

## I. INTRODUCTION

### A. Research Problem

Low birth weight (LBW) is a leading cause of racial-ethnic disparities in perinatal mortality and morbidities in the U.S. and in Los Angeles County (LAC). The reasons for the persisting disparities in LBW are largely unknown. We hypothesize that racial-ethnic disparities in LBW are mediated in a large part by pregnancy and lifetime exposures to interpersonal and institutionalized racism, acting directly on maternal stress, biology and behavior or indirectly through family, neighborhood and institutional stressors. The effects of racism are hypothesized to be moderated by social support and cultural factors.

### B. Purpose & Scope

To test this hypothesis, we conduct a multilevel study using the Los Angeles Mommy and Baby Survey (LAMBS). LAMBS is a population-based, cross-sectional survey of women who had recently given birth in Los Angeles County. It uses a multistage clustered design and mixed-mode methodology for data collection. The overall goal is to understand the multilevel determinants of birth outcomes in LAC, with a focus on racial-ethnic disparities in LBW.

### C. Nature of Findings

Preliminary analysis of 948 respondents (final sample = 4,553) provides evidence of significant racial and ethnic disparities in unintended pregnancies, preconception care utilization, preconception health status or behaviors, experiences of discrimination, pregnancy weight gain, breast feeding initiation and social resources. The study also suggests that low social support is associated with LBW and pre-term birth (PTB) among racial and ethnic minorities.

## II. LITERATURE REVIEW

LBW continues to be one of the most important problems in maternal and child health (MCH) today. It accounts for more than two-thirds of perinatal mortality and nearly half of long-term neurological disabilities in children (1, 2). It also contributes significantly to the persisting racial-ethnic disparities in infant mortality. The three-fold discrepancy in very low birth weight (VLBW) births is responsible for approximately two-thirds of the excess deaths among African American infants, compared to White infants (3).

The causes of the persisting racial-ethnic disparities in LBW (and its twin constituents – preterm birth (PTB) and intrauterine growth restriction, or IUGR) remain largely unexplained. Most extant studies have focused on individual medical or biobehavioral risk factors (4-7). These factors, however, do not adequately account for the racial gap in LBW (8-9). In recent years, a small but growing number of studies have begun to examine LBW and other birth outcomes in the contexts of family support and violence (10-12), neighborhood characteristics such as poverty (13-15), unemployment (15), housing (13), safety (16), or social capital (17), institutional environments such as working conditions (18), healthcare practices (19), or cultural norms and acculturation (20-22), and racism manifested as interpersonal discrimination (23-26) or residential segregation (27-28). These contextual factors may contribute to racial-ethnic disparities in LBW above and beyond individual differences.

Another push for a more comprehensive understanding of our nation's continuing racial-ethnic disparities in birth outcomes has come from the life-course perspective (29-31). The life course perspective conceptualizes birth outcomes as the end product of not only the nine months of pregnancy, but the entire life course of the mother leading up to the pregnancy. Disparities in birth outcomes, therefore, are the consequences of not only differential exposures during pregnancy, but also differential developmental trajectories across the life span. This approach is supported by the work of Barker and others (32) linking LBW to chronic adult diseases (early programming model), as well McEwen's model (33) on allostatic load and Geronimus' weathering hypothesis (cumulative pathways model) (see below) (34).

Lu and colleagues have called for more contextual and longitudinal integration in perinatal health research and interventions (35-36). An important first step is to expand the public health core function of assessment to include not only vital statistics or prenatal care utilization, but multi-level, life course determinants of LBW. Existing MCH surveillance system in LAC, relying largely on birth certificate and hospital discharge data, does not have the capacity to carry out such expanded assessment. The statewide Maternal and Infant Health Assessment (MIHA), California's

version of the Pregnancy Risk Assessment Monitoring System (PRAMS), focuses primarily on individual risk behaviors during pregnancy, and does not lend itself methodologically to multilevel analyses. The Los Angeles Mommy and Baby Survey, (heretofore referred to as LAMBS) uses a design (multistage clustered sampling) and questions that allow for routine assessment and multilevel analyses of the contextual determinants of LBW. And while the study has no plan for longitudinal follow-up in its current phase, it includes questions about preconceptional and inter-conceptional experiences, as well as “weathering” of racism over the lifespan, that will begin to assess life-course influences on LBW.

### **III. STUDY DESIGN AND METHODS**

#### **A. Study Design and Sample Selection**

LAMBS is a cross-sectional, population-based mail/telephone survey of a stratified random sample of mothers who had recently delivered a liveborn infant in LAC. LAMBS combines two modes of data collection – a survey conducted by mailed questionnaire with multiple follow-up attempts, and by telephone.

The sampling plan for LAMBS is based on a multi-stage, clustered design in which all census tracts in LAC (total 2,054) are divided into two strata that correspond to high and low perinatal health risk. For public health planning and surveillance purposes, MCAH had already identified high-risk zip codes within the County using six perinatal indicators, including number and proportion of women of reproductive age living on incomes below 200% of poverty, births to mothers receiving Medi-Cal, births to mothers age 18 and under, LBW births, and percent late onset or no prenatal care, and infant mortality rate. Using this method, 114 top priority and 46 second priority zip codes were identified. Census tracts within these 150 zip codes were then identified, representing “high-risk” census tracts. The rest within the LAMBS sampling frame were designated as “low-risk” tracts. A total of 300 tracts were then sampled, 200 from the high-risk stratum and 100 from the low-risk stratum.

Each month, the LAC Department of Public Health, Office of Health Assessment and Epidemiology provided MCAH with a monthly listing of County residents who had a recent live birth in LAC. Their birth records were geocoded, and those residing in the 300 sampled census tracts were identified. The study was conducted in four waves. A stratified random sample of about 3000 eligible women was drawn from the birth records of these 300 census tracts once every 3 months during the 12 month study period. Births that were low-birthweight (less than 2,500 grams) and preterm (less than 37 completed weeks’ gestation) were oversampled, so that the final sample consisted of 1/3 LBW and 2/3 normal birthweight (NBW) births.

#### **B. Study Population**

The final sample includes 4,553 women who completed the LAMB survey from the following racial backgrounds: 46% Latino, 21% White, 16% Asian/Pacific-Islander, 15% African-American, and 2% other races.

#### **C. Instrument**

The 2007 LAMB survey contains approximately 100 questions and covers a range of topics about their experiences before, during, and after pregnancy, such as maternal stress (e.g., perceived maternal stress, postpartum depression) and behaviors (e.g., utilization of healthcare, food insecurity, breastfeeding, tobacco and alcohol use during pregnancy, contraception use), family stressors (e.g., partner stress, intimate partner violence), neighborhood and institutional stressors (e.g. neighborhood safety, healthcare quality, work, acculturation), racism, and social support (e.g., partner involvement, interpersonal support, neighborhood support), that are associated with birth and pregnancy outcomes. The questionnaire takes between 30 to 45 minutes to complete and is written at a sixth grade reading level.

#### **D. Statistical Techniques**

Independent sample t-tests, Chi square tests and unadjusted odds ratios (UOR) are used to describe bi-variate associations. Multivariate analyses are conducted using linear and logistic regression models to examine key relationships, while accounting for other confounders.

### **IV. FINDINGS**

Preliminary analyses are based on the responses of 948 women from waves 1, with a live birth in 2007 in Los Angeles County. Half of the respondents in this sample were Latino (52%), while the other half reported their race/ethnicity as White (27%), Asian/Pacific-Islander (15%) or Black (6%). To date, 23 abstracts have been accepted for poster or oral presentation at APHA, MCH Epidemiology and CityMatCH conferences. Additional analyses are underway, and we are beginning to develop full manuscripts for these abstracts once the database for the 4,553 completed surveys are entered and cleaned. For now we will spotlight findings in seven key areas.

#### **A. Pregnancy Intention And Contraceptive Use**

Unintended pregnancies were stratified into 3 categories: 1) mistimed by less than 3 years, 2) mistimed by 3 years or greater, or 3) unwanted. Consistency of contraceptive use was dichotomized into two categories: 1) all the time (consistent) and 2) some of the time or never (inconsistent). Contraceptive methods were stratified into 2 categories: 1) more effective methods, including hormonal contraception and intrauterine devices or 2) less effective methods, including barrier methods, withdrawal, and natural family planning. Relationships between pregnancy intendedness and contraceptive behaviors were examined using Pearson's chi square tests.

Over half (52%) of pregnancies in our sample were unintended. Latina (58%) and African American women (58%) were significantly more likely to report an unintended pregnancy compared to White (34%) and Asian/Pacific Islanders (38%) ( $P < 0.001$ ). Among women with unintended pregnancies, only 25% reported consistent contraceptive use prior to pregnancy ( $p < 0.01$ ). Only 19% of African American (AA) women and 15% of Asian/Pacific Islanders were using contraceptives consistently, compared to 23% of Latinos and 30% of Whites. African American women were twice as likely to report reliance on less effective contraceptive methods than White, Asian/Pacific Islander, or Hispanic women ( $p < 0.01$ ). These findings are consistent with other studies that have reported similar rates of unintended pregnancies and differences in rates of unintended pregnancy by race/ethnicity (37, 38, 39,40).

Consistent contraceptive use was highest among women who did not ever desire pregnancy (42%) and lowest among those who mistimed by less than 3 years (18%) ( $p < 0.001$ ). In women who mistimed by 3 or more years, 22% reported consistent use. Therefore, there is evidence of a dose-response relationship between pregnancy intendedness and consistent contraceptive use.

#### **B. Preconception Health & Healthcare**

More than two-thirds (70.%) of women surveyed did not receive a checkup in the 6 months prior to their most recent pregnancy. Among these women, the top reasons given for not receiving care were: 1) knowing how to prepare for pregnancy already (39%), 2) not having a regular doctor or nurse (14%), 3) having too many other things going on (11%), and 4) lack of money or insurance (10%). More than half (63%) of uninsured women cited not having a regular provider as a reason for not receiving care, as compared to 17% of women with MediCal and 18% of women with private health insurance ( $P < 0.001$ ).

Among women who had a checkup, 86% reported that their doctor or nurse talked to them about multivitamin/folic acid; 80% about nutrition, 70% about healthy weight for pregnancy, 44% about oral health, and 39% about anxiety or depression. At least 1 in 3 (30%) women who were underweight or overweight did not receive advice about healthy weight. More than half (52%) of women who were not taking folic acid or multivitamin did not receive advice to do so.

Significant racial-ethnic disparities in preconception care utilization exist even among women with health insurance. Latina and African American women were significantly less likely to receive care ( $p < 0.0001$ ); 76% of Latina women

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and 70% of African American women did not receive care, as compared to 64% of Asian and Pacific Islander women and 60% of white women. Uninsured women were significantly less likely to receive preconception care than insured women ( $p<0.001$ ); 85% of uninsured women had no pre-pregnancy checkup compared to 61% of women with private insurance. However, racial-ethnic disparities in preconception care utilization persisted even when the analyses were stratified by insurance status. Among privately insured women; 68% of Latinas, 63% of African Americans, and 62% of API women compared to 52% of white women, did not receive preconception care ( $p<0.05$ ).

Preconception health status and behaviors varied significantly by race/ethnicity. Almost half of women (47%) reported being underweight or overweight before pregnancy, one in five (22%) reported problems with anxiety or depression, and half (53%) were not taking folic acid or multivitamin before pregnancy. Latina and African American (AA) women were more likely to be underweight or overweight than White or Asian/Pacific Islander (API) women ( $p<0.05$ ). Latina women (63%) were more likely to report not taking folic acid or multivitamin compared to all other groups ( $p<0.05$ ). Nearly one of three AA mothers (26%) had anemia compared to rates as low as 8% among White mothers ( $p<0.05$ ). Preconception care use was low among mothers with the following characteristics: smoked cigarettes, not taking folic acid or multivitamin, with gum or teeth problems, with anemia.

These findings indicate that there are significant disparities in preconception health status, behaviors and utilization by race-ethnicity and other socio-demographic characteristics. Our findings also suggest important missed opportunities to promote preconception health during the pre-pregnancy checkup especially among women with preconception health problems. The results are consistent with other studies highlighting the importance of maternal health status in the period before pregnancy to pregnancy outcomes (41, 42, 43, 44). Efforts to promote preconception care will need to address perceived barriers including the lack of regular providers and health insurance.

### C. Discrimination

Discrimination was measured using Krieger's seven-item discrimination scale. The relationship between discrimination and length of stay and discrimination and age at immigration was examined using Pearson's chi square tests. Overall, 27% of all Latinas reported discrimination during their entire lifetime compared to 55% of Black, 34% of Asian, and 18% of White women ( $p<0.0001$ ).

Among immigrant Latinas, those in the US more than 20 years were more likely to perceive discrimination; 50% who lived in the US more than 20 years reported discrimination compared to 23% who lived in the US 10- 20 years and 22% who lived in the US less than 10 years ( $p<0.01$ ). Similar trends were found by age at immigration; 39% who immigrated at 10 years old or younger reported discrimination compared to 22% who immigrated at 11 to 19 years old and 25% who immigrated at 20 years or older ( $p=0.079$ ). These findings suggest the longer Latina immigrants are in the US and the younger their age at immigration, the more likely they are of perceiving discrimination throughout their lifetime. This study adds to the body of literature demonstrating increased reports of discrimination with increased length of stay in the United States (45, 46). A possible explanation for this finding is that, immigrants who have been in the US longer have had increased exposure to discrimination which enables familiarity with the concept of discrimination in the US (47, 48). This increased familiarity enables the ability to perceive it (46). Additionally, recent immigrants may compare their experiences with experiences of those in their native country and feel they are better off in the US, whereas immigrants who have been in the US longer may compare their experiences with other racial/ethnic groups in the US and feel they are worse off.

Among all respondents, 12% reported stress during pregnancy and 13% reported dissatisfaction with partner support. Stress was measured using Cohen's nine-item perceived stress scale. Twenty-three percent of women reporting discrimination during pregnancy also reported stress during pregnancy, compared to only 11% of women reporting no discrimination ( $p<0.001$ ). The expected odds of reporting stress for women who experienced discrimination was 2.55 times greater than the odds of women who did not experience discrimination ( $p<0.001$ ). The effect of discrimination on stress remained significant after controlling for partner support (OR=1.89;  $p<0.01$ ). These findings suggest discrimination during pregnancy contributes to stress during pregnancy.

### **D. Maternal Resiliency and Birth Outcomes**

The literature has not adequately explored protective resources, or maternal resiliency factors, that may potentially reduce women's risk of having infants with these outcomes. Based on theoretical authenticity, conceptual relevance to the target population, and empirical findings in prior studies, maternal resiliency appears to be a multi-level construct consisting of personal resources (self-esteem and mastery), social resources (partner support, social network support, and neighborhood support), and spiritual resources. Operationalization of maternal resiliency was achieved using data reduction (principal components analysis, reliability testing, correlation matrix analysis), tests of group differences (t-tests), descriptive statistics (Pearson chi square tests and odds ratios), and linear regression.

Based on data reduction, maternal resiliency was measured as a construct consisting of personal, social and spiritual resources. Personal resources entailed self-esteem (measured by Rosenberg Self-esteem Scale short form) and mastery (measured by Pearlin Mastery Scale short form). Social resources included partner relational support and partner emotional/instrumental support (from the Fragile Families and Child Wellbeing Study), social network support (from the Pregnancy Risk Monitoring Assessment System), and neighborhood social cohesion/trust and neighborhood reciprocal exchange (from the Project on Human Development in Chicago Neighborhoods survey). Spiritual resources were measured by a 1-item LAMB spirituality item. Based on descriptive statistics and linear regression, self-esteem, mastery, partner emotional and instrumental support, and neighborhood social cohesion and trust items were the most salient components of maternal resiliency, especially with respect to LBW and PTB. This is one of the first to comprehensively conceptualize and measure maternal resiliency.

For the following results describing associations between maternal resiliency, socioeconomic status and acculturation, socioeconomic status (SES) was measured by level of annual household income and number of years of schooling. Acculturation factors included nativity, language spoken at home, and length of residence in the US.

Significant racial-ethnic disparities in maternal resiliency during pregnancy exist. After controlling for low SES, African-Americans were still twice as likely as Whites to have lower partner/emotional support and neighborhood social cohesion/trust scores ( $p < 0.05$ ). Adjusting for SES and acculturation factors, Hispanics were twice as likely as Whites to have low partner relational support ( $p < 0.05$ ). Asian/Pacific Islanders were about 2.2 times as likely as Whites to report lower scores on neighborhood reciprocal exchange, but most of this association was mediated by low SES and low levels of acculturation ( $p < 0.05$ ). This study contributes to the field by providing valuable insights into the complexities of racial/ethnic disparities in maternal resiliency. The finding that racial/ethnic minorities were more likely to have lower neighborhood and/or partner relational support scores than Whites disputes evidence in the literature suggesting greater neighborhood support among these groups (49, 50).

Marital status, age, education level, and income level were significantly associated with maternal resiliency during pregnancy. Unmarried women had low partner support (UOR=5.41-28.09;  $p < 0.001$ ), social network support (UOR=1.77-2.25;  $p < 0.001$ ), neighborhood support (UOR=1.64-3.60;  $p < 0.01$ ), and self-esteem (UOR=2.23-3.00;  $p < 0.05$ ) scores. Women under age 18 were more likely to low partner support scores than women aged 19-34 (UOR=2.62-6.89;  $p < 0.05$ ). Having less than 12 years of schooling was associated with low partner support (UOR=2.32-3.97;  $p < 0.05$ ), social network support (UOR=1.75-3.82;  $p < 0.05$ ), neighborhood support (UOR=1.65-2.64;  $p < 0.05$ ), and self-esteem (UOR=2.61-3.70;  $p < 0.01$ ) scores. Compared to women with household annual incomes between \$40,000-59,000, women with incomes less than \$19,000 had lower partner support (UOR=2.49-6.35;  $p < 0.05$ ), social network support (UOR=2.55-4.02;  $p < 0.01$ ), and mastery (UOR=2.85;  $p < 0.01$ ) scores.

Maternal resiliency during pregnancy is proposed as a potential buffer against stress that may reduce one's risk of suffering these negative birth outcomes. In this analysis, low birth-weight (LBW) infants were defined as those weighing less than 2500 grams, while pre-term births (PTB) were defined as infants born less than 37 weeks from the first day of the mother's last menstrual period. The incidence of LBW in this sample was 9.1% while the prevalence of PTW was 15.6%. Both of these outcomes differed significantly by race/ethnicity. African-American women were twice as likely as Whites to have LBW and PTB infants (UORs= 2.11, 2.13,  $p < 0.05$ ). Hispanic women with lower partner

support scores were significantly more likely to have LBW infants than White women (UOR = 2.5 – 2.7,  $p < 0.05$ ) and significantly more likely to have PTB infants (UOR = 2.4 – 3.0,  $p < 0.05$ ) than White women. Compared to White women, African-American and Asian/Pacific-Islander women with lower neighborhood support scores were significantly more likely to have PTB infants (UOR = 3.7 – 4.4,  $p < 0.05$ ). After controlling for socio-demographic factors, lower scores on mastery and neighborhood support slightly reduced the Black-White disparity in LBW, while lower scores on neighborhood support, and spirituality items partly mediated the Black-White disparity in PTB. These findings are consistent with other studies showing that women with more resources tend to have children with higher birth weights, and this association helps to explain racial/ethnic disparities in LBW (51, 52).

### **E. Intimate Partner Violence (IPV) during Pregnancy and Birth Outcomes**

Research indicates IPV during pregnancy poses a significant risk to the health of women and infant. IPA was measured in terms of physical, verbal, and sexual abuse using a 6-item scale. The logistic regression models were used to estimate the effect of IPV on low birth weight, preterm birth, and maternal health conditions during pregnancy after adjusting for age, race, education level, and marital status. About 19% of women reported IPA during their recent pregnancy. Women experiencing IPA during pregnancy were more likely than other women to have labor that began too soon (OR=1.76, 95% CI=1.1-2.7), severe nausea, vomiting, or dehydration (OR=1.57, 95% CI=1.03-2.38), problems with teeth (OR =1.87, 95% CI 1.2-2.9), and felt sad/or depressed (OR=3.1, CI 1.9-4.7) during pregnancy. However, no significant difference was found between IPA and preterm or low birth weight birth. These results are similar to findings obtained by McFarlane, Parker and Soeken (53). The prevalence of IPV in the prospective cohort analysis was 16% (53). Abuse during pregnancy was significantly associated with low birth-weight, but the association was no longer significant after adjusting for other confounders including ethnicity, marital status, poor obstetric history, poor weight gain, and alcohol/drug abuse (53).

### **F. Gestational Weight Gain**

Excessive weight gain during pregnancy is associated with birth trauma, postpartum weight retention, childhood obesity and other complications. Only one in three women surveyed adhered to the ideal weight gain recommendations during pregnancy set out by the Institute of Medicine. Compliance varied among racial/ethnic populations. African American (47%) and White (45%) mothers are more likely to gain too much weight during pregnancy. About one third of the women said they did not receive a weight recommendation. These findings add to the literature stating the importance of the role of healthcare provider on weight gain during pregnancy, that women who discussed with a healthcare provider about weight gain are more likely to adhere to the recommendations. (54, 55)

### **G. Breast Feeding Initiation**

Providers' help/encouragement can influence mothers' initiation of breastfeeding. Despite the large body of breastfeeding research, studies addressing the timing of providers' help/encouragement during pregnancy are limited. A logistic regression model was used to estimate the effect of providers' help/encouragement on breastfeeding initiation (BFI) after adjusting for age, race, and education level. The breastfeeding rate was 87%. Sixty-seven percent of providers encouraged breastfeeding during the pre-natal care (PNC) visit and 87% at the delivery hospital. Providers' help/encouragement at delivery hospitals was associated with BFI (OR=2.7, 95% CI=1.8). African American mothers were almost 4 times less likely to initiate breastfeeding than Whites (OR=3.7, 95% CI=1.5, 1.0, 2). Providers' help/encouragement at PNC was not associated with BFI (OR =0.87, 95% CI=0.49, 1.53). These results are consistent with findings from a national study regarding the influence of provider encouragement on BFI among women of different social and ethnic backgrounds (56).

## V. DISCUSSION AND INTERPRETATION OF FINDINGS

### A. *Conclusions to be drawn from findings (with reference to data supporting each).*

**Pregnancy Intention and Contraceptive Use:** Over half (52%) of pregnancies in our sample were unintended. Latina (58%) and African American women (58%) were significantly more likely to report an unintended pregnancy compared to White (34%) and Asian/Pacific Islanders (38%) ( $p < 0.01$ ). Among women with unintended pregnancies, only 25% reported consistent contraceptive use prior to pregnancy ( $p < 0.01$ ). Only 19% of African American (AA) women and 15% of Asian/Pacific Islanders were using contraceptives consistently, compared to 23% of Latinos and 30% of Whites. Therefore, there were significant racial-ethnic disparities in pregnancy intention and contraceptive use and many women had an unmet need for contraceptive services.

**Preconception Health & Healthcare:** Most women (70%) surveyed did not receive a checkup in the 6 months prior to their most recent pregnancy. But even among women who had a pre-pregnancy check-up, there were important missed opportunities. For example, more than half (52%) of women who were not taking folic acid or multivitamin did not receive advice to do so. There were significant racial-ethnic and socioeconomic disparities in preconceptional health status and healthcare. Latina and African American women were significantly less likely to receive care ( $p < 0.0001$ ); 76% of Latina women and 70% of African American women did not receive care, as compared to 64% of Asian and Pacific Islander women and 60% of white women.

**Discrimination:** Black women reported the highest levels of perceived lifetime discrimination (55%) compared to all other racial/ethnic groups; 34% of Asian women, 27% of Latina women, and 18% of White women. These results suggest that certain racial-ethnic groups are more likely to perceive discrimination than others. Length of stay in the US is also associated with perceived discrimination. Among immigrant Latinas, those in the US more than 20 years were more likely to perceive discrimination than those who have been in the US less than 10 years controlling for education, income and age.

The expected odds of reporting stress for women who experienced discrimination was 2.55 times greater than the odds of women who did not experience discrimination ( $p < 0.001$ ). The effect of discrimination on stress remained significant after controlling for partner support ( $OR = 1.89$ ;  $p < 0.01$ ). Discrimination during pregnancy and dissatisfaction with partner support contribute to stress during pregnancy.

**Maternal Resiliency and Birth Outcomes:** Significant racial-ethnic disparities in maternal resiliency during pregnancy exist. After controlling for low SES, African-Americans were still twice as likely as Whites to have lower partner/emotional support and neighborhood social cohesion/trust scores ( $p < 0.05$ ); Hispanics were twice as likely as Whites to have low partner relational support ( $p < 0.05$ ); Asian/Pacific Islanders were about 2.2 times as likely as Whites to report lower scores on neighborhood reciprocal exchange.

Maternal resiliency during pregnancy is proposed as a potential buffer against stress that may reduce one's risk of suffering these negative birth outcomes. Hispanic women with lower partner support scores were significantly more likely to have LBW infants than White women ( $p < 0.05$ ) and significantly more likely to have PTB infants ( $p < 0.05$ ) than White women. Compared to White women, African-American and Asian/Pacific-Islander women with lower neighborhood support scores were significantly more likely to have PTB infants ( $p < 0.05$ ). After controlling for socio-demographic factors, lower scores on mastery and neighborhood support slightly reduced the Black-White disparity in LBW, while lower scores on neighborhood support, and spirituality items partly mediated the Black-White disparity in PTB.

**Intimate Partner Violence (IPV) during Pregnancy and Birth Outcomes:** We found a high portion of women during pregnancy experiencing IPA are at an increased risk for several serious emotional and physical health concerns. About 19% of women reported IPA during their recent pregnancy. Women experiencing IPA during pregnancy were more likely than other women to have labor that began too soon ( $OR = 1.76$ , 95%  $CI = 1, 1-2.7$ ), severe nausea, vomiting, or dehydration ( $OR = 1.57$ , 95%  $CI = 1.03-2.38$ ), problems with teeth ( $OR = 1.87$ , 95%  $CI = 1.2-2.9$ ),

and felt sad/or depressed (OR=3.1, CI 1.9-4.7) during pregnancy. However, no significant difference was found between IPA and preterm or low birth weight birth. These findings suggest that a variety of venues, such as mental and physical health care providers, and social services will be needed in order to identify IPA victims during pregnancy, provide referral resources, and implement any future prevention efforts.

**Gestational Weight Gain:** Only one in three women surveyed adhered to the weight gain recommendations during pregnancy set out by the Institute of Medicine. Compliance varied among racial/ethnic populations. African American (47%) and White (45%) mothers are more likely to gain too much weight during pregnancy. About one third of the women said they did not receive a weight recommendation. Much effort is needed to emphasize the importance of appropriate weight gain during prenatal care, and to empower women to achieve healthy weight before and during pregnancy. Healthcare workers should play a more important role to reduce preventable risks of obesity in this critical period.

**Breast Feeding Initiation:** Providers' help/encouragement can influence mothers' initiation of breastfeeding. Sixty-seven percent of providers encouraged breastfeeding during the pre-natal care (PNC) visit and 87% at the delivery hospital. Providers' help/encouragement at delivery hospitals was associated with BFI (OR=2.7, 95% CI=1.8). African American mothers were almost 4 times less likely to initiate breastfeeding than Whites (OR=3.7, 95% CI=1.5, 1.0, 2). Providers' help/encouragement at PNC was not associated with BFI (OR =0.87, 95% CI=0.49, 1.53). Results suggest an association between providers' help/encouragement at the delivery hospital and breast-feeding initiation, and highlight the need to continue developing effective strategies to encourage breastfeeding among African American mothers.

### ***B. Explanation of Study Limitations***

LAMBS is subject to a few limitations. Since the mode of data collection in the LAMB survey was primarily a mailed questionnaire, this caused the majority of limitations. First, it did not allow for respondents to ask for further clarification on the questions or instructions as a face-to-face interview would ensure. Along these lines, mailing the questionnaire might have resulted in lower response rates since there was no potential for an interviewer to gain rapport with the respondent and therefore her participation; unfortunately, this limitation might have disproportionately decreased the response rates of women who may be at higher risk of negative outcomes. Second, measures of certain constructs were limited in order to maximize the number of topics covered while maintaining a reasonable length for the entire questionnaire. Third, this data collection mode relies on self report and there may be discrepancies in the information reported due to recall errors. In addition, since the LAMB study was cross-sectional, causality between various predictors and outcomes cannot be assumed.

### ***C. Comparison with Findings of Other Studies***

Our study is consistent with, or confirms the findings from previous research regarding: pregnancy intendedness, contraceptive use, low rates of preconception care use, intimate partner violence in pregnancy, adherence to gestational weight gain recommendations, association between provider encouragement and breast feeding initiation, associations between pre-pregnancy maternal health status and health outcomes, association between length of stay in the US and discrimination, and associations between social support and maternal outcomes (LBW and PTB). Furthermore, our study contributes to the literature with several new findings, such as 1) racial-ethnic disparities in preconceptional health status and healthcare, and 2) a quality gap in the preconception care that women receive. These findings have important practice and policy implications for MCH.

### ***D. Possible Application of Findings to actual MCH Health Care Delivery Situations (including recommendations when appropriate).***

LAMB project demonstrated a successful collaboration between academic and public health. Findings from our preliminary analyses already suggest some important application to improve MCH health care delivery and many collaboratives have been formed to address those concerns. A few examples are listed below:

## Racial-Ethnic Disparities in Low Birthweight: A Multilevel Study in LA County

- LAMB data demonstrated that only 35% of women achieved recommended gestational weight gain. Furthermore, 54% of African American and 43% of Latino women were overweight or obese prior to pregnancy. These data helped the **Healthy Weight for Women of Reproductive Age Action Learning Collaborative** to promote healthy weight before pregnancy among various communities in Los Angeles. In 2008, MCAH developed health messages specific to African American and Latino women and implemented 2 worksite wellness programs.
- LAMB data identified that only 47% of women were taking a multivitamin before pregnancy and 9% were smoking. Additionally, LAMB found that 52% of pregnancies were unplanned. These data highlight the need to promote healthy life styles for women of reproductive age. Consequently, the **Los Angeles County Preconception Health Collaborative** was developed to promote preconception health. This collaborative developed the Preconception Health Speakers' Bureau, which presented at 6 venues, hosted discussions with national MCAH leaders (CDC and CityMatCH), and are in the process of developing a preconception health data brief. Based on findings from LAMB, the **March of Dimes, Greater Los Angeles Division**, is also in the process of developing a specific forum to promote preconception health among Hispanic/Latino communities.
- LAMB findings demonstrated that 34% of women reported depressed mood during pregnancy. Additional LAMB analyses found that Latino and African American women in Los Angeles are at increased risk for depression during pregnancy. There is evidence of a relationship between a mother's mental health status during pregnancy and poor birth outcomes. These critical findings supported the formation of the **Los Angeles Perinatal Mental Health Task Force (LAC PMHTC)** whose aim is to improve the mental health of women during the perinatal period. Furthermore, LAMB data were used to help LAC PMHTC to secure a grant that would address perinatal depression in LAC.
- LAMB data have been key in helping the local **Healthy Baby Learning Collaboratives (HBLC)** to prioritize their work. LAMB data have shown that African American women are more likely to smoke before pregnancy, have an unplanned pregnancy, and have other medical conditions prior to pregnancy. Based on these LAMB findings the SPA 6 HBLC has developed an "Are You Ready" project to promote preconception health for African American mothers in SPA 6. The SPA 8 HBLC selected perinatal mental health as an area of focus, due to overall high rates of reported depressed mood during and after pregnancy and have sponsored forums for providers on how to address postpartum depression and better serve their clients.
- Findings from LAMB show that half of the African American mothers who recently gave birth experienced discrimination, more than any other racial or ethnic groups. In late 2008, MCAH was selected among six other nationwide teams by three leading maternal-health agencies (CityMatch, Association of State Maternal Child Health Programs (AMCHP), and the National Healthy Start Association (NHSA)) to form the **Los Angeles County Partnership to Eliminate Disparities in Infant Mortality Action Learning Collaborative** to address racial disparities in infant mortality in LAC. We will be exploring the impact of pregnancy and lifetime experience of discrimination on birth outcomes once the dataset is completely entered and cleaned. We will also be exploring the impact of institutionalized racism and its contribution to racial-ethnic disparities in birth outcomes.

In the near future, MCAH will use LAMB data to inform quality improvement processes and initiatives within First 5 LA, and the HBLC's; assist in prioritizing issues for the MCAH five-year planning process; and provide information for the Children's scorecard, developed by the Children's Council of Los Angeles County to prioritize efforts for improving the well-being of children.

### ***E. Policy Implications***

- With respect to contraceptive use and unintended pregnancy, our findings suggest the need to increase consistent contraceptive use by improving education and expanding access. This will require increased funding for Title X and Family PACT programs.

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- With respect to preconception health and healthcare, our findings suggest the need to improve access to and quality of preconception care for all. This may require legislative mandate for health insurers to cover pre- and interconception care without exclusion for preexisting conditions, as well as expansion of MediCal (e.g. through 1115 Waiver) to cover preconception health care services.
- With respect to discrimination, our findings document the prevalence of discrimination. Based on our preliminary analyses, 27% of all Latinas reported discrimination during their entire lifetime compared to 55% of Black, 34% of Asian, and 18% of White women. We will be exploring the impact of pregnancy and lifetime experience of discrimination on birth outcomes once the dataset is completely entered and cleaned. We will also be exploring the impact of institutionalized racism and its contribution to racial-ethnic disparities in birth outcomes. Our study contributes to a growing literature on discrimination and health, and may suggest the need to make racism including institutionalized racism a public health issue.
- With respect to perinatal depression, our findings may suggest the importance of routine mental health screening during prenatal care.
- With respect to resilience, our findings suggest that resilience factors such as partner or neighborhood support may play a role in racial-ethnic disparities in LBW and PTB. This underscores the need to focus on strengthening relationality and resilience in our national effort to reduce racial-ethnic disparities in birth outcomes.
- With respect to breastfeeding, our findings suggest the important role of provider encouragement and baby-friendly policies in birth hospitals to promote breastfeeding.

### ***F. Suggestions for Further Research***

In this report, we highlighted preliminary findings from only a few areas of research; there are many other topics that we are planning to examine. Once the dataset is completely entered and cleaned, we will have one of the richest datasets on maternal and infant health in existence. We plan to be conducting further analyses including multilevel analyses that will allow us to examine neighborhood effects. We believe LAMB is a demonstration of what 21<sup>st</sup> century MCH population surveillance ought to be, and it showcases the power of academic-public health collaboration in research. For the next phase LAMB (data collection scheduled to begin in 2010), we would like to include immigrant and oral-health. Given the rich diversity of our MCH population in Los Angeles, and the growing number of immigrant women, children, and families and lack of oral health data in our County, we believe this is an important area for better surveillance and further research, and will be looking to partner with MCHB and other potential funders on this very important endeavor.

### **Project Highlights:**

- Received the 2007 Best Practices Awards from the National Association of County and City Health Officials (NACCHO) award;
- Received \$100,000 Productivity Investment Fund (PIF) from the Productivity Investment Board of County of LA Quality and Productivity Commission to complete the 2007 LAMB Project.

**VI. LIST OF PRODUCTS**

1. Lau YY, Chao S, Higgins C, Eldahaby M, Donatoni G, Harding C. Disparities in the availability of social network support to pregnant mothers. Presentation at the 2008 CityMatCH Conference, Albuquerque, New Mexico. 9/22/08.
2. Otiniano AD, Muthengi EN, Doan LC, Wakeel F, Rains E, Lu MC, Chao M, Lau YY, Higgins C, Collier KM, Harding C, Eldahaby M, Bemis C, Donatoni G, Ramos D. Differences in Insurance Status and Access to Spanish Speaking Health Professionals Among Latinas: Findings from the Los Angeles Mommy and Baby (LAMB) Survey. Presentation at the 2008 CityMatCH Conference, Albuquerque, New Mexico. 9/22/08.
3. Otiniano AD, Muthengi EN, Collier KM, Doan LC, Wakeel F, Lu MC, Chao M, Harding C, Higgins C, Eldahaby M, Donatoni GM, Lau YY, Rains E and Ramos, DE. Content of Preconception Care: Findings from the Los Angeles Mommy and Baby Survey (LAMB). Presentation at the 136th Annual Meeting of the American Public Health Association, San Diego, CA. 10/27/08.
4. Wakeel F, Muthengi EN, Otiniano AD, Collier KM, Lu MC, Chao M, Harding C, Donatoni GM, Higgins C, Eldahaby M and Ramos DE. Racial and Ethnic Disparities in Maternal Resiliency: Findings from the Los Angeles Mommy and Baby (LAMB) Survey. Poster presentation at the 136th Annual Meeting of the American Public Health Association, San Diego, CA. 10/28/08.
5. Wakeel F, Muthengi EN, Otiniano AD, Collier KM, Lu MC, Chao M, Harding C, Donatoni GM, Higgins C, Eldahaby M and Ramos DE. Socio-demographic Characteristics Associated with Maternal Resiliency: Findings from the Los Angeles Mommy and Baby (LAMB) Survey. Poster presentation at the 136th Annual Meeting of the American Public Health Association, San Diego, CA. 10/28/08.
6. Chao M, Lu MC, Donatoni GM and Harding C. Providers' Help/ Encouragement and Breastfeeding Initiation (BFI): Findings from the 2007 Los Angeles Mommy and Baby (LAMB) Project. Poster presentation at the 136th Annual Meeting of the American Public Health Association, San Diego, CA. 10/28/08.
7. Lau YY, Chao M, Higgins C, Collier KM, Harding C, Otiniano AD, Muthengi EN, Wakeel F and Lu MC. Factors affecting achievement of ideal weight gain during pregnancy -- Preliminary findings from 2007 Los Angeles Mommy and Baby (LAMB) Project. Poster presentation at the 136th Annual Meeting of the American Public Health Association, San Diego, CA. 10/29/08.
8. Otiniano AD, Muthengi EN, Wakeel F, Doan LC, Collier KM, Lu MC, Chao M, Harding C, Lau YY, Higgins C, Eldahaby M, Donatoni GM, Rains R, and Ramos DE. Perceived Barriers to Preconception Care: Findings from the Los Angeles Mommy and Baby (LAMB) Survey. Poster presentation at the 136th Annual Meeting of the American Public Health Association, San Diego, CA. 10/29/08.
9. Doan, LC, Michael C. Lu, MD, MPH, Muthengi, EN, Otiniano, AD, Wakeel, F, Collier, KM, MPH PhD, Chao, M, Harding, C, Donatoni, GM, Yvonne Y. Lau, MPH, RD, Higgins, C, Eldahaby, M and Ramos, DE, MD, MPH. Racial and Ethnic Disparities in Preconception Care Utilization: Findings from the Los Angeles Mommy and Baby (LAMB) Survey. Poster presentation at the 136th Annual Meeting of the American Public Health Association, San Diego, CA. 10/29/08.
10. Muthengi EN, Wakeel F, Otiniano AD, Doan LC, Collier KM, Lu MC, Harding C, Chao M, Eldahaby M, Donatoni GM, Lau YY, Higgins C and Ramos DE. Racial and Ethnic Disparities in Preconception Health Status and Behaviors: Findings from the Los Angeles Mommy and Baby (LAMB) Survey. Poster presentation at the 136th Annual Meeting of the American Public Health Association, San Diego, CA. 10/29/08.

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11. Muthengi EN, Wakeel F, Coller KM, Doan LC, Otiniano AD, Lu MC, Chao M, Harding C, Donatoni GM, Lau YY, Higgins C, Eldahaby M and Ramos, DE MPH. Racial and Ethnic Differences in Contraceptive Behaviors and Unintended Pregnancies: Findings from the Los Angeles Mommy and Baby (LAMB) Survey. Poster presentation at the 136th Annual Meeting of the American Public Health Association, San Diego, CA. 10/29/08.
12. Schneider N, Ramos DE, Golden R, Chao M, Lu, MC and Harding C. Domestic Violence and Low Birth Weight and Preterm Birth in Los Angeles County: Preliminary findings from 2007 Los Angeles Mommy and Baby Survey (LAMB). Presentation at the 136th Annual Meeting of the American Public Health Association, San Diego, CA. 10/29/08.
13. Lau YY, Chao M, Higgins C, Donatoni GM, Eldahaby M, Coller KM, Lu MC, and Harding C. Disparities in the availability of social network support to pregnant mothers - Findings from 2005 Los Angeles Mommy and Baby (LAMB) Project. Presentation at the 136th Annual Meeting of the American Public Health Association, San Diego, CA. 10/29/08.
14. Coller, KM, Strobino D, Chao M and Lu MC. Unintended pregnancy and delayed entry into prenatal care (PNC), among Mexican women in Los Angeles County, CA. Presentation at the 136th Annual Meeting of the American Public Health Association, San Diego, CA. 10/29/08.
15. Wakeel F, Doan LC, Muthengi EN, Otiniano AD, Lu MC, Rains E, Lau YY, Higgins C, Donatoni G, Eldahaby M, Chao M, Harding C, Coller KM, Ramos D, Bemis C. Racial and Ethnic Disparities in Partner Support during Pregnancy: Findings from the 2007 Los Angeles Mommy and Baby Survey (LAMBS). Presentation at the 2008 MCH Epidemiology Conference, Atlanta, GA. 12/11/08.
16. Wakeel F, Doan LC, Muthengi EN, Otiniano AD, Lu MC, Rains E, Lau YY, Higgins C, Donatoni G, Eldahaby M, Chao M, Harding C, Coller KM, Ramos D, Bemis C. The Relationship between Acculturation Factors and Maternal Resiliency among Latina women: Findings from the 2007 Los Angeles Mommy and Baby Survey (LAMBS). Presentation at the 2008 MCH Epidemiology Conference, Atlanta, GA. 12/11/08.
17. Wakeel F, Lu MC, Muthengi E, Otiniano AD, Doan LC, Rains E, Lau YY, Higgins C, Donatoni G, Eldahaby M, Chao SM, Harding CA, Menendez K, Ramos D. The Role of Maternal Resiliency in Reducing the Black-White Disparities in Birth Outcomes Findings from the Los Angeles Mommy and Baby (LAMB) Survey. Poster presentation at the 2008 MCH Epidemiology Conference, Atlanta, GA. 12/08.
18. Wakeel F, Lu MC, Muthengi E, Otiniano AD, Doan LC, Rains E, Lau YY, Higgins C, Donatoni G, Eldahaby M, Chao SM, Harding CA, Menendez K, Ramos D. The Relationship between Maternal Resiliency and Birth Outcomes among African American, Hispanic and Asian/Pacific Islander Women: Findings from the Los Angeles Mommy and Baby (LAMB) Survey. Poster presentation at the 2008 MCH Epidemiology Conference, Atlanta, GA. 12/08.
19. Doan LC, Wakeel F, Muthengi EN, Otiniano AD, Lu MC, Rains E, Lau YY, Higgins C, Donatoni G, Eldahaby M, Chao M, Harding C, Coller KM, Ramos D, Bemis C. Effective Contraceptive Use and Unintended Pregnancy: Findings from the Los Angeles Mommy and Baby (LAMB) Survey. Presentation at the 2008 MCH Epidemiology Conference, Atlanta, GA. 12/11/08.
20. Doan LC, Wakeel F, Muthengi EN, Otiniano AD, Lu MC, Rains E, Lau YY, Higgins C, Donatoni G, Eldahaby M, Chao M, Harding C, Coller KM, Ramos D, Bemis C. Racial and Ethnic Disparities in Intimate Partner Violence During Pregnancy: Findings from the Los Angeles Mommy and Baby (LAMB) Survey. Presentation at the 2008 MCH Epidemiology Conference, Atlanta, GA. 12/11/08.

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21. Doan LC, Lu MC, Muthengi E, Otiniano AD, Wakeel F, Rains E, Lau YY, Higgins C, Donatoni G, Eldahaby M, Chao SM, Harding CA, Menendez K, Ramos D. Pregnancy Intention and Contraceptive Use: Findings from the Los Angeles Mommy and Baby (LAMB) Survey. Poster presentation at the 2008 MCH Epidemiology Conference, Atlanta, GA. 12/08.
22. Chao SM, Donatoni GM, Lau YY, Lu MC, Harding CA. Intimate Partner Violence During Pregnancy and Maternal and Neonatal Health Outcomes: Preliminary findings from 2007 Los Angeles Mommy and Baby Survey (LAMB). Presentation at the 2008 MCH Epidemiology Conference, Atlanta, GA. 12/08.
23. Mathew GA, Whaley SE, Chao SM. Community Partnership in Postpartum Depression. Presentation at the 23rd Annual Postpartum Support International Conference, Los Angeles, CA. 9/09.
24. Wakeel F. The role of maternal resiliency in the multi-level pathways between race/ethnicity and birth outcomes: Findings from the Los Angeles Mommy and Baby (LAMB) Study. Doctoral Dissertation in progress.
25. Wise A. Perceived neighborhood structural factors, stress, and birth outcomes. Master Thesis in progress.

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