calls or postcards). Provider-level interventions include collaboration between prenatal care and oral health providers, integration of oral health care into routine prenatal care, and increased availability of providers accepting public and private insurance. Community- and state-level interventions include dental insurance coverage and benefits expansion, guidelines development and promulgation, provision of preventive oral health services at no cost, public awareness and education of the importance of oral health care for pregnant women, and increased access to community health centers and local dental schools. While these sources provided consistent recommendations, they did not offer empirical evidence of the effectiveness of the strategies.

IMPLICATIONS

Over half of the states and jurisdictions selected the oral health NPM as a programmatic focus of the current 5-year cycle of the Title V MCH Services Block Grant. The purpose of this review was to provide information about evidence-informed and evidence-based strategies to increase the percentage of pregnant women with a dental visit.

A limited number of empirical studies assessing interventions to increase the percentage of dental visits in pregnant women with robust study designs were identified. Two studies targeting patients were identified. Cibulka et al. (2011) found an increase in dental visits in pregnant women in the experimental group compared to the control group, while Riedy et al. (2015) had non-significant findings. Only one state-level study, Milgrom et al. (2010) was identified. The study found that Medicaid managed care expansion yielded unfavorable results. Given the limited number of studies identified for patient- and state-level interventions, conclusions cannot be drawn.

The inclusion of five gray literature sources supplemented the limited findings from peer-reviewed literature.^{10,12,21,29,56} These sources outlined approaches targeting patients, providers, and communities/states to increase dental visits in pregnant women. Examples of interventions targeting patients include patient education and patient navigation. Examples of interventions targeting providers include integrating oral health care into prenatal care and increasing the availability of providers accepting insurance. Examples of community- and state-level interventions include insurance expansion and guidelines promulgation.

The major strength of this evidence review is that, to our knowledge, it is the first to focus exclusively on strategies to increase the percentage of pregnant women receiving dental visits. However, there are several limitations. First, the limited number of sources meeting the

review criteria limits the conclusions that may be drawn regarding interventions, particularly as these sources focused on different interventions. The inclusion of gray literature, particularly guidelines and recommendations from professional associations, was used to supplement the study findings. However, these sources lack rigorous empirical evidence. A second limitation is that this review may have omitted evidence from sources that could expand our identification or understanding of interventions. Although three databases and several gray literature sources were searched, it is possible that evidence from other studies is available. Third, search results were screened and interpreted by one reviewer; nevertheless, a consistent protocol was followed and issues that arose during this process were addressed with a team of experts. Lastly, synthesizing studies was difficult due to variations in the intervention components, study setting, sample, and design. While components could be articulated for each study, the goal had been to summarize interventions by target audience and/or components. However, this summary was not possible due to the limited number of studies.

This review indicates the need for rigorous evaluations of interventions aimed at increasing the receipt of dental visits by pregnant women through addressing barriers to access of oral health services. Although experts have recommended interventions targeting patients, providers, and communities/states, systematic research is needed to assess both implementation and outcomes. Ongoing efforts as part of the Perinatal and Infant Oral Health Quality Improvement Initiative may identify evidence-based strategies to promote high quality oral health care during pregnancy.⁶⁰

FIGURE AND TABLES

Figure. Flow Chart of the Review Process and Results.

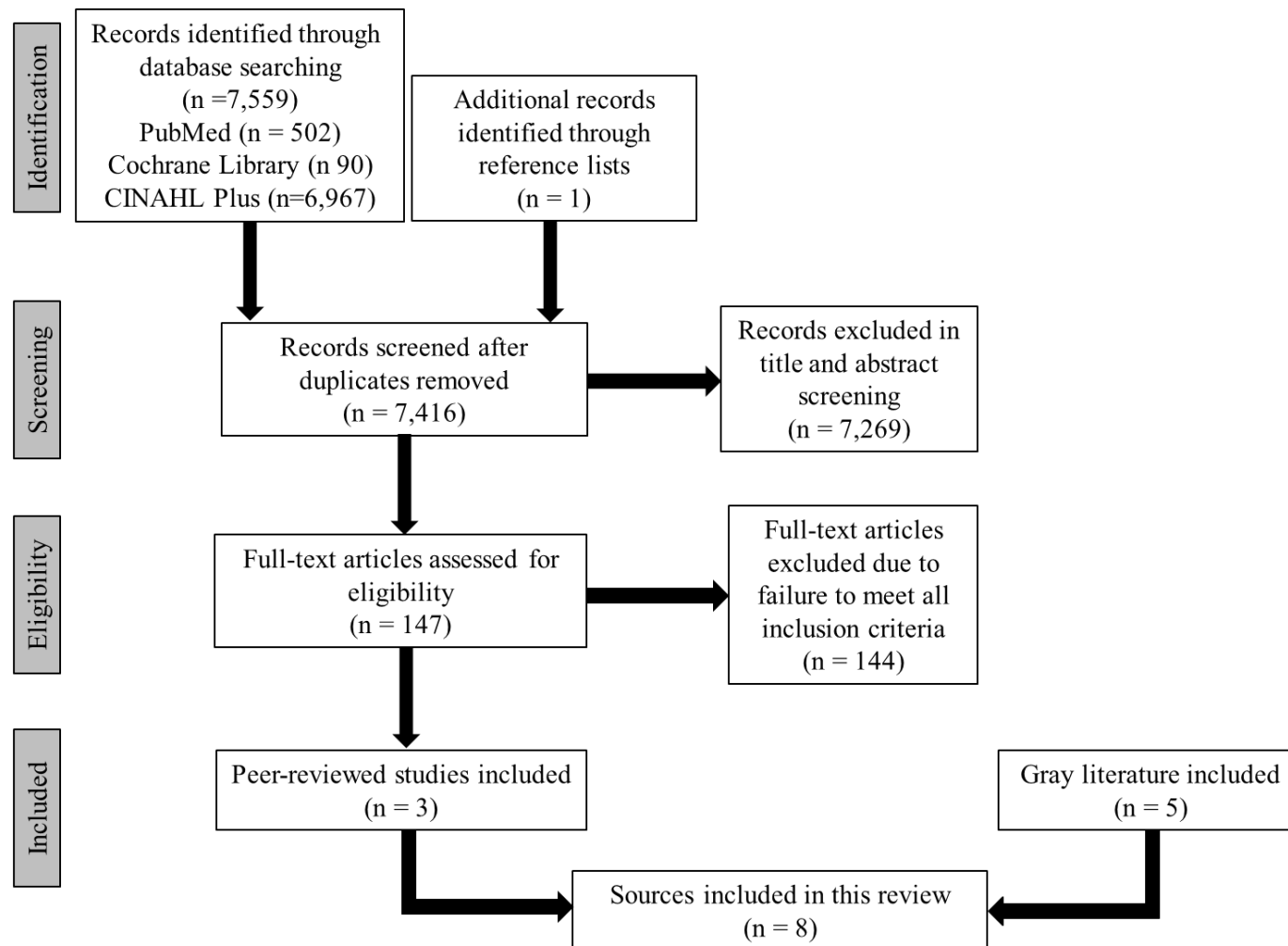


Table 1. Detailed Search Strategies.

Database	Search Strategies
PubMed	#1: (((((((pregnant women[MeSH Terms]) OR prenatal care[MeSH Terms]) OR perinatal care[MeSH Terms]) OR pregnan*[Text Word]) OR prenatal[Text Word]) OR antenatal[Text Word]) OR perinatal[Text Word])
	#2: (((((((((((((((((((oral health[MeSH Terms]) OR oral hygiene[MeSH Terms]) OR dental care[MeSH Terms]) OR dental health services[MeSH Terms]) OR dental facility[MeSH Terms]) OR dental practice patterns[MeSH Terms]) OR preventive dentistry[MeSH Terms]) OR dental care delivery[Text Word]) OR dental health education[Text Word]) OR gingivitis[Text Word]) OR gingival lesion[Text Word]) OR pyogenic granuloma[Text Word]) OR granuloma gravidarum[Text Word]) OR epulis[Text Word]) OR tooth mobility[Text Word]) OR tooth avulsion[Text Word]) OR tooth displacement[Text Word]) OR tooth erosion[Text Word]) OR enamel erosion[Text Word]) OR dental caries[Text Word]) OR periodont*[Text Word]) OR mouth disease[Text Word])
	#3: (((((((((((((((((((community outreach[MeSH Terms]) OR incentives[MeSH Terms]) OR dental medicaid programs[MeSH Terms]) OR dental insurance[MeSH Terms]) OR insurance coverage[MeSH Terms]) OR reimbursement mechanisms[MeSH Terms]) OR patient education[MeSH Terms]) OR referral[MeSH Terms]) OR counseling[MeSH Terms]) OR health knowledge, attitudes, practice[MeSH Terms]) OR patient acceptance of health care[MeSH Terms]) OR community dentistry[MeSH Terms]) OR primary health care[MeSH Terms]) OR program evaluation[MeSH Terms]) OR public health dentistry[MeSH Terms]) OR strategy[Title/Abstract]) OR theory[Title/Abstract]) OR CHIP[Title/Abstract]) OR PRAMS[Title/Abstract]) OR (Title V[Text Word]) OR health promotion[Text Word])
	#4: ("1985/01/01"[Date - Publication] : "3000"[Date - Publication])
Cochrane Library	#1: (((((((pregnant women[MeSH Terms]) OR prenatal care[MeSH Terms]) OR perinatal care[MeSH Terms]) OR pregnan*[Text Word]) OR prenatal[Text Word]) OR antenatal[Text Word]) OR perinatal[Text Word])
	#2: (((((((((((((((((((oral health[MeSH Terms]) OR oral hygiene[MeSH Terms]) OR dental care[MeSH Terms]) OR dental health services[MeSH Terms]) OR dental facility[MeSH Terms]) OR dental practice patterns[MeSH Terms]) OR preventive dentistry[MeSH Terms]) OR dental care delivery[Text Word]) OR dental health education[Text Word]) OR gingivitis[Text Word]) OR gingival lesion[Text Word]) OR pyogenic granuloma[Text Word]) OR granuloma gravidarum[Text Word]) OR epulis[Text Word]) OR tooth mobility[Text Word]) OR tooth avulsion[Text Word]) OR tooth displacement[Text Word]) OR tooth erosion[Text Word]) OR enamel erosion[Text Word]) OR dental caries[Text Word]) OR periodont*[Text Word]) OR mouth disease[Text Word])
	#3: (((((((((((((((((((community outreach[MeSH Terms]) OR incentives[MeSH Terms]) OR dental medicaid programs[MeSH Terms]) OR dental insurance[MeSH Terms]) OR insurance coverage[MeSH Terms]) OR reimbursement mechanisms[MeSH Terms]) OR patient education[MeSH Terms]) OR referral[MeSH Terms]) OR counseling[MeSH Terms]) OR health knowledge, attitudes, practice[MeSH Terms]) OR patient acceptance of health care[MeSH Terms]) OR community dentistry[MeSH Terms]) OR primary health care[MeSH Terms]) OR program evaluation[MeSH Terms]) OR public health dentistry[MeSH Terms]) OR strategy[Title/Abstract]) OR theory[Title/Abstract]) OR CHIP[Title/Abstract]) OR PRAMS[Title/Abstract]) OR (Title V[Text Word]) OR health promotion[Text Word])
	#4: ("1985/01/01"[Date - Publication] : "3000"[Date - Publication])
CINAHL Plus	#1: ((MH "Expectant Mothers+") OR (MH "Prenatal Care+") OR (MH "Perinatal Care+") OR TX pregnan* OR TX prenatal OR TX antenatal OR TX perinatal)
	#2: ((MH "Oral Health+") OR (MH "Oral Hygiene+") OR (MH "dental care+") OR (MH "dental health services+") OR (MH "dental facilities+") OR (MH "practice patterns+") OR (MH "preventative dentistry+") OR TX "dental care delivery" OR TX dental health education OR TX gingivitis OR TX gingival lesion OR TX pyogenic granuloma OR TX "granuloma gravidarum" OR TX epulis OR TX tooth mobility OR TX tooth avulsion OR TX "tooth displacement" OR TX tooth erosion OR TX enamel erosion OR TX dental caries OR TX periodont* OR TX mouth disease OR TX health promotion)
	#3: ((MH "Community Networks+") OR (MH "Community Health Centers+") OR (MH "Medicaid+") OR (MH "Insurance, Dental+") OR (MH "Insurance Coverage+") OR (MH "Reimbursement Mechanisms+") OR (MH "Patient Education+") OR ((MH "Referral and Consultation+") OR (MH "Counseling+") OR (MH "Attitude to Health+") OR (MH "Health Knowledge+") OR (MH "Primary Health Care+") OR (MH "Program Evaluation+") OR (MH "Public Health Dentistry+") OR AB strategy OR TI strategy OR TI theory OR AB theory OR TI children's health insurance program OR AB children's health insurance program OR TI prams OR AB prams) OR TX title v OR TX health promotion)
	#4: English, Academic journals, USA, 1985 – Now

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	
Cibulka et al. (2011)	US	Hospital-based inner-city clinic in Missouri	Pregnant women who were English-speaking, ages 18-45 years, less than 24 weeks pregnant and receiving prenatal care from Advanced Practice Nurses	Baseline (n=170) Follow-Up (n=146) • Intervention (n=73) • Control (n=73)	RCT
Milgrom et al. (2010)	US	Oregon	Pregnant women ages 15-45 with household incomes <100% of the Federal Poverty Guidelines, enrolled in Oregon Health Plan-plus ²	Adjusted analysis • Pre-reform (n=49,785) • Post-reform (n=22,405)	QE: pretest/posttest
Riedy et al. (2015) ³	US	Four rural counties in Oregon	Pregnant clients at the county health department who were English-speaking, ≥15 years old, in their first or second trimester, and eligible for Medicaid	Analysis (n=349) • Motivational interviewing (n=171) • Health education (n=178)	RCT

¹ Abbreviations used in this table: RCT (randomized controlled trial); QE (quasi-experimental study)

² Target sample and sample size limited to pregnant women.

³ Sample size was determined by adding numbers for all women receiving prenatal motivational interviewing and prenatal health education who were in the analysis sample, regardless of postpartum intervention.

Table 4. Data Source & Outcome Measure.

Study	Data Source	Outcome Measure
Cibulka et al. (2011)	Participant pretest and posttest questionnaires	Percentage of women who saw a dentist in past year
	Participant pretest and posttest questionnaires	Percentage of women who scheduled visit with dentist
Milgrom et al. (2010)	Medicaid enrollment and claims	Proportion of women with a dental claim
Riedy et al. (2015)	Medicaid claims and posttest questionnaires	Percentage of women who attended a dental appointment during pregnancy

Table 5. Intervention Description.

Study	Comparison Group¹	Description of Intervention	Intervention Implementation	Data Collection
Cibulka et al. (2011)	No intervention	<ul style="list-style-type: none"> • DVD on oral health for maternal education • Discussion of oral health and pregnancy information sheet with nurse or researcher • Receipt of dental supplies • Scheduled oral health checkup with reminder cards 	2 nd or 3 rd prenatal visit prior to 24 weeks of pregnancy	Baseline: Time of enrollment Follow-up: at or near 36-week prenatal visit
Milgrom et al. (2010)	N/A	<p>Oregon Medicaid reform</p> <ul style="list-style-type: none"> • Medicaid expansion to managed care model for vulnerable populations including pregnant women 	Early 2000s	Baseline: 2000-2002 Follow-Up: 2005
Riedy et al. (2015)	Prenatal health education (HE): video and written educational materials	<p>Baby Smiles:</p> <ul style="list-style-type: none"> • Motivational interviewing (MI): video and written educational materials; counseling on navigating barriers to care during pregnancy 	May 6, 2010 and August 2, 2011	May 1, 2010 to October 31, 2013

¹“No intervention” refers to the comparison group not having received an intervention. “N/A” (not applicable) refers to an absence of a comparison group.

Table 6. Intervention Components.

Study	Patients				States
	Oral health education	Oral health supplies	Assistance in making dental appointment	Motivational Interviewing	Medicaid managed care expansion
Patients (n=2)					
Cibulka et al. (2011)	X	X	X		
Riedy et al. (2015)	X		X	X	
States (n=1)					
Milgrom et al. (2010)					X

Table 7. Study Results.

Study	Results
Patients	
Cibulka et al. (2011)	At baseline, 30.1% of women in the control group and 27.4% of women in the experimental group had seen a dentist. At follow-up, the control group increased to 32.9% while the experimental group increased to 56.9% (p=0.006).
Riedy et al. (2015)	After the intervention, dental attendance for women in the prenatal period was 92.4% for those in the motivational interviewing (MI) group compared to 94.4% for those in the health education (HE) group (RR = 0.98; 95% CI = 0.93-1.04). No significant difference was observed between the two groups at follow-up.
States	
Milgrom et al. (2010)	Before the intervention, the adjusted proportion of pregnant women with a dental service claim was 0.36. After the intervention, the proportion of pregnant women with a dental service claim declined to 0.22 (p<0.001).

Table 8. Summary of Study Results.¹

Study	Dental Visit
Patients	
Cibulka et al. (2011)	+
Riedy et al. (2015)	ns
States	
Milgrom et al. (2010)	-

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

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