February 13, 2006

To: Board of Health

From: Dr. David McKeown, Medical Officer of Health

Subject: The Link Between Periodontal Disease and Adverse Birth Outcomes

Purpose:

To inform the Board of Health of current findings pertaining to the potential link between periodontal disease and adverse birth outcomes with a view to identifying possible public health strategies.

Financial Implications and Impact Statement:

There are no financial implications arising from this report.

Recommendations:

It is recommended that:

(1) Toronto Public Health continue to monitor research on the link between periodontal health and adverse birth outcomes;

(2) Toronto Public Health collaborate with the Royal College of Dental Surgeons of Ontario multidisciplinary task force to inform the public and health professionals about the evidence to date regarding the link between periodontal disease and adverse birth outcomes;

(3) Toronto Public Health include oral hygiene instructions in prenatal education sessions and provide oral health kits and information packages to high risk pregnant women and teens;

(4) the Board of Health advocate to the Community Services Committee and the Province of Ontario that pregnant women eligible for social assistance be entitled to receive basic dental services, instead of only emergency dental services as currently offered, to improve oral health and contribute to healthy birth outcomes;
(5) this report to be forwarded to the Community Services Committee and the Minister of Health and Long-Term Care; and

(6) the appropriate City officials be authorized and directed to take necessary action to give effect thereto.

Background:

At its meeting on May 10th, 2004, the Board of Health directed the Medical Officer of Health to keep the Board of Health informed of the findings pertaining to the potential link between periodontal disease and preterm birth, with a view to identifying possible strategies for public health dental services, and to share these findings with Shelter, Support and Housing Administration and Toronto City Council. This report is in response to the Board of Health directive.

Comments:

In the last ten years there has been increasing interest and investigation of the potential effect of women’s oral health on perinatal and early childhood outcomes. Investigations have focussed on the possible links between periodontal disease in pregnant women and adverse birth outcomes such as Preterm Low Birth Weight (PLBW).

Periodontal disease is a chronic, low grade infection characterized by inflammation and eventual loss of tooth supporting tissues (i.e. gums and bone).

Research on the possible links between maternal periodontal disease and adverse birth outcomes is important because despite significant advances in prenatal care, the incidence of spontaneous preterm births and low birth weight infants continues to be a problem. Significant numbers of adverse birth outcomes remain unexplained and are not linked to any specific known risk factor such as maternal age, low socio-economic status, race/ethnicity, malnutrition, chronic stress, tobacco use/environmental tobacco smoke exposure.

According to the February 2006, Toronto Board of Health Report entitled “The Health of Toronto’s Young Children: Volume 2 – The First Year of Life in Toronto” the rate of low birth weight (LBW) among total live births and singleton live births is consistently higher in Toronto than in the rest of Ontario. In 2001, Toronto’s singleton rate of 5.2% was 30% higher than the rate for the rest of Ontario. Toronto Public Health has identified significant disparities in singleton LBW across geographical areas, neighbourhood income levels, maternal country of birth, and maternal age groupings. LBW babies require a disproportionate amount of health care and other services. For each preterm LBW infant born in Canada, the cost of neonatal care to one year of age was conservatively estimated at $48,183 per surviving infant in 1995. The lifetime cost for permanent disabilities was estimated to be $676,800 per preterm LBW infant (1). Since the lifetime cost of health care for a preterm LBW infant may be significant, strategies to prevent preterm births are important.
Research Findings on the Link Between Periodontal Disease and Preterm Low Birth Weight:

The potential association between periodontal disease and preterm low birth weight was first demonstrated through research in 1996 by Offenbacher et al. This research showed that women who have low birth weight infants as a result of either early labour or preterm, premature rupture of membranes tend to have more severe periodontal disease than women who had full term, normal birth weight babies. The research found that there was a 7.5 to 7.9 times increase in the risk of preterm low birth weight associated with severe periodontitis after controlling for other known risk factors such as smoking, previous preterm birth, alcohol etc. (2).

Results of preliminary data collected from the five year prospective study “Oral Conditions and Pregnancy” (OCAP) released in 2001, also supported the findings of the Offenbacher study. This study was designed to determine whether maternal periodontal disease contributes to the risk of prematurity and growth restriction in the presence of traditional obstetric risk factors, such as previous preterm birth, smoking, stress, alcohol, etc. The preliminary results indicate that maternal periodontal disease and the worsening of the disease during pregnancy, are significant contributors to the risk of preterm delivery, low birth weight and low weight for gestational age (3).

Since then, there have been many other studies in which preterm births were compared between patients with and without periodontal disease. These studies also describe the association of periodontal disease and adverse pregnancy outcomes and show that pregnant women with periodontal disease are three to seven times at greater risk of preterm birth than women without periodontal disease. Women with the most advanced periodontal disease have the greatest risk of giving birth at less than 32 weeks (4).

In 2003, Scannapieco et al. examined 12 studies in a systematic review of “Periodontal Disease as a Risk Factor for Adverse Pregnancy Outcomes”. His findings concluded that several studies implicated periodontal disease as a risk factor for preterm low birth weight. In addition, several epidemiologic studies did not support periodontal disease as a risk factor for PLBW. Scannapieco concluded that:

(1) periodontal disease may be a risk factor for PLBW;
(2) additional longitudinal, epidemiologic and interventional studies are needed to validate this association and to determine whether it is causal;
(3) it is not yet clear whether periodontal diseases play a causal role in adverse pregnancy outcomes; and
(4) preliminary evidence to date suggests that periodontal intervention may reduce adverse pregnancy outcomes (5).

Since the Scannapieco review, the evidence linking periodontal disease as a risk factor for adverse pregnancy outcomes has continued to grow. However, not all the studies support the association.

A meta-analysis of the available literature on periodontal disease in relation to the risk of preterm low birth weight done by Y.S. Khuder in 2005, concluded that periodontal disease in pregnant
women significantly increases the risk of subsequent preterm low birth weight. This analysis included two case control studies and three prospective cohort studies (6).

Other recent studies have also concluded that:

(a) Oral bacteria, in addition to periodontal bacteria, can also be related to pregnancy outcomes. The level of these bacteria in the mouth may not only predict poor pregnancy outcomes, but may be risk factors which can be modified to reduce PLBW (7).

(b) Pre-eclampsia, a specific disease of pregnancy resulting in elevated blood pressure, and one of the leading causes of maternal and fetal morbidity and mortality has a possible association with periodontal inflammation (8).

Research Findings on the Effect of Providing Periodontal Therapy During Pregnancy:

Early findings from studies on the effect of providing periodontal treatment during pregnancy and before delivery, point to a five fold reduction in the rate of prematurity. A study done by Lopez et al., divided approximately 400 women into a treatment and a delayed treatment group. The researchers found that periodontal therapy during pregnancy is not only safe, but may also improve pregnancy outcomes (9). Other more recent studies suggest that there is increased destruction of the supporting tissues of the teeth from bacteria on and in the tissues of the mouth during pregnancy. This increased response to organisms in the mouth is a result of hormonal fluctuations during pregnancy. This condition also increases the risk for prematurity. The research suggests that preventing periodontal disease, even in relatively healthy individuals, may improve pregnancy outcomes (10).

Currently, multiple studies are underway to determine if periodontal treatment can reduce the incidence of preterm birth.

Results from a recent (2005) randomized controlled study to determine the effect of routine plaque control and scaling on pregnancy outcomes in women with gingivitis (i.e. inflammation of the gums) concluded that periodontal treatment significantly reduced the preterm low birth rate in the population of 870 pregnant Chilean women studied (11).

To summarize, the research on the link between periodontal disease and preterm birth has not established a direct cause-effect relationship. However, most of the peer reviewed evidence to date does indicate that there is an association between adverse birth outcome and poor periodontal health. The association is supported by epidemiologic data, experimental animal studies and documentation of maternal and fetal host responses to periodontal bacteria. The association is also biologically plausible as several mechanisms for the translocation of bacteria from the mouth to the foetus have been demonstrated and suggested. If further intervention studies demonstrate that the treatment of periodontal infections reduces the risk of adverse birth outcome significantly, then periodontal care must be considered as a part of prenatal care. It is important that Toronto Public Health continue to monitor the research in this area and make appropriate recommendations to government and health professionals.
Possible Strategies for Toronto Public Health:

The reported association between severe periodontal disease among pregnant women and adverse birth outcomes is of concern and it is therefore appropriate to consider whether public health interventions are justified based on current evidence.

It is noteworthy that several jurisdictions in the United States have started to include dental services as a component of prenatal services offered to high risk pregnant women, and in some areas, all pregnant women. These services are both government and privately funded. Examples of such dental programs for pregnant women include: Louisiana - Dental Program for Medicaid Eligible Pregnant Women, Wyoming Dental Program for Pregnant Women, Pittsburgh School of Dental Medicine, Magee Women’s Hospital and Clinton County N.Y. Medicaid Obstetrical Maternal Services (MOMS).

On February 4, 2005, the Royal College of Dental Surgeons of Ontario (RCDSO) convened a symposium entitled “Oral Health: A Window to Systemic Disease”. At this symposium it was agreed, that while the potential links between periodontal and systemic disease (i.e. pneumonia, cardiovascular disease, diabetes, and adverse birth outcomes) are as yet not completely understood and evidence is still accumulating, optimizing patient oral health may result in significant benefits for their overall health and well being. The key recommendation from the symposium was a call to establish a multi-disciplinary task force to consolidate and disseminate information on this important health-care issue to a wide range of sectors, including the dental profession, the medical profession, policy makers and the general public (12). It is recommended that Toronto Public Health collaborate with the RCDSO to ensure that the information is shared with Toronto’s diverse residents.

Based on preliminary evidence cited in this report, Toronto Public Health recommends that at minimum, teeth cleaning and oral hygiene instruction should be made available to pregnant women who are at risk for preterm birth. This has the potential to reduce bacterial oral infections and to contribute to improved birth outcomes. A more comprehensive approach of offering basic dental services (i.e. examinations, fillings, extractions) would help to improve the overall health of the mother since there is considerable evidence showing that good oral health contributes to general health and wellbeing.

Presently, Toronto Public Health offers dental treatment services to high risk mothers enrolled in public health programs. To be eligible for dental services, these clients must have an oral condition requiring treatment and must be referred by staff in Healthy Families programs. To increase the awareness of the importance of good oral health on the health and well being of the mother and the baby, the findings pertaining to the association of poor periodontal health and preterm, low birth weight should be shared with Healthy Families staff and their clients. Consideration should also be given to assessing the oral health of these clients, with a view to offering preventive dental services even if they do not have a specific condition requiring dental treatment. However, this would require additional resources for the Toronto Public Health dental program. It is estimated that it would be necessary to add, at minimum, 2 dental hygiene teams (i.e. 2 dental hygienists, 2 dental assistants and 1 dental clerk) for an annual cost of $400,000. A minimal intervention could be for Healthy Families staff to give an oral health kit to each client.
Such a kit would include oral hygiene instructions, toothbrush, toothpaste, dental floss, and mouthwash. This could help increase awareness of the potential risk of poor oral health on birth outcomes and would also contribute to improved oral health for these clients.

Funds have been requested in the Toronto Public Health 2006 Operating budget for a dental hygiene team to work in the city’s shelter system, in particular with teenage pregnant women, to screen, provide preventive dental services and to refer these clients for dental treatment services as appropriate. The addition of this team would allow Toronto Public Health to work with vulnerable pregnant women to improve their oral health and possibly contribute to improved birth outcomes.

Adults on the Ontario Works Social Assistance Program are eligible for emergency dental care through a discretionary program funded 80% for program costs and 50% for administrative costs, by the Province. It is recommended that all pregnant women on social assistance be given access to basic dental services that have been shown to contribute to the improvement of birth outcomes. These services include examination, x-rays, fillings, extractions and root canal treatment of critical teeth, preventive services and periodontal therapies (scaling and root planning).

Studies have also demonstrated that children can be infected with caries causing bacteria, early in their development. The mother’s saliva is the main vehicle by which the transfer of bacteria takes place (13). This leads to an increased risk of caries developing in the baby teeth. By assisting pregnant women and mothers to improve their oral health status, the transmission of bacteria from mother to child could be reduced, and thereby reduce the caries experience of young children. As well, mothers with an improved understanding of the importance of oral health, would be better able to care for the oral health of their infants.

Conclusions:

Recent research points to a possible association between poor oral health and adverse birth outcomes such as preterm low birth weight. The evidence for this association is increasing. If in the future, such a causal relationship is firmly established, it will have major implications for public health services. In the meantime, given the importance of oral health to general health and wellbeing, efforts should be made to improve the oral health of women at risk for preterm delivery. Interventions such as providing oral health information and oral health kits to such at risk clients, should be included in public health prenatal services. Toronto Public Health will also continue to monitor the research findings and to keep the Board of Health informed on this issue.
Contact:

Dr. Hazel Stewart, Director
Dental and Oral Health Services
Tel: 416-338-7834
Email hstewart@toronto.ca

Dr. David McKeown
Medical Officer of Health
References:


