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ENGAGING HYGIENISTS, NURSES AND SOCIAL SERVICE PROFESSIONALS IN AN INTERDISCIPLINARY MODEL FOR PREVENTION AND EARLY CARE OF ORAL DISEASES IN WOMEN OF CHILDBEARING AGE

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Abstract
Compelling physiologic and epidemiologic evidence is establishing a strong link between periodontal disease and preterm labor and birth. Because many women do not seek care during the first critical few weeks after conception, it is imperative that health professionals intervene proactively at various levels of prevention (e.g., primordial, primary, secondary) during periodic contact with women before pregnancy or soon after conception. Preconceptional counseling and care have traditionally been provided primarily by medicine and nursing. The authors recommend a broad-based, patient-focused, interdisciplinary preconceptional care model to ensure provision of preventive dental education and care. Using, as a foundation, the 5 "A"s approach promoted by the U.S. Public Health Service in its "Treating Tobacco Use and Dependence Clinical Practice Guideline", the authors present a community-based, interdisciplinary strategy for improving risk factor assessment, increasing knowledge about the importance of risk factors on pregnancy outcomes, and developing new skills related to oral health and periodontal disease. All health professionals share roles in providing preventive care. An ideal strategy for successful preventive care is a collaboration of medical, nursing, dental, and social service professionals to provide preconceptional care aimed at reducing and controlling gingival/periodontal inflammation, with the goal of decreasing the rate of preterm labor and birth.

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Introduction

Preterm birth (PTB), which is responsible for most neonatal deaths in newborns, is a serious health concern in the United States. In 2004, 12.5% of all births were preterm (before 37 weeks of gestation). Unfortunately, over the last decade, the overall PTB in the U.S. has risen steadily and increased by about 30% since 1981.[1] The articles in this issue of *Grand Rounds* provide strong evidence supporting a physiologic and epidemiologic relationship between periodontal disease and adverse pregnancy outcomes, including PTB. These findings challenge healthcare professionals to ensure that women of childbearing age receive high quality preventive dental care in addition to other preconceptional measures recommended by healthcare professionals and consumer organizations.

Organizations such as the Centers for Disease Control and Prevention (CDC) and the March of Dimes have identified strategies to decrease PTBs. The March of Dimes' National Prematurity Campaign increases public awareness about

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risks of premature birth and provides educational programs to professionals and consumers to identify and reduce the risks of PTB.[2] The CDC has identified 10 measures to improve women's health before pregnancy.[3] They are: 1) Individual responsibility throughout the lifespan; 2) consumer knowledge and awareness; 3) preventive visits; 4) interventions for identified risks; 5) interconceptional care; 6) pre-pregnancy checkups; 7) health insurance coverage for women with low incomes; 8) public health programs and strategies; 9) research; and 10) monitoring improvements. The recommendations were developed to guide consumers and health professionals and to increase the number of women who enter pregnancy in optimal health.

In addition to the March of Dimes and CDC recommendations, the review of *Healthy People 2010* objectives, published in March of 2004, identifies additional steps needed to achieve Oral Health Objectives by 2010.[4] Two of the 7 suggestions relate to preconceptional care: 1) Enhancing oral health literacy for parents and prospective parents; and 2) seeking ways to ensure that "high risk women of childbearing age" receive preconceptional counseling.

To increase research-based knowledge about risk identification, prevention and treatment of preterm labor and birth and improved epidemiological surveillance systems, the Institute of Medicine (IOM) recently released a report endorsed by the March of Dimes and the American College of Obstetricians and Gynecologists calling for aggressive research aimed at improving prediction and prevention of preterm labor and birth.[1] Subsequently, the U.S. Senate Health, Education, Labor and Pension Committee unanimously approved the Prematurity Research Expansion and Education for Mothers who Deliver Infants Early (PREEMIE) Act (S. 707) in June of 2006.[5] In addition to funding grants and surveillance systems, the PREEMIE Act, which allocates $18 million per year, will fund the Interagency Coordinating Council on Prematurity and Low Birthweight, which will oversee activities authorized by the act, a measure also supported by the IOM.[1]

Two studies suggest that active periodontal interventions in pregnant women, such as scaling and root planing (with or without antibiotics), can reduce preterm labor and birth.[6,7] It is not clear whether the presence of periodontal disease has a causative effect on PTB (i.e., whether periodontal pathogens, either directly or indirectly through production of inflammatory cytokines, induce early labor). It is also possible that women who give birth prematurely have periodontal disease or intrinsic inflammatory conditions or an innate immunity trait predisposing them to both conditions. Evidence supporting a link between periodontal disease and PTB should, however, alert healthcare providers to the need for prevention efforts.[1] Since PTB can result in significant morbidity and mortality for infants, emotional stress for the family and financial cost to society, addressing periodontal health issues prior to conception or very early in pregnancy should contribute to reduction of preterm labor and birth associated with poor dental health.

Despite extensive evidence supporting periodontal disease as a risk factor for preterm labor and birth, diffusion of this concept into health prevention programs and clinical practice has been slow. More critically, consumer awareness among pregnant women is extremely low. A recent report from the CDC's Pregnancy Risk Assessment Monitoring System (PRAMS) showed that women have negative perceptions about seeking oral healthcare during pregnancy. The CDC encourages health education program planners to give increased attention to this area.[8] Other data from PRAMS suggest that 12 to 25% of women report dental problems during pregnancy and that only approximately half sought care.[9] Ensuring effective health promotion and preventive dental care for women of childbearing age, especially those with limited access to traditional dental care delivery models, requires collaboration between medical/nursing, dental/dental hygiene, and social service professionals. An interdisciplinary model of prevention and care must be developed to bring underutilized resources and healthcare professions to the forefront of preconceptional care. In this paper a preliminary interdisciplinary model for preconceptional screening, assessment, and interventions are proposed that can be adapted for use in community health environments.

What is preconceptional care?

Preconceptional care has been defined as interventions which focus on the identification and modification of risks for preventable or modifiable adverse pregnancy outcomes (such as preterm labor and birth).[3] Over a decade ago, the Department of Health and Human Services published *Healthy People 2000*, which proposed to "increase availability of appropriate preconceptional care and counseling".[10] Medical and nursing providers who treat women aged 15 to 44 are providing preconceptional care including counseling women about daily folic acid supplementation, rubella immunity, smoking cessation, and alcohol and illicit drug use.[11,12] Barriers to providing effective preconceptional counseling include the fact that approximately one-half of all pregnancies in the U.S. are unplanned (totaling 3 million per year) and few women specifically seek preconceptional care or counseling.[12-15] In addition, many women are not aware they are pregnant during the first 4-10 weeks of pregnancy when the embryo/fetus is most susceptible to effects of maternal health and exposures. Even among women who know they are pregnant, about

20% of them do not seek prenatal care during the critical first trimester.[14,16]

Because of the complexity of the current healthcare system, preconceptional care may be fragmented. The authors engaged a more diverse web of providers, including social workers and dental care providers who are knowledgeable of preconceptional counseling, in order to further facilitate reduction of adverse pregnancy outcomes as new scientific evidence becomes available.

Current preconceptional guidelines for medical providers can be grouped into the following 4 categories:[3,16]

- Assessment of maternal health
- Ensuring appropriate immunity levels for diseases harmful to the embryo/fetus
- Screening for conditions harmful to the embryo/fetus
- Counseling

Preconceptional care now includes: Discontinuing or adjusting dosages of prescribed drugs such as isotretinoins, warfarin, anti-seizure, and anti-hypertensive drugs that are known teratogens; minimizing occupational exposures to environmental toxins; screening for sexually transmitted diseases and human immunodeficiency virus; and screening for intimate partner violence. In addition, guidelines suggest educating women who may become pregnant about folic acid supplementation, healthy diet, and adequate exercise; discontinuing alcohol, tobacco and illicit drug use; and rubella, varicella and hepatitis B immunizations.[10] A primary goal of preconceptional care is to provide education to delay pregnancy until risks of adverse pregnancy outcomes can be minimized.[17]

Chronic infections, including gingivitis and periodontitis, should also be addressed in preconceptional care. Estimates of the prevalence of gingival or periodontal diseases in women of childbearing age vary, depending on how the study defines severity of disease. Data obtained from a large national sample in NHANES III suggest that approximately one-fourth of women aged 20 to 39 show evidence of gingivitis or periodontitis.[17] Other estimates from a large prospective study, the Oral Conditions and Pregnancy study (OCAP), suggest that approximately 57% of pregnant women exhibit signs of mild disease, and another 13-14% show moderate to severe periodontitis.[18-20]

Of particular interest to dental clinicians is the CDC's April 2006 report, *Recommendations to Improve Preconception Health and Health Care: United States*. While this document acknowledges a link between a mother and child's oral health with respect to transmission of cariogenic bacteria, it inappropriately references 3 pivotal studies showing a link between periodontal disease and preterm labor, not transmission of cariogenic bacteria. No further discussion of oral health appears in the document, nor are oral health experts listed as members of the work groups or advisory panel.[3] Recently, within the extensive, 600-page IOM report on PTB, only 2 paragraphs are devoted to maternal periodontal disease. Of concern is the fact that no dental health professionals are represented on the committee.[1] In spite of a growing body of evidence on periodontal disease as a risk factor for preterm labor and birth, diffusion into the mainstream of medical and dental practice has been slow.

A model for practice

Since many women present for an initial prenatal appointment only after the first trimester of pregnancy, preventive strategies must target a larger population of women of childbearing age at earlier stages of pregnancy. Health professionals other than physicians and nurses, such as dentists, dental hygienists or social service professionals, often have regular communication with women through periodic preventive care visits. This contact provides a unique opportunity to provide early counseling regarding health risks potentially impacting pregnancy (e.g., preterm labor and birth) and to refer high-risk individuals to preconceptional or early prenatal care. In 1997, 43% of adults and 48% of adolescents sought dental care within the previous 12 months; *Healthy People 2010* objective 21-10 aims to increase this number to 56% by 2010.[21] Unfortunately, only 20% of individuals in the <200% of poverty level sought oral healthcare, requiring community-based systems or social service professionals to be the primary component of any preventive model. Irrespective of where women of childbearing age enter the healthcare system, dental hygiene/dental, nursing/medical, and social service providers must be knowledgeable about preconceptional care and skilled in providing appropriate counseling and timely referrals of women at risk. Figure 1 illustrates the ongoing cycle of preventive education and care, beginning with primordial prevention in pubertal girls and continuing through secondary prevention activities.

Additionally, use of a standardized method for risk assessment could be useful for busy professionals in contact with women of childbearing age. A proposed model for prevention can be conceptualized as one of shared responsibility in which medical, nursing, dental, and social service professionals identify potential risk factors for adverse pregnancy outcomes (either before pregnancy or immediately after conception) and provide counseling, education or referral to the appropriate health professional for interventions (Figure 2).

A well known approach that can be adapted to imple-

Fig. 1: Cycle of interdisciplinary preventive care

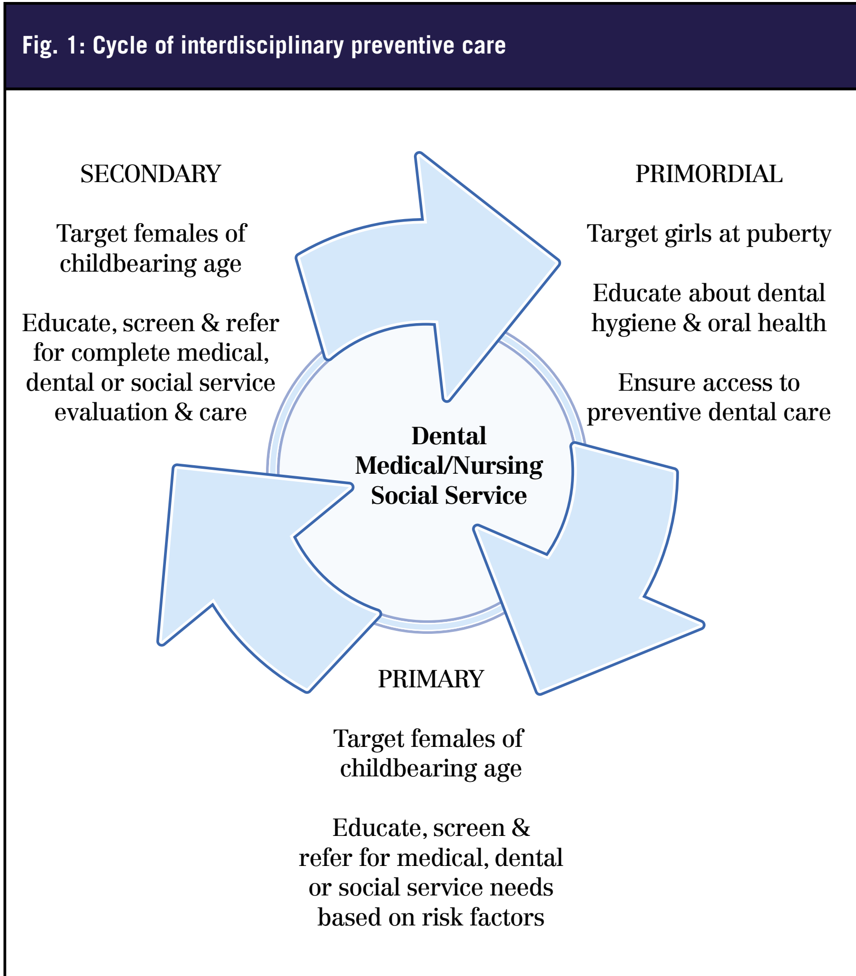
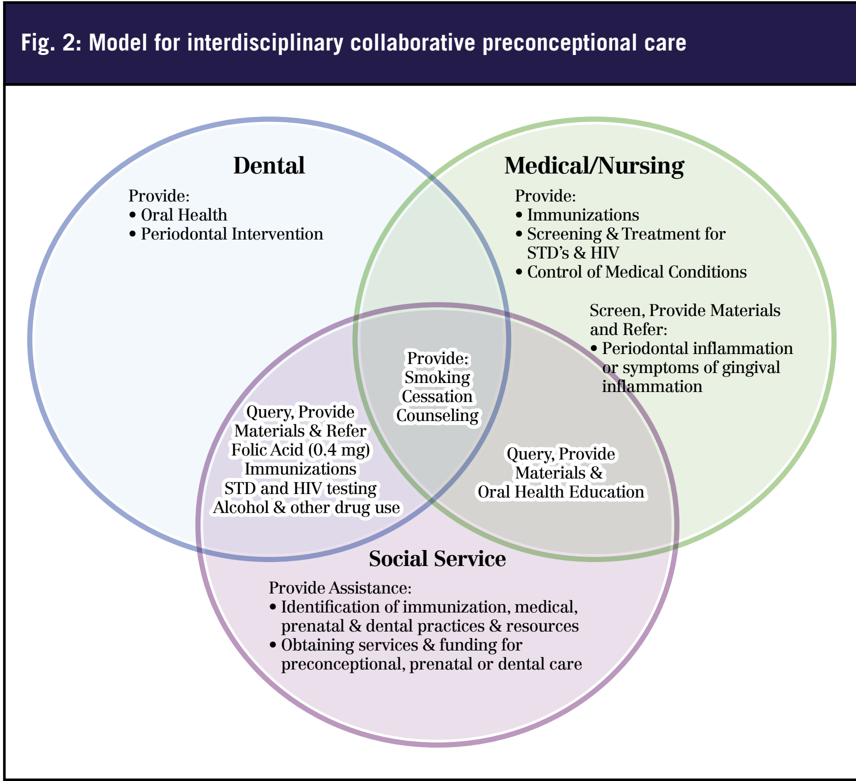


Fig. 2: Model for interdisciplinary collaborative preconceptional care



ment this model is known as the 5As. This method is promoted by the U.S. Public Health Service in its *Treating Tobacco Use and Dependence Clinical Practice Guideline* and endorsed by the American College of Obstetricians and Gynecologists for reducing smoking during pregnancy.[22] The strategy utilizes a brief counseling intervention that includes the following components:

- Ask about smoking.
- Advise about behavior change.
- Assess willingness to quit.
- Assist by providing materials and support.
- Arrange for follow-up.

The approach could be expanded and adapted to preconceptional counseling by health and social service professionals. That assessment could include the following:

- Ask about the risk factor.
- Advise about reducing risk for an adverse pregnancy outcome.
- Assess willingness to engage in risk-reduction behavior.
- Assist by providing specific materials, referrals and/or interventions, as needed.
- Arrange for referral or follow-up as appropriate.

This approach represents a novel paradigm in which women and children are the focus of assessment and intervention. Implementation requires synergy between dental, nursing, medical, and social service environments to improve screening for risk factors, increase practitioners' knowledge of the importance of risk factors on pregnancy outcomes, and increase practitioners' development of new skills. Clearly, this approach necessitates greater cooperation among interdisciplinary team members than the current standard of care. Table 1 outlines application of the 5As for each professional group. Implementation will require cross-training to ensure that specific skills in preconceptional care are available to all members of the health-care team.

Education to implement the model

Previous examples of links between systemic health and adverse pregnancy outcomes (e.g., maternal phenylketonuria and maternal diabetes mellitus) provide guidance for how interdisciplinary teams can effectively provide appropriate care. Such approaches require a significant shift in the paradigm of "patient responsibility". Dental professionals need to enhance their knowledge of general risk factors in pregnancy and improve counseling skills, as well as make available pregnancy-specific health promotion materials for patients. Nursing and medical professionals need to learn to screen patients for common

Table 1
A paradigm of shared responsibility

5As	Dental Providers	Medical Providers	Social Service Providers
ASK	Tobacco use	Tobacco use	Key risk factors
ADVISE	Rubella vaccine Varacella vaccine Hepatitis B vaccine Folic acid intake (>0.4mg) Previous pregnancy outcomes Family history Past periodontal history	Rubella vaccine Varacella vaccine Hepatitis B vaccine Folic acid intake (>0.4mg) Previous pregnancy outcomes Family history Past periodontal history	Current access to care Financial resources Past health-seeking behaviors: • Immunizations • OB care • Dental Potential for safety risk
ASSESS	Willingness to stop smoking Willingness to seek prenatal care Need for social services	Willingness to stop smoking Willingness to seek prenatal care Need for social services	Available resources and person's emotional, physical and financial ability to seek care and change behaviors
ASSIST	Provide materials: • Smoking cessation • Folic acid • General good prenatal care	Provide materials: • Smoking cessation • General good prenatal care • Role of oral health in pregnancy • Impact of pregnancy on oral health	Assist individual in: • Navigating healthcare systems • Identifying barriers • Problem solving • Identifying community and funding resources • Encouraging use of personal resources
ARRANGE	Refer to public health clinic, nurse practitioner or physician Arrange for periodontal care, as needed Arrange for periodonal maintenance during and following pregnancy	Refer to public health clinic, dentist or dental hygienist Arrange for immunizations, support of systemic conditions, reduction in medications, as needed Arrange for ongoing prenatal care	Refer to appropriate health clinic Arrange for social services and support Follow-up on use of personal resources

Table 2
Proposed brief preconceptional screening instrument

Areas of Potential Risk	Clinical Plan
Medical History	
• Have you been diagnosed with any chronic diseases (e.g., asthma, epilepsy, diabetes, etc.)?	If yes, document specific disease(s).
• Are you currently seeing a healthcare provider for your chronic disease(s)?	If yes, support continuation; if no, encourage follow-up, especially if planning pregnancy.
Nutrition History	
• Have you lost or gained more than 10 pounds in the past year without trying to?	If yes, refer to primary healthcare provider for assessment
• Are you on a special diet? (vegetarian, high protein, etc.)	If yes, ask her if she has talked with a healthcare professional or registered dietician about the nutritional “balance” of the diet and, if she has not, encourage her to do so.
• Have you ever been diagnosed with an eating disorder?	If yes, refer to primary healthcare provider for assessment
• Are you concerned that you are not eating a healthy diet?	If yes, refer to dietician for assessment
• Did you eat breakfast this morning?	If yes, reinforce importance; if no, recommend nutritional counseling with a dietician
Tobacco Use Do you smoke cigarettes or use tobacco products?	If yes, document smoking status and proceed to “advise, assess, assist and arrange”.
Gingival or Periodontal Disease • Have you ever been told you have gum disease? • Have you ever been treated for gum disease? • Do your gums bleed when you brush or floss your teeth? • Are your gums red, swollen or tender? • Are any of your teeth loose? • Have any of your teeth moved or changed position lately? • Have you ever had a gum abscess?	If no, perform visual screening. If yes to 2 or more questions, refer for periodontal assessment.
Medication History • Are you currently taking any prescribed medications? • Are you currently taking any non-prescibed medications, drugs, herbs or supplements?	If yes to either question, discuss importance of talking with prescriber or pharmacist about effects during pregnancy.
• Do you take vitamins on a regular basis?	If yes, clarify.
If yes, which of the following are you currently taking?	
• Multiple Vitamin or Prenatal Vitamin	Support daily use
• Vitamin A	Caution on overuse
• Folic Acid	Support 0.4 mg daily
• Dietary Supplements ____________________	Discuss ingredients and possible risks.
Women’s Health • How many times have you been pregnant? What was the outcome(s)?	If previous pregnancy(s) with complications, encourage obstetric/gynecologic assessment before pregnancy.
• When was your last gynecological exam?	If more than 1 year ago, refer for exam.

Table 3
On-line resources for preconceptional care

Resources	Description	Location
DHHS Office of Women's Health	Central point for consumers and professionals to obtain preconceptional information from the CDC; most consumer resources available in Spanish.	http://www.4women.gov/Pregnancy/tryingtogetpregnant/beforeresources.cfm#preconception
National Healthy Mothers, Healthy Babies Coalition	Covers FAQs with evidence-based responses on diet and nutrition, stress, oral health, smoking, and drugs and alcohol use.	http://www.hmhb.org/pregnant.html#oh
CDC Recommendations to Improve Preconception Health and Healthcare – U.S.	Overviews specific goals and recommendations to achieve goals to reduce risks associated with preterm, low birthweight pregnancy outcomes.	http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5506a1.htm
Washington State Department of Health: Maternal and Child Health Program Publications	Best practice guidelines using 5As format for multiple preconceptional counseling topics: • Smoking Cessation During Pregnancy: Guidelines for Intervention • Domestic Violence and Pregnancy: Guidelines for Screening and Referral • Substance Abuse During Pregnancy: Guidelines for Screening	http://www.doh.wa.gov/CFH/mch/mch_publications.htm
Bright Futures in Practice: Oral Health – National Maternal and Child Oral Health Resource Center	Pocket Guide is designed to help health professionals implement specific oral health guidelines during pregnancy and postpartum, and in infancy, early childhood, middle childhood and adolescence.	http://www.mchoralhealth.org/pocket.html

signs of gingival/periodontal disease and also have oral health promotion materials available. Social service professionals must be oriented to the need for timely referral and identification of women of childbearing age who are at high risk. Finally, all participants must collaborate to develop streamlined referral mechanisms that encourage cross-referral when indicated.

Specific strategies for fostering an oral-systemic paradigm shift in patient care are as follows:

- Develop direct referral systems between nurses and dental hygienists.
- Modify questionnaires used in dental environments to obtain information about risk factors (e.g., folic acid supplementation, alcohol consumption, tobacco use).
- Improve screening competencies for gingivitis or early periodontitis in healthcare facilities serving women of childbearing age.
- Expand guidelines for health promotion and primary prevention in preconceptional care that include all key elements.
- Develop assessment instruments for use by all health professionals to assess signs of periodontal inflammation.
- Implement evidence-based intervention strategies.
- Increase extramural clinical experiences to ensure cross-training for medical/nursing students in periodontal care environments and for dental/dental hygienist students in obstetrical environments.
- Expand knowledge and skills through scholarly venues such as continuing education and creative interdisciplinary educational opportunities, such as extramural rotations and educational curricula available on professional Websites; materials could include:
  - » PowerPoint presentations
  - » Case examples for learners to analyze and develop clinical maps
  - » Role-playing of patient interview questions to explore periodontal disease risk factors and appropriate counseling and referral

One potential resource to guide healthcare professionals would be a screening checklist that is easy to use in multiple environments. Table 2 shows such an instrument that can facilitate the "Ask" and "Assist" phase of the

intervention. Questions can be administered in a few minutes of any medical, dental or social service encounter, enabling quick assessment of potential risk factors. Online resources for health and social service professionals are listed in Table 3.

Conclusion

All health professionals have a potential role in providing preconceptional care. Because of the established link between periodontal disease and adverse pregnancy outcomes, medical, nursing, dental, and social service professionals should ideally provide preconceptional care aimed at reducing gingival/periodontal inflammation. In the absence of preconceptional care, early pregnancy counseling should be positive and aimed at teaching a pregnant woman to employ good plaque control through an understanding of the role of hormones in exacerbating existing disease. Although evidence for a link between periodontal disease and preterm labor and birth continues to grow, directly attributing preterm labor and birth to periodontal disease may be premature and statements to this effect should be avoided until more scientific support accumulates. It is the ethical and moral obligation of all health professions in contact with women who are or may become pregnant to conduct screening and appropriately refer for treatment of any disease, including oral disease, to ensure "best practice" outcomes.

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