

Oral Health Care for the Pregnant Adolescent

Review Council

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Purpose

The American Academy of Pediatric Dentistry (AAPD), as the oral health advocate for infants, children, adolescents, and persons with special needs, recognizes that adolescent pregnancy remains a significant social and health issue in the U.S. This guideline is intended to address management of oral health care particular to the pregnant adolescent rather than provide specific treatment recommendations for oral conditions.

Methods

This guideline was originally developed by the Council on Clinical Affairs Committee on the Adolescent and adopted in 2007. This document is an update of the previous version, revised in 2012. The revision included a search of the PubMed®/MEDLINE database using the terms: teen pregnancy AND dental and adolescent pregnancy. This search yielded 209 articles that met the defined criteria to update this guideline. The search then was narrowed to include articles that were limited to clinical trials, systematic reviews, or meta-analysis. When data did not appear sufficient or were inconclusive, recommendations were based upon expert and/or consensus opinion by experienced researchers and clinicians.

Background

General considerations

In 2014, a total of 249,067 infants were born to 15 through 19 year olds, for a live birth rate of 24.2 per 1,000 women in this age group.¹ This is a nine percent decline from 2013 (26.5 per 1,000) and represents an historic low for the U.S., with an overall decline of 61 percent since the peak in 1991 (61.8 per 1,000).² While the decline in the U.S. teen birth rate is promising, the U.S. teen pregnancy rate still is substantially higher than other western industrialized nations.³ The declines in teen birth rates reflect a number of behavioral changes, including decreased sexual activity and increases in the use of contraception.^{4,5} Approximately 50 percent of adolescent pregnancies occur within the first six months of initial sexual intercourse, even with increasing use of contraceptives by adolescents.⁵

The correlation between poverty and adolescent pregnancy is great; many adolescent females who give birth are from low-income families.⁶ Teen childbearing may present unfavorable consequences for mothers and their children and imposes high public sector costs.⁶ Eighty-two percent of adolescent preg-

nancies are not planned.^{7,8} More than half of these pregnancies (59 percent) end in births, 14 percent result in miscarriages, and 27 percent result in abortion.⁷

There exist economic, racial, and ethnic disparities related to oral hygiene practices and dental service utilization during pregnancy; reports indicate minority pregnant adolescents had only limited dental visits and possessed limited knowledge of oral health and pregnancy outcomes.^{9,10} Little is known about individual characteristics or behaviors related to clinically assessed oral health during pregnancy.¹¹

Medical complications involving mother and child occur more frequently in pregnant females aged 11 through 15 years than those aged 20 to 22 years.⁵ These include the delivery of low-birth-weight infants, increased neonatal death rate, and increased mortality rate for the mother.⁵ The socioeconomic and cultural environments of the pregnant adolescent are related to the increased frequency of low-weight and premature newborns.¹² Pregnancy-induced hypertension, anemia, sexually transmissible diseases, and premature delivery also are concerns for the pregnant adolescent.⁵ Hypertension increases the risk of bleeding during procedures. Teens are at a higher risk for pregnancy-related high blood pressure (preeclampsia) and its complications than older mothers.¹³ Preeclampsia is a dangerous medical condition that combines high blood pressure in women who have never before had high blood pressure with proteinuria and swelling of the hands and face.¹⁴ Risks for the baby include premature birth and low birthweight.¹³ Proper prenatal care is essential, and blood pressure monitoring, weighing in, and testing the urine for protein should take place at each prenatal healthcare visit.¹⁵ If an abnormal elevation in blood pressure is noted during a dental visit, the patient's physician should be notified. Blood pressure greater than or equal to 140/90 mmHg is considered mild hypertension, whereas values greater than or equal to 160/110 mmHg are considered severe.¹⁶ Acute-onset, severe hypertension that persists for 15 minutes or more is considered an emergency. The physician should be notified immediately as untreated severe hypertension can have significant morbidity (e.g., hemorrhagic stroke) or mortality.¹⁷

ABBREVIATIONS

AAPD: American Academy of Pediatric Dentistry. **MS:** Mutans streptococci. **TOP:** Teen Outreach Program.

The diet of the pregnant adolescent can affect the health of the child. A healthy diet is necessary to provide adequate amounts of nutrients to the mother-to-be and the unborn child. Recommended dietary allowances (RDAs) during pregnancy and lactation are tabulated as absolute figures rather than additions to the basic allowances.¹⁸ Nutrients of particular importance include folate (folic acid), calcium, magnesium, zinc, and vitamins K, C, B-6 and B-12.¹⁸ Maternal levels of vitamin D during pregnancy may affect the developing primary dentition, with lower levels altering enamel integrity and increasing the risk for early childhood caries.¹⁹ Folic acid, a B vitamin, plays an important role in the production of cells and helps in the development of the neural tube, the brain, and spinal cord.²⁰ Folic acid supplementation has been shown to decrease the risk of isolated cleft lip with or without cleft palate.²¹ A recent study supports the hypothesis that folate supplements play a significant role in preventing cleft lip and palate when taken in the first 12 weeks of pregnancy.²² The growing benefits of folic acid and the importance of folic acid supplements should be included as part of prenatal counseling.²⁰ Assessment of folic acid status in children having orofacial clefting is yet to be evaluated in depth.²³

During pregnancy, a woman's nutritional needs are increased, but certainly the eating for two concept is not recommended.²⁴ The total energy needs during pregnancy range between 2,500 to 2,700 kcal a day for most women, but pre-pregnancy body mass index, rate of weight gain, maternal age, and physiological appetite must be considered in tailoring this recommendation to the individual.²⁵ Poor prenatal dietary intakes of energy, protein, and micronutrients have been shown to be associated with increased risk of adult obesity in off-spring.²⁶ Recent studies have shown that improving the nutritional status of women prior to and during pregnancy can reduce the risk of low-birth-weight babies substantially.²⁶ Nausea and vomiting are common during the first trimester and often are associated with young age and low socioeconomic status.²⁷ An expectant female may modify food choices due to morning sickness and/or taste aversions, but appropriate nutrition for the health of the mother and fetus is crucial. Nausea and vomiting may cause a woman to avoid routine oral health practices such as toothbrushing and flossing. This could lead to dental caries and gingivitis.²⁸⁻³⁰ Gingivitis is reported to be the most common oral disease during pregnancy.³¹

The goal of any drug therapy during pregnancy is to improve maternal/fetal health while avoiding adverse drug reactions.³² Reporting that medications for pregnant patients sometimes are prescribed under less than optimal conditions, a study of obstetrician-gynecologists emphasizes the importance of generating and having available to health care providers up-to-date information on effects of medications during pregnancy.³³ The U.S. Food and Drug Administration has defined drug categories according to the risk they pose to pregnant women and their fetuses.³⁴ These categories provide some guidance to the relative safety of the medication for use by pregnant women. Category A includes drugs that have been studied in

humans and have evidence supporting their safe use; Category B drugs show no evidence of risk to humans. Generally, these drugs are considered acceptable for use during pregnancy.³² Category C drugs, such as aspirin and aspirin-containing products, may be used with caution, whereas drugs in categories D (e.g., tetracycline) and X are not intended for use during pregnancy. The Organization of Teratology Information Services provides useful national information for drug safety during pregnancy.³⁵

Low socioeconomic status and lack of parental involvement can place an adolescent at increased risk of initiating tobacco use.³⁶ Smoking during pregnancy is associated with adverse outcomes.^{36,37} Women who smoke may have increased risks for ectopic pregnancy, spontaneous abortion, and preterm delivery.^{36,37} Infants born to women who smoke during pregnancy are more likely to be small for gestational age and have low birthweight.³⁶⁻³⁹ The longer the mother smokes during pregnancy, the greater the effect on the infant's birthweight.³⁷ Increasing evidence shows that maternal tobacco use is associated with intellectual disability and birth defects such as oral clefts.³⁶ The risk for perinatal mortality and sudden infant death syndrome (SIDS) is increased for infants of women who smoke.^{36,37} Infants and children exposed to environmental tobacco smoke have higher rates of lower respiratory illness, middle ear infections, asthma, and caries in the primary dentition.³⁶⁻⁴¹ Women are more likely to stop smoking during pregnancy, both spontaneously and with assistance, than at other times in their lives.³⁷

Oral conditions associated with pregnancy

Physiologic changes in the oral cavity during pregnancy are well documented.⁴² These include alterations in both the hard and soft tissues. An increase in caries has been associated with carbohydrate loading as snacking becomes more frequent.⁴² Nausea and vomiting are common and occur in 70-85 percent of women, but are usually self-limiting after the first trimester. Persistent, severe vomiting (hyperemesis gravidarum) is rare (0.3-2 percent of pregnancies),⁴³ but may contribute to the onset of perimyolysis, an erosion of the lingual surfaces of the teeth caused by exposure to gastric acids. A confounding factor is that pregnancy-associated hormonal changes may cause dryness of the mouth. Approximately 44 percent of pregnant participants in one study reported persistent xerostomia.⁴⁴

Signs of gingivitis (e.g., bleeding, redness, swelling, tenderness) are evident in the second trimester and peak in the eighth month of pregnancy, with anterior teeth affected more than posterior teeth.⁴⁵ These findings are exacerbated by poor plaque control and mouth breathing.⁴⁶ From a periodontal perspective, the effects of hormonal levels on the gingival status of pregnant women may be accompanied by increased levels of progesterone and estrogen which contribute to increased vascularity, permeability, and possible tissue edema.^{47,48} Evidence shows a relationship of periodontal disease and gestational diabetes which contributes to maternal and infant morbidity as well as the risk of the mother developing type II diabetes mellitus.^{45,49}

The study of periodontitis during pregnancy and its effect on preterm, low-birth-weight infants is ongoing. Early studies noted an increase rate of preterm/low-birth-weight deliveries associated with periodontal disease.^{45,50,51} However, a more recent study of 116 postpartum women noted clinical attachment level measures were not different between those with preterm/low-birth-weight babies and control groups. Therefore, maternal periodontal microbiota and clinical characteristics of periodontal disease were not associated with having preterm/low-birth-weight babies.⁵² Additional studies continue to demonstrate conflicting results.⁵³⁻⁶⁰ The effect of periodontitis and the development of preeclampsia, a rapidly progressing condition occurring in pregnancy characterized by hypertension and the presence of proteinuria, continues to be studied as well.^{55,59-62}

Poor plaque control coupled with hormonal changes may lead to the development of a pyogenic granuloma (i.e., pregnancy tumor or granuloma gravidarum). This benign vascular lesion appears as a deep red to purple gingival nodule in the second or third trimester of pregnancy.^{46,63} Although the lesion may regress postpartum, surgical excision may be necessary.⁶³

Oral health care during pregnancy

A multi-state study concluded that, besides neglecting medical care during pregnancy, most expectant females of all ages do not seek dental care, even though 50 percent of them have a dental problem.¹⁵ One study reported the most significant predictor of not receiving routine dental care during pregnancy was a woman's lack of routine dental care when not pregnant.⁹ Although an expectant mother might question the safety of dental treatment during pregnancy, untreated oral disease may compromise the health of the pregnant female and the unborn child.^{64,65} The consequences of not treating an active infection during pregnancy outweigh the possible risks presented by most of the medications required for dental care.³³ In addition, deferring elective dental treatment during a healthy pregnancy is not justified.⁶⁵

The objectives of professional oral health care during the first trimester include avoiding fetal hypoxia, premature labor/fetal demise, and teratogenic effects.⁶⁰ Due to the increased risk of pregnancy loss, use of nitrous oxide may be contraindicated in the first trimester of pregnancy.⁶¹ Because the pregnant uterus is below the umbilicus, the woman is generally more comfortable for treatment during weeks 14 to 20 of gestation. Pregnant women are considered to have a full stomach due to delayed gastric emptying and, therefore, are at increased risk for aspiration, particularly during the last trimester.⁶⁶⁻⁶⁸ Elective restorative and periodontal therapies during the second trimester may prevent any dental infections or other complications from occurring in the third trimester.⁶⁵

Evidence is insufficient to support or refute that mercury exposure from dental amalgams contributes to adverse pregnancy outcomes.^{68,69} Currently, there is no evidence that the exposure of a fetus to mercury release from the mother's existing amalgam fillings causes any adverse effects.^{67,69} Mercury vapor released during the removal or placement of amalgam restora-

tions may be inhaled and absorbed into the blood stream and does cross the placental barrier. The use of rubber dam and high speed suction can reduce the risk of vapor inhalation.⁷⁰ Because use of tooth whitening products that contain or generate hydrogen peroxide results in release of inorganic mercury from dental amalgams, these products should be used with caution during pregnancy.⁶⁷

During dental radiographic examination of a pregnant patient, optimizing techniques, shielding the thyroid and abdomen, choosing the fastest available image receptor (i.e., high-speed film, rare earth screen-film systems, digital radiography), and avoiding retakes help minimize radiation exposure to the fetus.^{71,72} The primary dental X-ray beam may pass near or through the thyroid gland, even with attention to proper radiographic techniques. The juvenile thyroid is among the most sensitive organs to radiation-induced tumors, both benign and malignant.⁷² Risk decreases significantly with age at exposure, essentially disappearing after age 20.⁷² Evidence shows that radiation exposure to the thyroid during pregnancy is associated with low birthweight.⁷¹ Common dental projections rarely, if ever, deliver a measurable absorbed dose to the embryo or fetus.⁷² Gonadal absorbed dose from a typical dental x-ray procedure is equivalent to about one hour of natural background radiation.⁷² The National Council on Radiation Protection and Measurements recommends if dental treatment is to be deferred until after the delivery, so should the dental radiographs.⁷² Once the decision to obtain radiographs is made, it is the dentist's responsibility to follow the ALARA (as low as reasonably achievable) principle to minimize the patient's exposure.⁷⁰

Suppression of the mother's reservoirs of Mutans Streptococci (MS) by dental rehabilitation and antimicrobial treatments may prevent or at least delay infant acquisition of these cariogenic microorganisms.⁷³ MS, present in children with early childhood caries, is predominantly acquired from mother's saliva.⁷⁴ The transmission of cariogenic bacteria from mother to infant is increased when the mother has poor oral health with untreated dental caries.⁷⁵ MS colonization of an infant may occur from the time of birth.⁷⁵⁻⁸³ Improving oral health during pregnancy leads to a reduction in salivary MS in the offspring.⁷³

Education is an important component of prenatal oral health care and may have a significant effect on the oral health of both the mother and the child. Counseling for the pregnant adolescent includes topics directed toward all adolescent patients (e.g., dietary habits, injury prevention, third molars), as well as oral changes that may occur during pregnancy and infant oral healthcare. Since the pregnant adolescent may be receptive to information that will improve the infant's health, anticipatory guidance, a proactive developmentally-based counseling technique, can be introduced to focus on the needs of the child at each stage of life. Studies have documented that early oral health promotion starting during pregnancy can lead to a sustained and long-term improvement of the oral health of children.^{84,85} Programs that promote oral health must continue to inform pregnant women and care providers about

the importance of dental care before, during, and after pregnancy. Oral health counseling during pregnancy and dental cleanings are recommended.⁸⁶ Mobile phone texting components added as a supplement to the Teen Outreach Program (TOP), a youth development program for reducing teen pregnancy and school dropout, has proven helpful in disseminating and sharing information to minority youth.⁸⁷ TOP can be used to address issues regarding oral health.

Legal considerations

Statutes and case law concerning consent involving pregnant patients less than 18 years of age vary from state to state. In some states, dentists are required to obtain parental consent for non-emergency dental services provided to a child 17 years of age or younger who remains under parental care.⁸⁸ This would involve obtaining consent from the parent who must be aware of the pregnancy in order to understand the risks and benefits of the proposed dental treatment.⁶⁵ However, if the parent is unaware of the pregnancy, the pregnant adolescent may be entitled to confidentiality regarding health issues such as the pregnancy.⁸⁹ In other states, there are mature minor laws that allow minors to consent for their own health care when a dentist deems the minor competent to provide informed consent. In addition, some states emancipate minors who are pregnant or by court order. Practitioners are obligated to be familiar with and abide by the laws specific to where they practice and where the patient resides.

Recommendations

The AAPD recommends that all pregnant adolescents seek professional oral health care during the first trimester. After obtaining a thorough medical history, the dental professional should perform a comprehensive evaluation which includes a thorough dental history, dietary history, clinical examination, and caries risk assessment. The dental history should include discussion of preexisting oral conditions, current oral hygiene practices and preventive home care, previous radiographic exposures, and tobacco use.³⁶⁻⁴¹ The adolescent's dietary history should focus on exposures to carbohydrates, especially due to increased snacking, and acidic beverages/foods. During the clinical examination, the practitioner should pay particular attention to health status of the periodontal tissues. The AAPD's caries-risk assessment guideline, utilizing historical and clinical findings, will aid the practitioner in identifying risk factors in order to develop an individualized preventive program.⁹⁰ Improving the oral health of pregnant women reduces complications of dental diseases during pregnancy to both the mother and the developing fetus.⁹¹

Based upon the historical indicators, clinical findings, and previous radiographic surveys, radiographs may be indicated. Because risk of carcinogenesis or fetal effects is very small but significant, radiographs should be obtained only when there is expectation that diagnostic yield (including the absence of pathology) will influence patient care.⁷² If dental treatment must be deferred until after delivery, radiographic assessment also

should be deferred. All radiographic procedures should be conducted in accordance with radiation safety practices. These include optimizing the radiographic techniques, shielding the pelvic region and thyroid gland, and using the fastest imaging available.⁷²

Counseling for all pregnant patients should address:

- Relationship of maternal oral health with fetal health⁶¹ (e.g., possible association of periodontal disease with preterm birth and pre-eclampsia, developmental defects in the primary dentition¹⁹).
- An individualized preventive plan including oral hygiene instructions, rinses, and/or xylitol products to decrease the likelihood of MS transmission postpartum.⁹²⁻⁹⁴
- Dietary considerations (e.g., maintaining a healthy diet, avoiding frequent exposures to cariogenic foods and beverages, overall nutrient and energy needs)^{61,62} and vitamin supplements¹⁹⁻²¹.
- Anticipatory guidance for the infant's oral health including the benefits of early establishment of a dental home.^{84,85}
- Anticipatory guidance for the adolescent's oral health to include injury prevention, oral piercings, tobacco and substance abuse, sealants, and third molar assessment.⁹⁵
- Oral changes that may occur secondary to pregnancy^{45,50} (e.g., xerostomia, shifts in oral flora).
- Individualized treatment recommendations based upon the specific oral findings for each patient.

Preventive services must be a high priority for the adolescent pregnant patient. Ideally, a dental prophylaxis should be performed during the first trimester and again during the third trimester if oral home care is inadequate or periodontal conditions warrant professional care. Referral to a periodontist should be considered in the presence of progressive periodontal disease.^{45,50} While fluoridated dentifrice and professionally-applied topical fluoride treatments can be effective caries preventive measures for the expectant adolescent, the AAPD does not support the use of prenatal fluoride supplements to benefit the fetus.⁹⁶

A pregnant adolescent experiencing morning sickness or gastroesophageal reflux should be instructed to rinse with a cup of water containing a teaspoon of sodium bicarbonate and to avoid tooth brushing for about one hour after vomiting to minimize dental erosion caused by stomach acid exposure.⁹ Women should be advised about the high sugar content and risk for caries associated with long term frequent use of over-the-counter antacids. Where there is established erosion, fluoride may be used to minimize hard tissue loss and control sensitivity. A daily neutral sodium fluoride mouth rinse or gel to combat enamel softening by acids and control pulpal sensitivity may be prescribed.⁹⁷ A palliative approach to alleviate dry mouth may include increased water consumption or chewing sugarless gum to increase salivation.⁴⁴

Common invasive dental procedures may require certain precautions during pregnancy, particularly during the first trimester. Elective restorative and periodontal therapies should be performed during the second trimester. Dental treatment for a pregnant patient who is experiencing pain or infection should not be delayed until after delivery. When selecting therapeutic agents for local anesthesia, infection, postoperative pain, or sedation, the dentist must evaluate the potential benefits of the dental therapy versus the risks to the pregnant patient and the fetus. The practitioner should select the safest medication, limit the duration of the drug regimen, and minimize dosage.⁶¹ Healthcare providers should avoid the use of aspirin, aspirin-containing products, erythromycin estolate, and tetracycline in the pregnant patient.⁶² Non-steroidal anti-inflammatory drugs routinely are not recommended during pregnancy; if necessary, administration should be avoided during the first and third trimesters and be limited to 48 to 72 hours.⁶¹ Consultation with the prenatal medical provider should precede use of nitrous oxide/oxygen analgesia/anxiolysis during pregnancy. Nitrous oxide inhalation should be limited to cases where topical and local anesthetics alone are inadequate. Precautions must be taken to prevent hypoxia, hypotension, and aspiration.⁶¹

Patients requiring restorative care should be counseled regarding the risk and benefits and alternatives to amalgam fillings.⁶⁷⁻⁶⁹ The dental practitioner should use rubber dam and high speed suction during the placement or removal of amalgam to reduce the risk of vapor inhalation.⁶⁷

Dental practitioners must be familiar with federal and state statutes that govern consent for care for a pregnant patient less than the age of majority. If a pregnant adolescent's parents are unaware of the pregnancy, and state laws require parental consent for dental treatment, the practitioner should encourage the adolescent to inform them so appropriate informed consent for dental treatment can occur. The Health Insurance Portability and Accountability Act (HIPAA) specifically addresses minor confidentiality.⁹⁸

References

- Martin JA, Hamilton BE, Osterman MJK, Curtin SC, Mathews TJ. Births: Final Data for 2013. National vital statistics reports; vol 64 no 1. Hyattsville, MD: National Center for Health Statistics. 2015. Available at: "http://www.cdc.gov/nchs/data/nvsr/nvsr64/nvsr64_01.pdf". Accessed September 7, 2016.
- Ventura SJ, Hamilton BE, Matthews TJ. National and state patterns of teen births in the United States, 1940-2013. *Natl Vital Stat Rep* 2014;63(4):1-34.
- Sedge G, Finer LB, Bankole A, Eilers MA, Singh A. Adolescent pregnancy, birth, and abortion rates across countries: Levels and Recent Trends. *J Adoles Health* 2015; 56(2):223-30.
- Haffner DW, ed. Facing Facts: Sexual Health for America's Adolescents: The Report of the National Commission on Adolescent Sexual Health. New York, N.Y.: Sexuality Information and Education Council of the United States; 1995.
- Klein JD, Committee on Adolescence. Adolescent pregnancy: Current trends and issues. *Pediatrics* 2005;116 (1):281-6.
- Centers for Disease Control and Prevention (CDC). Vital signs: Teen pregnancy-United States, 1991-2009. *MMWR Morb Mortal Wkly Rep* 2011;60(13):414-20.
- Finer LB, Zolna MR. Unintended pregnancy in the United States: Incidence and disparities, 2006. *Contraception* 2011;84(5):478-85.
- Gursory M, Pajukanta R, Sorsa T, Konen E. Clinical changes in periodontium during pregnancy and postpartum. *J Clin Periodontol* 2008;35(7):576-83.
- Bogges KA, Urlaub DM, Massey KE, Moos MK, Matheson MB, Lorenz C. Oral hygiene practices and dental services utilization among pregnant women. *J Am Dent Assoc* 2010;141(5):553-61.
- Fadavi S, Sevandal MC, Koerber A, Punwani I. Survey of oral health knowledge and behavior of pregnant minority adolescents. *Pediatr Dent* 2009;31(5):405-8.
- Chung LH, Gregorich SE, Armitage GC, Gonzalez-Vargas J, Adams SH. Sociodemographic disparities and behavioral factors in clinical oral health status during pregnancy. *Community Dent Oral Epidemiol* 2014;42(2): 151-9.
- de Azevedo WF, Diniz MB, da Fonseca ESVB, de Azevedo LMR, Evangelista CB. Complications in adolescent pregnancy: Systematic review of the literature. *Einstein (Sao Paulo)* 2015;13(4):618-26. Available at "<http://dx.doi.org/10.1590/S1679-45082015RW3127>". Accessed September 7, 2016.
- Carey E. Teenage Pregnancy. Healthline, July 2012. Available at: "<http://www.healthline.com/health/adolescent-pregnancy>". Accessed September 14, 2016.
- WebMD Medical Reference. Preeclampsia and eclampsia. 2016. Available at: "<http://www.webmd.com/baby/guide/preeclampsia-eclampsia#1>". Accessed September 14, 2016.
- Preeclampsia Foundation. Signs and symptoms. Available at: "<http://www.preeclampsia.org/health-information/sign-symptoms>". Accessed September 6, 2016.
- Gaffield ML, Colley Gilbert BJ, Malvitz DM, Romaguera R. Oral health during pregnancy. *J Am Dent Assoc* 2001;132(7):1009-16.
- The American College of Obstetricians and Gynecologists Committee on Obstetric Practice. Committee Opinion No 623: Emergent therapy for acute-onset, severe hypertension during pregnancy and the postpartum period. *Obstet Gynecol* 2015;125(2):521-5.
- National Research Council. Recommended Dietary Allowances, 10th ed. Washington, D.C., National Academy Press; 1989.
- Schroth RJ, Lavelle C, Tate R, Bruce S, Billings RJ, Mofatt ME. Prenatal vitamin D and dental caries in infants. *Pediatrics* 2014;133(5):1277-84.

20. Division of Birth Defects, National Center on Birth Defects and Developmental Disabilities, Centers for Disease Control and Prevention. Folic acid: Women need 400 micrograms of folic acid every day. Page last updated: February 23, 2016. Available at: "<https://www.cdc.gov/ncbddd/folicacid/features/folic-acid.html>". Accessed September 14, 2016.
21. Wilcox AJ, Lie RT, Solvoll K, et al. Folic acid supplements and risk of facial clefts: National population based case-control study. *BMJ* 2007;334(7591):1-6.
22. Kelly D, O'Dowd T, Reulbach U. Use of folic acid supplements and risk of cleft lip and palate in infants: A population base cohort study. *Br J Gen Pract* 2012;62(600):e466-72.
23. Brooklyn S, Jana R, Aravinthan S, Adhisivam B, Chand P. Assessment of folic acid and DNA damage in cleft lip and cleft palate. *Clin Pract* 2014;4(1):608.
24. McCann AL, Bonci L. Maintaining women's oral health. *Dent Clin North Am* 2001;45(3):571-601.
25. Kaiser LL, Allen L. Position of the American Dietetic Association: Nutrition and lifestyle for a healthy pregnancy outcome. *J Am Diet Assoc* 2002;102(10):1479-90.
26. Yang Z, Huffman SL. Nutrition in pregnancy and early childhood and associations with obesity in developing countries. *Matern Child Nutr* 2013;9(Suppl 1):105-19.
27. O'Brien B, Zhou Q. Variables related to nausea and vomiting during pregnancy. *Birth* 1995;22(2):93-100.
28. Bishai R, Koren G. Motherisk Program. Nausea and Vomiting in Pregnancy. State of the Art 2000. Toronto, Canada, Motherisk Hospital for Children; 2000:5-9.
29. Vergnes JN, Kaminski M, Lelong N, et al. Frequency and risk indicators of tooth decay among pregnant women in France: A cross-sectional analysis. *PLoS One* 2012;7(5):e33296.
30. Buerlein J, Peabody H, Santoro K, Children's Dental Health Project, National Institute for Health Care Management. Improving access to perinatal oral health care: Strategies and considerations for health plans. Issue brief, July 2010. Available at: "<http://www.nihcm.org/pdf/NIHCM-OralHealth-Final.pdf>". Accessed September 14, 2016.
31. Kandan PM, Menaga V, Jumar KKK. Oral health in pregnancy. Guidelines to gynecologists, general physicians and oral health providers. *J Pak Med Assoc* 2011; 61(10):1009-14.
32. Moore PA. Selecting drugs for the pregnant dental patient. *J Am Dent Assoc* 1998;129(9):1281-6.
33. Morgan MA, Cragan JD, Golderberg RL, Rasmussen SA, Schulkin J. Management of prescription and nonprescription drug use during pregnancy. *J Matern Fetal Neonatal Med* 2010;23(8):813-9.
34. U.S. Food and Drug Administration. Labeling and prescription drug advertising: Content and format for labeling for human prescription drugs. *Fed Regist* 1979;44(124):434-67.
35. The Organization of Teratology Information Services. Mother To Baby. Medications and more during pregnancy and breastfeeding. Ask the Experts. Available at: "mothertobaby.org/". Accessed September 14, 2016.
36. U.S. Dept of Health and Human Services. Healthy people 2020 Topics and objectives: Tobacco use. Washington, D.C. Available at: "<https://www.healthypeople.gov/2020/topics-objectives/topic/tobacco-use>". Accessed September 14, 2016.
37. U.S. Dept of Health and Human Services, CDC, National Center for Chronic Disease Prevention. Preventing Smoking and Exposure to Secondhand Smoke Before, During, and After Pregnancy. Available at: "http://www.ctparenting.com/_files_/smoking.pdf". Accessed September 14, 2016.
38. Matthews TJ. Smoking during pregnancy in the 1990s. National vital statistics report. Hyattsville, Md: National Center for Health Statistics; 2001:49;7. CDC. Dept of Health and Human Services. Publication No. (PHHS) 2001-1120; PRS 01-0539 (8/2001).
39. World Health Organization. International consultation on environmental tobacco smoke (ETS) and child health – Consultation report. Geneva, Switzerland: World Health Organization; 1999.
40. U.S. Dept of Health and Human Services. Preventing Tobacco Use Among Young People: Report of the Surgeon General. Atlanta, Ga.: US Dept of Health and Human Services, Public Health Service, CDC, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 1994.
41. Aligne CA, Moss ME, Auinger P, Weitzman M. Association of pediatric dental caries with passive smoking. *J Am Med Assoc* 2003;289(10):1258-64.
42. Hughes D. Oral health during pregnancy and early childhood: Policy February 2010. Available at: "<http://www.cdph.ca.gov/programs/MCAHOralHealth/Documents/MO-OHP-PolicyBrief-2010.pdf>". Accessed September 11, 2016.
43. Ismail SK, Kenney L. Review of hyperemesis gravidarum. *Best Pract Res Clin Gastroenterol* 2007;21(5):755-69.
44. Steinberg BJ. Women's oral health issues. *J Dent Educ* 1999;63(3):271-5.
45. McGaw T. Periodontal disease and preterm delivery of low-birth-weight infants. *J Can Dent Assoc* 2002;68(3): 165-9.
46. Demir Y, Demir S, Aktepe F. Cutaneous lobular capillary hemangioma induced by pregnancy. *J Cutan Path* 2004;31(1):77-80.
47. Straka M. Pregnancy and periodontal tissues. *Neuro Endocrinol Lett* 2011;32(1):34-8.
48. Xiong X, Elkind-Hirsch KE, Vastardis S, Delarosa RL, Pridjian G, Buekens P. Periodontal disease is associated with gestational diabetes mellitus: A case control study. *J Periodontol* 2009;80(11):1742-9.

49. Xiong X, Buekens P, Vastardis S, Pridjian G. Periodontal disease and gestational diabetes mellitus. *Am J Obstet Gynecol* 2006;105(4):1080-9.
50. Raber-Durlacher JE, van Steenberghe TJM, van der Velden U, de Graaff J, Abraham-Inpijn L. Experimental gingivitis during pregnancy and postpartum: Clinical, endocrinological, and microbiological aspects. *J Clin Periodontol* 1994;21(8):549-58.
51. Mitchell-Lewis D, Engebretson SP, Chen J, Lamster IB, Papapanou PN. Periodontal infections and pre-term birth: Early findings from a cohort of young minority women in New York. *Eur J Oral Sci* 2001;109(1):34-9.
52. Vettore MV, Leão AT, Leal Mdo C, Feres M, Sheiham A. The relationship between periodontal disease and preterm low birth weight: Clinical and microbiological results. *J Periodontol Res* 2008;43(6):615-26.
53. Jeffcoat MK, Geurs NC, Reddy MS, Cliver SP, Goldenberg RL, Hauth JC. Periodontal infection and preterm birth: Results of a prospective study. *J Am Dent Assoc* 2001;132(7):875-80.
54. Davenport ES, Williams CE, Sterne JA, Murad S, Sivapathasundram V, Curtis MA. Maternal periodontal disease and preterm low birthweight: Case-controlled study. *J Dent Res* 2002;81(5):313-8.
55. Contreras A, Herrera JA, Soto JE, Arce RM, Jaramillo A, Botero JE. Periodontitis is associated with preeclampsia in pregnant women. *J Periodontol* 2006;77(2):182-8.
56. Heimonen A, Rintamäki H, Furuholm J, Janket SJ, Kaaja R, Meurman JH. Postpartum oral health parameters in women with preterm birth. *Acta Odontol Scand* 2008;66(6):334-41.
57. Khader Y, Al-shishani L, Obeidat B, et al. Maternal periodontal status and preterm low birth. *Arch Gynecol Obstet* 2009;279(2):165-9.
58. Guimarães AN, Silva-Mato A, Miranda Cota LO, Siqueira FM, Costa FO. Maternal periodontal disease and preterm or extreme preterm birth: An ordinal logistic regression analysis. *J Periodontol* 2010;81(3):350-8.
59. Newnham JP, Newnham IA, Ball CM, et al. Treatment of periodontal disease during pregnancy: A randomized controlled trial. *Obstet Gynecol* 2009;114(6):1239-48.
60. Shub A, Wong C, Jennings B, Swain JR, Newnham JP. Maternal periodontal disease and perinatal mortality. *Aust N Z J Obstet Gynaecol* 2009;49(2):130-6.
61. California Dental Association Foundation. Oral health during pregnancy and early childhood: Evidence based guidelines for health professionals. February 2010. Available at: "http://www.cdafoundation.org/Portals/0/pdfs/poh_guidelines.pdf". Accessed September 14, 2016.
62. New York State Dept of Health. Oral health care during pregnancy and early childhood practice guidelines. New York, 2006. Available at: "<http://www.health.ny.gov/publications/0824.pdf>". Accessed September 14, 2016.
63. Jafarzadeh H, Sanatkhan M, Mohtasham N. Oral pyogenic granuloma: A review. *J Oral Sci* 2006;48(4):167-75.
64. Pitiphat W, Joshipura KJ, Gillman MW, Williams PL, Douglass CW, Rich-Edwards JW. Maternal periodontitis and adverse pregnancy outcomes. *Community Dent Oral Epidemiol* 2008;36(1):3-11.
65. Hilgers KK, Douglass J, Mathieu G. Adolescent pregnancy: A review of dental treatment guidelines. *Pediatr Dent* 2003;25(5):459-67.
66. Creasy RK, Resnik R. *Maternal-Fetal Medicine: Principles and Practice*. 5th ed. Philadelphia, Pa.: WB Saunders, 2004.
67. Whittle KW, Whittle JG, Sarll DW. Amalgam fillings during pregnancy. *Br Dent J* 1998;185(10):500.
68. Hujoel PP, Lydon-Rochelle M, Bollen AM, Woods JS, Geurtsen W, del Aguila MA. Mercury exposure from dental filling placement during pregnancy and low birth-weight risk. *Am J Epidemiol* 2005;161(8):734-40.
69. U.S. Food and Drug Administration. White Paper: FDA Update/Review of Potential Adverse Health Risks Associated with Exposure to Mercury in Dental Amalgam. July, 2009. Available at: "<http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/DentalProducts/DentalAmalgam/ucm171117.htm#1>". Accessed September 14, 2016.
70. American Dental Association Council on Scientific Affairs, U.S. Dept Health and Human Services Food and Drug Administration. Dental radiographic examinations: Recommendation for patient selection and limiting radiation exposure. ADA positions, Policies and Statements. Revised 2012. Available at: "http://www.ada.org/en/-/media/ADA/Member%20Center/Files/Dental_Radiographic_Examinations_2012". Accessed September 16, 2016.
71. American Dental Association Council, U.S. Dept Health and Human Services Food and Drug Administration. The selection of patients for dental radiographic examinations – 2004. U.S. Department of Health and Human Services. Available at: "[http://www.ada.org/en/-/media/ADA/Science%20and%20Research/Files/topics_radiography_examinations\(1\)](http://www.ada.org/en/-/media/ADA/Science%20and%20Research/Files/topics_radiography_examinations(1))". Accessed September 16, 2016.
72. National Council on Radiation Protection and Measurements. Radiation protection in dentistry. Report No. 145. NRC Publications, Bethesda, Md.; 2003.
73. Brambilla E, Felloni A, Gagliani M, Malerba A, García-Godoy F, Strohmeier L. Caries prevention during pregnancy: Results of a 30-month study. *J Am Dent Assoc* 1998;129(7):871-7.
74. Caulfield PW. Dental caries – A transmissible and infectious disease revisited: A position paper. *Pediatr Dent* 1997;19(8):491-8.
75. Li Y, Caulfield PW, Dasanayake AP, Wiener HW, Vermund SH. Mode of delivery and other maternal factors influence the acquisition of *Streptococcus mutans* in infants. *J Dent Res* 2005;84(9):806-11.

76. Ge Y, Caufield PW, Fisch GS, Li Y. *Streptococcus mutans* and *Streptococcus sanguis* colonization correlated with caries experience in children. *Caries Res* 2008;42(6):444-8.
77. Berkowitz RJ, Jordan HV, White G. The early establishment of *Streptococcus mutans* in the mouths of infants. *Arch Oral Biol* 1975;20(3):171-4.
78. Stiles HM, Meyers R, Brunnelle JA, Wittig AB. Occurrence of *Streptococcus mutans* and *Streptococcus sanguis* in the oral cavity and feces of young children. In: Stiles M, Loesch WJ, O'Brien T, eds. *Microbial Aspects of Dental Caries*. Washington, D.C.: Information Retrieval; 1976:187.
79. Loesche WJ. Microbial adhesion and plaque. In: *Dental Caries: A Treatable Infection*. 2nd ed. Grand Haven, Mich; Automated Diagnostic Documentation, Inc; 1993:81-116.
80. Wan AK, Seow WK, Purdie DM, Bird PS, Walsh LJ, Tudehope DI. A longitudinal study of *Streptococcus mutans* colonization in infants after tooth eruption. *J Dent Res* 2003;82(7):504-8.
81. Wan AK, Seow WK, Walsh LJ, Bird P, Tudehope DI, Purdie DM. Association of *Streptococcus mutans* infection and oral developmental nodules in predecidate infants. *J Dent Res* 2001;80(10):1945-8.
82. Berkowitz RJ. Mutans streptococci: Acquisition and transmission. *Pediatr Dent* 2006;28(2):106-9; discussion 192-8.
83. Law V, Seow WK, Townsend G. Factors influencing oral colonization of mutans streptococci in young children. *Aust Dent J* 2007;52(2):93-100.
84. Murphey C, Rew L. Three intervention models for exploring oral health in pregnant minority adolescents. *J Spec Pediatr Nurs* 2009;14(2):132-41.
85. Meyer K, Geurtsen W, Günay H. An early oral health care program starting during pregnancy: Results of a prospective clinical long-term study. *Clin Oral Investig* 2010;14(3):257-64.
86. Thompson TA, Cheng D, Strobino D. Dental cleaning before and during pregnancy among Maryland mothers. *Matern Child Health J* 2013;17(1):110-8.
87. Devine S, Bull S. Enhancing a teen pregnancy prevention program with text messaging: Engaging minority youth to develop TOP® Plus Text. *J Adolesc Health* 2014;54(3 Suppl):S78.
88. Weber TJ, Fernsler HL. Treating the minor patient. *Penn Dent J* 2002;69(3):11-4.
89. Hasegawa TK, Matthews M Jr. Confidentiality for a pregnant adolescent? *Texas Dent J* 1994;111(2):23-5.
90. American Academy of Pediatric Dentistry. Guideline on caries risk-assessment and management for infants, children, and adolescents. *Pediatr Dent* 2016;38(special issue):142-9.
91. Caufield PW, Li Y, Bromage TG. Hypoplasia-associated severe early childhood caries--A proposed definition. *J Dent Res* 2012;91(6):544-50.
92. Isokangas P, Söderling E, Pienihäkkinen K, Alanen P. Occurrence of dental decay in children after maternal consumption of xylitol chewing gum: A follow-up from 0 to 5 years of age. *J Dent Res* 2000;79(11):1885-9.
93. Söderling E, Isokangas P, Pienihäkkinen K, Tenovou J. Influence of maternal xylitol consumption on acquisition of mutans streptococci by infants. *J Dent Res* 2000;79(3):882-7.
94. Thorild I, Lindau B, Twetman S. Caries in 4-year-old children after maternal chewing of gums containing combinations of xylitol, sorbitol, chlorhexidine, and fluoride. *Eur Arch Paediatr Dent* 2006;7(4):241-5.
95. American Academy of Pediatric Dentistry. Guideline on adolescent oral health care. *Pediatr Dent* 2016;38(special issue):155-62.
96. Centers of Disease Control and Prevention (CDC). Recommendations for using fluoride to prevent and control dental caries in the United States. *Centers for Disease Control and Prevention. MMWR Recomm Rep* 2001;50(RR-14):1-42.
97. Linnett V, Seow WK. Dental erosion in children: A literature review. *Pediatr Dent* 2001;23(1):37-43.
98. English A, Ford CA. The HIPAA privacy rule and adolescents: Legal questions and clinical challenges. *Perspect Sex Reprod Health* 2004;36(2):80-6.