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Preventing Preterm Birth

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In this Issue:

Introduction

Did you know that preterm birth is the most costly employee health care claim in 2004 for King County employees in Washington State—more than heart disease or any single cancer diagnosis? Nationally, direct health care costs to employers for a baby that is born too soon is 15 times higher than for a healthy, full-term delivery. And high delivery and hospitalization costs don't reflect the financial toll of long-term disability associated with prematurity, let alone the incalculable emotional burden on families.

According to the Centers for Disease Control and Prevention (CDC), more than 500,000 babies were born prematurely in 2004, an increase of 2% over the prior year. Thomas Benedetti, MD, author of the feature article in this issue of *Northwest Bulletin*, tells us that half of the cases of preterm birth have *no known cause*. And the explosion in the use of special fertility techniques in the last twenty years does not explain the persistent high rates of prematurity, even though multiple gestation is a known risk factor.

This issue of *Northwest Bulletin* looks at prevention strategies used by the states in Region X. Dr. Thomas Bruck covers the possible link between periodontal disease and increased risk of preterm delivery. The editorial, by Kathy Carson, highlights social factors behind this enigma including research that shows a disturbing relationship between chronic stress, infant health outcomes, and race.

The public health community faces many challenges. We hope this issue's focus on preventing preterm birth—through sharing and working together on research, policy, education, and program interventions—will lead to new solutions to protect infants and families.

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Northwest **Bulletin:**
Family and Child Health

Editorial Board Transitions

Many thanks to Ruth Francis Williams (Washington representative) and Molly Emmons (Oregon representative) for their many years of dedicated service to *Northwest Bulletin*. We welcome the following editorial board members: **Candi Wines,** with the Office of Maternal and Child Health, Washington State Department of Health; and Immunization Program Research and Training Manager **Martha Skiles**, with the Office of Family Health, Oregon Department of Human Services.

Thank you!

A special thanks to Cherish Hart, Program Services Director for the Washington State Chapter of the March of Dimes, and board editor for this issue of *Northwest Bulletin*.

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The Twelve P's of Preterm Birth

by Thomas J. Benedetti, MD, MHA

The U.S. preterm birth rate—inching up over the last three decades—stands at 12.3% in 2005. This exceeds the national Healthy People 2010 objective of 7.6%. Figure 1 shows the increase in preterm birth rates between 1980 and 2002. Preterm birth is the leading cause of perinatal morbidity and mortality. And while there's an understanding of factors that contribute to this rise in the preterm birth rate, no obvious solution to the problem has emerged.

The preterm birth rate varies from state to state, with rates for Blacks generally double those for Whites. Because of this disparity, preterm birth rates in individual states tend to be proportional to the percentage of Blacks in the population. The relatively lower rates in the Northwest states are no cause for celebration though, because they are also increasing. For example, Oregon's preterm birth rate increased more than 17% from 1993 to 2003 while Idaho's increased 32%. (See figure at http://www.marchofdimes.com/washington/7406_17802.asp.)

Half of the cases of preterm birth have no known cause. Those risk factors that *have* been identified are discussed below.

Plurals
Multiple gestation is the highest risk maternal condition for preterm birth. Over 50% of all pregnancies involving the delivery of more than one baby end before 37 weeks. Over 10% of multiple gestations deliver before 32 weeks (very premature). This latter group accounts for a disproportionate number of perinatal deaths and infants born with permanent disabilities. The number of babies born of multiple birth pregnancies has soared in the last two decades, due largely to the advent of special fertility techniques such as in vitro fertilization. While plurals often result in preterm birth, multiple gestation births do not make a huge impact on the overall prematurity rate in the Northwest states.

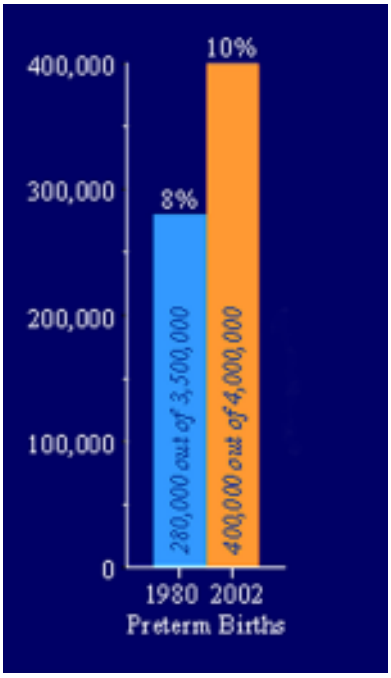

Figure 1. Increase in preterm births in the United States, 1980-2002.

The Twelve P's of Preterm Birth

- Plurals
- PPROM
- Placental Problems
- Parentage
- Perinatology
- Pressure
- Prior Preterm Birth
- Preeclampsia
- Poverty
- Puffing
- Pus
- Periodontal Disease

Multiple gestation is the highest risk maternal condition for preterm birth. Over 50% of all pregnancies involving the delivery of more than one baby end before 37 weeks.

Prior Preterm Birth
Approximately 10% of all preterm births in the U.S. occur to women with at least one prior preterm birth. The risk of a subsequent preterm birth is a function of the cause of the prior preterm birth. In women who have had preterm labor or preterm premature rupture of membranes followed by preterm labor, the risk is increased approximately 3–4 fold. The absolute risk is estimated at between 30 to 40%. If a patient has more that one preterm birth the risk in a subsequent pregnancy may exceed 50%.

On a brighter note, two randomized studies have shown a 30 to 40% reduction in recurrent preterm birth in patients who receive therapy between 16 to 20 weeks gestation. Preventive therapy is either weekly intramuscular progesterone or daily vaginal progesterone suppositories. Unfortunately, intramuscular progesterone is available only through specialized pharmacies and may be of variable quality.

Preterm Premature Rupture of Fetal Membranes
Preterm premature rupture of membranes (PPROM) accounts for 25 to 40% of all preterm births (3 to 5% of all pregnancies). The pregnancy outcome is directly related to the time in gestation when the membranes rupture, and to the latency

period (time from membrane rupture to delivery). Pregnancies with PPROM at less than 20 weeks rarely result in the delivery of viable infants. This is because the lungs require amniotic fluid to develop normally and, with PPROM, this fluid leaks out and is usually not reaccumulated in amounts sufficient for normal development of alveoli (lung air sacs). In addition, the loss of fetal protection from vaginal bacterial infection usually means the precipitating factor for delivery is maternal or fetal infection. When the PPROM occurs after 24 weeks, standard therapy includes administration of antibiotics that prolong latency and one dose of corticosteroids that promote release of fetal surfactant (a substance that prevents the alveoli from collapsing).

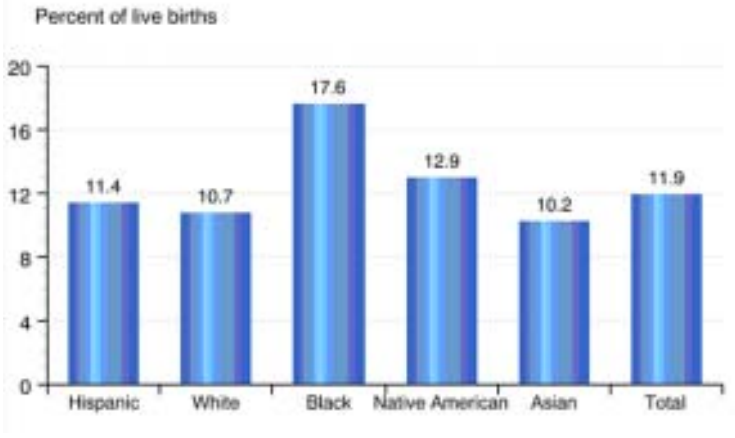

Figure 2. U.S. Preterm birth rates by race/ethnicity, 2000-2002 average. National Center for Health Statistics, final natality data from www.marchofdimes.com/peristats.

Preeclampsia

Preeclampsia is a common medical condition leading to preterm birth, occurring in 5 to 10% of first pregnancies and in 20 to 25% of patients with multiple gestations. Delivery of the fetus and placenta is the only known cure. When preeclampsia presents before 37 weeks the decision to initiate delivery depends on both the maternal and fetal condition. Often the mother is too sick to delay the delivery for more than 48 hours and the health care team must deliver a premature infant to preserve maternal health. In other cases the infant suffers from lack of oxygen or placental insufficiency and the fetus is judged to have a better chance of survival outside the uterus. The earlier preeclampsia occurs in pregnancy, the greater the chance that the needs of mother and fetus will conflict.

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Criteria for Preterm Birth

Weight

- Low: Less than 2,500 grams
- Very Low: Less than 1,500 grams
- Extremely Low: Less than 1,000 grams

Gestational age

- Preterm: Less than 37 weeks
- Moderately preterm: 32 to 36 weeks
- Very preterm: Less than 32 weeks

Placental Problems

The two most common causes of second and third trimester bleeding are placental abruption (premature separation of normally implanted placenta) and placenta previa (abnormal location of the placenta over the uterine cervix). Both conditions can cause life-threatening maternal hemorrhage. Placenta previa happens in ½ of 1% of pregnancies and a significant risk factor is prior uterine surgery. Placental abruption occurs in approximately 1% of pregnancies and is associated with hypertension and smoking. Premature delivery in the face of third trimester bleeding is often done to preserve the health of the mother or to rescue the fetus from a hazardous intrauterine environment.

Poverty

People who live without adequate resources to provide for their basic needs suffer worse health outcomes, including preterm birth, than those with sufficient basic resources. For example, in Washington State preterm birth rates are lowest for those with third party insurance, intermediate for Medicaid recipients, and highest for individuals who receive both Medicaid and public financial assistance.

Parentage

Race and ethnicity influence health disparities. For example, the risk of preterm birth for Black pregnant women in the U.S. is nearly 50% higher than that for Whites. All other ethnic populations have preterm birth rates closer to the national average but higher than that of the White population (Figure 2).

Puffing

Smoking contributes to preterm birth rates through many mechanisms. It increases the risk of placental abruption, placenta previa, PPROM, and leads to poor growth in the fetus. Early delivery may be necessary for fetal well-being.

Perinatology
The advent of high-risk obstetrics and neonatology as subspecialties accounts for many advances in perinatal care. Delivery of endangered fetuses occurs at earlier gestational ages with higher likelihood of survival and less risk of lifelong disability. This is especially true after 34 weeks gestation, but 34 to 36 weeks is still premature and associated with increased morbidity and costs. Data shows that the most significant rise in preterm birth has been in infants greater than 32 weeks gestation in the Northwest states. The rise in very preterm birth has been less dramatic. It is generally assumed that high risk perinatal care has resulted in healthier infants and has prevented stillbirths and handicapping conditions.

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Pus
The association between preterm birth and infection has been reported for more than 50 years. Many types of bacteria have been found in the amniotic fluid of women who delivered prematurely. In general, the earlier in pregnancy that delivery occurs, the greater the likelihood of recovering bacteria from the amniotic fluid. Infections outside the reproductive tract, such as appendicitis, are also associated with preterm delivery. Culturing the asymptomatic mother and treating organisms found *in* the vagina, however, has not been shown to reduce the preterm birth rate. The exception is urinary tract infections, especially Group B Streptococcus. Screening and treating for this organism during pregnancy can reduce the preterm birth rate.

Periodontal Disease
In recent years periodontal disease has been associated with increased risk of delivery below 37 weeks gestation. This is true after controlling for factors such as upper genital tract infection. The relationship between infection and prematurity is probably more complex than can be explained by the ascent of organisms from the lower to the upper genital tract during pregnancy. Research into the roles played by host defense, and maternal and fetal immune response may shed light on this enigma.

Pressure
Substantial epidemiologic and experimental data show a connection between stress and preterm birth. Psychosocial stressors, such as major life events, come to mind. Recent research has broadened the concept of stress to include depression and generalized distress, especially when these are chronic. An even wider hypothesis views preterm birth from a life course perspective. In this model, the stress pathway is seen as an entry point to other pathways, such as inflammation and infection, that work together to trigger preterm birth. This hypothesis is a useful framework for integrating seemingly unrelated factors contributing to preterm birth. It suggests that longitudinal, integrated multidisciplinary approaches may be the best avenue to reducing preterm birth.

Preterm birth presents an untold emotional burden to families and a staggering economic burden to all. Yet the problem has been out of the public eye for two decades. One explanation is public perception that preterm birth affects only *others.* Prior to its launch of a national education campaign on prematurity, the March Dimes sponsored a Gallup Poll. A key finding was that nearly one-third of Americans thought a major risk factor for preterm birth was alcohol and other drug abuse. A significant first step in the battle to reduce the preterm birth rate will be to educate all Americans that this can happen to any family.

Thomas Benedetti, MD, MHA, is professor and vice chairman in the Department of Obstetrics and Gynecology at the University of Washington (UW) School of Medicine. In 1993 he founded the preterm birth prevention clinic at the UW. He is the editor of *Dialogue*, published by the Washington State Obstetrical Association, and chairs the Washington State March of Dimes Prematurity Steering Committee.

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Editorial

Infant Well-being—Perspectives Through a Social Prism

by Kathy Carson, RN

While we in the health professions can feel some satisfaction in the overall decline in infant mortality rates, the persistent disparities between the rates of Blacks and Native Americans compared to Whites, Asians, and Hispanics are an alarming 'sentinel event.' A sentinel event is one that is easily seen and alerts us to a problem or danger not so readily seen. Infant mortality is considered a sentinel community health indicator because it is affected by many factors that impact family and child well-being but are not as easy to measure. Factors such as poverty, unemployment, inadequate housing, and lack of hope for the future affect infant mortality, but also affect those families whose children don't die. Infant mortality rates can tell us something about the well-being of communities. Disparities in infant mortality rates alert us to differences in the health of communities that adversely impact the survival of our children.

Infant mortality is considered a sentinel community health indicator because it is affected by many factors that impact family and child well-being but are not easy to measure, such as poverty, unemployment, inadequate housing, and lack of hope.

Why hasn't the gap in infant mortality rates been closed by the measures that have brought down the overall rate? Low-income women of all races and ethnicities in our state have benefited from increased access to prenatal care and contraception through expanded Medicaid coverage for pregnant women. Improvements in neonatal technology seem to be equally available to all. What is the explanation?

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In King County, Washington, the highest rate and number of fetal-infant deaths occur at birthweights of less than 1,500 grams, whether death occurs before birth, during the neonatal period, or in the first year of life. Not all infant deaths are preventable, but every population group should be able to have the same infant survival rate as the group with the lowest rates of mortality. White women between 18 and 34 have the lowest rates of infant mortality in King County. Our calculations show that excess deaths of Black infants are largely in those with birthweights less than 1,500 grams, and a gestational age of less than 28 weeks. Excellent prenatal and neonatal care has little chance to prevent prematurity—we have to back up and look at the health and well-being of women.

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Chronic Stress and Infant Health Outcomes

Recent research on the effects of chronic stress sheds light on how factors in the community environment can affect health outcomes like preterm birth and infant mortality. Acute stress raises levels of cortisol and related hormones in the familiar fight-or-flight response—the heart pounds and the brain abandons other thoughts to focus on action in response to the perceived threat. When the threat is gone, the levels of stress hormones return to normal, the heart beats regularly, and the brain can return to processing information.

Recent research on the effects of chronic stress sheds light on how factors in the community environment can affect health outcomes like preterm birth and infant mortality.

Cardiovascular readiness is a benefit when one is faced with an acute threat. Chronically elevated levels of stress hormones, however, can lead to high blood pressure and heart disease.

Short-term depression of the immune system is a reasonable trade off when one is faced with an acute danger which might result in bodily injury. But the depression of the immune system that results from chronically elevated

Table 1. Reported stressful life events during year before delivery in King County, Washington, 1999-2001

Stress Events	Black	American Indian/Alaska Native	White
	←	Percent	→
Changed residence (moved)	44*	53*	33
Argued with partner more than usual	36*	43*	17
Had bills and couldn't pay	31*	42*	14
Someone close died	24*	25	15
Close family member ill and hospitalized	24	22	24
Separated or divorced from partner	20*	19*	5
Someone close had drinking/drug problem	15	28*	13
Partner said he didn't want pregnancy	15*	21*	8
Husband/partner lost job	14	20*	8
Mother lost job	21*	15*	5
Mom or partner went to jail	10*	22*	4
Involved in a physical fight	7	12*	4
Homeless	11*	15*	1
Reported 5 or more stress events	12*	23*	4

Stress factor prevalence rates followed by an asterisk (*) are statistically significantly higher than the estimates for Whites.
Data Source: Pregnancy Risk Assessment Monitoring System (PRAMS)

cortisol levels can lead to an overgrowth of the body's normal organisms and reduced ability to fight infections.

Depression of cortical function in the brain is helpful when one is faced with an acute threat. But long-term depression of the cortical function can result in mental depression, self-medication with tobacco, alcohol, or other drugs, and reduced ability to care for self or others.

The Perinatal Risk Assessment Monitoring System (PRAMS), a random survey of recently delivered mothers done in 36 states, including Washington, yields information on stresses experienced by pregnant women and the disparities among groups of women (Table 1).

For each of the stressors asked about in the PRAMS survey, except whether a close family member had been ill or hospitalized, Black and American Indian/Alaska Native women more frequently reported experiencing the stressor. Experiencing five or more of these stressful events was 3-fold more common among African Americans and almost 6 times more common among Native Americans than among Whites.

For each of the stressors asked about in the PRAMS survey, except whether a close family member had been ill or hospitalized, Black and American Indian/Alaska Native women more frequently reported experiencing the stressor.

Racism and poverty, together and separately, are increasing levels of chronic stress, impacting the health and well-being of women and families, and resulting in disparities in infant survival. The health system can be part of the solution in recognizing and educating about the effects of stress and providing support during health care interactions. But we who care about the well-being of families must work with our institutions and our communities to eliminate racism and develop systems of support for childbearing families. Until we tackle these root causes, disparities in infant survival and other health outcomes will remain.

Kathy Carson, RN, administers parent child health services for Public Health–Seattle & King County. She has worked in public health for over 33 years, beginning as a public health nurse and serving in management and leadership roles since 1985.

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Periodontal Disease and Pregnancy

by Thomas L. Bruck, DDS, MPH

Recent research suggests that women with periodontal disease (an infection of the gums and bone around the teeth) are at increased risk of delivering preterm, low birthweight (PLBW) babies. The question is whether or not the association is causal or coincidental.

Smoking, alcohol use, poor diet, certain infections, and stress are recognized risk factors for having a baby that is born too early or too small. Some in dentistry have long suspected a link between maternal oral health and birth outcomes. Emerging science is stimulating interest in this possible link and the potential for improving birth outcomes through preventive oral health care. As many as 18% of the 250,000 PLBW infants born in the U.S. each year may be due to infectious oral disease (NIH).

Some in dentistry have long suspected a link between maternal oral health and birth outcomes. Emerging science is stimulating interest in this possible link and the potential for improving birth outcomes through preventive oral health care.

Preterm birth and low birthweight (LBW) are widely recognized as the leading perinatal problems in the U.S. The costs for individuals, families, and society are significant in terms of morbidity, mortality, and economic impact. The hope is that improved oral health care during pregnancy will reduce the number of PLBW infants born each year.

There is no consensus in the research that periodontal disease has a negative impact on birth oucomes. Several large studies funded by the National Institutes of Health are exploring the relationship between advanced periodontal disease and PLBW (Children's Dental Health Project 2003). A review of the literature (Berreth 2005) supports some association between maternal periodontal disease and preterm delivery:

- Toxins or other by-products from anaerobic organisms associated with the chronic bacterial infection of periodontal disease may reach the blood stream or uterine cavity and lead to production of prostaglandins (chemicals that make uterine muscles contract), or stimulate muscle contractions that result in preterm labor.
- Women with periodontal disease are as much as 7 ½ times more likely to deliver preterm, when controlling for other risk factors.
- Mothers of PLBW babies have significantly higher levels of biochemical and microbiological markers for periodontal disease (Offenbacher 1998).
- Mothers with periodontal disease have an increased risk of developing preeclampsia.
- Women with spontaneous preterm birth at less than 32 weeks gestation have higher rates of severe periodontal disease than women who have either an indicated[1] preterm birth or gestation of a term birth.
- Women who receive treatment for periodontal disease during pregnancy have a significantly lower rate of PLBW deliveries.

The number of low-income pregnant women in Idaho who do not get regular dental care is a serious concern. Some do not recognize the value of routine dental visits and are unaware of the relationship between oral health and overall health for themselves and their children. For others, lack of dental insurance and financial resources are barriers. Finding a dentist who accepts Medicaid clients is a challenge statewide; 93% of Idaho is designated as a Dental Health Professional Shortage Area (HPSA). In addition, misconceptions are common among both health care providers and the public regarding the safety of getting dental care during pregnancy. According to data from the 2001 Idaho Pregnancy Risk Assessment Tracking System, most health care providers do not discuss dental care with their pregnant patients.

In Idaho, approximately 40% of births are paid for by the Medicaid Program. A review of Medicaid deliveries during State Fiscal Year 2004 (SFY04) found that 6.9% were LBW. The average Medicaid cost one year from date of birth for a

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[1]*A preterm birth preceded by a complication such as preeclampsia.*

non-LBW infant was $3,500 compared to $35,776 for a LBW infant, a difference of $32,276. Only 13% of pregnant women on Medicaid accessed any dental service during SFY04; 1.4% received preventive or periodontal care.

Only 13% of pregnant women on Medicaid accessed any dental service during State Fiscal Year 2004.

No Idaho data is available on the percentage of women who have periodontal disease. A study published in 2001 by the American Academy of Periodontology reported that one in seven 26-year-old women had well established periodontal disease. During pregnancy, hormonal changes can cause an exaggerated response to bacteria on the teeth, known as "pregnancy gingivitis." Gums that were healthy may become swollen and bleed easily. Thorough and frequent cleaning of the teeth along the gumline can help control gingivitis. Untreated, gingivitis can progress to periodontal disease over time.

The American Dental Association encourages women who are pregnant or planning pregnancy to pay extra attention to their teeth and gums, and to continue regular dental visits throughout the pregnancy.

During pregnancy, hormonal changes can cause an exaggerated response to bacteria on the teeth, known as "pregnancy gingivitis."

The American Academy of Periodontology recommends that women achieve and maintain a high level of oral hygiene and that they obtain preventive oral care services as early as possible in the pregnancy (AAP 2004). Periodontal treatment is usually scheduled in the second trimester. The presence of infection or a dental emergency may require immediate treatment regardless of the stage of pregnancy.

American Academy of Periodontology diagnosis and treatment considerations for the pregnant woman include:

- Diagnosis and evaluation of periodontal and medical status.
- Patient education regarding the possible link between periodontal disease and birth outcomes, along with prevention and treatment options.
- Consultation as needed with the patient's prenatal care provider.
- Gestational period, status of pregnancy and risk factors for periodontal disease that may influence pregnancy outcomes.
- Periodontal therapy and patient motivation to establish and maintain good oral health. (AAP 2004)

The potential benefits of addressing periodontal disease in pregnant women are far reaching. The next steps are to use the available science to educate health providers, the public and policy makers. Good oral health is not optional for mothers and babies, it is essential.

Thomas Bruck, DDS, MPH, was the Idaho State Dental Director from 1973–1987 and Maternal and Child Health Director (MCH) from 1987–1992. Now semi-retired, he provides dental consultation to Idaho's MCH and Medicaid programs.

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Prenatal Migrant Health Policy in Two Northwest States

by Vickie Ybarra, RN, MPH

The Yakima Valley Farm Workers Clinic (YVFWC) provides primary care for uninsured and other underserved populations in Washington and Oregon. The historical base of clinics is in the agriculture-rich Yakima Valley in Washington State, and clinics are also located in Oregon's Willamette Valley. Each year YVFWC serves over 5,000 women for prenatal care, of whom approximately 40% are migrant/seasonal farmworkers, or their family members.

Each year YVFWC serves over 5,000 women for prenatal care, of whom approximately 40% are migrant/seasonal farmworkers, or their family members.

Mexican people have migrated to the Pacific Northwest for over a century. The history of migrant and seasonal farmworkers in the Yakima and Willamette Valleys mirrors the development of agriculture. Once the railroad and irrigation systems were in place, "labor shortage was the most serious obstacle encountered by farmers" (Gamboa 2000). Even before the labor shortages of World War II, the Yakima Valley "became one of the most important users of seasonal farm workers in the West" because of the labor-intensive nature of the crops grown at the time—primarily tree fruit and hops.

The immigrants who come as farmworkers come to work, and they work hard. Yes, some (many) are undocumented. The decision to move to this country as an undocumented immigrant is not taken lightly. It is difficult and expensive to cross the border. In a study begun in the Yakima Valley in 2001, undocumented women reported that their crossing experience ranged from "expected discomfort and difficulties to extreme danger and life-threatening circumstances" (Andrews 2002). Despite the risks, the costs, and their fears, these women come to the U.S. for work.

Prenatal Care Coverage at the State Level

Washington and Oregon have made profoundly different policy decisions around prenatal care coverage for undocumented pregnant women. In Washington, prenatal care for low-income pregnant women has been a priority for years. Even before passage of the Maternity Care Access Act of 1989, which dramatically expanded access to prenatal care for low-income pregnant women, state-only funds covered prenatal care for some low-income women. Although the Prenatal Care Program for unqualified immigrant[1] pregnant women was occasionally threatened with elimination, Washington State continued to fund that program with state-only funds throughout the 1990s. This funding pattern continued until the 2002 supplemental budget when State Children's Health Insurance Program (SCHIP) funding was tapped for needed matching dollars. Today the program covers prenatal care for between 6,000 and 7,000 women each year statewide. In Yakima County the program covers about one quarter of all births each year, or about 1,000 of the total 4,000 annual births (Cawthon 2005).

Utilization at the Clinic Level

When low-income women were offered coverage for prenatal care in YVFWC clinics, they accessed that care. In 1990, 26% of prenatal patients at the Yakima Valley clinics entered prenatal care in the first trimester; in 2001 it was 87%. And there is evidence that the program actually reduces the rate of low birthweight among the target population. An early study of the program showed that in the first two years, the rate of low birthweight among women served with the state-only program dropped from 6.0% to 4.8% (Cawthon 1992).

When low-income women were offered coverage for prenatal care in YVFWC clinics, they accessed that care. In 1990, 26% of prenatal patients at the Yakima Valley clinics entered prenatal care in the first trimester; in 2001 it was 87%.

Early access to prenatal care for this population is essential to detecting and treating diseases of pregnancy that occur more often among Hispanic women. A dramatic example is gestational diabetes. Just as the rate of type 2 diabetes is increasing among Hispanics in the state and nationwide, the incidence of gestational diabetes is increasing among the pregnant women served by YVFWC. The rate per 1,000 live births surged from 20.3% among Hispanic women in Yakima County in 1990 to 60.6% in 2001 (Washington DOH). Improved access to early, continuous prenatal care, therefore, contributes to overall health status in addition to preventing low birthweight and preterm birth.

Meanwhile, in Oregon, low-income unqualified immigrant women are *not* covered for prenatal care, and many do not enter prenatal care early.

In the YVFWC clinic system, there is a stark difference in entry to prenatal care among migrant and seasonal farmworker women in the two states. Only about half of the women entering prenatal care at YVFWC clinics in the Willamette Valley enter in the first trimester, compared to

[1] *While many in this group are undocumented, legal immigrant women not covered by Medicaid were added to this group following welfare reform in 1996.*

Yakima Valley Farm Workers Clinic

about 87% of those women entering care in the first trimester at Yakima Valley clinics. At these same clinics in Oregon, about 19% of women enter prenatal care in the third trimester, versus fewer than 2% who enter prenatal care in the third trimester at Yakima Valley clinics. Yet these clinics all offer the same system of care, have a sliding-fee-scale that discounts fees for low-income women, and make culturally and linguistically competent physicians and outreach and education services available to teach women the importance of early prenatal care and encourage them to enroll in prenatal care. Because of the difference in health policy for prenatal care coverage, women continue to enter prenatal care later in Oregon.

Only about half of the women entering prenatal care at YVFWC clinics in the Willamette Valley enter in the first trimester, compared to about 87% of those women entering care in the first trimester at Yakima Valley clinics.

Oregon has admittedly had fewer resources and a less robust economy than Washington. So it was encouraging when federal rules changed in 2002 to allow states to use SCHIP to provide health coverage for prenatal care and delivery to mothers and their unborn children. With a 75% SCHIP match for the states, the YVFWC hoped that Oregon would take the opportunity to cover disadvantaged pregnant women through this program. To this end, the clinic worked during the Oregon legislative sessions in 2003, 2004, and 2005.

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However, Oregon policy makers felt that other issues should be considered in making the decision about using SCHIP funds to cover prenatal care. For example, because SCHIP funds are limited, policy makers had to consider other populations in need, such as increasing the number of children who would qualify for this funding. So although undocumented pregnant women are covered for labor and delivery, they are still not covered for prenatal care.

In 2005 there was some movement on the issue among Oregon policy makers, some of whom have made very promising statements. When the 2005 Oregon legislative session ended in August, however, this group of women still lacked insurance coverage for prenatal care. Policy makers are exploring other strategies for serving this underserved group.

Vickie Ybarra, RN, MPH, is Director of Planning and Development for the Yakima Valley Farm Workers Clinic. Among her many activities, Ms. Ybarra has led efforts in Washington State and nationwide to increase diversity in the health care workforce.

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Born Too Soon

by G. Maria Carlos, MS and Susan Oatis, MHA

When a baby is born too soon or born too small, the impact is devastating. Suddenly, a woman and her family must adjust to a terrible reality: a tiny baby in the neonatal intensive care unit (NICU), a frightening world of strange equipment, complex rules, and complicated medical information.

This is enough to overwhelm any family. But it can be formidable when the family is already coping with lack of resources, unstable housing, poor self-esteem, little social support, mental health problems, or chemical dependency.

People of all races struggle with these issues, but for people of color the problems may be exacerbated by the very organizations and people who are supposed to help them because of racism. Here are some of the extra burdens a Black woman in King County, Washington recently encountered:

- She gets less than recommended prenatal care because she didn't understand what the staff wanted and the staff didn't understand her.
- She did not get all the support services she needed because she could not get someone to help her.
- On hospital bed-rest due to premature labor and preeclampsia, and while her baby was in NICU, the hospital social worker told her to leave the hospital to complete paperwork required by Child Protective Services, or her children would be removed from family custody.
- She could not get to the NICU because the Medicaid transportation broker wouldn't cover this type of medical appointment.
- She could not buy or otherwise get the recommended equipment and supplies when it was time to bring the baby home.
- She did not have a strong support network to help her deal with a fragile infant and potentially serious health problems.

Racism is cultural insensitivity backed by power and privilege. So cultural competency training alone cannot fix these problems. What is needed—within each institution—is to analyze and eliminate the policies and procedures that allow differential treatment.

G. Maria Carlos, MS, is manager of the Infant Mortality Prevention Outreach Program at Public Health—Seattle & King County (PHSKC). Susan Oatis, MHA, is manager of the Family Support Services Program at PHSKC and a member of the *Northwest Bulletin* Editorial Board.

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UW Maternal and Child Health Education Opportunities

The University of Washington offers two pathways to obtain a Master of Public Health (MPH) degree in Maternal and Child Health (MCH):

The **Extended MPH Degree Program** (EDP) is available to employed mid-career public and community health professionals who cannot attend school full time. The program can be completed in three years or less and is delivered through a combination of independent study and required attendance on campus. The EDP also offers a one-year **Certificate of Public Health in MCH**. Individual MCH courses may also be completed by distance.

Application forms and information material for the **Extended Degree Program** are available at http://depts.washington.edu/hsedp.

The **Maternal and Child Public Health Leadership Training Program (MCH Program)** offers a two-year, in-residence program leading to a **MPH** degree through either the Departments of Health Services or Epidemiology. The program includes a practicum and thesis. The MCH Program's core and affiliate faculty are drawn from diverse fields: obstetrics, pediatrics, social work, nutrition, child development, and physical therapy. Faculty research interests cover a wide range of health policy and epidemiological issues, including perinatal epidemiology; child and adolescent health; children with special health care needs; injury prevention; nutritional risk; behavioral, organization, and social influences on health care utilization; and women's health.

Strong links have also been built between the MCH Program and many public and private health organizations in the Northwest. Practicum placements and thesis research can involve working with local and state health departments, area hospitals, private and community health centers, and other regional programs.

For more information about the **MCH Program**, check its Web site at http://depts.washington.edu/mchprog/admissions.html.

State Reports

Alaska Report

Preterm birth in Alaska 1989–2003[1]

by Bradford D. Gessner, MD, MPH

Preterm birth is one of the leading causes of neonatal and infant mortality and morbidity and a substantial source of economic loss. While great strides have been made in decreasing adverse outcomes associated with preterm birth, there has been little to no progress in decreasing the *occurrence* of preterm birth. In Alaska, gestational age has been reported routinely on birth certificates since 1989; the latest available data are from 2003.

During the 15 years of evaluation, 1.0% of infants were born very preterm and 6.4% were moderately preterm. High-risk groups for preterm birth include:

- Multiple gestation birth (8.2–fold increase in risk)
- Caesarean-section delivery (2.3–fold increase)
- Maternal prenatal tobacco use (1.4–fold increase)
- Maternal prenatal alcohol use (1.3–fold increase)
- Alaska Native status (1.3–fold increase)
- Less than a high school education (1.3–fold increase)
- Maternal age less than 20 years (1.2–fold increase) and similar results for paternal age and education.

Criteria for Preterm Birth

Weight

- Low: Less than 2,500 grams
- Very Low: Less than 1,500 grams
- Extremely Low: Less than 1,000 grams

Gestational age

- Preterm: Less than 37 weeks
- Moderately preterm: 32 to 36 weeks
- Very preterm: Less than 32 weeks

[1] *All raw data in this report are from the Alaska Bureau of Vital Statistics; analyses performed by author.*

The rate of infants born very preterm has remained static while the rate of infants born moderately preterm has increased from approximately 5.0 to 8.0%, an increase of 60% (Figure 1). If the 1989 to 1991 rates had persisted through 2001 to 2003, 803 more babies would have been born full term, meaning a significant drop in mortality and morbidity associated with these infants.

The reasons for the higher rate of moderately preterm birth are not clear. The rate of multiple gestation birth has increased from 1.8 to 2.9% during the study period, but multiple gestations account for a small portion (17%) of all preterm births. Reported maternal smoking and alcohol use rates have declined over the study period while the proportion of all births occurring to teen mothers has remained constant at 11%. The proportion of births delivered by caesarean section has increased from 15 to 20%, but this increase occurred only recently, while preterm birth rates have been increasing since this information has been collected. Finally, all of the risk factors identified for moderately preterm birth are more strongly associated with very preterm birth, yet rates for very preterm infants have remained constant.

In the U.S. as a whole, preterm birth rates have increased from 8.3 to 9.4% among Caucasians, but decreased from 19 to 16% among Blacks from 1989 to 2000. Consequently, Alaska has a preterm birth rate that remains below the national average but is increasing at a more rapid rate.

The neonatal mortality rate—one of the best general measures of preterm infant care—has remained relatively constant in Alaska at approximately 3 to 3.5 per 1000 live births during 1996 to 2003, although there was an approximately 30% decrease from 1989 to1996. Alaska's neonatal mortality rate has been substantially below the national average since data on gestation were routinely collected and is approximately one-third lower than the 4.7 per 1000 live births reported for the U.S. during 2002.

Alaska has a preterm birth rate that remains below the national average but is increasing at a more rapid rate.

Future priorities for Alaska include continuing the excellent system of perinatal care regionalization that has led to some of the nation's lowest neonatal mortality rates while seeking to identify and address the reasons for the increasing occurrence of births at 32 to 36 weeks gestation. Programs to decrease preterm birth must target all pregnant women since subgroups have not been identified that have substantially elevated risk and account for a large proportion of all preterm births.

Bradford Gessner, MD, MPH, is the manager of the MCH-Epidemiology Unit of the Alaska Division of Public Health. Dr. Gessner is a pediatrician and CDC-trained epidemiologist. He has authored over 60 manuscripts on pediatric and infectious disease issues.

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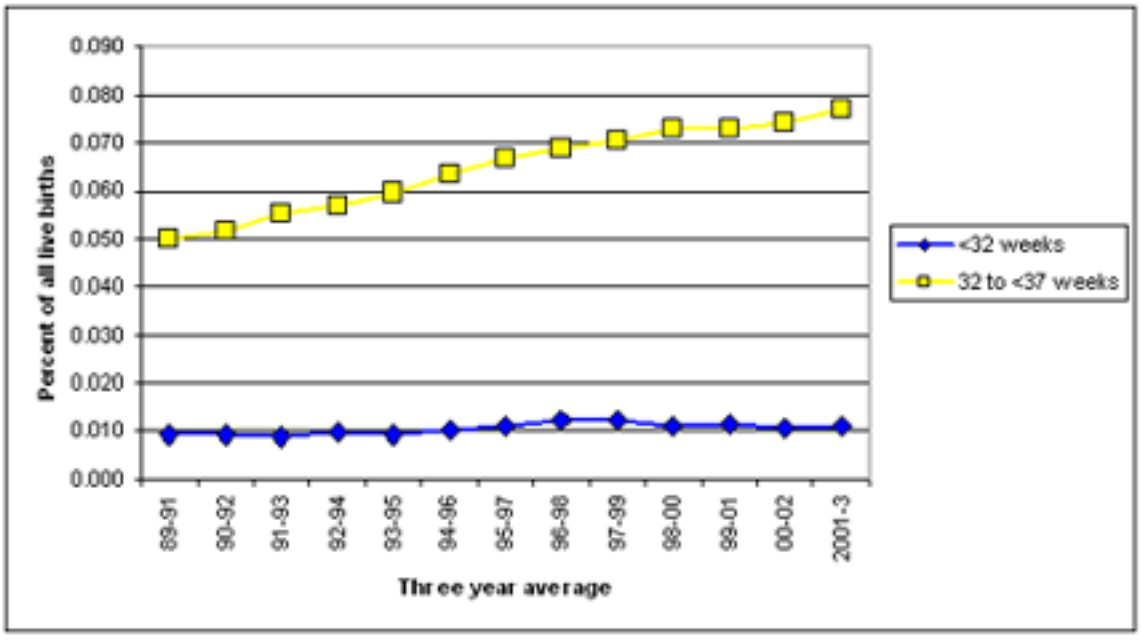

Figure 1. Trends in preterm and very preterm birth rates by three-year moving averages Alaska: 1989-2003.

Idaho Report

IDAHO DEPARTMENT OF HEALTH & WELFARE

Idaho's Perinatal Oral Health Project

by Lisa Penny, RDH, BS

An increasing number of Idaho infants are born prematurely or at low birthweight (LBW).[1] While better than the national average, the proportion of live births that are preterm has increased to 10.6% and LBW has increased to 6.5%, exceeding the Healthy People 2010 targets of no more than 7.6% preterm and no more than 5.0% LBW.

Health insurance is a key determinant of women's access to services that can improve pregnancy outcomes. Idaho's Medicaid Program provides a full package of benefits to eligible pregnant women who meet Aid to Families with Dependent Children guidelines. For women at or below 133% of the Federal Poverty Level, the Medicaid Pregnant Women and Children's Program provides coverage limited to pregnancy-related services up to 60 days postpartum.

Health insurance is a key determinant of women's access to services that can improve pregnancy outcomes.

A presumptive eligibility component allows a pregnant woman to obtain limited prenatal care during the time between pregnancy verification and application for benefits, and eligibility determination. For high-risk pregnancies, the Idaho Medicaid Program provides enhanced services when requested by a physician, including additional social service, nutrition, and nursing visits—plus a monthly risk-reduction visit.

Idaho has no statewide comprehensive, coordinated system to provide quality prenatal care to pregnant women or to identify high-risk pregnancies. The local district health departments serve pregnant women through the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC Program), family planning clinics, and tobacco cessation classes. They provide pregnancy testing, counseling and education, supplemental foods, referrals and assistance in finding prenatal care, and determination of eligibility and assistance in applying for Medicaid and other benefits. Only one district health department provides intensive prenatal services, including a comprehensive risk reduction assessment with appropriate follow-up education or counseling services.

Idaho's Perinatal Oral Health Project

Idaho is developing a perinatal oral health project for pregnant women. Research suggests that women with periodontal disease (inflammatory disease of the gums and bone that support the teeth) may have a more than 7–fold increase in preterm low birthweight (PLBW) infants, when controlling for all other PLBW risk factors. Studies also suggest an association between treating periodontal disease during pregnancy and improved birth outcomes. While some question whether the science is strong enough to support implementation of public policies and practices, there is no "downside" to improving pregnant women's oral health. The "upside" benefit is improved birth outcomes, health, and quality of life for Idaho mothers, children, and families.

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According to the Idaho Pregnancy Risk Assessment Survey, two-thirds of Idaho mothers surveyed 3–12 months post partum in 2001 reported that their prenatal health care providers did not tell them about the importance of getting regular dental care during their most recent pregnancy. Sixty-three percent reported that they did not go to a dentist or dental clinic for routine dental care during their pregnancy. Of those who did not get dental care, 23% reported that they did not feel getting dental care was important.

The goal of the Idaho Perinatal Oral Health Project (see Periodontal Disease and Pregnancy) is to develop a statewide infrastructure for educating pregnant women about the importance of dental care during pregnancy, and to refer those with oral health risk factors or untreated dental disease for care. While a reduction in periodontal disease is a major focus of the project, transmission of strep mutans bacteria from mother to child will also be addressed. Project objectives are to:

- Educate health providers and consumers.
- Increase access to dental care for pregnant women.
- Improve pregnancy outcomes.

Project plans include forming local leadership teams in each health district, conducting grand rounds at regional medical

[1] *Idaho Maternal and Child Health and Children with Special Health Care Needs Five Year Assessment Report, Aprilt 2005. www.healthandwelfare.idaho.gov/site/3329/default.apx*

centers, follow-up "lunch and learn" sessions in medical offices, and community outreach through the media and other sources. Project impact will be evaluated based on data from the Pregnancy Risk Assessment Tracking System, Idaho Medicaid and the Medicaid Pregnant Women and Children's Program claims, as well as Idaho birth certificates.

Lisa Penny, RDH, BS, is the Oral Health Program Manager with the Idaho Department of Health and Welfare. Her career in dental public health spans 35 years. She has been responsible for oversight of the statewide maternal and child health preventive oral health program since 1987.

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Oregon Report

DHS oregon department of human services

Early Prenatal Care and Healthy Newborns

by Andrea Allison, RN, BSN

The national rate for preterm birth in 2003 was 12.3%. Oregon's overall rate was somewhat better at 8.4%, with the rates for Non-Hispanic American Indians and Non-Hispanic African Americans at 10.8% and 10.2% respectively.[1] Despite a better showing than the national average, Oregon's rates are still high given the cost of preterm births to families and society. Improving access to prenatal care and preventing preterm birth are included in our state outcome measures, making the two issues top priorities for Oregon's Perinatal Health Program.

Maternity Case Management (MCM) and Oregon MothersCare (OMC) are two programs that provide women early care and assistance during pregnancy. MCM in Oregon follows the standard model of risk assessment, client education, referral, and follow-up through eight weeks postpartum. OMC is a unique program that complements public and private prenatal care and maternity case management.

Oregon MothersCare
supporting healthy pregnancies

Oregon MothersCare: A Unified Perinatal System
Oregon MothersCare assists women in accessing early prenatal care. It was created in the mid-1990s in response to the fragmented system of care in rural counties. The program is a collaborative effort with the Oregon Health Plan (Oregon's Medicaid waiver program), county health depart-

[1] *Oregon Vital Statistics Annual Report, 2003*

ments, and many private non-profit agencies. The program creates a streamlined referral system to link women with pregnancy testing, prenatal care, Oregon Health Plan (OHP), WIC, and other pregnancy services. OMC sites receive referrals through our *SafeNet* toll-free line, WIC, physicians' offices, schools, and word of mouth. Most of the sites are located in health departments, though some are housed in hospitals, Community Action facilities, and obstetrics and primary care clinics.

Launched in January 2000 in six locations, OMC has grown to 26 sites statewide. In 2004, 3,020 women received over 13,000 services. One in five women in Oregon does not receive prenatal care during the first three months of pregnancy, placing her health and the health of her baby at risk. OMC has improved this rate. In 2004, 70% of the women who contacted the OMC program did so in their first trimester, and, of those, 84% started their prenatal care while still in their first trimester. Additionally, 30% were in their second or third trimester when they contacted an OMC site. At least half of these women started prenatal care within two weeks of the initial visit. In the second quarter of 2005, the percentage of women contacting OMC in their first trimester and obtaining first trimester care rose to 89%—closing in on the Healthy People 2010 goal of 90%.

One in five women in Oregon does not receive prenatal care during the first three months of pregnancy, placing her health and the health of her baby at risk. OMC has improved this rate. In 2004, 70% of the women who contacted the OMC program did so in their first trimester, and, of those, 84% started their prenatal care while still in their first trimester.

Improved integration through local partnerships. Oregon MothersCare facilitates increased communication and collaboration within communities. OMC sites encourage local providers, health plans, schools, and other agencies to reach out and assist women in receiving timely perinatal services. OMC has partnered with the Oregon Health Plan to accept OMC site applications and issue determinations for Medicaid/OHP eligibility within seven working days. Communciation flows easily between OHP and OMC staff so that all parties are updated on application status. The community partners and providers know that they can pick up the telephone and refer a woman to an OMC site for "one-stop-shopping."

For many women, visiting the OMC site is their only chance to receive and review educational information. Women are informed about the many issues related to pregnancy with a concentration on oral health—Oregon's new statewide focus. Oregon MothersCare also facilitates referral to MCM where referrals are made for the woman and her family based on assessed risk factors. Maternity case managers educate women on maternal/fetal HIV transmission prevention, lead exposure and screening, immunizations, tobacco use and exposure, use of the 5 A's[2], childhood caries prevention, maternal oral health, and fetal alcohol syndrome.

The OMC and MCM programs receive strong support from health providers who work together with OMC sites to identify women who need early prenatal care. The OMC program is low cost and relies on social marketing and community involvement to connect all pregnant women to health insurance and other services needed to assure early and adequate prenatal care.

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[2] *A health care provider protocol for asking about and treating tobacco use.*

Washington Report

Washington State Department of Health

Smoking Cessation: Interagency Collaboration to Reduce Preterm Birth and Low Birthweight

by Jeanette Zaichkin, RNC, MN

The rate of preterm birth in Washington State appears to be increasing. Overall, the rate of singleton preterm birth increased an estimated 1.7% per year from 7.6 per 100 livebirths in 1993 to 8.8 per 100 livebirths in 2003. This increase is seen in both moderately preterm births and in very preterm births. However, the rate of singleton preterm birth is not quite double the singleton low birthweight (LBW) rate, which means that many singleton preterm infants in our state weigh more than 2,500 grams.

Strategies to Reduce Risk of Preterm Birth
Strategies must be carefully chosen based on public health priorities and potential impact on concurrent health indicators. In Washington, reducing tobacco use among pregnant women is a top public health priority because it is an important preventable cause of LBW. Smoking during pregnancy is also associated with other risks, including preterm birth.

In our state, rates of smoking are especially high for low-income pregnant women receiving Medicaid. In 2003, the rate of smoking during pregnancy was 18.7% for Medicaid-served women, and 4.2 % for non-Medicaid women.

In Washington, reducing tobacco use among pregnant women is a top public health priority because it is an important preventable cause of LBW.

The Medicaid singleton LBW rate for 2003 was 8.0% for smokers and 4.7% for non-smokers. Because of these disparities, the state Department of Health Tobacco Prevention and Control Program (TPCP), Maternal and Child Health Program (MCH) and the Department of Social and Health Services Medical Assistance Program (Medicaid) have partnered to address tobacco use by low-income pregnant and parenting women. Interventions are targeted at Medicaid's First Steps program, which covers Maternity Support Services, Infant Case Management, Childbirth Education, childcare during prenatal care visits, and transportation to medical appointments.

Medicaid Smoking Cessation Benefit for Pregnant Women
Medicaid covers smoking cessation for pregnant women in its fee-for-service scope of benefits. The benefit covers pregnant women up to two months postpartum and when appropriate, payment for Zyban[1]. The Department of Health (DOH) mailed every obstetrical provider information on the benefit and guidelines for prescribing Zyban.

First Steps Tobacco Cessation Performance Measure
DOH, in collaboration with Medicaid, implemented the Tobacco Cessation Performance Measure in 2003. The measure mandates that First Steps providers document discussions with each client about tobacco usage and secondhand smoke exposure and offer individualized interventions. The discussions must occur throughout pregnancy and two months postpartum.

TPCP and MCH, in collaboration with Medicaid, provide ongoing training to First Steps providers on motivational interviewing, health education materials, and community resources. Over 80% of 1,200 First Steps providers have participated in these trainings and First Steps providers reached over 25,000 clients in 2003. Providers include public health nurses, behavioral health specialists, dietitians, community health workers, childbirth educators, and infant case managers. As a result, assessment of tobacco use almost doubled from 36.1 to 67.9%, and assistance to quit nearly tripled from 15.9 to 44%. Assessment of exposure to secondhand smoke increased from 64.2 to 82.1% and assistance to reduce secondhand smoke exposure tripled from 12.5 to 38.6%.

As a result, assessment of tobacco use almost doubled from 36.1 to 67.9%, and assistance to quit nearly tripled from 15.9 to 44%.

A one time per client $10 reimbursement is available for First Steps providers who complete the Tobacco Cessation Performance Measure.

Quit Line: A service for all pregnant women
DOH has implemented a toll-free statewide Washington Quit Line that has a specialized intervention protocol for all pregnant women.

The newly established Quit Line Fax Referral program embeds cessation counseling into routine health care. The medical provider asks about and documents tobacco use, advises users to quit, and assesses interest in quitting. Pregnant women interested in quitting allow their contact information to be faxed to the Washington Tobacco Quit Line. The Quit Line confirms the referral, contacts the

[1] *A prescription medicine that can help alleviate smoking withdrawal symptoms.*

pregnant woman, and assists in developing a quit plan and arranging referrals.

Best practice booklet
DOH, Medicaid, the Perinatal Advisory Committee, and other health care professionals developed a best practice booklet for prenatal care providers. *Smoking Cessation During Pregnancy: Guidelines for Intervention* includes information on motivational interviewing, handling relapse, developing quit plans, pharmacotherapy, and additional resources. The booklets are disseminated at major medical education meetings, First Steps trainings, MCH Regional meetings, and at Regional Perinatal Program events.

The total rate of smoking in pregnant women has declined from 13.5% in 2000 to 10.8% in 2003. While it is difficult to link any particular intervention with this decrease, any reduction in smoking has a positive effect on maternal and newborn health.

The total rate of smoking in pregnant women has declined from 13.5% in 2000 to 10.8% in 2003.

Jeanette Zaichkin, RNC, MN, is a public health nurse consultant with the Washington State Department of Health, Maternal and Child Health. Jeanette facilitates the work of the Perinatal Advisory Committee and manages the regional perinatal programs in the state.

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Resources

DSHS/ MAA First Steps program for low-income pregnant and parenting women:
http://fortress.wa.gov/dshs/maa/firststeps/

DSHS/ MAA Smoking Cessation Counseling Benefit
http://www.doh.wa.gov/cfh/mch/documents/DSHS_MAAbenefit_refcard_3-05.pdf

First Steps Tobacco Cessation During Pregnancy Performance Measure
http://fortress.wa.gov/dshs/maa/firststeps/Performance%20Measure%20Overview.htm

Key Indicators of Perinatal Health for Washington Residents
http://www.doh.wa.gov/cfh/mch/documents/Key_Indicators_Perinatal_Health_2005.pdf

"Smoking Cessation During Pregnancy: Guidelines for Intervention" best practice booklet:
http://www.doh.wa.gov/cfh/mch/documents/CessationFinal_122.pdf

Washington Quit Line: 1-877-270-STOP

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1990 M Street NW, Suite 200
Washington, D.C. 20036
202-833-8288
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March of Dimes Web site

Peristats section at http://www.marchofdimes.com/peristats Comprehensive source of perinatal statistics and tools for displaying data and preparing customized graphics and tables.

Prematurity section at http://www.marchofdimes.com/prematurity "Share Your Story" Web site for families of premature babies; NICU section for families with a baby in intensive care.

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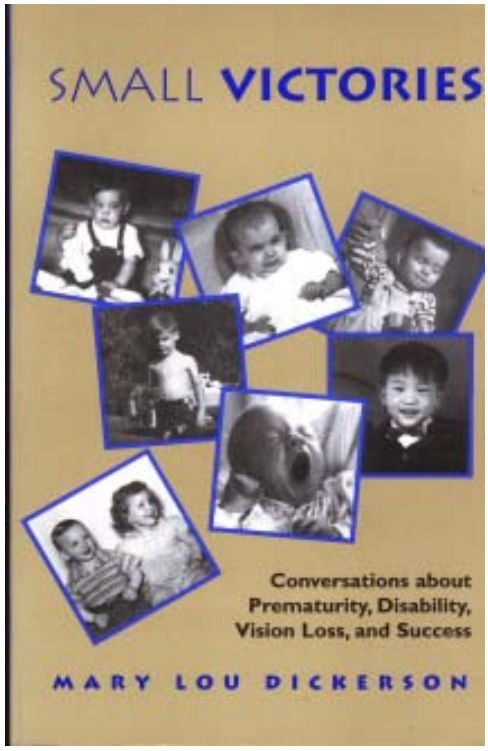

Save the Date

February 22–24

National Association of County and City Health Officials (NACCHO) Local, State, and Federal Public Health Preparedness Summit, Washington D.C.
http://www.naccho.org/phprep06

March 4–8

Association of Maternal and Child Health Programs (AMCHP) 2006 Conference. Theme: Early Childhood. Arlington, VA.
http://www.amchp.org/news/2005conference/conference-general.htm

March 6–9

Centers for Disease Control and Prevention (CDC) National Immunization Conference, Atlanta.
http://www.cdc.gov/nip/NIC/default.htm

April 11–12

Adolescent Sexuality Conference, Theme: Start Early, Stay Late—Nurturing Healthy Adolescent Transitions. Seaside, OR
For information contact: Aylette Wright at 541-317-9388 or e-mail: Aylett.wright@ppcw.org for registration information.
http://www.geocities.com/selby_s/oregonconference.html

May 4–6

Interprofessional Continuing Education, The University of British Columbia, "Second National Biennial Conference on Late Adolescents and Adults with Fetal Alcohol Spectrum Disorder." Navigating the Rapids: Doing What Works in Practice. Vancouver, B.C.
http://www.interprofessional.ubc.ca

May 10

Healthy Mothers Healthy Babies 3rd Annual Luncheon. "Making Connections for Health." Westin Hotel, Seattle.
http://www.hmhbwa.org/

May 16–19

Centers for Disease Control and Prevention (CDC) 2006 Diabetes and Obesity Conference, Denver.
http://www.cdc.gov/diabetes/conferences

June 2–3

Interprofessional Continuing Education, The University of British Columbia Maternal and Child Youth Conference. Theme: Optimizing the Care of Mothers, Children, and Youth. Vancouver B.C.
http://www.interprofessional.ubc.ca

June 21–24

University of South Florida 16th Annual Social Marketing in Public Health Conference, Clearwater Beach, Florida.
http://www.cme.hsc.usf.edu/coph/smph

July 26–28

National Association of County and City Health Officials (NACCHO) Annual Conference, San Antonio.
http://www.naccho.org/conferences

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