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## CenteringPregnancySmiles™: Implementation of a Small Group Prenatal Care Model with Oral Health

Judith Skelton, PhD  
Raynor Mullins, DMD, MPH  
LeAnn Todd Langston, RN  
Sara Womack, RDH, BS, MS  
Jeffrey L. Ebersole, PhD  
Sharon Schindler Rising, CNM, MSN  
Robert Kovarik, DMD, MS

*Summary:* Preterm/low birth weights are the leading perinatal problem in the U.S., and an association between preterm/low birth weight outcomes and oral health has been identified. In response to this, a group prenatal care program—CenteringPregnancySmiles™—was implemented in rural Kentucky in 2006. This report describes the model and preliminary outcomes of the CenteringPregnancySmiles™ program.

*Key words:* Preterm birth, oral health, CenteringPregnancy™.

The 2000 *U.S. Surgeon General's Report* noted that preterm birth (PTB) and low birthweight (LBW) deliveries are considered one of the leading perinatal problems in the U.S.<sup>1</sup> Preterm birth is defined as onset of labor prior to 37 weeks gestational age; low birthweight is defined as infants who weigh less than 2,500 grams. Poor birthing outcomes occur disproportionately in low socioeconomic groups, certain ethnic groups, and in rural areas throughout the United States.<sup>2</sup> Kentucky ranks among the worst nationally in rates of PTB/LBW.

There are many risk factors that contribute to PTB/LBW. For example, it is well documented that infection and inflammatory mediators impede intrauterine development and can initiate a spontaneous preterm delivery.<sup>3</sup> Several studies have documented that enhanced prenatal care that includes patient education, health behavioral advice

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*DR. SKELTON is an Associate Professor and the Director of Coordinated Outreach Clinical Education, Research and Service, in the Division of Dental Public Health, College of Dentistry, at the University of Kentucky (UK) in Lexington. DR. MULLINS and DR. KOVARIK are also Associate Professors in the Division of Dental Public Health at the UK College of Dentistry. MS. LANGSTON is the Director of the Center for Women's Health at Trover Health Systems and MS. WOMACK is with the Hopkins County Department of Public Health, both in Madisonville, Kentucky. DR. EBERSOLE is the Alvin L. Morris Professor of Oral Health Research and Associate Dean for Research at the Center for Oral Health Research at the UK College of Dentistry. MS. RISING is the Executive Director of the Centering Healthcare Institute in Cheshire, Connecticut, where she can be reached at 558 Maple Ave., Cheshire, CT 06410; (203) 271-3632; fax (203) 272-3460; info@centeringhealthcare.org.*

and interventions, and/or psychosocial support results in reductions in the incidence of LBW.<sup>4,5</sup> It is also well established that women who have early and regular prenatal care have healthier babies;<sup>6</sup> appropriate and adequate prenatal care is associated with reductions in the risk of PTB and LBW.<sup>7,8</sup>

Group care has been identified as one method of delivering effective prenatal care. CenteringPregnancy™ (CP™) is an innovative group care model for providing prenatal care that is being implemented around the United States and globally.<sup>9</sup> In 2003, Ickovics et al. conducted a clinical trial using the CP™ model. Women who received group care had larger babies and continued their pregnancies two weeks longer than women receiving traditional care ( $p < .05$ ).

Oral disease in America has been called a *silent epidemic*.<sup>1</sup> Tooth decay affects 78% of the population by age 17 and 98% by age 44. Nearly one fourth of adults aged 35 through 44 years have destructive periodontal disease. Recent data suggest that periodontal infections may influence systemic health, with periodontitis being associated with increased risk of coronary heart disease and stroke, diabetes, and PTB/LBW deliveries.<sup>1,2,10–18</sup>

The Commonwealth of Kentucky, particularly the many rural counties of the state, continues to demonstrate metrics of poor oral health and increased incidence of negative birthing outcomes. Statewide, there has been a 24% increase in the rate of PTB and a 22% increase in LBW babies since 1994, placing it among the nation's worst states on these measures.<sup>19</sup>

In response to the combination of negative birthing data and the lack of access to oral health care in rural areas, a research team at the University of Kentucky established partnerships with the Center for Women's Health (CWH) at Trover Health Systems to address community needs. The Center for Women's Health elected to convert its traditional prenatal care delivery model into the CP™ model with an oral health component added. The new model is called CenteringPregnancySmiles™ (CPS™). This model was developed to integrate completely oral health treatment and education with routine prenatal care and education so that pregnant women see oral health care as part of normal prenatal care and understand that oral health is integral to general health.

CPS™ has three care components: assessment, education, and support.

**Assessment.** Women participating in the CPS™ enter a group after their initial prenatal nursing/medical evaluation. The group size is usually 10–12 women; they are organized by gestational age beginning with the 2nd trimester. They also receive an oral examination, diagnosis, and treatment plan by a dentist who performs this service in the women's health clinic. At each subsequent session, the standard prenatal assessment is completed within the group setting. Unless a woman develops medical problems she does not have to re-enter an exam room until 38–40 weeks gestation. In addition, each woman receives a *Mom's Notebook*, an aid that includes a series of self-assessments that are used for discussion in the groups and as take-home educational handouts. Self-assessments help the women focus their concerns and also help to trigger group discussion.

**Education.** A general curriculum for the CPS™ program emerges from handouts, worksheets, visual aids, and tailored activities. Topic areas for the sessions include nutrition, exercise/relaxation, oral health, childbirth preparation, pregnancy problems,

infant care and feeding, postpartum concerns, communication and self-esteem, comfort measures, sexuality, abuse issues, and parenting (see Box 1 for details of the curriculum). Each session lasts approximately two hours and is led by the primary provider, who is a certified nurse midwife.

**Support.** The stable group environment afforded by the CPS™ model fosters trust among the members. The program begins early in pregnancy and continues through

## Box 1.

### CENTERING PREGNANCY SMILES SESSION OUTLINES

#### Session 1

Content:	Program overview, ground rules, nutrition
SAS:	Personal Goals, Core Content Ranking, Weight Chart
Resource Person:	Nutritionist/WIC Dental hygienist (provide an overview of the relationships between oral health, systemic health, and fetal health) (3–5 min.)
Video:	Fetal development or substance abuse Dental Screening Exam
RDH 1st appointment—	FMP, Bleeding points, OHI (plaque, brush, floss) and initial cleaning
RDH 2nd appointment—	cleaning and OHI

#### Session 2

Content:	Common complaints of pregnancy, exercise
SAS:	Common Discomforts
Resource Person:	Physical therapist Dental hygienist: T/F survey and review of answers (10–15 min.)
Video:	Substance abuse

#### Session 3

Content:	Relaxation/stress reduction, breast feeding, overview of family/parenting issues
SAS:	Relaxation Methods, Thinking About Breastfeeding
Resource Person:	Lactation consultant, massage therapist, family counselor Dental hygienist: plaque PowerPoint and plaque self-assessment w/disclosing (to be done at home) (10–15 min.)

#### Session 4

Content:	Relationship issues, sexuality, contraception, preterm labor
SAS:	Contraceptive Issues, Family Assessment
Resource Person:	Counselor Dental hygienist: interdental cleaning (flossing) (10–15 min.)

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**Box 1. (continued)***Session 5*

Content:	Signs of labor, birth procedures
SAS:	Personal Goals update from Session 1
Resources:	Tour of birth unit, labor/delivery nurse
Video:	Birth video
Resource Person:	Dental hygienist: discuss dentition, oral anatomy, tooth eruption (10 min)

*Session 6*

Content:	Labor/birth continued, pediatric care resources
SAS:	Comfort Measures for Labor, Self-Inventory
Resource Person:	Doula, massage therapist, other birth specialists Dental hygienist: caries and how to prevent it including ECC, Fluorides, nutrition (10 min)

*Session 7*

Content:	New baby care, breast feeding, siblings
SAS:	Decisions of Pregnancy, Evaluation I
Resource Person:	Pediatric, lactation of child life specialist Dental hygienist: periodontal disease and how to prevent it (10–15 min.)
Video:	Baby care, breastfeeding

*Session 8*

Content:	Emotional adjustment now and postpartum, support system, birth concerns
SAS:	Personal Assessment
Resource Person:	Mental health specialist Dental hygienist: cleaning your baby's teeth (10–15 min.)

*Session 9*

Content:	Birth concerns/stories, postpartum issues, playing with your baby
SAS:	Pregnancy Review Sheet; Thinking Ahead
Resource Person:	Perhaps a “group” baby Dental hygienist: oral habits—paci vs thumb, injury (10–15 min.)
RDH:	Periodontal maintenance appointment

*Session 10*

Content:	Continued birth stories, pregnancy/birth/postpartum and newborn issues
SAS:	Evaluation II, Final Summary of Outcomes
Resource Person:	Community agency involved with new moms and parenting
RDH:	Postpartum evaluation

SAS = Self Assessment Sheet

RDH = Registered Dental Hygienist

OHI = Oral Hygienist's Instruction

the early postpartum period. Women/couples become invested in each other and build community as a result of their interactions. This leads to increased support and decreased feelings of isolation.

**Oral health components.** Oral health as an integral part of prenatal care was accomplished in two ways in the CPS™ program. First, oral health information and treatment was incorporated into eight of the 10 group sessions. Topics included the oral systemic health link, myths and realities, plaque and how it causes disease, plaque removal techniques, dentition development, oral anatomy, caries and prevention, periodontal disease and prevention, and care for baby's teeth. Second, a dental operatory was established within the CWH, so that every pregnant mother enrolled in CPS™ was given a dental examination approximately 14 weeks into their pregnancy, followed by therapeutic intervention to provide control of oral infections.

### After Two Years

This fully integrated prenatal care approach built collegiality and mutual respect among physicians, nurses, nurse practitioners, midwives, dentists, and dental hygienists. It also provided interactive learning among the professionals and often leveraged understanding of the interactions among oral and general health. The professional relationships and activities conveyed to the expectant mothers the importance of oral health in their overall wellness and the health of their fetus.

During 2006 and 2007, 447 women were enrolled in CPS™ prenatal care delivery model. Of this number, 379 women had given birth when this article was written (Table 1). Their average age was 22.8 years (standard deviation 5.1). Over four-fifths of this population receives public assistance for medical care. High levels of poverty are common and contribute to access to care barriers in this region, particularly with respect to oral health care. In addition, educational levels of the expectant mothers were low (four fifths had completed no more than high school).

The initial oral health status of the pregnant mothers ranged from extremely poor, with multiple abscessed teeth and serious oral infections, to a very healthy dentition requiring no dental treatment. As a group, the oral health status was worse than was reported for the state of Kentucky as a whole in the 2000 State Adult Oral Health Survey.<sup>20</sup> At their first dental examination (13–16 weeks gestation), nearly 70% of the women examined had active caries, over half had at least one periodontal pocket of 4 mm or more, and one out of five had pain in one or more teeth. Over 17% had active pericoronitis infections around one or more of their third molars (wisdom teeth). Sixteen percent had periapical abscesses of one or more teeth. Over 60% of the women had bleeding points indicating the presence of gingival inflammation.

Following oral health education and treatment of their dental needs during prenatal care, the oral health status of the expectant mothers was improved at 34–38 weeks gestation (Figure 1). More than half of the odontogenic oral infections were completely resolved (pericoronitis and periapical abscesses). In addition, the proportion of pregnant mothers presenting with positive bleeding points dropped to 35%. Lack of compliance and missed appointments have contributed to the continued presence of some of the oral infections and gingival inflammation.

**Table 1.****DEMOGRAPHIC INFORMATION ON BIRTH MOMS**

	Group prenatal care— 2006–07 (n=379)	Birthing mothers in the region— 2002 (n=3,022) <sup>a</sup>	Birthing mothers in all of Kentucky 2002–2004 <sup>b</sup>
<b>Demographic characteristics</b>			
<i>Race</i>			
White/Caucasian (%)	85.7	82.4	86.1
African American (%)	12.5	15.5	8.8
Hispanic (%)	1.2	NA	3.5
Other (%)	0.6	2.1	1.6
Age <sup>c</sup>	22.8 ± 5.1	NA	26.9
Last year of education <sup>d</sup>	11.5 ± 1.7	NA	NA

<sup>a</sup>State of Kentucky Cabinet for Health and Family Services. County health profiles. Frankfort, KY: Department for Public Health, 2008. Available at: <http://chfs.ky.gov/dph/epi/cohealthprofiles.htm>.

<sup>b</sup>March of Dimes Foundation. March of Dimes Foundation website. White Plains, NY: 2009. Available at: <http://www.marchofdimes.com/>.

<sup>c</sup>(y, mean ± standard)

<sup>d</sup>(mean ± standard)

NA = not available

**Table 2.****BIRTH OUTCOMES AND PRENATAL CARE FOR SINGLETON BIRTHS: DESCRIPTIVE DATA**

	Group prenatal care— 2006–07 (n=132)	Regional births in 2004 <sup>a</sup>	Kentucky births in 2004 <sup>a</sup>	National births in 2004 <sup>a</sup>
<b>Birth outcomes and prenatal care</b>				
Preterm birth (%)	6.6	13.7	12.6	10.8
Gestational age <sup>b</sup>	39.1 ± 3.0	NA	NA	NA
Low birth weight (%)	5.3	7.3	7.0	6.3
Birth weight <sup>c</sup>	3365 ± 568	NA	NA	NA

<sup>a</sup>March of Dimes Foundation. March of Dimes Foundation website. White Plains, NY: 2009. Available at: <http://www.marchofdimes.com/>.

<sup>b</sup>weeks, w ± SD

<sup>c</sup>grams, g ± SD

NA = not available

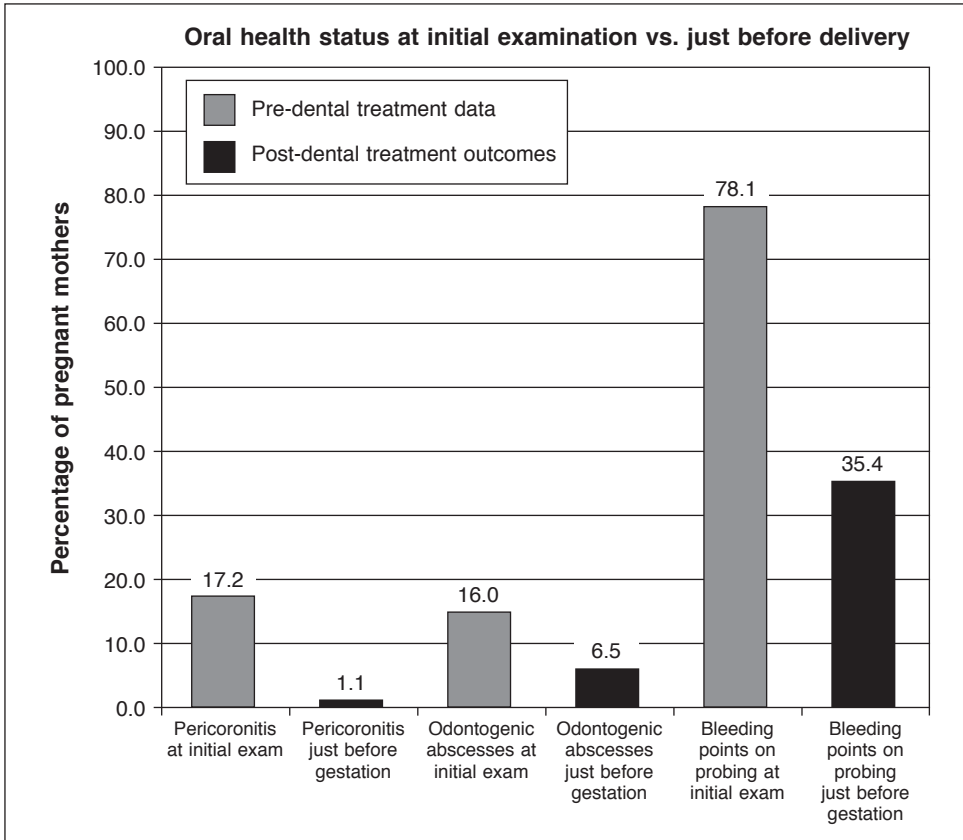


Figure 1. Oral health findings in 379 pregnant women participating in the program at the center for women's health, Trover Health Systems: descriptive data.

The singleton PTB rate for mothers who participated in the program was 6.6% for all births in 2006 in the CPS™ prenatal care program, compared with the regional singleton preterm birth rate of 13.7% in this region for prior years (average of years 2002–04). Similarly, the singleton LBW rate for mothers who participated in the program was 5.3% for all births in 2006 and 2007 in the CPS™ prenatal care program, compared with the regional singleton low birthweight birth rate of 7.3% in this region for earlier years (average of years 2002–04). Similar rate changes were not observed in the comparable population of women who started the program but did not actively participate in it. (Table 2).

### Preliminary Conclusions

The CPS™ group prenatal care model was successfully implemented at a rural health care clinic in western Kentucky. The degree of poverty among participating mothers was very high; more than 80% of the participating pregnant mothers were on Medicaid. Second, the oral health status of this population of women was poor, with gingivitis,

dental decay, pericoronitis, abscessed teeth, and periodontal disease much more prevalent than has been seen in otherwise similar urban populations.<sup>20</sup>

The apparently substantial improvement in rates in PTB and LBW were somewhat unexpected. Previous studies on the effect of oral infections on PTB and LBW pregnancy outcomes have estimated that up to 20% of these adverse birthing outcomes could be related to oral infections.<sup>21</sup> CenteringPregnancySmiles™, descriptively, seems to have synergistic beneficial effects on birthing outcomes. This program is ongoing and data will be analyzed on an annual basis to track changes in birthing outcomes. If ongoing improvements are realized, CPS™ holds real promise for improving prenatal care in rural settings.

## Notes

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