

Persistent Disparities in Connecticut's Perinatal System of Care

A Report to

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January, 2010

Introduction

Compared to national statistics, Connecticut residents report good overall health status. Large health disparities exist, however, between certain racial and ethnic groups (Davis and Stone, 2009; Morin, 2008). A state priority has been identified within the Title V Maternal and Child Health (MCH) Block Grant of the Connecticut Department of Public Health (DPH) to reduce health disparities in the MCH population, and especially disparities related to teen pregnancy, low birth weight, prenatal care and infant mortality (DPH, 2008). In response, DPH applied for and was awarded technical assistance through the Health Resources and Services Administration of the U.S. Department of Health and Human Services to explore ways in which state and local MCH partners can work together to address these disparities through a coordinated perinatal system of care. A forum was planned and conducted with statewide and community-based MCH leaders in the state to review and analyze MCH data, examine programs and resources that are currently available, and reach consensus about how best to enhance coordination of existing programs and resources. The objective was to identify several action steps of low-cost that could be implemented by community-based and regional organizations immediately and completed within a short time frame.

The forum was conducted on August 27, 2009 and September 3, 2009, and was conducted using the following components of a public health problem-based approach (Thorne et al, 1993; Guyer, 1998): 1) define the problem, 2) develop a conceptual framework for key determinants, and 3) identify and develop a set of prioritized intervention and prevention strategies. Programs included in the discussion were: Centering Pregnancy, Nurturing Families Network, Hartford

¹ **Heather Lipkind** (Author) was contracted by DPH to facilitate a forum of state and community-based perinatal professionals, and to prepare this summary report of its proceedings (C. Stone & K. Sullivan, eds).

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federal Healthy Start, New Haven federal Healthy Start, WIC, state Healthy Start, the Fatherhood Initiative, Planned Parenthood of Connecticut, and Real Dads Forever. Individuals who kindly contributed expertise and time for this endeavor were: **Rosa M. Biaggi** (DPH), **Laura Victoria Barrera** (Connecticut Department of Social Services), **Renee Coleman-Mitchell** (DPH), **Grace Damio** (Hispanic Health Council), **Doug Edwards** (RealDads Forever), **Karen Foley Schain** (Children's Trust Fund), **Amy D. Gagliardi** (Women's Health Subcommittee, Medicaid Managed Care Council; Community Health Center, Inc.), **Delores Greenlee** (New Haven Healthy Start, Community Foundation for Greater New Haven), **Evelyn Guzman** (Hartford Health and Human Services), **Erin Jones** (Connecticut Chapter of March of Dimes), **Susan Lane** (Planned Parenthood of Connecticut), **Mary Alice Lee** (Connecticut Voices for Children), **Horace McCaulley** (Connecticut Department of Social Services), and **Sharon Rising** (Centering Healthcare Institute). The forum was hosted by **Lisa Davis**, Acting Chief of the Public Health Initiatives Branch (DPH), and administered by **Carol Stone**, Family Health Section.

This report describes outcomes of the forum discussion and includes suggestions for locally implemented immediate, low-cost action steps of high feasibility to address disparities in Connecticut's perinatal system of care.

Definition of The Problem

The discussion below of selected perinatal health indicators establishes that persistent racial and ethnic disparities among perinatal indicators and perinatal healthcare indicators exist in the state of Connecticut. These disparities exist during the preconception and interconception period, the prenatal period, and at birth. The data also provide a measure of the problem's magnitude.

During the preconception and interconception periods, when a woman of childbearing age is not pregnant, information from the state's Behavioral Risk Factor Surveillance System,² show that, whereas only about 9% of all non-Hispanic White/Caucasian women in the state during 2001-2005 combined were uninsured, close to 20% of non-Hispanic Black/African American women were uninsured (over 2 times higher; Gagliardi, 2007). Among Hispanic women, the percent of uninsured women was even higher (36%, or 4 times higher). In addition, using the state's Pregnancy Risk Assessment Tracking System (PRATS),³ it was estimated in 2003 that of those who responded, 11.8% of non-Hispanic White/Caucasian women had no insurance just prior to pregnancy, while four times more non-Hispanic Black/African American and nearly as many Hispanic women had no insurance just before pregnancy. Further information from the PRATS survey indicated that, of those who responded, 4.3% of non-Hispanic White/Caucasian women with insurance were enrolled in Medicaid⁴ just before pregnancy. In sharp contrast, over

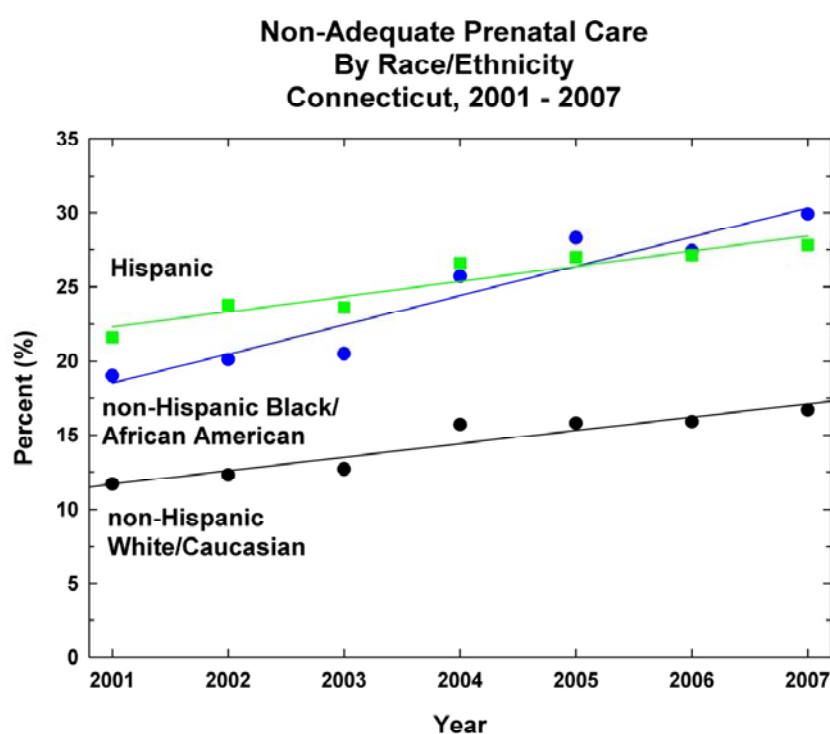
² The Behavioral Risk Factor Surveillance System (BRFSS) is a continuous telephone survey conducted by the Connecticut Department of Public Health of all adult residents in Connecticut (ages 18 and over), which explores a variety of health-related topics.

³ The Pregnancy Risk Assessment Tracking System (PRATS) is a postpartum survey conducted by the Connecticut Department of Public Health, which explores a variety of perinatal topics just before pregnancy, during pregnancy, and after birth. Two rounds have been conducted as point-in-time surveys. Round 1 was conducted in 2002 and Round 2 was conducted in 2003. A third round is planned for Spring, 2010.

⁴ Unless specifically noted, the term "Medicaid" in this report includes: HUSKY A (Medicaid managed care); HUSKY B (Connecticut's Children's Health Insurance); and/or Fee-For-Service Medicaid.

6 times more non-Hispanic Black/African American women with insurance were enrolled in Medicaid, and almost 8 times more Hispanic women with insurance were enrolled in Medicaid.

Once a woman is pregnant, initiation of prenatal care in the first trimester during 2007 occurred among 77.4 % of mothers enrolled in the state's HUSKY A program and 67.4 % of mothers enrolled in the Medicaid Fee-For-Service program, compared to 85.2 % of all mothers across the state (Lee et al, 2009). Disparities also existed in non-adequate prenatal care, which is defined by a combination of the month of first prenatal care visit and the total number of visits during pregnancy. Among the 2007 birth cohort in Connecticut, the percent of non-adequate prenatal care was 17.5% among non-Hispanic White/Caucasian women, 27.5% among Hispanic women, and 30% among non-Hispanic Black/African American women (see **Figure**, below). The increasing trend in non-adequate prenatal care seen since 2001 was greater among the non-Hispanic Black/African American mothers than among other race/ethnic groups.



Source: C. Stone (FHS, DPH), from birth records for calendar years 2001-2007, provided courtesy of L. Mueller, F. Amadeo, & K. Backus, HCQSAR, DPH.

In 2005, the estimated teen birth rate was 2.5 per 1,000 people among non-Hispanic White/Caucasian women, 13.5 per 1,000 among Hispanic women, and 15 per 1,000 among non-Hispanic Black /African American women (Gagliardi, 2007). Although these rates were lower in 2005 than at any other time from 2000-2004, the disparities in the teen birth rate among Hispanic and non-Hispanic Black/African American women remained significant.

Using the PRATS survey, disparities in stress and social support among pregnant women within Connecticut are also evident (Gagliardi, 2007). When asked how they would describe their pregnancy, over 8% of non-Hispanic Black/African American women who responded in 2002 and 2003 reported that the pregnancy was one of the worst times in their life, a percentage almost three times greater than that among non-Hispanic White/Caucasian women (2.8%).

Further, whereas 35% of non-Hispanic White/Caucasian women were not trying to become pregnant, almost 78% of non-Hispanic Black/African American women were not trying to become pregnant, and nearly 58% of Hispanic women were not trying. Also, almost three times more non-Hispanic Black/African American women experienced physical abuse in the months before their pregnancy, compared to their non-Hispanic White/Caucasian counterparts.

Among all first time mothers in Connecticut, those enrolled in Medicaid were less likely to enroll in childbirth classes (see **Table, below**; *J. Morin, personal communication*), compared to all first time mothers in the state. Among first time mothers enrolled in Medicaid, only 55% were enrolled in the Special Supplemental Nutritional Program for Women, Infants and Children (WIC) during pregnancy, and less than one-third were enrolled in parenting classes.

Service Utilization Among First Time Connecticut Mothers

PRATS¹

Survey Questions	All First Time Mothers ²		First Time Mothers Enrolled in Medicaid During Pregnancy	
	Number	Percent	Number	Percent
TOTAL	1,587	35.8	200	36.3
No insurance just before getting pregnant	184	17.7	90	69.8
Prenatal care paid for by Medicaid	200	18.5	na	na
Enrolled in WIC during pregnancy	180	28.3	84	55.3
Services received during pregnancy				
Childbirth classes	989	62.5	61	30.4
Parenting classes	443	30.4	47	28.2
Smoking cessation classes	23	1.9	9	4.7
Home visits by nurse/healthcare worker	224	12.7	48	22.7
Food stamps	100	9.2	64	30.8
TANF (Welfare)	80	7.9	62	34.5

na - not applicable

¹ - PRATS (Pregnancy Risk Assessment Tracking System) was a point-in-time postpartum survey conducted within Connecticut of women with a recent pregnancy. The survey was conducted during spring, 2002, and Fall, 2003.

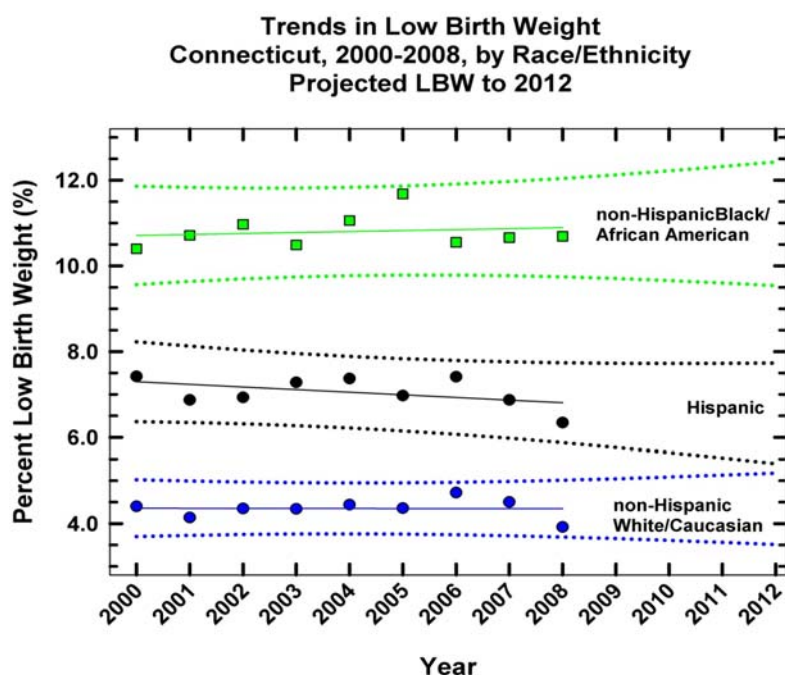
² - Weighted data for survey respondents

A recent study showed that women in the calendar year 2000 birth cohort who participated in WIC had a significantly reduced risk for a low birth weight delivery than those not enrolled in WIC, which suggests that WIC may be protective against low birth weight. (Stone et al, 2008). During an analysis of WIC enrollment, it was found that not all women enrolled in HUSKY A were co-enrolled in WIC, despite roughly equal eligibility.⁵ The data revealed that 6,432 women were co-enrolled in both WIC and HUSKY A, and 29,849 women were not enrolled in either program. Of 9,630 women enrolled in HUSKY A, 6,432 were co-enrolled in WIC. Despite eligibility for co-enrollment, the remaining 33% women were not enrolled in the food supplement program. Also, of 10,028 women enrolled in WIC, 3,596 (or 36%) were not co-enrolled in HUSKY A.

Racial and ethnic disparities also exist in birth outcomes. Low birth weight, defined as a birth weight of less than 2,500 grams (or about 5.5 pounds), has been a public health problem in Connecticut for many years and was the focus of a report by the Public Health Initiatives

⁵ In calendar year, 2000, eligibility limits for both WIC and HUSKY A were at 185% the federal poverty level (FPL). In January, 2008, eligibility for HUSKY A was increased from 185% FPL to 250% FPL, while eligibility for WIC remained at 185% FPL.

Disparities Workgroup (Morin, 2008). The rate of singleton low birth weight among all births in the state has increased since 2000 (DPH, 2009), and although corresponding rates among women enrolled in Medicaid has decreased, these rates remain significantly high. Further, in Connecticut during calendar year 2007, the singleton low birth weight rate was 4.5% among non-Hispanic White/Caucasian mothers, 10.5% among non-Hispanic Black/African American mothers, and 7.0% among Hispanic mothers (see **Figure**, below; C. Stone, *personal communication*). Trend analysis indicates that statistically significant disparities in low birth weight ($p < 0.05$) in Connecticut will continue through year 2012 without concentrated efforts to reduce the adverse birth outcome.



Actual percent low birth weight (LBW) for years 2000-2008 (symbols) is shown for singleton births across the state. Births for 2007 and 2008 are based on preliminary vital records reporting. Average trends in LBW (solid lines) were determined by linear regression of LBW percentages for years 2000-2008.

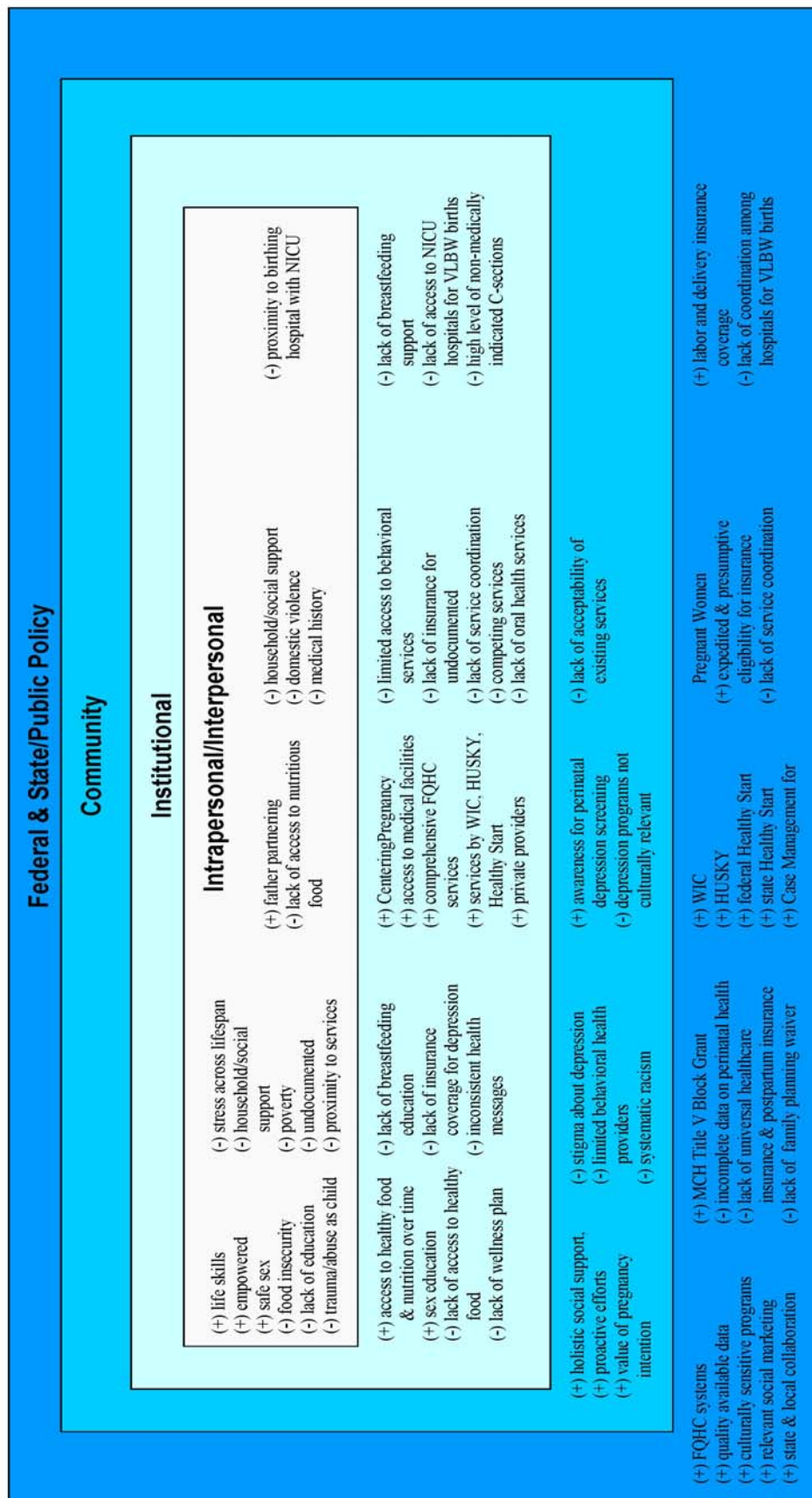
Projected 95% confidence range of percent LBW, in the absence of interventions, for years 2009-2012 (dotted lines).

Source: C. Stone (FHS, DPH), from birth records for calendar years 1995-2006, provided courtesy of L. Mueller, F. Amadeo, & K. Backus, HCQSAR, DPH.

Conceptual Framework of Key Determinants

Disparities within the Connecticut perinatal system of care are the result of many determinants, both positive (to reduce disparities) and negative (to increase disparities). The ecological model (see **Schematic**, next page) demonstrates that disparities in perinatal care are not limited to positive and negative modifiable personal behaviors, but are also deeply influenced by increasingly global positive and negative environmental elements within which a person resides. These environmental elements include institutions such as schools and health care centers, the surrounding community or neighborhood, and state and federal policies. Positive and negative determinants in Connecticut were identified by participants in the forum, and these perceptions were influenced by current conditions in the state.

Disparities in Perinatal Systems of Care within Connecticut Ecological Model of Positive and Negative Determinants—August, 2009



Many personal and interpersonal determinants identified within Connecticut reduce disparities in perinatal care services, and include life skills, personal empowerment, and father involvement in parenting. Some determinants that exacerbate disparities include stress across the lifespan, poverty, and a lack of proximity to services.

Determinants at the institutional level that reduce disparities in the Connecticut perinatal system of care include access to healthy food and nutrition, attainment of sex education, and access to medical facilities and programs. Some determinants that increase disparities include the lack of insurance for undocumented individuals, competing perinatal services, and limited access to behavioral services.

At the community level, determinants of the perinatal care system that have a positive impact on disparities include social support, awareness about perinatal depression screening, and an understanding of the value of pregnancy intention. Negative determinants include stigma about depression, systematic racism, and a lack of acceptance for existing services.

At the federal and state level, policies that have a positive impact on disparities in the Connecticut perinatal system of care include existence of the state's federally qualified healthcare systems, and a variety of existing programs such as WIC, HUSKY, state Healthy Start, and federal Healthy Start. Negative determinants include a lack of service coordination among existing programs, incomplete data on perinatal health, and a lack of coordination among hospitals to serve very low birth weight babies.

Prioritized Interventions and Prevention Strategies

An ecological model of determinants shows that strategies directed at more personal levels are embedded in environmental levels, and that the most effective interventions will not simply address personal determinants, but will reach beyond the individual to affect the family system, institutional and community environments, as well as state and federal policies (Guyer, 1998). Intervention strategies that are directed at any one level of the ecological model, therefore, could have significant impact on disparities in the Connecticut perinatal system of care. Strategies that address multiple levels, however, are likely to have an even greater impact. Also, strategies directed primarily at environmental levels may have a secondary impact on more personal levels. For instance, a public policy at the state level may affect services offered by a healthcare center (Institution level), which might then enhance direct services to clients (Intrapersonal/Interpersonal level). Conversely, some strategies offered at more personal levels may, with sufficient capacity and a groundswell of support, affect more global environmental levels.

Given the current economic environment within Connecticut, strategies identified in this report are limited to those that leverage existing funds and enhance existing programs. Participants at the forum identified a number of short-term solutions that would satisfy these more limiting criteria. Possible solutions, organized by the number of ecological levels addressed, and ranked by the group's collective assessment of feasibility, are discussed below. Some strategies could be implemented separately by community-based organizations, while others may require coordination between state and local organizations.

State, Community, Institutional, and Intrapersonal/Interpersonal Levels

The two activities below would have a primary impact on determinants at the state and institutional levels, and their program components would have a secondary impact on determinants at the community and intrapersonal/interpersonal levels. These activities, therefore, are likely to have a very high impact on disparities in the perinatal system of care, though they may require coordination by state, regional, and local organizations.

- 1) **Ensure maximal co-enrollment of WIC and HUSKY A during the prenatal and postpartum/interconception periods.** Work is needed to ensure that women and children receive and retain benefits from WIC and HUSKY, because participation has been shown to improve health outcomes. Existing programs across the state could explore individual methods to encourage WIC co-enrollment that might include the state and federal Healthy Start programs, and the Nurturing Families program.
- 2) **Maximize the quality of perinatal health data across the state.** The quality of existing data needs to be more carefully assessed, including its availability to monitor determinants of health disparities. Important indicators of disparities in perinatal systems of care were identified by the forum participants and are shown in the **Problem Table** (*next page*). Existing baseline measures were also identified for the non-Hispanic Black/African American and Hispanic populations, relative to the non-Hispanic White/Caucasian population (reference group). The quality of these indicators need to be assessed.

Community, Institutional and Intrapersonal/Interpersonal Levels

The activity proposed below would have a primary impact at the institutional level. The enhanced services that result from the activity could have a secondary impact at the community and intrapersonal/interpersonal levels because of the populations served by the service. This activity is likely to have a high impact on disparities in the state's perinatal system of care, and may require coordination by regional and local organizations.

- 1) **Convene a meeting of funders to maximize Infoline 211 services.** This telephone service is funded by multiple agencies. The group felt that there are gaps in the services offered by Infoline 211, and that agreement of these gaps by the funding agencies would help reveals ways in which Infoline 211 services could be enhanced.

Institutional and Intrapersonal/Interpersonal Levels

The eight proposed activities below would have a primary impact on determinants at the institutional level. They are focused on personnel who offer perinatal services. The activities would also have a secondary impact on intrapersonal/interpersonal determinants because of the enhanced direct services that result from the activities. These activities are likely to have a moderate impact on disparities in the Connecticut system of perinatal care, and could be implemented directly by local organizations.

- 1) **Encourage male involvement in the perinatal period.** Community social service personnel need to be trained to understand the value of family men's participation during pregnancy, at birth and during the early years of the child's life. Staff working on programs

**Problem Table
Disparities in Perinatal Systems of Care**

Health Indicators		Service Indicators		Indicators of Difficulty	
Indicator	Baseline	Indicator	Baseline	Indicator	Baseline
% reporting depression during pregnancy (PRATS)	65% nHB/AA, 68% Hisp (ref=51%)	% eligible pregnant women enrolled in WIC (PRATS)	55% (all races)	% women with partner involvement during pregnancy (PRATS)	62% nHB/AA, 68% Hisp (ref=85%)
Singleton low birth weight rate (Vital Records, 2007)	10.7 per 100 births nHB/AA, 6.9 per 100 Hisp (ref=4.5 per 100)	% high risk births at NICU hospitals (Vital Records, 2007)	15% (all races)	teen birth rate (Vital Records, Census est, 2005)	22 per 1,000 women nHB/AA, 17 per 1,000 Hisp (ref=5 per 1,000)
% extremely preterm birth among LBW births (Vital Records, 2005)	20% nHB/AA, 12% Hisp (ref=11%)	% women in HUSKY A receiving nonadequate services during pregnancy (linked Vital Records, 2006)	32% nHB/AA, 28.6% Hisp (ref=22.2%)	% women uninsured before pregnancy (BRFSS, 2001-2005)	24% nHB/AA, 26% Hisp (ref=9%)
% distribution of those drinking at least 10 drinks weekly during pregnancy (Vital Records, 2003-2007)	36% nHB/AA, 7% Hisp (ref=46%)	% Medicaid women with non-adequate prenatal care (linked Vital Records, 2006)	43% nHB/AA, 34% Hisp (ref=31%)	% women uninsured/underinsured during pregnancy (Vital Records, 2005)	6% Hisp, 1% nHB/AA (ref < 1%)
% abused during pregnancy (PRATS)	13% nHB/AA, 7% Hisp (ref=4%)	% all women with non-adequate prenatal care (Vital Records, 2006)	27.4% nHB/AA, 27.1% Hisp (ref=15.9%)	% unintended pregnancies (PRATS)	78% nHB/AA, 58% Hisp (ref=35%)
Infant Mortality Rate (Vital Records, 2006)	14.6 per 1,000 nHB/AA, 7.2 per 1,000 Hisp (ref=4.5 per 1,000)	% women with initiation of care beyond first trimester (Vital Records, 2006)	25.3% nHB/AA, 24.9% Hisp (ref=8.5%)	% pregnant women with no more than high school degree (Vital Records, 2006)	55% nHB/AA, 70% Hisp (ref=26%)
% stress during pregnancy (PRATS)	8.1% nHB/AA, 1.5% Hisp (ref=2.8%)	% women with reproductive/family plan		% all women in poverty	
% obesity before pregnancy (PRATS)	55% nHB/AA, 32% Hisp (ref=33%)	% women with wellcare before pregnancy		% undocumented or immigrants with access to prenatal services	
% smoking during pregnancy (Vital Records, 2006)	6.8% nHB/AA, 5.1% Hisp (ref=6.3%)	% pregnant women with non-medically indicated C-sections		% homeless women	
% births with chronic disease (cardiac disease, chronic hypertension, diabetes)	3.4% nHB/AA, 1.6% Hisp (ref=1.9%)	% community organizations offering health information before pregnancy		% pregnant women living in households with social support	
% reporting depression before pregnancy		% eligible pregnant women receiving coordinated social services		% women with food security as result of food-related services	
% with poor nutrition during pregnancy		% doctors providing universal messages about prenatal care		% screened for HIV/STD in previous 12 months	
% inadequate weight before pregnancy		% culturally sensitive health messages during			
% inadequate weight gain during pregnancy		% pregnant women receiving dental services			
% obesity during pregnancy		% high-risk women receiving home visitation			
% race-related stress across lifespan		% prenatal services with evening and weekend hours			
		% pregnant high-risk women receiving outreach			
		% pregnant women with breastfeeding counseling			
		% women receiving duplicated prenatal services			
		% prenatal programs that incorporate father involvement			
		% outreach to marginalized pregnant women			

ref = non-Hispanic White/Caucasian

such as Centering Pregnancy, the state and federal Healthy Start and Nurturing Families Network, as well as healthcare centers that offer perinatal services, would be good venues for these activities.

- 2) **Create and maintain quarterly a professional perinatal resource list.** This resource list, which could be developed on a webpage, would include the identity of known state programs, as well as contacts, towns served, and other valuable information about the programs. The resource would provide practitioners and service providers with necessary information to support women and their families throughout the perinatal period. The ability of Infoline 211 to serve this function could be explored.
- 3) **Train community social service staff about the value of breastfeeding.** Breastfeeding during the interconception period is beneficial to both the baby and the mother, and there is a need to increase awareness among social service staff about this potential benefit.
- 4) **Pilot Centering Parenting in Connecticut.** With the recent positive evidence for Centering Pregnancy in the state (Ickovics et al, 2007), Centering Parenting, a similar program focused on new parents, might also be effective, and needs to be assessed.
- 5) **Institute a monthly/quarterly newsletter to practitioners and service providers.** Responding to a need for better communication among professionals in the state who serve women in the perinatal period, the newsletter could take the form of email or a webpage. The intent would be to share information about services, that include when, where, what, and who are offering those services.
- 6) **Present available perinatal services in Connecticut to clinical service groups.** This suggestion is similar to the previous suggestion (Item #5), and would be a mechanism to increase awareness about perinatal services in the state among service providers. Verbal presentations could be directed at state meetings of the American College of Obstetrics and Gynecology, the American College of Nursing Midwives, and other clinical groups.
- 7) **Encourage healthcare centers to implement the Centering Pregnancy model of prenatal care.** This strategy could be accomplished by developing and distributing informational packets about Centering Pregnancy, and offering personal visits to healthcare centers across the state. The activity could aim to address concerns about: 1) a paradigm shift in prenatal care, and 2) potential physical space limitations.
- 8) **Support efforts to train providers about preconception care.** A woman's health during the prenatal period is influenced by her health status before pregnancy, and more awareness of this connection is needed among medical and social service professionals. Available preconception toolkits, such as the Preconception Screening and Counseling Checklist endorsed by the March of Dimes (March of Dimes, 2010), could also be disseminated.

Intrapersonal/Interpersonal Level

The activities described below would have a direct impact at intrapersonal/interpersonal level. These activities are intended to impact individual behaviors, and, by empowering individuals of minority race and ethnicity, may create paradigm shifts in the state's perinatal system of care. This potential impact may be limited, however, if adequate environmental support structures are not present.

- 1) **Distribute a brochure about perinatal programs to pregnant women.** The brochure, prepared for pregnant and postpartum women, could include eligibility criteria for WIC and the Healthy Start programs. Literature with this content may be available from the Connecticut WIC program, and it could be reviewed, updated, and widely distributed in the state.
- 2) **Include preconception messages in packets distributed to high school graduates.** Information packets are prepared annually for graduating high school students, and included in those packets could be preconception health messages.

References

Davis L, Stone, C (2009) Low birth weight outcomes and disparities in Connecticut: A strategic plan for the Family Health Section, Connecticut Department of Public Health, Hartford, Connecticut (http://www.ct.gov/dph/lib/dph/family_health/revised_strategic_plan_for_lbwt_021909_final.pdf, accessed on January 6, 2010).

DPH (2008) Maternal and Child Health Services Title V Block Grant State Narrative for Connecticut, Connecticut Department of Public Health, Hartford, Connecticut (http://www.ct.gov/dph/lib/dph/family_health/mchbg/mchbg_fy09_application_ct-narratives.pdf, accessed on January 6, 2010).

DPH (2009) Factsheet: Low birth weight in Connecticut, Winter, 2009, Connecticut Department of Public Health, Hartford, Connecticut (http://www.ct.gov/dph/lib/dph/family_health/low_birth_weight_winter_2009.pdf, accessed on February 17, 2010).

Gagliardi, A (2007) Women's health before, during and after pregnancy: the relationship between women's health and birth outcomes, child development and school readiness. Women's Health Subcommittee, Medicaid Managed Care Council, Connecticut (<http://www.cga.ct.gov/ph/medicaid/>, accessed on January 6, 2010).

Guyer, B (1998) Problem-solving in public health (Chapter 2), in *Epidemiology and Health Services* (HK Armenian, S. Shapiro, eds), Oxford University Press, New York, New York.

Ickovics, JR, Kershaw, TS, Westdahl, C, Magriples, U, Massey, Z, Reynolds, H, Rising, S (2007) Group prenatal care and perinatal outcomes: a randomized controlled trial. *Obstet Gynecol* 110(2, pt. 1):330-339.

Lee, MA, Sautter, K, Learned, A (2009) Births to Mothers with HUSKY Program and Medicaid Coverage: 2007, Connecticut Voices for Children, Hartford, Connecticut, (<http://www.ctkidslink.org/publications/h09birthsreport07.pdf>, accessed on February 17, 2010).

March of Dimes (2010) Preconception Checklist, (http://www.marchofdimes.com/files/preconception_tool_ed.pdf, accessed on February 2, 2010).

Morin J (2008) Addressing racial and ethnic disparities in low birthweight for Connecticut. Public Health Initiatives Branch Health Disparities Workgroup, Connecticut Department of Public Health, Hartford, Connecticut (http://www.ct.gov/dph/lib/dph/family_health/health_disparities_in_lbwt_final_report_10_1_08.pdf, accessed on January 6, 2010).

Stone C (2008) WIC participation and improved birth weight outcomes: Connecticut, 2000. Connecticut Department of Public Health, Hartford, Connecticut (http://www.ct.gov/dph/lib/dph/family_health/wic_brief_final.pdf, accessed on January 6, 2010).

Thorne MS, Sapirie, S, Rejeb, H (1993) District team problem solving guidelines for maternal and child health, family planning and other public health services. Division of Family Health and Division of Epidemiological Surveillance and Health Situation and Trend Assessment, World Health Organization, Geneva (http://erc.msh.org/newpages/english/toolkit/DTPS_Guidelines.pdf, accessed on January 6, 2010).