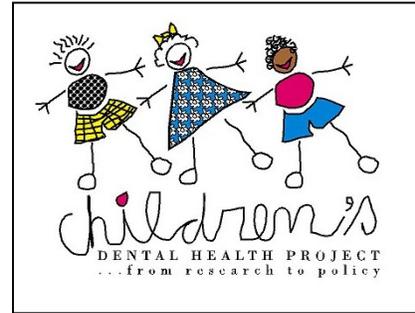


# Periodontal Disease Association With Poor Birth Outcomes: State of the Science and Policy Implications



## Preterm Low Birthweight in the US

The continuing problem of preterm low birthweight pregnancy outcomes (PLBW) in the U.S. is of concern because of significant consequences to maternal and child health, high costs, long-term disease burden, and individual suffering. Infants born prematurely in the U.S. account for 6 to 9 percent of all births, but 70% of all perinatal deaths and half of long-term neurologic morbidity.<sup>1</sup> Low birthweight associated with premature delivery is the “major underlying cause of infant mortality and childhood morbidity.”<sup>2,3</sup> Economic consequences exceed \$5 billion annually.

According to the Centers for Disease Control, the second leading cause of infant mortality is premature birth/low birth weight.<sup>4</sup> While some causes of premature birth and associated low birthweight are known and may be managed medically (e.g. asthma, cigarette smoking, bacterial vaginosis, diabetes), much of its incidence remains unexplained. NIH reports that “as many as 18% of the 250,000 premature low-weight infants born in the United States each year may be attributed to infectious oral disease.”<sup>5</sup> This is about the same percentage as explained by cigarette smoking.

## State of the Science

A growing body of research supports an association between periodontal disease (inflammatory gum disease) and unfavorable birth outcomes associated with PLBW. Based on this science there is growing hope that the severe developmental, economic, behavioral, and health consequences of PLBW may be partially preventable through improved oral health during pregnancy. The problem confronting educators, policymakers, maternal and child health officials, and child health advocates is determining whether the existing scientific evidence is yet strong enough to support implementation of clinical policies and public policies that may hold promise to reduce the incidence of PLBW. Since there is no known “downside risk” of improving pregnant women’s

oral health and the “upside benefit” of reducing poor birth outcomes is possible, there is great enthusiasm for dealing with this problem.

Various types of scientific studies show consistent trends toward substantiating the relationship between gum disease and PLBW. For example, inducing periodontal disease in animals leads to significantly smaller litter weights.<sup>6</sup> Animal studies also help explain how periodontal disease may lead to low birthweight. Animals with induced gum disease show higher levels of blood-borne chemical mediators that are known to stimulate uterine contraction, cervical dilation, labor, and abortion.<sup>7</sup>

Human studies that compare birth outcomes from women with periodontal disease to women with healthy mouths are somewhat less definitive. After adjusting for all other risk factors (for example, tobacco use and maternal age), one study of national data showed that mothers with periodontal infections have more than seven times the risk of delivering a low birthweight infant.<sup>8</sup> Other such studies, however, have detected no greater risk of PLBW.<sup>9</sup>

Another kind of human study follows women through pregnancy and compares those with favorable and unfavorable birth outcomes. Preliminary results from two such studies have shown that mothers with severe or widespread periodontal disease have a higher risk of preterm delivery.<sup>10,11</sup> Study authors describe a “dose-response” relationship between increasing periodontal disease severity and an increasing rate of prematurity and low birthweight.<sup>11</sup>

However, other such studies have found no significant association between the severity of periodontal disease and PLBW and no significant association between any of the common dental indices for periodontal disease status and preterm birth.<sup>12,13</sup>

These studies raise the question, “Can treating periodontal disease in pregnancy reduce poor birth outcomes?” Here the evidence is more uniform.

Two studies have shown an association between treating periodontal disease during pregnancy and improved birth outcomes.<sup>14,15</sup> However, the statistical test of significance that gives assurance that the finding is “real” was sufficiently robust in only one of these two studies. When multiple factors were considered, periodontal disease remained the most important predictor of PLBW in women with periodontal disease. In addition, however, one study found no “real” differences in the rate of adverse pregnancy outcomes between treated and non-treated groups of women.<sup>16</sup> Women who were referred for treatment but did not obtain care, however, had significantly more unfavorable birth outcomes.

The “gold standard” of scientific research into the association between cause and effect is the large, randomized, controlled, clinical intervention trial. Currently NIH is supporting two clinical trials, but the results will not be available for some time. These studies, conducted at seven universities, focus on the relationship between significantly advanced periodontal disease and PLBW. However, they do not address the more common, but less severe, inflammatory periodontal conditions that may also be related to poor birth outcomes.

## Policy Implications

While scientists and epidemiologists continue to explore the association between periodontal disease and PLBW, activists have already been using available information to promote professional education, public education, and public finance policies. It is important to note that there is no known downside risk to addressing inflammatory periodontal disease in pregnant women while there is potentially tremendous upside benefit to acting on this association. Indeed, National Institute of Dental and Craniofacial Research Director Larry Tabak highlighted the potential to reduce PLBW through dental care for pregnant women in a recent Congressional briefing.

Public policy questions that will need to be addressed as the evidence base grows and further substantiates the association between periodontal disease and unfavorable birth outcomes include:

### Professional educational policies and programs:

- How will primary medical and dental providers and trainees learn about these new scientific studies?
- How will clinical policies be developed to guide providers in

practice?

- How will clinicians incorporate this information into practice?

### Public educational policies and programs:

- How will the public – especially women of childbearing age and pregnant women – learn about the connection between their oral health and pregnancy?
- What services should they seek?
- At what point in their pregnancy?

### Public finance policy:

- Will Medicaid pay for oral health care for pregnant women?
- Will dental coverage for pregnant women result in overall cost savings by reducing PLBW incidence?

***A growing body of research supports an association between periodontal disease and unfavorable birth outcomes. Public policy questions will need to be addressed as the evidence base grows.***

<sup>1</sup> Gibbs RS. *Annals Perio*. 2001.

<sup>2</sup> Packard, Future of Children. 1995.

<sup>3</sup> Premature birth is defined as before the thirty-seventh week of gestation.

<sup>4</sup> Hoyert D et al. *Nat Vit Stat Report*. CDC. 2001.

<sup>5</sup> [www.nidcr.nih.gov/spectrum/NIDCR2/2grasec3.htm](http://www.nidcr.nih.gov/spectrum/NIDCR2/2grasec3.htm)

<sup>6</sup> Collins JG et al. *Journal Dent Research*. 1995.

<sup>7</sup> Collins JG et al. *Infect Immun*. 1994.

<sup>8</sup> Offenbacher S et al. *Journal Perio*. 1996.

<sup>9</sup> Davenport ES et al. *Annals Perio*. 1998.

<sup>10</sup> Jeffcoat MK et al. *J Amer Dent Assoc*. 2001

<sup>11</sup> Offenbacher S et al. *Annals Perio*. 2001.

<sup>12</sup> Moore S et al. *Journal Dent Research*. 2002

<sup>13</sup> Sundell TM et al. *Journal Dent Research*, 2002.

<sup>14</sup> Mitchell-Lewis D et al. *Eur J Oral Sci*. 2001

<sup>15</sup> Lopez NJ et al. *Journal Perio*, 2002.

<sup>16</sup> Moore S et al. *Journal Dent Research*, 2002.

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