Healthy Births Initiative Blueprint

Los Angeles Best Babies Collaborative-
Planning and Network Support Provider
First 5 LA: Healthy Births Initiative
Mission Statement

The Los Angeles Best Babies Collaborative (LABBC) is dedicated to improving the health of mothers and babies in Los Angeles County through a community-based, multi-disciplinary collaborative approach. The LABBC brings together the diverse expertise of those in our communities who are committed to optimizing the health and improving the quality of life of each mother and child in Los Angeles County.
Acknowledgements

This report was made possible by the dedication, vision, and efforts of many individuals. We want to specifically acknowledge the dedication and commitment of the project leads Calvin Hobel, Carolina Reyes, Cindy Harding, Vicki Lombardo, Michael Lu, and Ellen Silver.

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# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acknowledgments</td>
<td>ii</td>
</tr>
<tr>
<td>Table of Contents</td>
<td>iii</td>
</tr>
<tr>
<td>Preface</td>
<td>v</td>
</tr>
<tr>
<td>Executive Summary</td>
<td>1</td>
</tr>
<tr>
<td>I. Introduction</td>
<td>13</td>
</tr>
<tr>
<td>Background</td>
<td>14</td>
</tr>
<tr>
<td>II. Methods</td>
<td>16</td>
</tr>
<tr>
<td>Building Collaborative Partnerships</td>
<td>17</td>
</tr>
<tr>
<td>Conceptual Framework</td>
<td>19</td>
</tr>
<tr>
<td>Community Assessments</td>
<td>20</td>
</tr>
<tr>
<td>Identification of Existing Community Assessments</td>
<td>20</td>
</tr>
<tr>
<td>Community Participation</td>
<td>21</td>
</tr>
<tr>
<td>Literature Review</td>
<td>23</td>
</tr>
<tr>
<td>III. Conceptual Framework</td>
<td>25</td>
</tr>
<tr>
<td>IV. Community Assessment-Los Angeles County</td>
<td>28</td>
</tr>
<tr>
<td>Los Angeles County</td>
<td>30</td>
</tr>
<tr>
<td>Demographics</td>
<td>31</td>
</tr>
<tr>
<td>Perinatal Health Indicators</td>
<td>32</td>
</tr>
<tr>
<td>Service Capacity</td>
<td>37</td>
</tr>
<tr>
<td>Community Needs and Resources</td>
<td>38</td>
</tr>
<tr>
<td>Other Assessments</td>
<td>39</td>
</tr>
<tr>
<td>Comments</td>
<td>42</td>
</tr>
<tr>
<td>V. Literature Review</td>
<td>43</td>
</tr>
<tr>
<td>VI. Recommendations</td>
<td>82</td>
</tr>
<tr>
<td>Overview</td>
<td>82</td>
</tr>
<tr>
<td>Guideline Principles</td>
<td>83</td>
</tr>
<tr>
<td>Core Approaches</td>
<td>85</td>
</tr>
<tr>
<td>Approach #1 Policy and Advocacy</td>
<td>86</td>
</tr>
<tr>
<td>Approach #2 Health Education and Messaging</td>
<td>87</td>
</tr>
<tr>
<td>Approach #3 Prenatal Care Quality Improvement</td>
<td>89</td>
</tr>
<tr>
<td>Approach #4 Interconception Care</td>
<td>91</td>
</tr>
<tr>
<td>Approach #5 Outreach</td>
<td>93</td>
</tr>
<tr>
<td>Approach #6 Case Management</td>
<td>95</td>
</tr>
<tr>
<td>Approach #7 Community Building</td>
<td>97</td>
</tr>
<tr>
<td>Approach #8 Social Support</td>
<td>98</td>
</tr>
</tbody>
</table>
PREFACE

This report is intended to provide the bases for the Healthy Birth Initiative, a three-year Initiative by First 5 LA to improve birth outcomes in Los Angeles County.

Today in Los Angeles County, approximately 41 babies will be born before they are ready or preterm, 24 babies will be born too small or low birth weight, and ten percent or more of those born too soon or too small will have a life long disability or handicap like cerebral palsy, blindness or deafness. Moreover, although infant mortality has declined nationally, in some regions in Los Angeles County the infant mortality rates have worsened. Unfortunately, many of these conditions could have been prevented. Any life lost or compromised when it is preventable is simply unacceptable.

The Los Angeles Best Babies Collaborative was commissioned by First 5 LA to bring together diverse experts to provide valuable input on solutions to address these problems, identify the community’s asset base, and identify evidence-based interventions that have demonstrated a positive impact on birth outcomes. During this process, the LABBC formed the Healthy Birth Learning Collaboratives (HBLCs) and brought together, in an unprecedented way, networks of over 500 consumers, providers, researchers, advocates and other community stakeholders, representing over 225 organizations. What the LABBC found was a community passionate about improving birth outcomes and a level of readiness for a coordinated collaborative approach.

At the beginning of this effort, we assumed that we would seek to improve outcomes from the current status. Instead we found the economic climate in Los Angeles County producing significant challenges, including the erosion of the current safety net infrastructure and a rapidly shrinking pool of resources available. As the LABBC and the community mobilized to draft the priorities for the Healthy Birth Initiative, there was a clear commitment to producing a plan of action to proactively improve pregnancy outcomes and strengthen the community’s ability to optimize the health and well being of each child.

The Healthy Birth Initiative provides a foundation to enhance each community’s ability to coalesce and act to improve pregnancy outcomes community-by-community, family by family. This report includes components of the blueprint document submitted by the LABBC to First 5 LA and the recommendations for implementation by First 5 LA.
EXECUTIVE SUMMARY

Being born on time and at a healthy birthweight are the two most important factors needed to optimize an individual child’s potential for early childhood development, intellectual capacity and lifelong health. Being born too soon or preterm (prior to completing 37 weeks gestation) and being born too small or low birthweight (weighing 5 and ½ pounds or less) are the leading, potentially preventable causes for infants to die, suffer brain injury and other impairments, or be suffer serious illness leading to lifelong developmental and health problems in the first five years of life and beyond. Research over the past 30 years has enhanced our understanding of the many factors that interact in complex ways to cause preterm birth or low birthweight. No longer can efforts to improve pregnancy focus on one cause and one preventive strategy, or focus only during pregnancy. To be optimally effective, efforts to improve the health and well being of pregnant women and infants must simultaneously address potentially adverse influences from social, psychological, behavioral, environmental, and biological factors that shape pregnancy outcomes. Further, specific steps to improve the health and well being of pregnant women and infants must occur before, during and between pregnancies to be optimally effective. This report provides a Blueprint for Action that incorporates these comprehensive, collaborative, multi-level, community-driven, evidence-based approaches to improving birth outcomes and maximizing each child’s potential for healthy growth and development, and intellectual attainment for Los Angeles County.

Background

In 1998, California voters approved Proposition 10: The California Children and Families First Act to add a 50-cent surtax on cigarettes and tobacco products. The monies generated are intended to improve early childhood development from age zero to five. Since early childhood development begins before birth, the Los Angeles Proposition 10 Commission (now renamed as the First 5 LA Commission) designated $15 million for its Healthy Births Initiative, a three-year initiative to improve birth outcomes in Los Angeles County.

The Los Angeles Best Babies Collaborative (LABBC) was selected by the First 5 LA Commission to (1) recommend priorities and strategies for improving birth outcomes in Los Angeles County (Phase I), and (2) provide technical assistance and implementation support for grantees funded under the Healthy Births Initiative (Phase II). This report presents the LABBC blueprint for improving birth outcomes and maximizing each child’s potential for healthy growth and development, and intellectual attainment in Los Angeles County.
Los Angeles Best Babies Collaborative (LABBC)

The LABBC consists of the following six partners from communities, academia, and public health:

- Healthy Births Advisory Board comprised of key stakeholders in the community
- Cedars-Sinai Medical Center, Department of Obstetrics & Gynecology (CSMC)
- Perinatal Advisory Council: Leadership, Advocacy and Consultation (PAC/LAC)
- University of California, Los Angeles, Center for Healthier Children, Families, and Communities (UCLA)
- Los Angeles County Department of Health Services – Maternal Child & Adolescent Health Programs (LAC/DHS), and the
- March of Dimes (MOD), Southern California Chapter

Figure 1. Los Angeles Best Babies Collaborative. Partnerships and areas of responsibility that are informing the Healthy Births Initiative.

The diversity of experience and expertise that members of the LABBC bring to the collaborative partnership is one of its greatest strengths. This diversity has enabled the project to go beyond the conventional “medical model” or “public health paradigm” to develop a broad vision that encompasses multiple perspectives from multiple disciplines as well as multiple communities. This broad vision, in turn, has guided the LABBC to develop a plan for improving birth outcomes in Los Angeles that is truly multi-level\(^1\), comprehensive, evidence-based and community-driven.

\(^1\) The First 5 LA Commission’s vision of how to improve the health and well-being of children follows from Bronfenbrenner’s theory of human ecology and is conceptualized as the “Circles of Influence Framework” (1). This framework acknowledges that a child’s well-being is influenced not only by what happens to the child, but also by the family that surrounds the child, the neighborhood and community that surround the family, the organizations that work with families and society as a whole. This report refers to these concepts represented by the “Circles of Influence Framework” as multi-level influences on health.
Methods

In developing the blueprint, the following steps were taken:

- **Build Collaborative Partnerships**: The LABBC created collaborative partnerships 1) amongst ourselves within the LABBC, 2) with the Healthy Births Advisory Board, and 3) with communities across Los Angeles County through our unique Healthy Births Learning Collaboratives (HBLCs). The HBLCs are networks of providers, consumers, researchers, public health professionals, advocates, and other community stakeholders whose primary aim is to improve birth outcomes. The HBLCs were created in each geographic Service Planning Area (SPA) to provide a platform for community collaboration in promoting healthy births.

- **Develop Conceptual Frameworks**: From its inception, the LABBC has been guided by three conceptual frameworks: 1) Health Field Model, 2) Women’s Health Continuum, and 3) Community-Based Approach. Together these conceptual frameworks guided the development of an integrated plan for improving birth outcomes that is multilevel, comprehensive, and community-driven.

- **Convene the Community Advisory Board**: The LABBC engaged the participation of a multi-disciplinary group of community experts to guide the development of the recommendations and implementation of the Healthy Births Initiative.

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2 A SPA or service planning area is a specific geographic area designated by the Children’s Planning Council of Los Angeles County. The County is thus divided into eight specific geographic regions called Service Planning Areas (SPA). The American Indian population comprises the ninth SPA, which provides planning across the eight geographic regions of Los Angeles County for American Indian and Alaskan Native children and families.
• **Conduct Community Assessment**: The LABBC conducted 1) telephone surveys with 156 community-based organizations to identify over 40 existing needs assessments and asset maps, 2) personal or group interviews of approximately 34 providers to identify systems barriers and opportunities for improving prenatal care and birth outcomes, and 3) a Smoking and Pregnancy Health Summit and 29 HBLC meetings involving 536 participants representing 227 organizations from across Los Angeles County to help identify priorities and strategies for improving birth outcomes.

• **Conduct and Analyze Literature Review**: The LABBC searched computerized databases (e.g., Medline, PubMed, MD Consult, Cochrane Library, ClinPsy) for original research, systematic reviews, meta-analyses, and commentaries, and reviewed over 1,000 articles on protective and risk factors as well as interventions and best practices for improving birth outcomes. The review of the literature took a multi-level approach in examining factors and interventions at the individual, interpersonal, institutional/community, and policy levels.

• **Recommend Strategies**: Together the community assessment, the literature review and the information garnered from the Advisory Board and the HBLC meetings guided the development of the LABBC’s six guiding principles and core approaches for improving birth outcomes. The LABBC took its blueprint back to the Healthy Births Advisory Board and the HBLCs for feedback before presenting our final recommendations to First 5 LA.

**Community Assessment**

There are over 157,000 births each year in Los Angeles County. Overall, Los Angeles County performs better than national averages on most perinatal health indicators, with an infant mortality rate of 4.9 deaths per 1,000 live births (vs. 7.0 for the U.S.), LBW rate of 6.8% (vs. 7.8% for the U.S.), and VLBW rate of 1.3% (vs. 1.4% for the U.S.). However, County averages belie the disparities that exist across Los Angeles County. A summary of perinatal indicators by race/ethnicity is shown in Table 1.

**Table 1: Selected perinatal indicators by race/ethnicity, Los Angeles County 2002**

<table>
<thead>
<tr>
<th>Rates</th>
<th>African American</th>
<th>American Indian</th>
<th>Asian/ Pacific Islander</th>
<th>Hispanic</th>
<th>Non-Hispanic White</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infant mortality&lt;sup&gt;*&lt;/sup&gt;</td>
<td>13.1</td>
<td>*</td>
<td>4.0</td>
<td>4.8</td>
<td>5.2</td>
</tr>
<tr>
<td>Fetal mortality&lt;sup&gt;*&lt;/sup&gt;</td>
<td>10.2</td>
<td>*</td>
<td>3.7</td>
<td>4.6</td>
<td>4.0</td>
</tr>
<tr>
<td>Neonatal mortality&lt;sup&gt;*&lt;/sup&gt;</td>
<td>7.9</td>
<td>*</td>
<td>2.3</td>
<td>3.1</td>
<td>3.8</td>
</tr>
<tr>
<td>Post-neonatal mortality&lt;sup&gt;*&lt;/sup&gt;</td>
<td>4.8</td>
<td>*</td>
<td>1.7</td>
<td>1.7</td>
<td>1.4</td>
</tr>
<tr>
<td>Low birth weight</td>
<td>12.2</td>
<td>7.1</td>
<td>7.2</td>
<td>6.0</td>
<td>6.6</td>
</tr>
<tr>
<td>Very low birth weight</td>
<td>3.0</td>
<td>2.8</td>
<td>1.0%</td>
<td>1.1</td>
<td>1.1</td>
</tr>
<tr>
<td>First Trimester Prenatal care</td>
<td>83.1%</td>
<td>85.8%</td>
<td>89.7%</td>
<td>86.5%</td>
<td>92.8%</td>
</tr>
<tr>
<td>Teen births&lt;sup&gt;*&lt;/sup&gt; (aged 15-19)</td>
<td>39.0</td>
<td>*</td>
<td>7.4</td>
<td>60.9</td>
<td>10.3</td>
</tr>
</tbody>
</table>

<sup>*</sup>Not Calculated

Source: California Department of Health Services, Center for Health Statistics, vital Statistics, 2002; LA County Department of Health Services, Maternal, Child & Adolescent Health Programs Research and Evaluation Unit.

Disparities also exist across geographic regions in the County. As shown in Table 2, several service planning areas (SPAs) have poorer birth outcomes compared to County averages.
Table 2: Selected perinatal indicators by service planning area (SPA), Los Angeles County 2002

<table>
<thead>
<tr>
<th>Rates</th>
<th>SPA 1</th>
<th>SPA 2</th>
<th>SPA 3</th>
<th>SPA 4</th>
<th>SPA 5</th>
<th>SPA 6</th>
<th>SPA 7</th>
<th>SPA 8</th>
<th>LA County</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infant mortality¹</td>
<td>10.6</td>
<td>5.0</td>
<td>5.2</td>
<td>5.4</td>
<td>3.6</td>
<td>6.2</td>
<td>4.7</td>
<td>5.4</td>
<td>5.5</td>
</tr>
<tr>
<td>Fetal mortality²</td>
<td>6.1</td>
<td>4.2</td>
<td>4.0</td>
<td>5.0</td>
<td>5.1</td>
<td>6.1</td>
<td>4.8</td>
<td>5.1</td>
<td>4.9</td>
</tr>
<tr>
<td>Low birth weight</td>
<td>8.1%</td>
<td>6.4%</td>
<td>6.5%</td>
<td>6.8%</td>
<td>6.7%</td>
<td>7.5%</td>
<td>6.1%</td>
<td>7.1%</td>
<td>6.8%</td>
</tr>
<tr>
<td>Preterm Birth under 37 weeks</td>
<td>13.3%</td>
<td>9.7%</td>
<td>9.4%</td>
<td>10.1%</td>
<td>8.9%</td>
<td>11.3%</td>
<td>10.4%</td>
<td>10.0%</td>
<td>10.2%</td>
</tr>
<tr>
<td>First Trimester Prenatal care</td>
<td>84.1%</td>
<td>91.1%</td>
<td>88.0%</td>
<td>88.1%</td>
<td>91.9%</td>
<td>82.3%</td>
<td>86.7%</td>
<td>88.4%</td>
<td>87.6%</td>
</tr>
<tr>
<td>Teen births³ (aged 15-19)</td>
<td>43.5%</td>
<td>28.4%</td>
<td>34.1%</td>
<td>45.2%</td>
<td>8.6%</td>
<td>72.6%</td>
<td>45.0%</td>
<td>36.4%</td>
<td>39.9%</td>
</tr>
<tr>
<td>Repeat Teen births³ (aged 15-19)</td>
<td>8.1%</td>
<td>5.1%</td>
<td>7.1%</td>
<td>9.5%</td>
<td>1.5%</td>
<td>16.7%</td>
<td>8.5%</td>
<td>6.9%</td>
<td>9.1%</td>
</tr>
</tbody>
</table>

1. per 1,000 live births  
2. per 1,000 live births plus fetal deaths  
3. per 1,000 adolescent females 15-19 years of age

Overall, there are 68 hospitals providing maternity and newborn care in the County, with 34 having Neonatal Intensive Care Units designated by the California Children’s Services. There are 510 Comprehensive Perinatal Service Providers (CPSP)³, 78 Women, Infants, and Children (WIC)⁴ nutritional service sites, and 34 Sweet Success⁵ affiliates in the County. A summary of service capacity indicators for the County is shown in Table 3.

³ The Comprehensive Perinatal Services Program (CPSP) was implemented in 1987 as a Medi-Cal fee-for-service program for low-income pregnant women. Effective July 1, 1997, with the implementation of the Two-Plan Model for Medi-Cal Managed Care in Los Angeles County, all pregnant women enrolled in Medi-Cal Managed Care must have access to comprehensive perinatal services.

⁴ WIC – Created in 1972, the Special Supplemental Food Program for Women, Infants, and Children (WIC) the program provides supplemental food, nutrition education and access to medical care for families under 185% of the Federal Poverty level.

⁵ Sweet Success is the clinical component of California Diabetes and Pregnancy Program. Sweet Success provides outpatient-based comprehensive education, nutrition, psychosocial and medical services by a multidisciplinary professional team.
Table 3: Service capacity indicators by service planning area (SPA) and Los Angeles County, 2003

<table>
<thead>
<tr>
<th>Indicator</th>
<th>SPA 1</th>
<th>SPA 2</th>
<th>SPA 3</th>
<th>SPA 4</th>
<th>SPA 5</th>
<th>SPA 6</th>
<th>SPA 7</th>
<th>SPA 8</th>
<th>LA County</th>
</tr>
</thead>
<tbody>
<tr>
<td># hospitals providing perinatal health services</td>
<td>1</td>
<td>15</td>
<td>13</td>
<td>11</td>
<td>4</td>
<td>4</td>
<td>9</td>
<td>11</td>
<td>68</td>
</tr>
<tr>
<td># CPSP providers</td>
<td>2</td>
<td>96</td>
<td>63</td>
<td>120</td>
<td>12</td>
<td>61</td>
<td>124</td>
<td>32</td>
<td>510</td>
</tr>
<tr>
<td>Ratio CPSP providers: 1,000 Medi-Cal live births</td>
<td>1.0</td>
<td>8.0</td>
<td>6.0</td>
<td>10.3</td>
<td>9.4</td>
<td>4.0</td>
<td>10.5</td>
<td>3.1</td>
<td>6.8</td>
</tr>
<tr>
<td># WIC programs</td>
<td>2</td>
<td>14</td>
<td>17</td>
<td>14</td>
<td>3</td>
<td>9</td>
<td>10</td>
<td>9</td>
<td>78</td>
</tr>
<tr>
<td># Sweet Success providers</td>
<td>1</td>
<td>6</td>
<td>6</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>9</td>
<td>34</td>
</tr>
</tbody>
</table>

Communities were asked to identify their priorities for improving birth outcomes in HBLC meetings held in January 2003. The following table summarizes the Community Priorities.

Table 4: Community priorities for improving birth outcomes by service planning area (SPA)

<table>
<thead>
<tr>
<th>SPA 1</th>
<th>SPA 2</th>
<th>SPA 3</th>
<th>SPA 4</th>
<th>SPA 5</th>
<th>SPA 6</th>
<th>SPA 7</th>
<th>SPA 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>PNC access &amp; quality</td>
<td>PNC access &amp; quality</td>
<td>PNC access &amp; quality</td>
<td>PNC access &amp; quality</td>
<td>PNC access &amp; quality</td>
<td>PNC access &amp; quality</td>
<td>PNC access &amp; quality</td>
<td>PNC access &amp; quality</td>
</tr>
<tr>
<td>Mental health</td>
<td>Infant care</td>
<td>Stress &amp; mental health</td>
<td>Stress &amp; mental health</td>
<td>Stress &amp; mental health</td>
<td>Stress &amp; mental health</td>
<td>Smoking, alcohol &amp; substance use</td>
<td>Stress &amp; mental health</td>
</tr>
<tr>
<td>Teen pregnancy services</td>
<td>Teen pregnancy services</td>
<td>Economic needs</td>
<td>Partner &amp; family involvement</td>
<td>Economic needs</td>
<td>Preconception care</td>
<td>Cultural competency</td>
<td>Cultural competency</td>
</tr>
</tbody>
</table>

Several major themes emerged from these HBLC meetings:

- **Prenatal Care Access and Quality** – Participants from all eight geographic SPAs identified access and quality of prenatal care as key priority issues in the community. Barriers to care included lack of transportation, financial difficulties, lack of service coordination, limited knowledge about resources/services, little family support, and lack of continuity in care. Participants highlighted cultural competency in prenatal care as the key quality issue. Strategies to improve cultural competency in prenatal care included availability of interpretation and translation services, culturally and linguistically appropriate health education materials, training of service providers and staff, and funding and support for services and programs to promote cultural competency.

- **Nutrition** – Participants from most SPAs advocated for more nutrition services for pregnant women and their families. Recommendations to promote healthy nutrition included better service coordination between WIC and other groups (providers, schools), positive images of healthy eating in the media, breastfeeding support (prenatal or parenting classes, Baby
• Stress and Mental Health – Participants from most SPAs also identified stress and mental health as priority issues in the community. Major sources of stress included intimate partner violence, social isolation and lack of social support, economic needs and lack of services (e.g. mental health providers and substance abuse treatment for pregnant women), insensitive providers and racial and other types of discrimination. Participants recommended increased counseling and support services, increased education about smoking, alcohol, and substance use during pregnancy, better screening of pregnant women for domestic violence, depression, substance abuse, increased family support, and increased efforts to combat discrimination.

• Teen Pregnancy Services- HBLC participants from several SPAs identified teen pregnancy as a priority issue to be addressed. They pointed to the need for better health education in the schools (including counseling and peer education), partner involvement and family support, health messaging and media advocacy, and teen specific services.

• Economic Needs - HBLC participants from several SPAs highlighted economic needs as a priority issue to be addressed, pointing to the link between poverty and teen pregnancy, homelessness, single parenthood, and domestic violence - all of which could increase psychosocial stress and lead to adverse birth outcomes.

Literature Review

In the literature review, multiple factors were identified that have been linked to adverse birth outcomes, particularly infant mortality, low birth weight (LBW), and preterm birth:

• Individual-level factors – include biological (infection, sexually transmitted infections, immune-inflammatory, genetic, neuroendocrine, and vascular), psychological (stress, pregnancy anxiety, depression, and personal resources such as self-esteem), behavioral (tobacco, alcohol and drug use, nutrition, unintended pregnancies, interpregnancy intervals), and sociodemographic (extremes of age, marital status, socioeconomic status and race-ethnicity)

• Interpersonal factors – include partner and family support, social networks, and intimate partner violence

• Institutional/community factors – include multiple factors in the social environment (neighborhood characteristics, social cohesion and social capital, racism and racial discrimination, culture, and acculturation) as well as physical environments (air pollution, water pollution, metals, and pesticides)

• Policy factors – include institutional policies such as those governing employment discrimination, working conditions, parental leaves, and those promoting smoking cessation or breastfeeding; public policies such as the welfare reform or Medicaid expansion
• **Life-course factors** – increasingly, birth outcomes are viewed as products of not only pregnancy exposures but also life-course experiences. Such “life-course” factors such as maternal birth weight, interpregnancy interval, pre-pregnancy weight, prior obstetrical history or pre-existing medical conditions, and so called “weathering” have all been linked to birth outcomes.

In sum, there are multiple, interconnected factors operating at multiple levels that impact birth outcomes. To achieve significant improvement in birth outcomes, interventions need to move beyond addressing perinatal risk factors one at a time, to a comprehensive, multilevel approach that begins to address the multiple determinants of birth outcomes before, during, and between pregnancies.

Additionally, the review of the literature included evidence-based interventions and best practices for improving birth outcomes. Again, a multi-level approach was taken:

• **Individual-level interventions** – The primary intervention at the individual level for improving birth outcomes is prenatal care. While the effectiveness of prenatal care for preventing LBW and preterm birth remains controversial, several components have been demonstrated to improve pregnancy behaviors and birth outcomes. These include prenatal screening for smoking, substance use, poor nutrition, diabetes, urogenital and periodontal infections, maternal stress and depression, and intimate partner violence. Health education, outreach and case management are also effective strategies to improve health behaviors and link women to health and social services. Interconception care also appears promising as a means to reduce unhealthy behaviors, screen and treat infections, and optimize care of medical problems (such as, diabetes, seizure disorders) to support healthy future pregnancies.

• **Interpersonal-level interventions** – The primary interpersonal-level intervention is increasing psychosocial support for pregnant and parenting women and families through outreach and case management. While overall results are mixed, several local and national best practice models were identified that have demonstrated effectiveness for improving birth and child health outcomes, including the Nurse Family Partnership program using the “Olds’ Model.” Other promising strategies for enhancing the capacity of partners, families, and communities to provide psychosocial support continue to be evaluated.

• **Institutional/Community-level interventions** – The best evaluated intervention at the community level for improving birth outcomes is the National Healthy Start program. While the overall results are mixed, several project sites demonstrated effectiveness in improving prenatal care utilization and reducing infant mortality and LBW. Best practice models around outreach and case management, health education, and community partnership have been developed. Other promising community-based programs such as the National Fetal-Infant Mortality Review, the Black Infant Health program, and Early Head Start were also examined.
Policy-level interventions – Numerous models were examined for both “top-down” policy interventions such as Medicaid expansion, as well as “bottom-up” models for grassroots (family, neighborhood, community) mobilization for policy and advocacy initiatives.

These evidence-based interventions and best practices guided the development of the LABBC’s comprehensive, collaborative, multi-level, community-driven, evidence-based strategies for improving birth outcomes.

Recommendations

Together the community assessment, the literature review and the information garnered from the Advisory Board, the Smoking and Pregnancy Health Summit and the HBLC meetings guided the development of the LABBC’s six guiding principles and core approaches for improving birth outcomes.

Guiding Principles

For the Healthy Births Initiative to improve birth outcomes, the approach must be:

1. **Comprehensive and integrated** – interventions should address multiple risk factors simultaneously, using multiple strategies thereby creating a comprehensive and integrated approach.

2. **Multi-Level** – interventions should address multiple influences at the individual, interpersonal, neighborhood/community, service systems and societal levels as exemplified by First 5 LA’s Circles of Influence.

3. **Collaborative** – interventions should be undertaken in collaborative partnerships representing diverse disciplines, knowledge and skills (health and social service providers, academics and researchers, policy makers and advocates).

4. **Community-Driven** – interventions should be developed, implemented and evaluated by local communities.

5. **Evidence-Based** – interventions should be supported by evidence of effectiveness.

6. **Culturally Competent** – interventions to identify, treat, and follow women at risk should be designed in a culturally competent manner.

Core Approaches

The core approaches are organized according to First 5 LA’s Circles of Influence (individual, interpersonal, neighborhood/community, service systems, and societal), starting with the outermost circle:
• **Policy and advocacy** – Institutional and public policy can have a profound impact on birth outcomes. The objective of this strategy is to strengthen local capacity to promote healthy births through policy and advocacy initiatives. Specifically, we recommend that each funded collaborative, as part of their scope of work, include specific plans to address a change in policy related to the priority topic they have chosen to address.

• **Health education and messaging** – Health education is the primary means for changing risk behaviors and promoting healthy behaviors during pregnancy and interconception. Presently much of the prenatal health education takes place at the prenatal visits. The goal is to expand the reach of health education through multiple channels at multiple levels. The aims are to change not only individual behaviors but also interpersonal (partners, families, and peers) support, community and social norms, institutional (worksites, health care systems) practices, and public awareness and public policy. Successful health education interventions are characterized by the following: 1) grounded in scientific theory; 2) capable of reaching the target population, who are capable of reaching the desired outcomes; 3) use of multiple channels; 4) guided by formative research; 5) developed and implemented with community partnership; and 6) core content is driven by community-identified priorities (e.g. nutrition, stress, teen pregnancy prevention) as well as scientific evidence.

• **Prenatal care quality improvement** – Prenatal care remains the most widely used population-wide intervention for improving birth outcomes. The goal of this strategy is to improve the quality and content of prenatal care by assisting providers to implement standard, evidence based, and nationally recommended Clinical Practice Guidelines in culturally competent ways. Eight core components of prenatal care have been identified for which evidence-based best practice standards have been established:

1. Smoking cessation
2. Nutrition
3. Intimate partner violence
4. Maternal depression and stress
5. Urinary, reproductive tract, and peridontal infections
6. Substance use
7. Gestational Diabetes
8. Cultural competency

Additionally, the Breakthrough Series (BTS) has been identified as the single most promising methodology for bringing about prenatal care quality improvement. BTS is a collaborative healthcare quality improvement method that incorporates the basic elements for improving care in health systems at the community, organization, practice and individual levels. The goal of this model is to rapidly change the system through which prenatal care is provided to promote client centered, up-to-date clinical management through team care and community partnership. The BTS has proven successful in improving the care and health of individuals with long term illnesses such as, diabetes, and heart disease, and asthma and can easily and effectively be applied to caring for pregnant women. Implementing this recommendation will bring together teams of providers and staff, to learn the BTS techniques for integrating rapid quality improvement cycles, the components of organizational and system change,
the content and principles of standard evidence-based clinical guidelines and cultural competency. Teams will work collaboratively to develop and share the plans that are implemented in their practices and their outcomes.

- **Interconception care** – Women with prior poor birth outcomes are at risk for having another poor birth outcome during their subsequent pregnancy. The goal of this strategy is to reduce the recurrence of adverse birth outcomes by providing interconception care for women who have had a
  - Prior early preterm or VLBW birth
  - Fetal or infant death
  - Pregnancy affected by preventable congenital anomalies
  - Adolescent pregnancy
  - Diabetes
  - Other chronic health problems associated with adverse pregnancy outcomes

The core components of interconception care consists of 1) risk assessment, 2) health promotion, 3) medical and psychosocial interventions, and 4) outreach and case management.

- **Outreach** – Even if a system is in place to provide quality prenatal and interconception care to every pregnant and parenting woman and family in Los Angeles County, it will have limited impact if women do not access prenatal/interconception care, particularly those at risk for poor birth outcomes. The goal of this strategy is to improve access to prenatal and interconception care, health insurance and other resources for at-risk women and families.

- **Case management** – The objective of case management is to connect pregnant and parenting women and families to the services they need. Similar to outreach, several effective local and national evidence-based best practice models have been developed, including the Nurse Family Partnership (the Olds’ Model) which uses professional home-visiting registered nurses, and the Healthy Start program and the Black Infant Health program which use a combination of professional and lay workers to provide the case management.

- **Community building** – Much as “it takes a village to raise a child”, it takes a community to promote healthy births. The goal of this strategy is to promote healthy births through increasing the community’s infrastructure, changing societal norms and expanding the social capital in Los Angeles County.

- **Social support** – Stress and mental health issues were identified as priorities for pregnant women across Los Angeles County. A growing body of scientific literature has linked psychosocial stress to adverse birth outcomes, particularly preterm birth and LBW. The goal of this strategy is to promote healthy births and interconception care by providing and promoting psychosocial support to pregnant and parenting women and families. Interventions should have a multi-level approach, consisting of 1) strengthening the capacity of partners, families, and social networks to provide psychosocial support (e.g. male
involvement program, family resource center), 2) building community support and social capital related to reproductive health, and 3) enhancing systems capacity to provide case management and home visitation.

For the Healthy Births Initiative to be truly comprehensive and multi-level, the LABBC recommends that the grantees strive to implement each of the aforementioned core approaches and address multiple levels of influence.

Final Recommendation:

- *Extend the Healthy Births Initiative to Five Years* - One of the most important lessons learned from the past two decades of clinical and community-based interventions to improve birth outcomes is that there is no quick fix. It takes time to change individual health behaviors; it takes even more time to change social norms that reinforce pregnancy behaviors. In order to demonstrate a lasting change in the health of Los Angeles women, infants and families that is the vision of the Healthy Births Initiative, we must act now but be patient and wait to see the benefits of our sustained efforts five and ten years in the future.
I. INTRODUCTION

The most important factors to optimize the potential for a full, healthy and productive life are being born appropriately developed at full-term and at a healthy birth weight. Yet, on this day in Los Angeles County, 41 babies will be born before they are ready or preterm; 24 babies will be born too small or low birth weight; and ten percent or more of those born too soon or too small will have a life long disability or handicap like cerebral palsy, blindness or deafness. Each year in Los Angeles County, one out of every 16 babies born is born weighing under 5 and ½ pounds. Preterm birth (prior to completing 37 weeks gestation) and low birthweight (weighing 5 and ½ pounds or less) are the leading reasons that infants die and are ill in the first year of their life. Those preterm (PTB) and/or low birthweight (LBW) infants that do survive are more likely to suffer life-long complications from developmental, neurological and learning disabilities, chronic health problems, as well as social and economic disadvantages associated with these biologic impairments. While the direct medical costs for caring for a single low birth weight or premature infant are estimated to be $50,000 in excess of the cost for an infant born on time and at a healthy birth weight (1), the life-long costs to the individual and society from special education needs, increased child abuse, health care for child and adult chronic illnesses and work absences associated with “being born too soon” are difficult to calculate. Frankly, any life lost or compromised that is preventable is unacceptable. There is little room for complacency.

Research over the past 30 years has enhanced our understanding of the many factors that act in complex ways to contribute to being born preterm or low birthweight. Researchers have been able to generate improved birth outcomes among participants in numerous controlled clinical trial settings; however, efforts to duplicate the improved birth outcomes using singly focused interventions among the general public have failed. No longer can efforts to improve pregnancy outcomes focus on one cause and one preventive strategy. Researchers are directed to look beyond a single healthcare strategy toward a more complete and comprehensive understanding of the determinants of health. To be optimally effective, efforts to improve the health and well-being of pregnant women and their infants should simultaneously address the social, psychological, behavioral, environmental, and biological factors influencing pregnancy. Further, efforts to improve the health and well-being of pregnant women and their infants must occur before, during and between pregnancies in order to be optimally effective. This report provides a Blueprint for Action that incorporates this comprehensive, collaborative, multi-level, community-driven, evidence-based approach to improving birth outcomes for Los Angeles County.
Background

In 1998, California voters approved Proposition 10: The California Children and Families First Act to add a 50-cent surtax on cigarettes and tobacco products. The monies generated, approximately $750 million a year of which Los Angeles County receives $150 million, are intended to improve early childhood development from age zero to five. Since early childhood development begins before birth, the Los Angeles Children and Families Proposition 10 Commission (now First 5 LA) has designated $15 million for its Healthy Births Initiative, a three-year initiative to improve birth outcomes in Los Angeles County. The specific goals of the Healthy Births Initiative are to reduce low birthweight and very low birthweight and to reduce disease and disability among newborns.

The Los Angeles Best Babies Collaborative was selected by First 5 LA to (1) identify priorities and recommend evidence-based strategies for improving birth outcomes in Los Angeles County (Phase I), and (2) provide technical assistance and implementation support for grantees funded under the Healthy Births Initiative (Phase II). This report briefly describes the process through which individuals and organizations throughout Los Angeles County were brought together to identify priorities and strategies for improving birth outcomes and the integration of the community priorities, community assessment, and evidence-based interventions into a Blueprint for improving birth outcomes in Los Angeles County.

The Los Angeles Best Babies Collaborative (LABBC)

The LABBC was created in 2002 in response to a Request for Qualification (RFQ) by the First 5 LA Commission for a Planning and Network Support Provider to provide guidance and technical assistance to the Healthy Births Initiative. The mission is to improve the health of mothers and babies in Los Angeles County through a community-based, multi-disciplinary collaborative approach. The LABBC brings together the diverse expertise of those in the communities who are committed to optimizing the health and improving the quality of life of each mother and child in Los Angeles County.

The LABBC consists of the following six partners from communities, academia, health care providers, and public health:

- Healthy Births Advisory Board (Advisory Board) comprised of key stakeholders in the community
- Cedars-Sinai Medical Center, Department of Obstetrics & Gynecology (CSMC)
- Perinatal Advisory Council: Leadership, Advocacy and Consultation (PAC/LAC)
- University of California, Los Angeles, Center for Healthier Children, Families, and Communities (UCLA)
- Los Angeles County Department of Health Services – Maternal Child & Adolescent Health Programs (LAC/DHS)
- March of Dimes (MOD), Southern California Chapter
Figure 1. Los Angeles Best Babies Collaborative Model

The diversity of experiences and expertise that members of the LABBC bring to the collaborative partnership is one of its greatest strengths. This diversity has enabled the Healthy Births Initiative to go beyond the conventional “medical model” or “public health paradigm” to develop a broad vision that encompasses multiple perspectives from multiple disciplines. As a result, the LABBC has created an ambitious plan that is truly multi-level, longitudinally integrated, and community-driven.

In the following section the methods used to establish the Blueprint are described including the:

- Collaborative partnerships that contributed content and form,
- Processes used to conduct the community assessment,
- Literature review and the integration of evidence-based strategies.

Subsequent sections describe in further detail the underlying conceptual frameworks that guide the development of the plan, summarize the literature, present the strategies for improving birth outcomes, provide a framework for evaluation and discuss the implementation and potential impact of these strategies for Los Angeles County. Final sections of this report provide an overview of how these recommended strategies complement other First 5 LA initiatives and describes the “lessons learned” in the process of developing these strategies.

Los Angeles Best Babies Collaborative- Healthy Births Initiative Blueprint

Figure 1 depicts the partners and their interdependent relationship to the community and First 5 LA.
II. METHODS

In this section, the methods used to develop the LABBC Blueprint for Action will be described. The steps are depicted in the logic model diagrammed below.

Figure 2. Logic Model for development of the LABBC Blueprint

Building Collaborative Partnership

Developing Conceptual Frameworks

Conducting Community Assessment
Conducting Literature Review

 Recommending Strategies to Improve Birth Outcomes in Los Angeles

Building Collaborative Partnership

The first step taken to develop the strategies to improve pregnancy and birth outcomes in Los Angeles County was to build the following collaborative partnerships:

- Amongst the LABBC partners,
- With the Healthy Births Advisory Board, and
- With community members through the Healthy Births Learning Collaboratives.
Los Angeles Best Babies Collaborative

The diversity of partners in the LABBC serves both as a strength and a challenge. Each partner brings a variety of perspectives, expertise, and agendas to the table. The LABBC partners learned to work together by focusing on our goals, building on strengths and developing trust among partners. A facilitated process led by an external consultant assisted in the development of the LABBC’s mission, served to clarify common goals and objectives, and helped develop group processes for shared leadership, decision-making, consensus building and conflict resolution. While early clarification of a shared vision and goals was critical to effective collaboration, individuals were required to commit to listening and considering others’ ideas, as well as work towards a common understanding. Facilitation of early successes in achieving joint decisions and completing milestones outlined in the project Scope of Work assisted in building the working trust that sustains the collaborative. Ultimately, it is the accumulation of these small successes and continued collaborative problem solving, over time that built the trust that sustains and strengthens our collaborative efforts.

“We wanted to learn to work together because we wanted to set an example for other collaborative partnerships.”

Observied one LABBC member

Healthy Births Advisory Board

The community-based Healthy Births Advisory Board broadens the academic, organizational, clinical and community expertise that is available to the Healthy Births Initiative. Like the LABBC, each member brings diverse perspectives, experience, and expertise to the group. Members were selected from each of the Service Planning Areas (SPAs) to provide leadership and insight as they inform the process of the Healthy Births Initiative.

The processes used to build a working partnership with the Advisory Board are similar to those utilized by the LABBC. Operational guidelines were proposed, revised and accepted during the initial Advisory Board meetings. Formal processes were established to incorporate input from the Advisory Board into the LABBC group processes and decisions. As with all partnerships, communication remains the key to building trusting relationships required for effective collaboration. Over time the work between the LABBC and Advisory Board has become more effective with increased accountability and shared successes. The LABBC has relied upon the Advisory Board to provide a) data and input into the Community Assessment; b) provide insight regarding the recommended strategies; and c) provide a “reality check” regarding it’s implementation within specific communities. The Advisory Board has become an integral member of the LABBC team providing important contributions to the process of the Healthy Births Initiative.
**Healthy Births Learning Collaborative**

In order for this Blueprint to be community-driven, collaborative partnerships needed to be built with communities across Los Angeles County. The Healthy Births Learning Collaborative (HBLCs) provides the platform for building such collaborative partnerships. The HBLCs are a network of community members, consumers, researchers, public health professionals, leaders, advocates, and other stakeholders whose primary aim is to improve pregnancy and birth outcomes in Los Angeles County. The HBLCs provide the infrastructure through which community members can come together on a regular basis to discuss their experience and expertise while exchanging much needed resources.

Presently there are eight HBLCs, one for each of the eight geographic Service Planning Areas (SPAs) in Los Angeles County. Although community networks developed by the Children’s Planning Council exist within the SPAs, the HBLCs were developed to provide a forum to focus on health and social service needs of pregnant women and their families. An initial database of 1400 professionals was collated from numerous databases from the following organizations: PAC/LAC, March of Dime, Office of Women’s Health, Cedars-Sinai Medical Center (CSMC), University of California, Los Angeles (UCLA), and SPA conveners. These professionals represent hospitals, community clinics, and community-based organizations that provide a variety of services to pregnant women and their families. These services include, but are not limited to mental health, nutrition and lactation support, health education and outreach, child care, case management, substance abuse services and resources for pregnant and parenting adolescent youth. Additionally, invitees have included policy makers, health plan representatives, and community advocates. HBLC members represent agencies of vast diversity in terms of both size and scope of practice. Participants are recruited through a variety of methods including mail, listserv e, e-mail, general announcements at community meetings and by word of mouth.

**Developing Conceptual Frameworks**

A conceptual framework provides the foundation and model to explore specific solutions to identified issues. Conceptual frameworks provide a common language and logic as the foundation for development and implementation of health improvement strategies.

The following is a list of the conceptual frameworks used to guide this process:

- Women’s Health Continuum,
- Health Field Model, and
- Community-Based Approach

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6 A SPA or service planning area is a specific geographic area designated by the Children’s Planning Council of Los Angeles County. The County is thus divided into eight specific geographic regions called Service Planning Areas (SPA). The American Indian population comprises the ninth SPA, which provides planning across the eight geographic regions of Los Angeles County for American Indian and Alaskan Native children and families.
Each is described in detail in Section III. The First 5 LA Commission’s vision of how to improve the health and well-being of children follows from Bronfenbrenner’s theory of human ecology and is conceptualized as the “Circles of Influence Framework” (2). This framework acknowledges that a child’s well-being is influenced not only by what happens to the child, but also by the family that surrounds the child, the neighborhood and community that surround the family, the organizations that work with families and society as a whole. This report refers to these concepts represented by the “Circles of Influence Framework” as multi-level influences on health. Together these conceptual frameworks guided the community assessment activities, the literature review, and the development of the multi-level, longitudinally-integrated, and community-driven strategies.

Conducting Community Assessment

The community assessment was designed to be “community-driven” and “expert-driven.” The goal of this assessment is to identify gaps between community needs and resources and to strengthen community capacity for collaborative planning around healthy births.

The community assessment centered on three different sets of activities:
- Review of existing community assessments
- Convening of the LABBC Advisory Board
- Community participation
  - Pregnancy and Smoking Summit
  - Healthy Births Learning Collaboratives
  - Stakeholder Interviews

Review of Existing Community Assessments

A telephone survey was conducted to identify existing needs assessments and asset maps related to pregnancy outcomes in Los Angeles County. A survey instrument was developed and pre-tested with community members and the LABBC. With the help of LABBC members and the Advisory Board, at least ten “community experts” were identified and contacted in each Service Planning Area (SPA). Additionally, at least three “content experts” were selected in each of the priority areas identified by the HBLCs. Priority areas include:
  1) Prenatal care (including access and quality of care, preconception care, and cultural competency);
  2) Mental health (including depression, domestic violence, stress, substance abuse); and
  3) Nutrition (including nutrition education, and food access).

Individuals contacted were asked to suggest others who might have the requested information and these additional experts were identified and contacted.

In the period between May and August, 2003, 156 telephone surveys were conducted with experts and organizations across Los Angeles County. More than 40 preexisting assessments on community needs and resources related to birth outcomes were compiled (Appendix A). The assessments were evaluated with respect to their content, scope, purpose, sample characteristics,
data collection methods, and results. The search was limited to existing assessments completed in Los Angeles County during the past five years (1998-2003). The data was supplemented by information on perinatal health statistics provided by the Research, Evaluation and Planning, Unit of the Maternal, Child, and Adolescent Health Programs, Los Angeles County Department of Health Services, as well as information on service capacity gathered by the Perinatal Advisory Council: Leadership, Advocacy and Consultation (PAC/LAC).

Healthy Births Advisory Board

The Healthy Births Advisory Board provided input into the priority topics in two primary ways. First at the first meeting of the Healthy Births Advisory Board in January 2003, the board members were surveyed and asked to “rank the top three topics that you believe should be priorities for improving birth outcomes in Los Angeles County.” Second, following completion of the analysis of the HBLC selected priorities, the Advisory Board was asked to review the list, and suggest topics that should be included.

Community Participation

One of the guiding principles for the Blueprint was that they be community-driven. Therefore, it is necessary to obtain input from the community when identifying the priorities for intervention and development of the recommendations. The community participated in a number of activities and through the following events participated in creating recommendations that are specific for the many communities that make up Los Angeles County.

Pregnancy and Smoking Summit

In December 2002, the LABBC convened a half day workshop entitled “Pregnancy and Smoking: A LA Community Health Summit”. This forum brought together maternal and child health providers, tobacco control agencies and organizations, and community representatives to discuss the complex issues surrounding tobacco exposure during pregnancy. A panel of experts provided a brief overview of literature on smoking from the research and clinical perspectives and representatives from the LA Department of Health Services Tobacco Control Division discussed available services. The majority of the summit focused on “break-out” sessions, where participants were asked to identify the following: 1) “Why pregnant women smoke”, 2) “What was needed to assist pregnant women to stop smoking?”, and 3) “What services or community resources are available to assist pregnant women?” Summit participants identified several reasons why women continue to smoke during pregnancy. These include addiction, stress and other psychological factors, social pressures, and influence of family members who smoke. A lively discussion about what can be done to address these factors was held. The primary factor identified by each break-out group was a need for coordinated cessation counseling and referral by health care providers. In addition, many voiced the need for early mental health screening for

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7 A five-year time limit was chosen to provide data most likely to reflect current regional demographic, social and economic trends, as well as to describes the current landscape of the community in terms of birth trends, health care delivery systems and service capacity.
signs of depression, stress, and other symptoms that perpetuate the need for cigarettes. Several groups also discussed the effect of the media both in maintaining positive images of smoking, and as a means to disseminate cessation messages.

Healthy Births Learning Collaboratives

Sixteen Healthy Births Learning Collaborative (HBLC) meetings were held in all of the eight Service Planning Areas (SPAs) between January and February of 2003 (two in each SPA). The overarching goal for convening the Healthy Birth Learning Collaboratives was to foster community collaboration to improve birth outcomes in Los Angeles County. Each HBLC is composed of community members who directly or indirectly provide perinatal health services and/or are committed to improving birth outcomes in the County. The purpose of these HBLC meetings was to have community members participate in a forum of knowledge exchange, discuss priorities and strategies for improving birth outcomes, and expand existing and form new collaborative relationships focused on improving birth outcomes.

Between January and October, 2003, HBLC meetings were held in SPAs across Los Angeles County. In total, 536 participants representing more than 227 organizations attended 29 HBLC meetings. The first two series of HBLC meetings focused on identifying priority issues related to improving birth outcomes and determining the available community resources and needs. Participants also were asked to identify key points for intervention along the continuum of a woman’s life course including preconception, pregnancy, and interconception.

**HBLC #1 Meetings-January 2003.**

The January HBLC meetings used an interactive small-group format and focused on determining community priorities that will need to be addressed in order to improve pregnancy outcomes, as well as identifying community needs and resources to address these priorities. Questions asked included the following:

a) What topics are the most pressing regarding pregnancy outcomes in your community?

b) Why is this topic important and how does it impact the pregnant woman on a variety of levels?

c) What needs to be done to address these issues (resources/services/strategies)?

d) Who is missing from our discussion (entities as well as names of programs, researchers, organizations)?

Participants were encouraged to consider these factors within different levels of impact or *Circles of Influence*, such as personal, interpersonal, community, institutional and policy levels. After the small groups presented the results of their discussions to the larger forum, attendees were asked to prioritize the topics presented.

**HBLC #2 Meetings-February 2003.**

The goal of the February meeting was to engage the participants in an activity to assess local resources and potential strategies to address priorities identified at the first HBLC meetings.
Again a small group, interactive format was utilized. The purpose of the interactive activity was to: 1) help participants assess existing resources in their SPAs; 2) help participants identify services that are needed and/or needing to be enhanced in their SPAs; and 3) assist participants in identifying the roadblocks to providing these services. Additionally, participants were asked to prioritize when before, during or between pregnancies would be optimal for investment of services, resources and funding.

Stakeholder Interviews

Direct care provider interviews. Although the attendance at the HBLC meetings was diverse, careful review of these meetings revealed that few direct prenatal care providers (physicians, nurse midwives, nurse practitioners and office staff) attended. Information collected at the Smoking and Pregnancy Summit, and the January and February HBLC meetings overwhelmingly identified gaps in services in the prenatal care provider setting including cultural competency and quality and content of prenatal care as areas for improvement across Los Angeles County. This prompted the LABBC to focus a component of the literature review on means to improve prenatal care quality and cultural competency. This review identified several areas where nationally recommended guidelines could be implemented to improve pregnancy outcomes. However, based on their past experiences both LABBC and Advisory Board members raised concerns about the willingness of direct care providers to add to or change their current clinical practices. Upon the advice of the Advisory Board, the LABBC undertook a series of interviews with provider groups to explore their willingness to participate in a long-term process to improve the quality and cultural competency of prenatal care.

A protocol was developed to systematically interview provider groups to examine their perceived needs around improving pregnancy outcomes, and their perceptions of barriers to implementing best practice clinical guidelines. Also addressed was their willingness to partner with community agencies for referrals, and the possibility of committing a year to work with a quality improvement collaborative to improve pregnancy outcomes.

Between May and August 2003, a convenience sample of providers was selected by asking community leaders to identify a variety of practitioners who are 1) considered leaders in the perinatal community; 2) who provide care for a large numbers of pregnant women; 3) use different practice models (physicians, nurse practitioners, nurse midwives); and 4) serve diverse populations. Practices/provider groups in each SPA were sought. Structured interviews were conducted for a total of 13 practice/provider groups and with a total of 34 individual physicians, nurse practitioners, nurse midwives, staff nurses and practice administrators.

Nutrition Providers. Nutrition was identified as a priority in six of eight HBLC/SPAs. To gather additional input about nutritional priorities and best practices for nutritional interventions the LABBC convened a “Nutritional focus group” comprised of the LABBC nutritionist and volunteer LAC/WIC providers. This group was asked to identify nutrition priorities for intervention in LAC.
Literature Review

The literature review was conducted using a variety of computerized databases (PubMed, MD Consult, Cochrane Library, ClinPSYC) for original research, systematic reviews, meta-analyses, and commentaries. The literature search was divided into the following sections:

- Risk and protective factors
- Interventions and best practices

Risk and Protective Factors

A multi-level approach was taken in examining protective and risk factors during pregnancy. Specifically, factors were reviewed at the individual, interpersonal, institutional/community, and policy levels. Additionally, factors that exist over the life-course and along women’s health continuum were also examined. For the purpose of this report, the literature review focused primarily on factors related to infant mortality, birth defects, and low birth weight (LBW).

Interventions and Best Practices

A similar multi-level approach was taken in examining interventions to improve birth outcomes at the individual, interpersonal, institutional/community, and policy levels. The effectiveness of the intervention was based on available scientific evidence. Additionally, the literature was reviewed for existing evidence-based practice guidelines or “best practices”, which have demonstrated the positive pregnancy and birth outcomes needed for this Initiative.

Over 1,000 articles were reviewed and used to guide the development of the strategies. An overview of the literature can be found in the Literature Review (Section V). The focus of the literature review is to demonstrate multiple factors operating at multiple levels and along women’s health continuum that call for multi-level, longitudinally-integrated, and community-driven strategies for improving pregnancy and birth outcomes.

Recommended Strategies for Improving Birth Outcomes

Based on the community assessment, literature review, and Community input the LABBC developed a multi-level, longitudinally-integrated, community-driven, evidence based plan for improving birth outcomes in Los Angeles County.

The plan consists of eight core approaches:

1. Policy and Advocacy
2. Community Building
3. Health Education and Messaging
4. Social Support
5. Prenatal Care Quality Improvement
6. Interconception Care
7. Outreach
8. Case Management

Details for each strategy are provided in the Recommendations section (Section VI) of this report. Appendix B outlines the "logic models", level of evidence and potential impact supporting these approaches.

This section outlined the formation of the collaborative partnerships that were developed to inform the recommendations, the processes used to conduct the community assessment and literature review were described and the integration of these lines of evidence into the recommendations is presented. The next section presents the Conceptual Frameworks that guide the development of the recommendations.
III. CONCEPTUAL FRAMEWORKS

From its inception, the LABBC has been guided by three conceptual frameworks. These are:

- Health Field Model
- Women’s Health Continuum
- Community-Based Approach

These conceptual frameworks guided the development of the strategies for improving birth outcomes that are truly multi-level, longitudinal and community-driven.

Health Field Model

The first is the Health Field Model, which conceptualizes birth outcome as a product not only of prenatal care, but also of multiple biologic, psychosocial and environmental determinants. This model is perhaps best described in the conceptual framework proposed by Evans and Stoddart (1994), whose Health Field Model identifies multiple domains that exert influences on health outcomes (Figure 3).

![Figure 3. A model of the determinants of health (3).](image-url)
Improving pregnancy and birth outcomes will require more than improving individual-level clinical care; it will necessitate a multi-level approach integrating individual, interpersonal, community, institutional and policy-level interventions. This model resonates with First 5 LA’s Circles of Influence, and the social ecological approach suggested by Bronfenbrenner, Stokols and others (2,4).

**Women’s Health Continuum**

The second conceptual framework is the *women’s health continuum*, which recognizes maternal health as a continuum of women’s health. Thus improving pregnancy and birth outcomes will take more than improving maternal health during pregnancy; it will require advancing women’s health before, during, and in between pregnancies (Figure 4).

![Women’s Health Continuum](image)

This perspective brings to focus the importance of the continuum of women’s health care, which includes not only prenatal care, but also primary care, family planning, preconceptional and interconceptional care. More recently, Lu and Halfon (2003) expanded on the women’s health continuum in their life course perspective, which posits that birth outcomes are the products of both early life influences and cumulative effects of stress and strain (allostatic load) over the life course (4).
Community-Based Approach

The third conceptual framework is a community-based approach, which emphasizes the importance of community participation for improving pregnancy and birth outcomes. In this framework, the term “community-based” refers to community not only as the setting for interventions, but also as the focus, resource, and agent of change. The community as focus refers to the goal of promoting healthy births by not only changing individual behaviors, but also creating healthy community environments through broad systemic changes in public policy and community-wide institutions and services. The community as resource aims at marshaling a community’s internal resources or assets to strategically focus their attention on a selected set of priority strategies to improve pregnancy outcomes. The community as agent aims at mobilizing the naturally occurring units of solution within a community (families, informal social networks, neighborhood associations, community-based or faith-based organizations, political structures) to promote healthy births. The goal of this community-based approach is to develop the infrastructure and strengthen the capacity within local communities to improve pregnancy and birth outcomes beyond the project period of the Healthy Births Initiative.

Several models have been developed to guide community collaboration to ensure that interventions address issues that are relevant to the communities, and make use of the assets and resources that the communities offer to solve their problems. The LABBC adopted the community-based participatory research (CBPR) model (5), which is guided by the following principles:

- CBPR is participatory;
- CBPR is cooperative, engaging community members and evaluators in a joint process in which both contribute equally;
- CBPR is a co-learning process for researchers and community members;
- CBPR is a method for systems development and local community capacity building;
- CBPR is an empowering process through which participants can increase control over their lives by nurturing community strengths and problem-solving abilities; and
- CBPR is a way to balance research and action.

CBPR guided the conduct of our community assessment, creation of the HBLCs, and development of the strategies and evaluation framework.
IV. COMMUNITY ASSESSMENT

The first step toward improving pregnancy and birth outcomes in Los Angeles County is to gain an understanding of the community through review of data, evidence-based “best” practices, and information from service providers, clients and community leaders, and stakeholders throughout the County. A community assessment of maternal and child issues empowers those who live and work in the community to more clearly identify disparities in birth outcomes, as well as the assets and deficits in the community that may directly or indirectly contribute to poor birth outcomes. Ultimately, a community assessment should be used not only for service planning, but more importantly, for community building.

This section presents the Community Assessment for Los Angeles County as a whole. Included here are selected demographic characteristics, perinatal health indicators, service capacity, and a summary of community needs and resources that were identified through the Healthy Births Learning Collaborative (HBLCs) meetings. Other assessments are summarized and included when available. The Section concludes with comments regarding priorities and strategies, which guided the development of this Blueprint for Improving Pregnancy and Birth Outcomes in Los Angeles County.

The methods used to compile this assessment were described in Section II. Briefly, information from three sets of activities informed this Assessment. These were: 1) a review of existing community assessments; 2) input from the LABBC Advisory Board; and 3) Community participation during the Smoking and Pregnancy Summit, Healthy Births Learning Collaboratives, and stakeholder interviews.

This Community Assessment for Los Angeles County and each of the SPA Community Assessments were designed to be both “community-driven” and “expert-driven”; thus, the “community voices” are included alongside perinatal health statistics and service capacity assessments. While this section presents an overview of gaps between resources and needs at this point in time, a community assessment is best viewed as a continuous process. Therefore, this Community Assessment should be viewed as a work in progress that will be continually updated as community needs and resources change and as additional focused assessments are completed.
Los Angeles County

Figure 5. Los Angeles County Service Planning Areas.

*Data Sources for this report.
The results of this outcome report for Los Angeles County births are based on birth certificate data collected from January 1, 2000 through December 31, 2000. In cases where data is not available for 2000, indicators will be presented from earlier years. Data derived from birth certificates, were compiled and analyzed by the Research, Evaluation and Planning Unit of the Department of Maternal, Child, and Adolescent Health Programs, Los Angeles County Department of Health Services. National estimates were obtained from the internet site for Healthy People 2010, as well as the “Annual Summary of Vital Statistics-2001”. California State data were collected at the website and/or were supplied by the Research, Evaluation and Planning Unit of the Department of Maternal, Child, and Adolescent Health Programs, Los Angeles County Department of Health Services. Data were also supplied by the data manager of the Los Angeles Children’s Planning Council. Where available, data are presented for the overall county as well as by Service Planning Areas (SPA).
Los Angeles County

Demographics

Los Angeles County covers approximately 4,081 square miles, includes 88 incorporated cities and a number of unincorporated areas. LA County is a collection of very distinct geographic communities, each with their own unique characteristics and resources. The County has established eight geographic service planning areas (SPAs) and the American Indian Council for the purposes of planning, coordination of services, and promotion of community involvement in decisions impacting the health and well-being of local residents.

According to 2000 Census data, the total population in LA County is estimated to be 9,519,338, up 7.4% from 8,863,164 in 1990. The SPAs of Los Angeles County differ in size, the number of residents, and population density. Five of the SPAs (2, 3, 4, 7, and 8) have over one million residents. Among the SPAs the largest growth in population between 1990 and 2000 occurred in the Antelope Valley (SPA 1), but only about 3% of the County’s total population live in this region. In contrast, the San Fernando Valley (SPA 2) and San Gabriel Valley (SPA 3) are the most heavily populated SPAs, accounting for nearly 40% of the County’s total population. SPA 6 (South) is the most densely populated SPA with 11,587 persons per square mile and a total population of 955,054.

One of Los Angeles County’s greatest assets is it’s diversity. On any given day one could hear over 100 languages or dialects being spoken within the business districts, neighborhoods or homes of Los Angeles County. Over 54% of the population speak more than one language, with 67% of bilingual residents speaking Spanish and English. Approximately 30% of residents speak languages other than English either primarily or exclusively. Latinos are the largest ethnic group in the County, representing 45% of the total population. Whites (31%), Asians and Pacific Islanders (12%), African Americans (10%), American Indians (0.3%), and Others (2.5%) make up the remaining populace. Children and youth under 18 years of age represent 28% of the population or 2,667,976 people, and among them, about 28% are under the age of 5. Overall, about 30% of the population lack a high school diploma and about 64% of the population are born in the U.S.

The median household income for families with children in LA County is $40,768, and ranges from less than $15,000 in areas of SPA 4 (Metro) to over $170,000 in parts of SPA 5 (West).

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10 Each SPA has an Area Health Office that is responsible for planning public health and clinical services according to the health needs of local communities. The American Indian Council (AIC) oversees the needs and service coordination of American Indian and Alaskan Native community members across LA County. In addition, each SPA and the AIC have community-based councils for promoting community engagement and input into County processes.
11 Children's Planning Council, 2004 Children's ScoreCard-Los Angeles County, from www.childrensplanningcouncil.org
Over 1.6 million residents (18%) live below the federal poverty level\(^{12}\), and the average unemployment rate is 8.2\% and ranges from 6.1\% in SPA 5 with the highest rate in SPA 6 (South) of 14.1\%.\(^{3}\) Across LA County, an estimated 41\% of the female population between the ages of 15 and 44 years live on incomes below 200\% of the federal poverty level. The proportion of low income women (200\% of poverty) varies across the SPAs and ranges from 33\% in SPAs 2 and 5 to 67\% in SPA 6. Tables with demographic and selected health data are provided in Appendix C.

Five outcome areas of child well-being are monitored by LA County: good health, social and emotional well-being, safety and survival, economic well-being and education and workforce readiness.\(^{13}\) Between 1998 and 2002 most measures demonstrated changes in beneficial directions. Measures of "Safety and Survival" improved in LA County with the percent of families reporting having a "safe place for children to play" increasing by 9\%; the rate of violent crime declining by 8\%; domestic violence related calls declining by 9\%; misdemeanor and felony arrests among youth age 10 to 17 declining by 27\% and 34\% respectively; and homicides declining by 17\%.\(^{8}\) Measures of "Economic Well-Being" improved, with declines in the proportion of poor (100\% of the federal poverty level) and low income (under 200\% of the federal poverty level) families with children; and increased proportions of Earned Income Tax Credits filed. The percent of mothers and fathers achieving at least 12 years of education by age 21 increased by 4\% and 3\% respectively, and high school graduation rates increased by 7\%. Among measures of "Good Health" a 16\% increase occurred in the percent of two-year olds who are fully immunized.\(^{8}\) While these measures are all encouraging, great disparities continue to exist across regions of LA County and among different ethnic groups.

Perinatal Health Indicators\(^{14, 15, 16}\)

There were 151,167 live births in LA County in 2002, accounting for 28.6\% of total live births in California and 3.8\% of total live births in the United States. Approximately one of every 25 babies born annually in the U.S. is born in LA County. Overall, 51.5\% of LA County births are paid for by public insurance (MediCal).

LA County on average performs better than national averages, but slightly worse than California averages on most perinatal health indicators. Over 87\% of LA County mothers begin prenatal care in the first trimester compared with 84.8\% California mothers and 83.7\% of U. S. mothers

\(^{12}\) Federal Poverty Threshold, in 2002 for a family of four living below 100\% of the poverty level had an annual income of less than \$18,244; Data source: United Way of Greater Los Angeles 2003.
\(^{13}\) For the full report on these measures please see the Children's Planning Council, 2004 Children's ScoreCard-Los Angeles County at www.childrensplanningcouncil.org.
\(^{14}\) Los Angeles County Department of Health Services Maternal, Child, and Adolescent Health Programs, Selected Perinatal Health Indicators, Countywide and by Service Planning Area, 2000
overall. This represents a 1.1% increase in the proportion of LA County mothers receiving first trimester prenatal care between 2000 and 2002. Definitions of the perinatal indicators discussed are listed in Table 1.

Table 1: Definitions of selected perinatal health indicators

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth Rate</td>
<td>Number of live births per 1,000 total population</td>
</tr>
<tr>
<td>Infant Mortality Rate</td>
<td>Number of infant deaths occurring at less than 365 days of age per 1,000 live births</td>
</tr>
<tr>
<td>Neonatal Mortality Rate</td>
<td>Number of infant deaths occurring at less than 28 days of age per 1,000 live births</td>
</tr>
<tr>
<td>Post-Neonatal Mortality Rate</td>
<td>Number of infant deaths occurring between 28 and 364 days of age per 1,000 live births</td>
</tr>
<tr>
<td>Fetal Mortality Rate</td>
<td>Number of fetal deaths of 20 weeks or more gestation per 1,000 live births</td>
</tr>
<tr>
<td>Low Birth Weight (LBW)</td>
<td>Live births weighing less than 2,500 grams</td>
</tr>
<tr>
<td>Very Low Birth Weight (VLBW)</td>
<td>Live births weighing less than 1,500 grams</td>
</tr>
<tr>
<td>Prenatal Care Onset In The First Trimester</td>
<td>Live born infants whose mothers received prenatal care in the first trimester of pregnancy</td>
</tr>
<tr>
<td>Fertility Rate</td>
<td>Number of live births to mothers aged 15-19 at delivery per 1,000 females 15-19 years of age</td>
</tr>
</tbody>
</table>

If this rate of increase is sustained, Los Angeles County could achieve the Healthy People 2010 Goal of 90% of women receiving first trimester care by the year 2010. Similarly, the birth rate among teens age 15 to 19 in LA County declined 21% from 50.8 to 39.9 births per 1,000 adolescent females age 15 to 19 years between 2000 to 2002. Decreases are noted among the youngest teens with births to teens under age 15 declining by 65% from 1.7 to 0.6, and births to teens age 15 to 17 declining by 46% from 46.7 to 25.1.17

Rates of low birthweight, very low birthweight, preterm birth, and infant mortality, are generally lower in LA County than national rates and similar to or slightly worst than California measures (Table 2). In 2002, 10,222 infants (6.8%) were born low birthweight, weighing 5½ pounds or less (under 2500 grams), compared to 6.4% of California births overall, and 7.8% of all U.S. births. The proportion of LA County births that are very low birthweight (1.3%), with weight of 3 lbs 4 oz or less (1500 grams) is slightly higher than the California rate (1.2%) and lower than

17 Rates calculated as number of live births to teens age 10 to 14 per 1,000 females age 10 to 14, and live births to teens age 15 to 17 per 1,000 females age 15 to 17 respectively. LAC-Department of Health Services, Maternal, Child & Adolescent Health Programs Research and Evaluation Unit prepared from California Department of Health Services, Center for Health Statistics, Vital Statistics, 1993-2002.
the U.S. rate (1.4%). Preterm birth (prior to 37 weeks gestation) occurred among 10.2% of births in LA County and California, compared with 12.1% of births throughout the U.S. In 2002, 825 infants born in LA County died before their first birthday yielding an infant mortality rate of 5.5 infant deaths per 1000 live births. This rate is slightly higher than the overall California rate, but considerably lower than the U.S. rate (Table 1).

Table 2. Selected Perinatal Indicators for LA County, California, and the U.S.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>LA County</th>
<th>California</th>
<th>U.S.</th>
<th>Healthy People 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infant Mortality (1)</td>
<td>5.5</td>
<td>5.4</td>
<td>7.0</td>
<td>4.5</td>
</tr>
<tr>
<td>Low Birthweight (b)</td>
<td>6.8%</td>
<td>6.4%</td>
<td>7.8%</td>
<td>5%</td>
</tr>
<tr>
<td>Very Low Birthweight (c)</td>
<td>1.3%</td>
<td>1.2%</td>
<td>1.4%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Preterm birth (d)</td>
<td>10.2%</td>
<td>10.2%</td>
<td>12.1%</td>
<td>7.6%</td>
</tr>
<tr>
<td>First Trimester Onset of Prenatal Care (e)</td>
<td>87.6%</td>
<td>86.4%</td>
<td>83.7%</td>
<td>90%</td>
</tr>
<tr>
<td>Teen Births age 10 to 14 years (f)</td>
<td>0.6</td>
<td>0.6</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Teen Births age 15 to 17 years (g)</td>
<td>25.1</td>
<td>22.4</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

Definitions:
- a. Infant mortality-number of infant deaths per 1,000 live births
- b. Low Birthweight-birthweight under 2500 grams
- c. Very low birthweight-birthweight under 1500 grams
- d. Preterm birth-birth prior to 37 weeks gestation
- e. First trimester onset prenatal care- first prenatal visit occurring before 14 weeks gestation
- f. Teen birth 10-14 years – live births to teens age 10 to14 per 1,000 teens girls age 10 to 14 years.
- g. Teen birth 15-17 years – live births to teens age 15 to17 per 1,000 teens girls age 15 to 17 years.

Between 2000 and 2002, low birthweight in LA County increased by 6.8% and infant mortality increased 11%.

Despite the favorable comparisons to national rates, such comparisons mask the concerning changes that have occurred in LA County over the past few years, and the considerable disparity that exists between regions and populations within LA County.

**Regional disparities.** Overall, SPAs 2 and 3 have better birth outcomes and SPAs 1 and 6 have worse birth outcomes compared with County averages. SPAs 2 and 5 have the highest percent of women receiving first trimester prenatal care and actually exceed the Healthy People 2010 goal of 90% with first trimester prenatal care (Table 3). Conversely, SPA 6 has the lowest proportion of women with first trimester prenatal care 82.3% followed by SPA 1 (84.1%) and SPA 7 (86.7%). SPAs 2 and 5 have the lowest teen birth rate among teens age 15 to 19 years old, and SPA 6 has the highest. The teen birth rate in SPA 6 is 82% higher than the LA County rate. Teen births among the youngest teens are also more prevalent in SPA 6. About one in four (24.2%) teen (age 10-17) births in Los Angeles County occurred in SPA 6, South in 2002. The proportion of LBW births in SPAs 1, 6, and 8 is higher than the LA County average (Figure 1).
Between 1999 and 2002 the infant mortality rate in LA County remained relatively stable at 5.4 infant deaths per 1000 live births in 1999 and 5.5 infant deaths per 1000 live births in 2002. Conversely, during this time period in SPA 1 (Antelope Valley) infant mortality increased steadily from year to year resulting in a doubling in the infant mortality rate from 5.0 in 1999 to 10.6 in 2002. Infant mortality rates in each of the other SPAs remained essentially unchanged or
declined slightly during this time period. Corresponding increases in low birthweight and preterm birth were noted in Antelope Valley during this same time period. Low birthweight and preterm birth increased by nearly 4% in Antelope Valley, between 1999 and 2002. Low birthweight occurred among 7.8% of births in 1999 and 8.1% in 2002. Similarly, preterm birth occurred among 12.8% of births in 1999 and 13.3% in 2002.

Importantly, within each SPA there are “pockets of need” with low birthweight exceeding 10% or infant mortality rates exceeding 10 infant deaths per 1,000 live births. These data support a community-based strategy that can capitalize on the strengths of the community as well as create solutions for the specific needs of the residents in the local area.

**Ethnic Disparities.** Ethnic disparities also exist among all of the perinatal health indicators in the County. Whites women are more likely to receive prenatal care in the first trimester compared with other ethnic groups.Nearly 93% of white women receive first trimester prenatal care compared with nearly 90% of Asian/Pacific Islander, 86% of American Indian and Hispanic, and 83% of African American women. Over 12% of all African American births weigh less than 2,500 grams. Asian/Pacific Islander mothers have the next highest percentages of low birth weight births (7.2%), followed by American Indian (7.7%), white (6.6%) and Hispanic (6.0%). Similar to national rates, in Los Angeles County African American infants are about twice as likely to be born low birthweight compared to White infants. African Americans also have the highest rates of preterm birth with 14.3% of African American births born under 37 weeks gestation, followed by American Indian (12.3%), Hispanic (10.2%), Asian/Pacific Islanders (9.4%), and white (9.0%). Overall, rates of preterm birth have decreased in each ethnic group between 1996 and 2002. Preterm birth decreased by 7.1% among African Americans, and approximately 2% among each of the other groups. However, African Americans continue to have a disproportionately high rate of preterm birth compared with other groups. Compared with white mothers, the risk of preterm birth is nearly 60% higher among African Americans, 37% higher among American Indians, 13% higher among Hispanics, and 4% higher among Asian/Pacific Islanders. Preterm birth is a problem that significantly impacts all ethnic groups in LA County. While the rates of preterm birth are disproportionately high among African American and American Indian groups, 62.5% of preterm births in LA County are born to Hispanic families, 16% to Caucasian families, 11% African American, 9.7% among Asian/Pacific Islander families and under 1% to American Indian families. Perinatal data can be reviewed in Appendix D.

Hispanic teens have disproportionately high rates of pregnancy. While 53% of adolescent females are Latina, 80.8% of LA County births to teens age 15 to 19 occur among Latinas, and 85% of the repeat births to teens age 15 to 19 years. Similarly, high rates of teen birth occur among the youngest teens with young adolescent Latinas (age 10 to 17 years) having the highest birthrate at 12.8 live births per 1,000 adolescent females age 10 to 17, compared with rates of 8.8 among African American, 6.4 among American Indian, 1.8 among non-Hispanic, white, and 1.5 among Asian/Pacific Islander adolescent females age 10 to 17 years.

In addition to having highest rates of preterm birth and low birthweight, African Americans have the highest infant mortality rates (13.1 per 1,000 live births), while Asians and Pacific Islanders have the lowest (4.0 per 1,000 live births). The LA County African American infant mortality rate is 2.5 times higher among African American infants compared with white infants. Of note,
change in the African American infant mortality rate varied across the regions of LA County. Between 1996 and 2002, infant mortality among African Americans declined between 13% and 34% in SPAs 4, 6, 7, and 8, and increased 3.5% in SPA 2 and 31% in SPA 3 (Figure 2). During the same timeframe, the African American infant mortality rate increased 116% in SPA 1.

![Figure 2. Infant Mortality per 1,000 Live Births by Antelope Valley (SPA 1) 1996-2002](image)

**Service Capacity**

There are 68 hospitals providing maternity and newborn care to the region. There are 34 hospitals with neonatal intensive care units designated by the California Children’s Services. Additionally, there are 134 County health centers and/or referral centers available to pregnant women and their families to provide prenatal care and/or to address medical complications of pregnancy. There are 510 Comprehensive Perinatal Services Program (CPSP) providers, 78 Women, Infant, and Children (WIC) sites, and 34 Sweet Success affiliates in Los Angeles County.

**Community Needs and Resources**

Several common themes emerged from the Healthy Birth Learning Collaborative meetings regarding community needs and resources in Los Angeles County.

1. **Prenatal Care Access and Quality** – Participants from all the SPAs identified access and quality of prenatal care as key priority issues in the community. Barriers to care included lack of transportation, financial difficulties, lack of service coordination, limited
knowledge about resources/services, little family support, lack of provider screening and counseling, and lack of continuity in care. Possible strategies to overcome barriers were increased networking and partnerships among providers, increased partnerships between service providers and community organizations, increased funding for outreach and education, and more family support.

2. **Cultural Competency** – Related to prenatal care access and quality, participants from all eight SPAs identified cultural competency as a major issue to be addressed. Strategies to improve cultural competency in prenatal care included availability of interpretation and translation services, cultural and linguistic competency and sensitivity among both service providers and staff, increased funding to support cultural and linguistic services and programs, and multiple language educational materials. Lack of culturally competent providers was described as one barrier to receiving prenatal care by HBLC participants.

3. **Nutrition** – Participants from most SPAs (six out of eight) advocated for enhanced nutrition education for pregnant women and their families. Recommendations to promote healthy nutrition included better service coordination between WIC and other groups (providers, schools), “healthy eating” images in the media, breastfeeding support (prenatal or parenting classes, Baby Friendly™ Hospitals, family involvement), and increased access to healthy foods at work and in the community.

4. **Stress and Mental Health** – Participants from most SPAs (five out of eight) agreed that stress and mental health were priority issues in the community. Sources of stress included domestic violence, lack of social support, social isolation, economic needs, discrimination (race, age), insensitive medical and social health providers, and lack of mental health/substance abuse providers for pregnant women in the community. Participants recommended increased counseling and support services, increased education about tobacco, alcohol, and substance use during pregnancy, better screening of pregnant women for domestic violence, depression, and substance abuse, increased family support, and increased efforts to combat race and age discrimination.

**Nutrition focus group**
The “Focus group” identified five priorities for improvement: 1) during prenatal care-initial screening for nutritional intake and cultural dietary practices, using IOM guidelines carefully monitor maternal weight gain and refer for dietary counseling as needed; 2) standardize vitamin supplementation beginning before pregnancy; 3) increase cultural competence of medical and health professional; 4) identify and use culturally and linguistically appropriate nutritional education materials; 5) provide appropriate referrals to dieticians for pregnant women needing nutritional interventions.

**Other Assessments**
Several countywide needs assessments and asset maps containing perinatal health statistics have been collected. Several countywide needs assessments and resources related to perinatal health are highlighted below:
Breastfeeding Programs and Support Systems in Los Angeles County: A Needs Assessment - The UCLA Center for Healthier Children, Family and Communities, in collaboration with a number of community and public health partners, conducted a needs assessment of breastfeeding programs and support systems in LA County in 2002. Representatives from 19 organizations in the strategic communication sector, 18 in the health care system sector, and 48 in the community resources sector were interviewed. Findings indicate that there is no broad, integrated community-based leadership in the County to take ownership of breastfeeding, which contributed to gaps in support and services, including a lack of positive breastfeeding images in film and television; lack of breastfeeding standards of care; failure of hospitals to comply with law to provide lactation support to patients; limited breastfeeding/lactation management education for physicians, nurses, and other health care professionals, limits in insurance coverage for lactation consultation services; few breast pump rental providers; and lack of breastfeeding educational programs for school age children. Possible strategies to expand lactation resources in LA County include:

- Provide technical support to hospitals to become Baby Friendly™ Hospitals
- Expand the roles of physicians, pediatricians, nurse practitioners, nurses, and nutritionists to support breastfeeding by developing minimum competencies
- Support the expansion of the WIC breast pump loan program
- Outreach to home visitation programs to integrate breastfeeding support and referrals
- Develop programs to expand breastfeeding support programs that serve pregnant and lactating teenagers
- Educate non-traditional lay health providers to administer peer breastfeeding and lactation support to the women they serve

Los Angeles County Department of Health Services - On June 30, 2003, the County’s Perinatal Outreach and Education (POE) Program was defunded. This program provided services to low income and uninsured pregnant women and women of childbearing age including outreach, health education, and case management services. Given funding shortages in the County’s health care system, it is unlikely that the services previously provided by this program will be attainable in some other venue. It is likely that the numbers of women receiving these services will no longer be served. According to a 2002 Evaluation Report of the POE Program, “for FY 01-02, a total of 4,694 clients were outreached, 578 health education classes were held, and 5,148 clients attended POE health education classes including 150 breastfeeding related courses”. Thirty-nine percent of clients were pregnant. Of the clients served 71% were of Hispanic/Latino descent, 15% were African American, and 9% were Asian). The program was increasingly successful in referral/enrollment of uninsured clients to a health insurance program, referral/receipt of health-related services, and provision of breastfeeding classes. Barriers to services included poverty, provider and staff cultural competency, lack of resources, and lack of interagency support. Given the number of women served, it is clear that there exists a gap in services with the most vulnerable populations at risk. Resources need to be redirected to this population to ensure appropriate care and desired pregnancy and birth outcomes.
University of California, San Francisco (UCSF), Institute for Health Policy Studies – UCSF conducted a study to evaluate trends in the use of illicit drugs and/or alcohol use among pregnant women in California and at local levels. Data included Patient Discharge Data (collected by the California Office of Statewide Health Planning and Development (OSHPD)) and the Birth Cohort File (collected by the LA County Department of Health Services) which were linked. The sample included 5,907,270 births in California from 1991-1998. While rates by County were not provided, rates for the fourteen Health Service Areas were provided. The Los Angeles Service Area has among the lowest rates in the State (8.5/1,000 or 0.85%) compared to an overall State rate of 11.9/1,000 or 1.19%). This rate is for only a part of LA County. It is important to note that the rates in this report were much smaller than previous estimates of illicit drug or alcohol use prior to admission (11.35%).

Metamorphosis Project - Communication processes are important for pregnant women when building social support networks. Community neighborhoods may provide a source of social support for women during pregnancy and may improve their health by alleviating many stresses women feel during pregnancy. While the project did not specifically address pregnancy-related issues, the aims of the Metamorphosis Project were to understand those processes that undermine or foster community belonging. Several key conclusions around promoting effective community belonging were identified in this report including but not limited to:

- Encourage neighborhood storytelling and interaction with residents
- Obtain support from those media storytellers that residents truly connect with and do not forget about ethnic and community media
- Encourage urban policy makers to utilize an area’s distinctive storytelling network, in efforts to create safe environments, especially schools.

Healthy Children, Healthy City Collaborative (http://www.healthychildrenhealthycity.org/) – The Healthy Children, Healthy City Collaborative has created a comprehensive web-based database of human services programs in LA County. Although the database does not exclusively list services for pregnant women, it includes a general listing of County organizations and programs including mental health facilities (130), outpatient mental health care (816), psychiatric support services (242), counseling settings (425), substance abuse services (519), human reproduction (258), and food (693). (The number in parentheses is the number of organizations listed in the directory). The address, directions, telephone number, program description, fees, hours of operation, and languages spoken are included for each organization listed.

Los Angeles County Department of Health Services (http://lapublichealth.org/mch/cpsp/CPSP%20Direct/CPSP_Index_Inforline.htm) - INFO LINE has prepared a healthcare resources directory for the Los Angeles County Department of Health Services which includes prenatal services information, telephone numbers, and hotlines. When accessing the community resource directory, a variety of topics are listed, including family planning, domestic violence, mental health, and nutrition/food. Organizations are listed by SPA.
First 5 LA Connect (1-888-347-7855)
The First 5 LA (formerly the Los Angeles County Children and Families First-Proposition 10 Commission) has funded a telephone and web-based help-line, which is designed to function as a multilingual information, referral, and parent support and assistance service to both expectant parents and parents of children up to age five in Los Angeles County. The telephone service became operational in January 2003. This service provides telephone contact twelve hours/day, seven days/week. Referrals can be made for health insurance; mental health counseling; pregnancy, nutrition, and parenting education; housing; immigration issues; immunizations; and child development, among others. In addition, professional nurses and social workers offer pregnant women who call the help-line support and assistance. If the caller is Spanish speaking, assistance is available at call-in. For other non-English speaking callers, First 5 LA Connect has access to the “Language Line” services, enabling a translator to participate in the call.

Rainbow Resource Directory - The Los Angeles County 2003 Social Service Rainbow Resource Directory lists free and low cost social service agencies in Los Angeles County. Sixty-two categories of resources on a variety of social service topics are included. Organizations are listed according to area and geographic location. For every listing, the following information is provided: population served, languages spoken, location, services offered, hours of operation, type of funding, fees, and methods of payment. There is an entire chapter devoted to prenatal and other services. In this chapter, 133 organizations are included that provide pregnancy, childbirth and family planning services. Free services are provided by nearly 20% of the organizations. This directory gives an indication of the linguistic capacities of an organization, with 45% of the organizations offering services in Spanish but only 2% offering services in other languages.

L.A. Care – The L.A. Care Community Health Education Services Directory (2000) is a directory for providers who need to refer LA Care members to services. The directory includes 52 perinatal health organizations. Among these organizations, services are offered in nine different languages.

Health Net – The Health Net Prenatal Resource Directory is included in a large packet of pregnancy related materials given to pregnant clients at HealthNet, one of the two Medi-Cal managed care entities in Los Angeles County. Referrals by county are provided including such topics as domestic violence, emergency food, and pregnancy outreach programs. A separate directory of health education information and referrals is also included in the packet.

Comments

Based on the LABBC’s community assessment activities, the following conclusions can be drawn:
1. While Los Angeles County performs better than the national average for most perinatal health indicators, possibly because of our population demographics, many communities within the County fare significantly worse.

2. Prenatal Care Access and Quality was uniformly identified as key priority issues. Over 95% of women in Los Angeles County access prenatal care at some point during pregnancy; the vast majority (86%) do so in the first trimester. Prenatal care is still the most widely-used, population-wide intervention for improving pregnancy and birth outcomes, and the best way to reach the greatest number of pregnant women.

   • Access can be improved through outreach and case management. However, several local model programs that have demonstrated remarkable success in improving prenatal care access and utilization (i.e., the Nurse Family Partnership program, Perinatal Outreach and Education [POE]) have recently lost funding.

   • Also, at each HBLC meeting concerns were raised around the quality and content of care that women receive. Quality of prenatal care can be improved by implementing nationally recommended clinical practice guidelines through quality improvement strategies. Several priority areas were identified by the communities for clinical quality improvement: cultural competency, nutrition (including breastfeeding), and mental health (including stress, depression, and intimate partner violence, smoking, and substance use), and best practice clinical standards have been established in each of these areas.

3. Nutrition during pregnancy can be improved with a multi-level approach involving health education for pregnant women, partners, and families; increased screening and referral through prenatal care; improved service coordination between prenatal care providers and WIC programs; and community interventions and media advocacy to improve access to healthy foods. Such a multi-level approach was recommended in Breastfeeding Programs and Support Systems in Los Angeles County: A Needs Assessment for promoting breastfeeding in Los Angeles. A similar approach is recommended to improve prenatal nutrition.

4. Services that address stress and mental health by providing psychosocial support can be addressed through the LABBC’s multi-level strategies. These include counseling and skill training (positive coping, increased self-esteem, and self-efficacy, effective communication techniques, conflict resolution) at the individual level, partner and family support at the interpersonal level, initiatives to build social capital (see Metamorphosis Project), and efforts to combat racism/racial discrimination at the community and policy/advocacy levels. Screening and referral for maternal stress and depression, intimate partner violence, and smoking, alcohol, and substance use can be improved using prenatal care quality improvement and can be integrated with efforts to enhance the community’s capacity to provide support services (mental health services, support for victims of intimate partner violence, smoking cessation, and substance abuse treatment programs).
5. The LABBC's community assessment, both by SPAs and countywide, guided the development of the Blueprint for Improving Pregnancy and Birth Outcomes in Los Angeles County. The blueprint contains six Guiding Principles and eight Core Approaches. They are the following:

   a. Guiding Principles
      1. Comprehensive and integrated
      2. Multi-level
      3. Collaborative
      4. Community-Driven
      5. Evidence-Based
      6. Culturally Competent

   b. Core Approaches
      a. Policy and Advocacy
      b. Community Building
      c. Health Education and Messaging
      d. Social Support
      e. Prenatal Care Quality Improvement
      f. Interconception Care
      g. Outreach
      h. Case Management

Details for each of the approaches are provided in the Recommendations section.
During the 20th century improvements in pregnancy outcomes and reductions in maternal and infant mortality are attributed to improved health care, standard of living, nutrition, sanitation and availability of effective contraceptives (6,7). Experts agree that the next step to take to improve the health and well-being of pregnant women, newborns, infants and children is to reduce the number of infants born preterm and low birth weight infants. The purpose of this review is to highlight knowledge about modifiable risk factors, and promising interventions to reduce the occurrence of preterm birth, low birthweight, birth defects and infant mortality.

This review is organized to provide (1) a brief review of protective and risk factors in pregnancy, and (2) to identify evidence-based interventions and best practices for improving birth outcomes. The review is also organized to follow the First 5 LA’s “Circles of Influence Framework” and show the influences on birth outcomes that occur at each level of society: individual, interpersonal/family, neighborhood/community, agencies and organizations and society. Finally, the review extends the “Circles of Influence Framework” to add the dimension of time. Time is an important component to consider in the efforts to improve pregnancy outcomes, because how a risk factor or adverse exposure may influence a pregnancy outcome often depends on when before or during the pregnancy the exposure occurs. Following the review of the literature, Section VI presents the recommended strategies for improving pregnancy outcomes. These strategies were developed by integrating information from Los Angeles County data and the Community Assessment presented in Section III with the scientific literature presented here.

**Protective and Risk Factors**

The literature addressing pregnancy outcomes is vast. Well over 50 risk factors for low birthweight and preterm birth are commonly studied. Study of protective factors is not as frequent but is being increasingly undertaken. The factors that were reviewed those that are amenable to interventions, related to reducing infant mortality, birth defects, and low birth weight (LBW).

**1. Individual-Level Factors**

The individual level factors reviewed have been categorized as biological, psychological, behavioral, and socio-demographic factors.
Biological Factors

Infants may be born with low birthweight because they are born before they are fully developed (preterm delivery) or because they did not grow or develop normally during pregnancy (intrauterine growth restriction). Infants may be born preterm when labor begins before term (preterm labor), when the bag of water (fetal membranes) breaks before term and preterm labor follows, or because of obstetrical intervention for maternal or fetal illness which could be resolved with delivery. There are several biological factors implicated in the pathogenesis of low birthweight (LBW) and its two constituents: preterm birth (PTB) and intrauterine growth restriction (IUGR). These include genetics, neuroendocrine (as a result of behavioral factors), immune-inflammatory, vascular and structural.

Genetics

While some birth defects (i.e., Down syndrome, achondroplasia) have been clearly linked to chromosomal or genetic abnormalities, the genetic basis of LBW has only recently begun to be explained. Recent research shows that: 1) two variants of metabolic genes (CYP1A1 MspI and GSTT1 deletion genotypes) found in the mother have been associated with LBW and shortened gestation in the infant (8-10), and 2) a variation of the gene for tumor necrosis factor-alpha (TNF-α), TNFA*2 has been linked to preterm premature rupture of membranes among African American women (11). In other studies, mutations in genes such as Factor V Leiden mutation, prothrombin gene (G20210A) mutation, and methylenetetrahydrofolate reductase (MTHFR) gene mutations have been implicated in IUGR (12,13). Many other chromosomal and genetic abnormalities are associated with abnormal intrauterine growth, LBW and excess morbidity and mortality in infants and children.

Although conventional wisdom has held that genetic inheritance is immutable, one of the great scientific breakthroughs in the past decade has been the increased understanding of gene-environment interactions, or how gene expression may be influenced by non-genetic (epigenetic) factors such as environmental exposures including life experiences. For example, it has been found that the aforementioned variant genotypes, (CYP1A1 MspI and GSTT1 deletions) are associated with LBW and shortened gestation only in pregnant women who smoked cigarettes (10). Among non-smokers, genetic susceptibility alone did not confer a higher risk for LBW or prematurity. This study joins a growing body of evidence that supports the importance of prenatal environment in regulating maternal-fetal gene expressions.

Brain and hormone influence (neuroendocrine)

Increasingly neuroendocrine mechanisms are being implicated in the pathogenesis of preterm labor and IUGR. Maternal stresses appear to play roles in fetal, placental, and/or maternal neuroendocrine pathways to LBW and preterm birth (14). Stress activates the maternal hypothalamic-pituitary-adrenal (HPA) axis and is associated with increased placental corticotropin releasing hormone (CRH) gene expression. Placental CRH, in turn, stimulates secretion of a hormone from fetal adrenal called DHEA-S with subsequent placental release of estriol and prostaglandins, thereby mediating preterm labor (15). While many authors have examined stress close to the time of birth, Hobel, Dunkel-Schetter and others found maternal
plasma levels of CRH to be significantly elevated early in pregnancy in women who subsequently delivered preterm, compared with those who delivered at term (16). As with genetic susceptibility, whether or not these neuroendocrine pathways to preterm labor become activated may well depend on the presence of environmental triggers – in this case biological (infectious or nutritional deficits) or psychosocial stress as well as maternal susceptibility. Given the central role that the neuroendocrine system plays in activating labor, reducing maternal stress is an important strategy for primary prevention of preterm delivery.

**Infection and immune-inflammatory**

The role that infections play in preterm birth (particularly very early preterm birth) has been clearly established, and the interactions that occur with maternal and fetal immunity is increasingly understood (17). Microbes can cause LBW and preterm birth directly or through activation of maternal and fetal immune processes. Infection causes white blood cells (T-helper lymphocytes, TH1) to specialize and release proteins called cytokines (i.e., gamma-interferon, tumor necrosis factor and interleukins) that increase the immune response and serve as crucial mediators of the body’s immune-inflammatory responses. Considerable information from human studies and animal models is available regarding the mechanisms through which immune functioning mediates LBW and PTB. As part of the body’s response to infection, a cascade of maternal and fetal enzymes (metalloproteases) that may precipitate preterm labor and preterm premature rupture of membranes (PPROM) can be released (18). Infections such as bacterial vaginosis (BV) (19-22), asymptomatic bacteruria (23), sexually transmitted infections (19,24-26) and periodontal infections (27) have all been associated with increased risk for preterm delivery. Current investigations suggest that genetic variation in response to infection (e.g., increased inflammatory response) may place susceptible women at increased risk (28,29).

A mother’s ability to resist infection during pregnancy is dependent upon such factors as stress, nutritional status, and personal habits (e.g., smoking, substance use, douching) as well as genetics. Infection and inflammation during pregnancy may have other adverse consequences for the infant. Pro-inflammatory cytokines implicated in LBW and PTB have also been implicated in the pathogenesis of cerebral palsy in premature infants and maternal depression (30). Common sexually transmitted infections (e.g., gonorrhea and chlamydia) cause potentially serious morbidity in the newborn when passed from mother to infant at the time of birth (31).

Research shows that timely screening and appropriate treatment of infections during prenatal care is an effective strategy for primary prevention of LBW/PTB caused by intrauterine infection and inflammation (32-36). Studies to examine reductions of LBW and PTB among women screened and treated for infection prior to pregnancy are underway in the U.S.

Separate from infection, immunologic interactions between the fetus and the mother may also be abnormal and predispose to miscarriage or LBW and PTB (37).

**Vascular and coagulation**

Maternal and placental vasculature regulates blood flow, oxygen and nutrients through the placenta. Disruption of placental blood flow and the carriage of oxygen and nutrients can lead to preterm birth and/or IUGR (38,39). Reduced placental blood flow through tightening
(vasoconstriction) and blockage (thromboses and infarcts) of the blood vessels as can occur with smoking, or hypertension (including pre-eclampsia), with autoimmune diseases (systemic lupus erythematosus) and with coagulation diseases such as thrombophilia (antiphospholipid syndrome). Each of these can lead to preterm delivery and/or IUGR. Psychosocial (stress), behavioral (substance use) and environmental (air pollution) triggers can also reduce placental blood flow and may lead to preterm delivery or IUGR. Therefore, it is important to screen, treat and monitor these maternal conditions before, during and in between pregnancies to reduce the impact on poor pregnancy and birth outcomes.

**Multiple gestation**

Multiple gestation is directly linked to LBW/PTB. Between 1980 and 1997 in the U.S., the number of twin live births increased by 52% and the number of triplet and higher order births rose over 400% (40). Assisted reproductive technology (ART) can increase the risk of twins and high order multiples (triplets or quadruplets) due in a large part to the numbers of embryos transferred. Restriction of embryo transfer is an effective means to prevent multiple pregnancy in women receiving ART.

**Assisted Reproductive Technology**

ART is independently associated with a doubling of the risk of short gestation in women with only singleton gestation. Preservation of fertility and prevention of primary and secondary infertility are optimal ways to avoid ART related LBW/PTB. The possibility of reducing infertility is now suggested by several well-designed studies from the U.S. and Europe that demonstrate significant reductions in the occurrence of infection in the uterus and fallopian tubes (pelvic inflammatory disease) and ectopic pregnancy from systematic screening and treatment for the sexually transmitted infection, *Chlamydia trachomatis* (41,42). Pelvic inflammatory disease is a leading cause of infertility among women worldwide; reduction in the occurrence of pelvic inflammatory disease should lead to corresponding reductions in infertility among women.

**Short Cervix and Polyhydramnios.** Abnormal cervical functioning has long been associated with increased risk of LBW/PTB. Cerclage (a suture around the mouth of the uterus) can help some of the affected pregnancies reach term or extend gestation, but is not without risk. Fetuses with excess amniotic fluid are at increased risk for PTB.

In sum, a growing body of evidence has implicated genetic, neuroendocrine, infection, immune-inflammatory, vascular and structural mechanisms in the pathogenesis of LBW/PTB. However, it is important to keep in mind that while these biological factors increase the mother’s vulnerability for having a preterm or IUGR infant, current understanding holds that it is likely the interactions between vulnerabilities and certain psychological, behavioral, and environmental triggers that activate these biological pathways to preterm birth and LBW. Without these triggers (e.g., smoking, stress, infections, and air pollution), these biological pathways may never get activated.

**Psychological Factors**

A growing body of evidence suggests that preterm birth and IUGR are associated with women’s psychological well-being. Below is a review of three psychological factors in relation to LBW: stress, pregnancy anxiety, and depression.
Stress

Stress during pregnancy has been most consistently linked to preterm birth (43). Stress is often defined as a state of threatened homeostasis provoked by a psychological, environmental, or physiological stressor (39). Stress may include both physical and psychological demands. Pregnancy itself can be a source of physical and emotional stress for the woman even when it is a planned pregnancy (44). For this report, stress is defined as demands that tax or exceed the resources of the individual.

Psychosocial stress can activate maternal hormonal and genetic pathways initiating the biological cascade leading to preterm delivery (44-46). Stress can also alter immune function, possibly leading to increased susceptibility to intraamniotic infection or inflammation (47). Additionally, stress may induce high-risk behaviors such as smoking and substance use as a means of coping with stress. Therefore, maternal stress may lead to preterm delivery via neuroendocrine, immune-inflammatory and behavioral pathways.

Recent well-controlled prospective studies with relatively large sample sizes (>1,000 women) have generally found a 1.5 to 2-fold increase in the risk of preterm delivery associated with maternal psychosocial stress (48,49). However, an association between stress and preterm birth has not been consistently demonstrated, as one review reported that a significant relationship between stress and preterm birth or LBW is found in only about 60% of the studies (50,51). A problem with extant studies may be the way stress is defined and measured. In most studies, stress is measured as acute psychological stressors that occurred during pregnancy (e.g., Stressful Life Events). Even measures of so-called “chronic stress” (e.g., Perceived Stress Scale) assess the degree to which the pregnant woman appraises her situations as stressful within the past month. These measures might not fully capture the chronic social stressors (e.g., single parenthood, economic needs, neighborhood violence, domestic violence and racial discrimination) that are pervasive in the everyday lives of many women (52). Recent ethnographic research is beginning to expand the understanding of psychosocial stress and its impact on pregnancy outcomes (53).

Beyond poor birth outcomes, maternal stress may have life-long implications for the emotional and physical well-being of the developing fetus. Associations between maternal stress and a higher level of stress reactivity in the child that persists into adulthood are being examined (54-57). Early life exposures to stress hormones during critical periods of immune maturation may also alter immune function, leading to increased susceptibility to infectious or inflammatory diseases over the life course (58). Thus, the effects of stress in utero may have life long implications for the fetus, including maladaptive stress and immune responses that last into adulthood. Hypothetically, among female off-spring of the woman who is stressed during pregnancy, later maladaptive stress and immune responses may increase the vulnerability to preterm delivery or IUGR later on in life (4). This might help explain the observed intergenerational clustering of preterm birth and LBW (59).(4)

Pregnancy anxiety

The concept of “pregnancy anxiety”, developed by Dunkel-Schetter and others, refers to fear and worries about the pregnancy itself (44). Pregnancy anxiety includes concern about how the baby is
developing, potential loss of the baby, fear of having a difficult labor, and of personal harm during delivery. Several studies found that of all the stress concepts, pregnancy anxiety is the strongest predictor of gestational length and preterm delivery. In the largest of these studies, the adjusted odds ratio was 2.1 (95% confidence interval (CI) 1.5, 3.0), indicating that women with high pregnancy anxiety had greater than two-fold increased risk of a spontaneous preterm delivery compared to women with lower pregnancy anxiety (44,60). Pregnancy anxiety is also linked to lower mental and motor development scores in the newborns at eight months of age (61).

**Depression**

Depression has been linked to poor birth outcomes as well as poor child health outcomes (62-64). Maternal depression has been associated with inadequate use of prenatal care, poor nutrition, perinatal substance use, preterm labor, and child abuse. Children of depressed mothers show developmental delays and learning disabilities, less positive and more negative affect, lower self-esteem, higher academic failure, and poorer physical health than children of non-depressed mothers (63-65).

In sum, a growing body of evidence establishes stress, pregnancy anxiety, and depression as risk factors for LBW and preterm birth. Specifically, maternal stress and pregnancy anxiety are associated with 1.5 to two-fold increased risk for preterm delivery. Depression has also been linked to a number of adverse birth and child health outcomes. These findings point to the importance of clinical screening and psychological intervention and support for maternal stress and depression.

**Behavioral Factors**

A number of behavioral factors impact pregnancy outcomes. These include: nutrition, cigarette smoking, alcohol and substance use, exposure to sexually transmitted infections and unintended pregnancy all have an effect on pregnancy and birth outcomes.

**Nutrition**

Nutritional status of the mother is associated with the health of the developing fetus in several distinct ways. Poor nutrition has been linked to infant mortality, preterm birth, low birth weight, congenital anomalies, fetal abnormalities, and other factors which may have life-long negative implications for the health of the developing child. Severe malnutrition can result in death. Good nutritional status is strongly associated with positive health status. Nutritional status is dependent on macronutrient intake (energy-providing foods such as protein, carbohydrates, and fat) and micronutrient intake such as vitamins and minerals (66). Women who begin pregnancy at less than their recommended weight for their height (body mass index [BMI]) and those who gain less than the recommended amount of weight in pregnancy are at increased risk for preterm birth (67-69). In addition, minimal maternal weight gain during pregnancy and low prepregnancy body mass index (BMI) are estimated to account for about 25% of IUGR (70). Recent information also links meal patterns and frequency to increased risk for preterm birth (71,72). In a study of women in Los Angeles, Siega-Riz, Hobel and colleagues found that women who ate fewer than three meals and two snacks each day were 30% more likely to delivery preterm (71). Further, pregnant women who reported not eating for more than 13 hours...
(equivalent to skipping breakfast) were three times more likely to deliver preterm (71). Subsequently, Herrmann found that the women who fasted for more than 13 hours had significantly increased levels of circulating corticotrophin releasing hormone (72). Thus, it appears that the link between fasting and preterm birth may be mediated by the release of stress hormones (CRH) (43).

The major micronutrients linked with IUGR and preterm birth are iron, folate, calcium, zinc, and long-chain polyunsaturated fatty acids (PUFA) (50). Omega-3 long chain PUFAs act to depress the biosynthesis of local acting hormones, the 2-series prostaglandins and leukotrienes, that are centrally involved in the onset of labor, both preterm and at term (73). Observational studies and a recent randomized controlled trial found a decreased risk of PTB and prolonged pregnancy among women eating cold water fish or receiving fish oil supplements that contain high amounts of omega-3 long chain PUFAs (74). The typical diet consumed in Los Angeles County lacks these essential micronutrients. Diets that are high in dairy, meat products, fried and “fast” foods, particularly among subpopulations at-risk for preterm delivery such as African Americans may not have adequate amounts of long chain-PUFAs. Nutritional interventions to optimize maternal omega-3 long chain-PUFAs status during pregnancy and lactation merit further investigation to improve pregnancy and birth outcomes.

Women who begin pregnancy with a high BMI (over 29) are also at risk for adverse outcomes impacting the mother, fetus and newborn. Obesity among women in the United States has increased from 12% (1991) to 21% (2001) (75). Both the mother and fetus are at risk for adverse outcomes. Obese women experience health problems that are correlated with negative effects on fetal/infant health status including gestational diabetes, hypertension, neural tube defects, and preeclampsia, among others. While obese women are more likely to give birth to excessively large babies (weight greater than 4,000 grams), some studies show increased risk of IUGR as well (76). These large, or macrosomic babies, are at increased risk for birth trauma and/or cesarean delivery and problems with glucose regulation in the neonatal period (hypoglycemia) (76,77). Many studies show that infants of obese women are at increased risk of neural tube defects (up to a two-fold increase in risk), even with folic acid supplementation (76). It is clear that the obese woman’s pregnancy must be carefully managed. Unfortunately, in the scientific literature there appears to be little or no evidence of nutritional interventions and/or programs targeting the obese pregnant population (76).

**Cigarette smoking**

Approximately 12% of women in the U.S., and 10% of women in California, smoke cigarettes during pregnancy. The California Maternal and Infant Health Assessment Survey found that approximately 6% of pregnant women in Los Angeles County smoke during pregnancy.

Maternal cigarette smoking is a leading preventable cause of adverse birth outcomes (78). Estimates suggest that if all women stopped smoking in pregnancy, the proportion of infants born with IUGR would be reduced by 25% and the proportion of infants born preterm would be reduced by 10% (78). Smoking is also associated with increased risk for spontaneous abortion and placental abruption during pregnancy. Children born to women who smoked during pregnancy have higher incidence of Sudden Infant Death Syndrome (SIDS), childhood asthma and respiratory tract infections, motor, sensory, and cognitive deficits during infancy and
toddlerhood (79-84). Additionally, there tends to be cognitive deficits and behavioral disorders in children and adolescents whose mothers smoked during pregnancy. A study in California estimated savings of $21 million a year in direct costs with an annual decrease of just 1% in the prevalence of maternal smoking (85).

It appears that quitting smoking in the first trimester ameliorates many of the adverse effects of cigarette smoking on birth outcomes (86). Early identification, referral and treatment of pregnant women for cigarette smoking may have a positive impact on pregnancy and birth outcomes.

**Alcohol use**

One study found that 6.7% of pregnant women in California reported drinking alcohol during pregnancy (87). Maternal alcohol consumption is the leading preventable cause of birth defects and childhood disability (88). It is associated with Fetal Alcohol Syndrome, which is characterized by growth restriction, facial abnormalities, and central nervous system abnormalities including microcephaly, mental retardation (average IQ of 63), and behavioral disorders such as attention deficit hyperactivity disorder. Increased rates of skeletal and heart defects (ventricular septal defects) are also found in infants whose mothers use alcohol during pregnancy. Early identification, referral and treatment of pregnant women for alcohol use may have a positive impact on pregnancy and birth outcomes.

**Substance use**

An estimated 3.7% of women in the U.S., and 5.2% of women in California, use illicit drugs during pregnancy (87). Among pregnant teens, the rate of drug use could be as high as 15%.

Perinatal substance exposure has been linked to many obstetrical and neonatal complications, including low birth weight, prematurity, abruptio placentae, fetal distress, stillbirth, cerebral infarctions, congenital malformations, and neurobehavioral dysfunction (89-93). Pregnant women who use cocaine have been shown to be at high risk for premature rupture of membranes (PROM) (20%), preterm labor and delivery (25%), IUGR (25%-30%), and placental abruption (6-8%). Early identification, referral and treatment of substance using pregnant women may have a positive impact on pregnancy and birth outcomes.

**Sexually transmitted infections**

Several studies have documented increased risk for preterm birth and PPROM among pregnant women infected with gonorrhea, chlamydia and/or trichomonas (94-98). Treatment for gonorrhea and chlamydia is associated with decreased risk. Infants born to mothers infected with gonorrhea or chlamydia are at risk for developing conjunctivitis, pneumonia, and other complications (32,95,99,100).

Infants who become infected via perinatal transmission of hepatitis B virus (HBV) have a 90% risk of chronic infection, and up to 25% will die of chronic liver disease as adults (101). More than 90% of these infections can be prevented if HBsAg-positive mothers are identified during pregnancy so that their infants can receive hepatitis B vaccine and hepatitis B immune globulin.
(HBIG) soon after birth (102,103). The CDC (104,105) recommends universal screening of all pregnant women to prevent perinatal hepatitis B virus transmission.

Between 15 to 30% of infants born to mothers with untreated HIV will be infected through vertical transmission. Screening and treatment with zidovudine (AZT) has been shown to decrease the vertical transmission risk by nearly 50%. Combination therapy may be even more effective than zidovudine alone. US Public Health Service has recommended and California law requires providing information and education on HIV and offering confidential testing for all pregnant women (106,107).

While technically not a “sexually-transmitted infection,” bacterial vaginosis (BV) is consistently associated with an increased risk for PTB, with the majority of relative risks reported between 1.5 and 2.5 (19-21,35,108). The evidence is particularly strong for early preterm birth (<32 weeks), when upper genital tract infection/inflammation is frequently present (109).

Early identification, referral, treatment, and partner treatment, followed by tests of cure for pregnant women for sexually transmitted infections and bacterial vaginosis18 may have a positive impact on pregnancy and birth outcomes

Unintended pregnancy

Unintended pregnancy is associated with poor pregnancy and birth outcomes as a result of poor preconception health, underutilization of prenatal care, and increased exposure to unhealthy factors (i.e., cigarette, alcohol and other drug use) (110). Pregnancy intent is also linked to parenting issues such as availability of resources and social support, increase in family violence and child abuse/neglect and parent-child interactions such as bonding and attachment. Children whose conceptions were unintended exhibit higher levels of fearfulness and lower levels of positive affect at age two (111). They have lower scores on verbal development tests at preschool age. Long-term studies found that children born as a result of an unintended pregnancy perform less well in schools, achieve lower educational attainment, and have greater psychological problems than children whose births were planned and wanted (112-118). These differences persist even after controlling for family background characteristics. Early identification, referral and treatment of pregnant women for pregnancy intention may have a positive impact on pregnancy and birth outcomes.

In sum, adverse birth, infant, and child health outcomes have all been linked to behavioral factors such as poor nutrition (low pre-pregnancy BMI and pregnancy weight gain, macronutrient and micronutrient deficiencies including iron, folate, calcium, zinc, and omega-3 long chain polyunsaturated fatty acids), cigarette smoking, alcohol and substance use, sexually transmitted infections (including gonorrhea, chlamydia, trichomonas, hepatitis B, syphilis and HIV), bacterial vaginosis and unintended pregnancy. Reducing behavioral risk factors before and during pregnancy continues to be the primary mode of interventions for improving birth outcomes in the United States and here in Los Angeles County.

18 Partner treatment is not recommended for partners of women with bacterial vaginosis.
Sociodemographic Factors

Sociodemographic factors such as age, marital status, socioeconomic status (SES) and race-ethnicity have also been associated with infant mortality and LBW.

Age

The risk for infant mortality and LBW increases when the maternal age is below 20 and over 35, with women age 20 to 34 having lower risk for adverse outcomes. The relationship between age and infant mortality or LBW is often described as j-shaped (50,119). Since age is correlated with many other social and behavioral characteristics, it is actually quite difficult to isolate the true impact of age per se. Biological immaturity may account for increased risk of adverse birth outcomes in adolescents less than 18 years old due to competition for daily nutrients with the fetus, small pelvic floor leading to intrapartal delivery problems and short cervix leading to preterm labor (120). The increased risk among older women may reflect greater chance for chromosomal abnormalities, presence of long term chronic health conditions or inhibition of other adaptive systems.

Marital status

Women who are unmarried have been consistently found to have higher rates of LBW,PTB, and infant mortality compared to married women, even controlling for other socioeconomic factors (50,119). The lack of partner support has been postulated as a mediating factor. Other authors suggest that other behavioral factors such as smoking, substance use, and exposure to sexually transmitted infections may be the cause.

Race and ethnicity

Racial-ethnic disparities in birth outcomes are well documented, with African Americans having a persistent two-fold increased risk for infant mortality, LBW and preterm birth compared to non-Hispanic Caucasians (121). Hispanic women as a group generally have higher risk for some of these adverse outcomes compared with non-Hispanic Caucasian women, but lower risk than African American and American Indian women. Asian and Pacific Islander women as a group generally have the lowest risk for these adverse outcomes (122). It is important to note that the groups described are not uniform. Additional disparities exist within the groups described above. There is considerable variation in pregnancy outcomes between the diverse ethnic groups categorized as Asian/Pacific Islanders, between urban and rural American Indians and U.S.-born and immigrant women, among others (122,123). These disparities cannot be completely accounted for by behavioral or socioeconomic status (SES) differences (52), and are now increasingly acknowledged to be deeply rooted in U.S. sociopolitical history (121,124). Health disparities arise from differences in 1) access to preventive and curative health services; 2) differences in the attitudes, perceptions and biases of health care providers that affect the quality of care received; and 3) different social, political, economic, and environmental exposures that result in differential risk for disease (124,125). Lu and Halfon recently described a comprehensive “Life Course Perspective” for understanding the pathophyslogic mechanisms through which a life-time of chronic stress (racism, neighborhood or interpersonal violence), can
alter vulnerability (gene expression) and reactivity (immune-inflammatory responses) to an acute stressor leading to preterm birth (52).

**Socioeconomic status (SES)**

Most studies have demonstrated a socioeconomic gradient in birth outcomes, with lower SES being associated with increased risk for infant mortality, LBW, and PTB (50,119). SES is often measured in terms of household income, occupational status, or educational attainment. Because SES often acts as an indirect marker for another factor more directly related to low birthweight or infant mortality such as risk behaviors or health care access, the strength and consistency of association depends on how strongly SES is related to the real risk factor. For example, there is a stronger social class gradient for Caucasians than for African Americans for infant mortality and LBW.

**Working during pregnancy**

In the U. S., three-fourths (78%) of pregnant women work during the last trimester of pregnancy, and nearly half (47%) work within one month of delivery. A recent meta-analysis of 29 observational studies found a significant association between preterm birth and working conditions, including physically demanding work, prolonged standing, shift or night work, and high cumulative work fatigue score (126). Physical demanding work is also significantly associated with small for gestational age (SGA). Based on “number needed to treat” analyses, Mozurkewich, et al. estimated that one preterm birth might be prevented for each 36-65 women who discontinue physically demanding work, 27-80 women who discontinue prolonged standing, 23-171 women who discontinue shift or night work, or 12-32 women who modify cumulative work fatigue factors (126).

**In sum, sociodemographic factors have been clearly linked to poor birth outcomes, factors such as age (less than 20 or over 35), marital status (unmarried), SES (lower SES), race-ethnicity (highest rates of infant mortality and LBW among African Americans) and work strain. The mediating factors (risk behaviors, stress and lack of social support, racism and racial discrimination) are not well understood.**

**2. Interpersonal Factors**

Two factors operating at the interpersonal level that impact birth outcomes are reviewed below: partner support and intimate partner violence.

**Partner support**

Partner support has been linked to increased contraceptive use (110) and decreased unintended pregnancies. It has been shown to increase positive health behaviors (prenatal care utilization) and decrease risk behaviors during pregnancy (smoking, alcohol and substance use) (110). Compared with children living with both biological parents, children in father-absent families often have fewer economic and emotional resources and do not fare as well on many health outcome measures (127).
Efforts to reduce the rising number of father-absent families by focusing on preventing unintended pregnancy among unmarried women, especially teen girls, have met with some success. Programs seeking to alter adolescents' life opportunities in addition to providing education or family planning services appear to hold the most promise. Efforts to encourage greater father involvement by focusing almost exclusively on increasing absent parents' child support payments reap only minimal benefits for poor children because their absent parents often have few resources and little incentive to make support payments. To date, efforts to increase the emotional involvement of unmarried fathers with their children have produced disappointing results, but new research suggests that such programs can make a difference when targeting fathers at the time of a child's birth (127).

**Intimate partner violence**

Estimates of prevalence of intimate partner violence in pregnancy are in the range of 1 to 20%, with most studies identifying rates between 4% and 8% (128). These estimates suggest that violence may be a more common problem for pregnant women than preeclampsia, gestational diabetes and placenta previa, conditions for which pregnant women are routinely screened and evaluated. Some evidence suggests that violence may escalate during pregnancy, especially in the postpartum period.

Pregnancy complications associated with domestic violence include: unplanned pregnancy, rapid repeated pregnancies, poor maternal weight gain, delay in onset of prenatal care, chronic stress, increased tobacco and poly-substance use, vaginal bleeding, increased prevalence of sexually transmitted infections, bacterial vaginosis, chorioamnionitis, miscarriage, placental abruption, preterm labor, preterm birth, low birthweight, stillbirth, fetal injury and death and maternal death (129-136).

Consequences of violence against women are life-long for themselves as well as their infants and children. Women who are victims of violence are often clinically depressed and are more likely to have difficulty being emotionally available, sensitive and responsive to their children (137). Child witnesses of violence are more likely to exhibit depression, anxiety, aggressive behavior, lower levels of social competence, and to have problems with attention and concentration and poorer academic functioning (137,138). Additionally, child witnesses are at increased risk for being physically injured either as they attempt to protect their mother or as the result of child abuse. Up to 50% of perpetrators of domestic violence also engage in violence against children (139). Children born into households of violence are more likely to engage in similar relationships when they become older (139).

Since women seek health care providers routinely during pregnancy, prenatal care provides a “window of opportunity” for women to receive information about intimate partner violence. Pregnancy also represents a time when women are more open to change. Unfortunately, screening for intimate partner violence by physicians is low (140). A number of barriers have been identified by physicians including time constraints, burnout, mandatory reporting, language barriers, fears of offending the woman, and feeling powerless in their ability to recommend treatments (141,142). Conversely, the vast majority of women favor universal screening for intimate partner violence and believe that health care providers can help (141). A number of organizations have published guidelines on domestic violence. The American College of
Obstetricians and Gynecologists and the American College of Nurse Midwives recommend that all pregnant women be screened for past and current intimate partner abuse at the first prenatal visit and at least once every trimester (143).

In sum, partner support during pregnancy and parenting has been shown to reduce unintended pregnancy, increase prenatal care utilization, decrease risk behaviors (smoking or alcohol use), and promote positive parenting (breastfeeding, father involvement). Intimate partner violence is common in pregnancy (prevalence of 4 to 8 percent in most studies) and can lead to adverse birth and child health and developmental outcomes. Prenatal care providers have a “window of opportunity” to intervene.

3. Institutional/Community-Level Factors

A growing literature in both health and the social sciences suggests that social and physical environments may be important determinants of birth outcomes. While there are multiple institutional and community-level factors that could impact birth outcomes, the review will focus primarily on four factors in the social environment (neighborhood characteristics, social cohesion and social capital, racism and racial discrimination, culture and acculturation), and four factors in the physical environments (air pollution, water pollution, metal exposures, and pesticides), that have been linked to infant mortality and LBW.

Social Environment

Neighborhood characteristics

Several studies have linked birth outcomes to neighborhood characteristics. Collins et. Al. (1998) found a two to three-fold increase in the risk of very low birthweight births (most of which were preterm) among African American women who rated their neighborhoods unfavorably in terms of the following eight characteristics: police protection, protection of property, personal safety, friendliness, delivery of municipal services, cleanliness, quietness, and schools (55). O’Campo, et. al. found that the effects of individual poverty on birth outcomes are exacerbated by residence in a disadvantaged neighborhood (144). Urban African-American women were more likely to deliver LBW infants when living in socioeconomically disadvantaged area, regardless of individual level poverty and other risk factors.

Several potential pathways linking neighborhood characteristics to adverse birth outcomes have been suggested. First, because of the history of residential segregation, African Americans and to a lesser degree Latinos, are more likely to live in concentrated poverty neighborhoods in which daily life is more dangerous and stressful. Second, concentrated poverty neighborhoods are also likely to include a higher proportion of individuals with self-destructive and anti-social behaviors, including participation in violence, drug and alcohol abuse, and smoking. Individuals living in concentrated poverty neighborhoods are, therefore, more likely to be exposed to these negative influences. Third, residents of concentrated poverty neighborhoods may have less access to places to exercise safely and to purchase fresh fruits and vegetables. In many disadvantaged communities, there are more liquor stores than grocery stores, and more fast food restaurants than healthy restaurants. It has been shown that the typical cost of food is
approximately 15%-20% higher in poor neighborhoods, while the quality of food available is poorer (145). Finally, poor neighborhoods are typical underserved by health care and social service providers. Environmental stressors, behavioral norms, and limited access to healthy nutrition, exercise, health care and social services in the neighborhood could adversely impact birth outcomes above and beyond individual characteristics.

**Social cohesion and social capital**

An important characteristic of a neighborhood or community is its social cohesion or social capital. Social cohesion is defined by the extent of connectedness among groups in society (146). Social capital is defined as those features of social bonds such as levels of interpersonal trust and norms of reciprocity and mutual aid which act as resources for individuals and facilitate collective action (147). In research, social capital is typically measured by the proportion of people who say that they generally trust other people (social trust) and by membership in voluntary associations (civic participation).

The notions of social cohesion and social capital have been applied in various disciplines, from criminology to political science to public health. For example, Sampson et. al. found lower levels of social cohesion in neighborhoods with higher homicide rates. Kawachi et al. found looking at state-level data that higher levels of civic participation in voluntary organizations were associated with lower mortality from all causes regardless of age (148). Additionally, they found that lower levels of social trust were associated with higher rates of most causes of deaths, including coronary heart disease, malignant neoplasms, cerebrovascular diseases, and unintentional injury. When other factors were controlled statistically, variations in the levels of social trust explained 58% of the difference in total mortality across states. Importantly, they found that lower levels of civic participation and social trust to be strongly associated with higher rates of infant mortality.

Other studies have not consistently found an association between social capital and infant mortality (149). Presently the mechanisms linking social capital to population health are not clearly understood. Three pathways have been proposed: 1) by influencing health-related behaviors; 2) by influencing access to services and amenities; and 3) by affecting psychosocial processes of individuals residing in socially-cohesive communities. What is even less clear is how to build social capital. Both top-down and bottom-up approaches have been proposed. From a top-down perspective, local, state and federal government, as well as the private sector, could do much to directly subsidize local associations that foster social capital, such as neighborhood associations, cooperative childcare, and youth organizations. From a bottom-up perspective, existing institutions (such as faith-based entities, trade unions, and charitable foundations) could do much to encourage volunteerism and invest in the social infrastructure of neighborhoods. There does not appear to be any published intervention studies on building social capital to promote healthy births.

**Racism and racial discrimination**

A growing body of evidence links racial discrimination to health disparities. There are several different levels of racism, all of which can impact health (150,151). *Internalized racism* is an acceptance by members of the stigmatized races of negative messages about their own abilities...
or intrinsic worth, often manifested as self-devaluation, resignation, helplessness, and hopelessness (151). It can reduce adaptive resources of the individual, such as coping, self-esteem, optimism, and mastery. Krieger found that African American women who responded to unfair treatment by “accepting it as a fact of life” and “by keeping it to themselves” were at greater risk for hypertension than those who “tried to do something about it” and “talked to other people about it” (152). *Personally mediated* racism is defined as prejudice and discrimination (151). It can impact health by intensifying psychosocial stress. *Institutionalized racism* is defined as differential access to the goods, services, and opportunities of society by race (151). It manifests itself in material conditions (quality education, sound housing, gainful employment, clean and safe environment) and access to power (information, resources, voice) (151,152).

An example of institutionalized racism is residential segregation, which has been linked to infant mortality and mortality from all causes among African Americans. The gap between African American and Caucasian infant mortality rates is greater in cities that are more segregated (153)(154). Another example of institutionalized racism is discriminatory medical care, which has been well documented in the recent Institute of Medicine (IOM) report (155). African Americans receive less ambulatory, hospital, and disease-specific care than Caucasians and experience greater barriers in their interactions with the medical care system (156). They are also less likely to receive standard care or health education during prenatal visits (154), ultrasound, amniocentesis, and medication to stop preterm labor (tocolytic agents) than Caucasian women (156). Access to services and variations in quality services are two factors considered to maintain health disparities.

Despite the well-documented effects of racism on health, only two published studies link racism to birth outcomes. In a small case-control study, Collins, et. al. asked African American mothers whether they had experienced racial discrimination during the pregnancy in any of the five domains of life: “at school,” “getting medical care,” “getting service at a restaurant or store, ” “getting housing,” and “at work” (157). Women who had experienced racial discrimination during pregnancy were 3.3 times more likely to give birth to a very low birthweight (VLBW) infant than those who did not experience racial discrimination (157). In a more recent case-controlled study, Rosenberg, et. al. asked African American mothers nine questions about their experiences of racism (158). Women who reported unfair treatment on the job and that people acted afraid of them at least once a week were significantly more likely to give birth to a preterm infant than women who did not report such racist experiences. The effect of racism on birth outcomes was particularly strong in African American women with lower levels of education, with odds ratios for preterm birth exceeding 2.0 on four racism variables (158).

**Culture and acculturation**

Culture may play a protective role in pregnancy by buffering against psychosocial stress. Scribner and Dwyer, (159) and Cobas, et al., (160) found that Mexican American women with a predominantly Mexican cultural orientation (as indexed by place of birth – United States or Mexico; parental and self-identification as Mexican or Chicana, and a preference to communicate in Spanish rather than English) were less likely to have given birth to a LBW child than Mexican American women with a predominantly U.S. cultural orientation. It is speculated that there may be protective factors in the traditional Mexican culture (family support, religious support, positive valuation of pregnancy) that protect women against psychosocial stress; these
protective factors become increasingly lost as one becomes more acculturated (160,161,161). In fact, one study found that Mexican immigrants who have lived in the United States for more than five years were nearly twice as likely to deliver preterm infants than newcomers who have lived in the U.S. for less than five years (162).

In sum, factors in the social environment such as neighborhood characteristics, social cohesion and social capital, racism and racial discrimination, culture and acculturation have been linked to birth outcomes. Living in neighborhoods characterized by lack of basic services, safety, cleanliness, and social capital, experience of racial discrimination during pregnancy, and acculturation are associated with two to three-fold increased risk for adverse birth outcomes such as infant mortality and LBW.

**Physical environment**

**Air pollution**

Epidemiologic studies addressing the relation between ambient air pollution exposure and fetal development are accumulating worldwide. Studies conducted in China (163,164), Brazil (165), the Czech Republic (166-168), Mexico (169), Korea (170) and the United States (171,172) link ambient air pollution exposure during pregnancy with term LBW, IUGR, PTB, and perinatal mortality. Studies conducted in Los Angeles County found that increases in carbon monoxide (CO), airborne particulate matter, and ozone (O₃) concentrations during vulnerable pregnancy periods are associated with increased risk of term LBW (173), preterm delivery (174) and common cardiac malformations, such as ventricular septal defects (174).

**Water pollution**

Epidemiological and animal toxicological studies provide some evidence that certain adverse reproductive outcomes and fetal development may be associated with water pollution. For example, exposures to disinfectant by-product compounds (trihalomethanes or THMs) and chlorinated solvents are associated with increased risk for preterm delivery, spontaneous abortions, stillbirths and certain birth defects (175-177). One recent review of these studies concluded that the weight of evidence suggests a positive association with disinfection by-product exposure for some measure of growth restriction (intrauterine growth restriction or small for gestational age) and for urinary tract anomalies (176). Another review of 14 studies on chlorination disinfection by-products such as THMs provided moderate evidence for associations with small for gestational age (SGA), neural tube defects (NTDs), and spontaneous abortions (177). Although, there were flaws in some of these studies, they suggest a possible link between water pollution and adverse birth outcomes. These studies are difficult to compare because they often look at different birth outcomes, measure different chemicals with varying levels of accuracy, and often did not measure potential contaminants. Despite these concerns, the studies suggest a possible link between water pollution and adverse birth outcomes.

**Metals**

It is well established that certain metals such as arsenic, cadmium, lead, and mercury are toxic to embryonic and fetal tissues (178). These metals along with aluminum may interact metabolically
with nutritionally essential metals such as iron, calcium, and zinc (179). Iron deficiency may increase absorption of cadmium, lead and aluminum, which in turn can impair cognitive development (lead), bone growth and development (cadmium and aluminum), and blood enzyme activity (lead) (179). Several studies link maternal lead exposure to increased risk for IUGR (180), diminished head circumference (181-183); low birth weight, neural tube defects (184), low Apgar scores (185), preterm labor and preterm premature rupture of membranes (186). Perinatal lead exposure can occur from environmental and dietary sources or from release of lead stored in the maternal skeleton. Environmental and dietary lead levels are generally low in the U.S. (187). However, lead accumulates in the skeleton over the course of a lifetime and may be released into the blood circulation when bone is being metabolized to release calcium. During pregnancy the fetus requires large amounts of calcium that must come either from dietary sources or maternal bone stores (187). U.S. studies show that blood lead levels are low, but still increase over the course of pregnancy (187,188). The principal worry concerning lead is its well-known neurotoxic nature. While a recent study did not shown adverse pregnancy outcomes related to perinatal lead exposure, it was associated with modest decrements in intelligence, small increases in blood pressure, higher risks of protein in the urine, and small increases in behavior problems in early childhood (189). The perinatal period may be a particularly susceptible time for neurotoxicity because of immaturity of the blood/brain barrier. Adequate calcium in the diet likely meets fetal needs and prevents release of lead from bone reabsorption. Appropriate nutritional counseling and food resources should reduce the potential for perinatal lead exposure. Beyond the prenatal exposure to lead, migrating lead from the home environment to the child can result in neurological damage. Pregnancy is the ideal time to intervene for lead abatement activities before the child becomes mobile and more at risk for environmental lead exposure.

Several studies also link perinatal exposures to cadmium and mercury to low birth weight (190-192). Mercury exposure is linked to increased risk for miscarriage, and abnormalities of the fetal central nervous system (microcephaly), mental retardation and cerebral palsy (193,194). Recent Japanese and Mexican studies show that rising cadmium levels during pregnancy increased risk of early delivery and a lower birthweight (192,195). Another study comparing Norwegian and Russian women reported maternal and cord blood lead, but not cadmium levels to be negatively associated with birth weight and child's body mass index (196).

Pesticides

The effect of environmental toxicants on reproductive outcomes depends on timing and intensity of the exposure and susceptibility. Pesticides may interfere with reproduction through disruption of hormone action or normal cellular processes. Effects of pesticides on animal reproduction are well documented. In humans, both maternal and paternal pesticide exposure are associated with increased risk for delays in becoming pregnant (subfertility), infertility, miscarriage, fetal anomalies, fetal death, as well as preterm birth in some but not all studies (194,197-199).

While DDT has been banned in the U.S. since 1972, significant environmental levels still exist and pose health hazards (194). Recent studies noted an apparent negative relationship between the persistent organochlorine pesticide metabolites p,p'-DDE level (a DDT metabolite) in mother's milk or serum and birthweight or prematurity of the baby born in India (200) and in
44,000 U.S. babies born between 1959 and 1966 when DDT was still in use (201). Other U.S. studies using geographic information system technologies to identify the proximity of maternal residence to agricultural areas, or exposure to contaminated drinking water demonstrated associations with IUGR, low birthweight, and fetal death (199,202,203). Studies in urban New York and Los Angeles populations confirm that pesticide exposure is common in these urban populations as well (204,205). Recently, results from a small study of women (N=51, age 28 to 42 year) having genetic amniocentesis at Cedars-Sinai Medical Center in Los Angeles showed one out of three amniotic fluid samples tested were positive for at least one environmental contaminant, with p,p’-DDE being most commonly detected (205). While these studies are compelling, considerably more research is needed in this area.

In sum, environmental exposures such as air and water pollution, metals, and pesticides have been linked to adverse birth outcomes, including subfertility, infertility, birth defects, preterm birth, IUGR, and fetal death.

4. Policy Factors

Institutional and public policies can have profound impact on birth outcomes. Examples include the well-documented impact of welfare policies on single parenthood and of the Medicaid expansion on increasing access to and utilization of prenatal care.

Social legislation governing employment during pregnancy

Many European countries have enacted social legislation governing employment during pregnancy (206). These include maternity leave policies, laws prohibiting employment discrimination, or safeguards for work safety and working conditions. In France, prevention of preterm birth has been a national objective since the 1970s; following the onset of these policies, France noted a one-third reduction in the rate of preterm birth (from 8.6% to 4.8%) and a 62.5% reduction in very preterm births (i.e., before 34 weeks gestation) between 1972 and 1989 (207). While it remains unclear how much of the decline in preterm birth rates in France over the past decades can be attributed to social legislation designed to protect working women, the French experience points to the possibility that policy interventions have the potential to positively impact birth outcomes.

The policy decision to add folic acid fortification to all enriched cereal and grain products is another example of a policy decision that has improved birth outcomes. Food fortification with folic acid is credited with significantly reducing the incidence of neural tube defects in the U.S. (208). In 1992, the U.S. Public Health Service issued a recommendation that all women of childbearing age capable of becoming pregnancy consume 400 µg of folic acid daily to decrease the risk of having an infant with a neural tube defect (209). Until recently, awareness of this recommendation spread slowly, with little change in supplementation habits, or reduction in neural tube defects (210). However, within three years of folic acid fortification, the incidence of neural tube defects in the U.S. declined by 23% (208,211).

In sum, institutional and public policies can have profound impact on perinatal health. Examples include the impact of welfare policies on single parenthood, Medicaid expansion on
A Life Course Perspective

Most of the aforementioned factors have a life history (or life span) as defined as ongoing repeated exposure over the person's lifetime (3,212). For example, the neuroendocrine system may be programmed for over-reactivity by early life or chronic exposures to stress (4). Biologically speaking, chronic or repeated exposures to stress, particularly during critical periods of neuroendocrine development (fetal or early childhood development), leads to chronically elevated levels of stress hormones (cortisol) which may down-regulate the glucocorticoid receptors inside the brain, resulting in the loss of feedback inhibition on the HPA axis (54,213). Similarly, chronically elevated levels of cortisol may also down-regulate the glucocorticoid receptors inside immune cells, resulting in the loss of counter-regulation of the inflammatory responses by the HPA axis (58). Thus, vulnerability to preterm delivery may be traced not only to stress and infections during pregnancy, but more importantly to stress reactivity and immune-inflammatory dysregulations that have been programmed by chronic and repeated exposures to stress over the life course (4). Smoking, nutrition, and many other risk behaviors usually do not begin during pregnancy; they also have a life history of how they came about and may be difficult to change during pregnancy, particularly if the behavior is addictive.

Research on factors related to adverse birth outcomes has identified several areas of study that fit the “life-course” perspective: intergenerational factors, nativity and childhood SES, interpregnancy interval and pre-pregnancy weight, previous obstetrical and medical history and weathering hypothesis.

Intergenerational factors

A large number of studies have found an approximately two-fold increase in the risk of perinatal and infant mortality, LBW, and preterm birth associated with low maternal birth weight (59,214-219). While some researchers have interpreted these findings as indirect evidence supporting genetic transmission of LBW and prematurity, a non-genetic explanation for this intergenerational clustering of birth outcomes involves early programming of a woman’s reproductive potential that are shared by siblings and possibly even across generations (59). For example, psychosocial stress during pregnancy activates maternal neurochemical-hormonal pathways (HPA-axis) as well as placental CRH gene expression. It is hypothesized that the “stress hormones” released might cross the placenta and prime the female fetus’ neuroendocrine system during critical periods of fetal development. Such prenatal programming may lead to higher stress reactivity later on in life, resulting in increased vulnerability for preterm birth and LBW when the offspring becomes pregnant herself twenty or more years later.

Nativity and Childhood SES

Foreign-born women have better birth outcomes than U.S-born women of the same race and ethnicity (119,220). In fact, the infant mortality rate is about one-third lower among foreign-born women than their U.S born counterpart. One study in Harlem (221) found that foreign-born
Black women were more likely to have fathers who worked in high or highest social-status occupation than U.S.-born Black women. In fact, their fathers’ occupations were more predictive of their infants’ birth weight than their husbands’ occupations. This led the researchers to conclude that a partial explanation for the relative reproductive success of foreign-born women might be that they spent their childhood years under better social circumstances. However, longer residence in the U.S. is associated with increased preterm birth (162). Several authors document behaviors especially smoking that are related to increased preterm birth among long term immigrants (160,162).

**Interpregnancy interval and pre-pregnancy weight**

These factors relate maternal health status prior to pregnancy to her subsequent pregnancy outcomes. A short interpregnancy interval is associated with increased risk for LBW and preterm birth, possibly because of maternal depletion from previous pregnancy. Maternal reserves do not have a chance to get replenished with a short interpregnancy interval, leading to under-nutrition and other deficiencies that may impact the outcomes of subsequent pregnancy. Similarly, low pre-pregnancy weight is a strong predictor of LBW and preterm birth, possibly due to low nutritional reserves available for the pregnancy. These factors point to the importance of preconception and interconception care in promoting optimal maternal health prior to pregnancy.

**Previous obstetrical and medical history**

Women who had a poor birth outcome are at increased risk for having another poor birth outcome in their subsequent pregnancies. Recurrence risk has been estimated at 20 to 30 percent for preterm delivery, and 20 to 60% for pre-eclampsia (222). The cause of recurrence is unclear, but biological, psychological, behavioral, social and environmental vulnerabilities that are carried from one pregnancy to the next may contribute to the recurrence. Medical conditions such as hypertension, pre-gestational diabetes, autoimmune diseases (lupus erythromatosus) can also affect subsequent pregnancy outcomes, particularly if they go untreated.

**Weathering hypothesis**

The weathering hypothesis posits that the effects of social inequality on the health of populations may compound with age, leading to growing gaps in health status through young and middle adulthood that can affect fetal health. It is supported by the work of Geronimus who found a four-fold increase in the risk of LBW and VLBW births with increasing age among African American women, but not among Caucasian women (223). Moreover, among African American women, the elevated risk with increasing age was seen only in women of low and average SES, but not in those of high SES. She also noted a more rapid decline in the health status of African American women than that of Caucasian women with increasing age, particularly among the disadvantaged. Geronimus attributed the accelerated decline in the health status of disadvantaged African American women with increasing age to the chronic stress and strain (so called allostatic load) that they have to weather day in and day out throughout their life-course (223). The cumulative impact of these repeated stresses (allostatic load) on their reproductive health is manifested in the increasing rates of LBW and VLBW births with increasing age.
In sum, several “life-course” factors have been linked to adverse birth outcomes, including low maternal birth weight, childhood SES, interpregnancy interval and pre-pregnancy weight, previous obstetrical and medical history, and “weathering.” These factors remind us that what a woman has experienced prior to her pregnancy may be just as important as what happens during it. This further demonstrates the need for interventions to improve birth outcomes to occur before and in between pregnancies.

Evidence-Based Interventions and Best Practices for Improving Birth Outcomes

A similar multi-level approach is used to examine interventions to improve birth outcomes at the individual, interpersonal, institutional/community, and policy levels.

1. Interventions at the Individual Level

Prenatal Care

Over the past 20 years, prenatal care has become established as the primary intervention for improving pregnancy and birth outcomes. In large part due to Medicaid expansion, the use of early and continuous prenatal care has increased substantially. More than 95% of pregnant women in Los Angeles County receive prenatal care at some point during pregnancy; about 85% started prenatal care in the first trimester and 75% receive adequate prenatal care. Thus, prenatal care is still the best way for reaching the greatest number of pregnant women in Los Angeles County.

Recent literature on the effects of prenatal care on pregnancy outcomes can be misleading without considering the historical accomplishments showing improved maternal and infant health. Improvements in pregnancy outcomes and reductions in maternal and infant mortality through the 1900s are attributed to improved health care, standard of living, nutrition, sanitation and availability of effective contraceptives (7). Over the past 30 years, screening and treatment for maternal diabetes, sickle cell disease, syphilis, Rh disease, HIV, and early detection and intervention for obstetrical complications such as maternal hemorrhage, preeclampsia, among others have greatly improved the health and reduced mortality of exposed infants and their mothers (7). The next step that is required to further improve pregnancy outcomes is to reduce the occurrence of low birthweight and preterm birth. Studies that examine the effectiveness of prenatal care to reduce low birthweight and preterm birth are inconsistent (224,225). While this is likely due in part to study design issues such as size, and biases in the populations studied and how prenatal care was measured, authors point out that prenatal care as it is currently implemented was designed for early detection of preeclampsia and other problems late in pregnancy (7). Alexander and Korenbrot also concluded that “[t]here is little done during the standard prenatal care visit that could be expected to reduce low birth weight” (226). Most recently, Lu et al. concluded from their review of the literature “neither preterm birth nor IUGR can be effectively prevented by prenatal care in its present form” (227). What is needed is to learn how to improve prenatal care so that it has a chance of improving birth outcomes. Researchers have begun to reexamine the content, quality, timing, and context of prenatal care. The following review of the literature will identify emerging best practices for improving prenatal care.
Content of Prenatal Care

Prenatal care is not a single intervention. It consists of a series of 1) risk assessments, 2) health promotion activities, and 3) medical and psychosocial interventions during pregnancy. Several components of prenatal care have been shown to improve pregnancy outcomes. In their comprehensive review of the literature on prenatal care, Lu identified evidence-based best practices in the following areas (227):

- Screening and treatment of urinary and sexually transmitted infections
- Screening, treatment, and/or referral for depression
- Screening and referral for domestic violence
- Promoting smoking cessation
- Promoting alcohol and drug use cessation
- Promoting healthy nutrition
- Management of existing medical problems

Over the past decade, nutritional support, psychosocial services (including screening, treatment, and/or referral for maternal depression and domestic violence), and health education (including promotion of smoking, alcohol and drug use cessation and breastfeeding) have been added to prenatal care for low-income pregnant women in California through the Comprehensive Perinatal Services Program (CPSP). Statewide evaluation showed 30% reduction in the odds of LBW among pregnant women receiving enhanced prenatal services through CPSP, compared to those receiving standard prenatal care from non-CPSP Medi-Cal providers. The benefits of enhanced prenatal care, however, have not been consistently demonstrated in other studies, and have been limited largely to particular high-risk groups (228). The “West LA Preterm Birth Prevention Project” conducted in eight Los Angeles County Department of Health Services clinics between 1983 and 1986 demonstrated a 19% reduction in preterm birth among high-risk women attending clinics randomized to receive intensive health education, and more frequent clinic visits, compared with women attending clinics randomized to provide standard prenatal care. The study design was considered pseudo randomization, as clinics not patients were randomized to receive specific treatments. High risk patients within treatment sites were randomized to receive either education only or one of four other treatments including: social work, bed rest, provera, placebo (double blind FDA approved protocol). All five interventions were evaluated and compared to a control group and none performed any better than the education group. Education focused on prevention and early detection of preterm labor. This system of care improvement was implemented by teams consisting of public health nurses, social workers, health educators, community health workers, nutritionists, and nurse practitioners, in county clinics within Los Angeles (181). This study was also evaluated for cost effectiveness and showed anet savings of more than $1,700 per mother-baby pair for mothers who had received the enhanced prenatal services. Subsequently, the only clinical trial that randomized individual women to different treatment groups, found that enhanced prenatal services were related to higher mean birth weights for women who had not given birth before, but not those who had (229). In observational trials, enhanced prenatal services have been associated with reduced infant mortality or LBW statewide (230), for Black women only (231) for medically high-risk women (232) or with no impact on LBW (233).
Since prenatal care and enhanced prenatal care have failed to show consistent impact on birth outcomes, it is important to consider the quality, timing, and context of prenatal care.

**Quality and Content of Prenatal Care**

Several studies have documented significant variations in the quality of prenatal care. For example, Kogan, et al. (234) found that one third or more of U.S. women who had a live birth reported receiving no advice on tobacco or other substance use from their prenatal care providers, with African American women significantly more likely to report not receiving advice from their prenatal care providers than Caucasian women. Women who reported not receiving all the types of recommended advice during prenatal care were significantly more likely to have a LBW infant compared with women who reported receiving the optimal level of prenatal advice. Lu, et al., (235) found that one in four women in a national survey reported that they never once during prenatal care received any encouragement from a physician or nurse to breastfeed. A recent survey in California demonstrates that only 9% to 11% of physicians routinely screen for intimate partner violence at the onset of prenatal care (140).

There do not appear to be any published intervention studies aimed to improve the quality and content of prenatal care. Recently in Vermont, a statewide collaborative has been developed to implement “best practice” clinical guidelines to improve the quality of prenatal care. Drawing upon successful efforts to improve the care of individuals with chronic illnesses like diabetes, hypertension and children with asthma this Vermont initiative will apply these principles to improve the quality of prenatal care. The model ties a philosophy of providing health care that is individualized, client centered, comprehensive, and community-linked with system change methodology to provide for change at the community, organizational, practice and individual levels to reach a “breakthrough” in improved outcomes. Thus, it is named the Breakthrough series (BTS). The effectiveness of the BTS in bringing about quality improvement has been demonstrated in several other areas of healthcare including diabetes, depression, cardiovascular disease and asthma management.

**Timing of Prenatal Care Interventions**

Many of the pathophysiologic processes leading to poor birth outcomes may have their onset early in pregnancy. For example, the infection responsible for preterm delivery may already be present in the urogenital tract in early pregnancy or even before conception (236). If it is not cleared by midgestation, preterm labor or PPROM may ensue. Screening for and treating BV with antibiotics in midgestation, weeks or perhaps even months after its onset, or giving antibiotics after preterm labor is already in progress, may prove to be ineffective in preventing preterm birth. Even if the infection is treated, in some cases it may be too late to arrest the immune-inflammatory processes that have long been initiated. Similarly, the “uteroplacental insufficiency” responsible for IUGR may be traced to abnormal trophoblastic invasion during implantation early in pregnancy (237). Implantation, in turn, is regulated by immunologic mechanisms involving predominantly decidual natural killer cells, which secrete certain

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19 Improving Pregnancy Outcomes in Vermont. MOD and Vermont Department of Health grant. For Vermont Child Health Improvement Programs. A population-based child and adolescent health services research and quality improvement program of the University of Vermont.
cytokines to stimulate growth, differentiation, and migration of trophoblasts (238). Immunologic dysregulation of implantation shortly after conception could start the pathophysiologic pathway toward IUGR, which may be difficult for prenatal care to reverse.

The timing of these events underscores the potential contributions of preconceptional care to preventing adverse pregnancy outcomes. While current research has focused primarily on its benefit in preventing congenital anomalies through dietary control of pregestational diabetes mellitus or hyperphenylalaninemia or nutrition supplementation (folic acid) (239), intervening prior to pregnancy (preconception care) may prove effective against PTB and LBW as well. In a five-year interconception care demonstration program, women participating for at least six months had 34% fewer subsequent LBW infants, no infants requiring NICU admission, and fewer closely spaced pregnancies (240). Estimates indicate that among the women, who had subsequent children, one LBW birth is prevented for every three women who participated in the interconception care program (240).

**Context of Prenatal Care**

Presently, prenatal care is still delivered primarily through the obstetrical clinical visit, with links to public health ancillary services such as WIC services or social support services for low-income women. These clinical and ancillary services, while necessary, are hardly sufficient to address the multiple causes of adverse birth outcomes. As discussed earlier, neighborhood characteristics, racial discrimination, air and water pollution, and access to nutrition and healthy lifestyle choices can all impact birth outcomes. Currently, little is done during the standard prenatal visit, or through its public health ancillary services, to address these and other contextual determinants of LBW. As Alexander and Korenbrot (226) observed, the “ultimate success of prenatal care in reducing current low birthweight percentages in the United States may hinge on the development of a much broader and more unified conception of prenatal care than currently prevails.”

In sum, prenatal care is the most widely-used individual level intervention for improving birth outcomes, and the best way to reach the greatest number of pregnant women. While the effectiveness of prenatal care remains a subject of great controversy, several components of prenatal care have been demonstrated to be effective, and best practice guidelines have been developed:

- Screening and treatment of urinary and sexually transmitted infections
- Screening, treatment, and/or referral for depression
- Screening and referral for domestic violence
- Promoting smoking cessation
- Promoting alcohol and drug use cessation
- Promoting healthy nutrition
- Management of existing medical problems

Additionally, preliminary data suggest that interconception care for at-risk women may be effective in reducing the risk of recurrence in subsequent pregnancy.
2. Interventions at the Interpersonal Level

There are two types of interventions to be reviewed at the interpersonal level: 1) psychosocial support provided by professional or lay workers, and 2) interventions to enhance the capacity of partners, families, and communities to provide psychosocial support.

Psychosocial Support

As discussed earlier, many observational studies have shown that low birthweight and preterm delivery are associated with women’s psychological well-being, suggesting that stress and lack of social support are risk factors (241,242). Provision of psychosocial support, in the forms of emotional support (counseling, reassurance, sympathetic listening), information/advice, or more tangible assistance (transportation to clinic appointments, assistance with the care of other children at home), either in home visits or through care coordination/case management has been proposed as a means to reducing LBW and preterm delivery. The results of interventions providing psychosocial support to pregnant and parenting women and families have been quite mixed (243). In general, studies that focus solely on providing “emotional” and “tangible” support showed no reduction in LBW or preterm birth (243). Conversely, studies that include an integrated approach including health promotion counseling with social support activities show improved pregnancy outcomes for high risk groups (244).

However, other intervention trials have not fared so well. Fiscella (1995) reviewed two trials (229,245) that provided comprehensive care coordination and case management. Neither of these demonstrated a significant improvement in gestational age or birth weight, or a significant reduction in low birth weight or preterm birth. Blondel and Mellier (242) reviewed eight randomized trials on home visitation. Overall the studies provided little evidence that programs offering home visits are effective in improving either pregnancy outcome or the use of health services. A recent Cochrane review of 14 trials involving over 11,000 women examined the effect of additional support during at-risk pregnancy by either a professional (social worker, midwife, or nurse) or specially trained layperson, compared to routine care (246). Although some improvement in psychosocial outcomes were found in individual trials, programs which offer additional support during pregnancy were not found to reduce the numbers of LBW or preterm births or improve other important medical outcomes for mothers and babies.

However, it may be premature to conclude from these studies that provision of psychosocial support is ineffective for preventing LBW and preterm birth. First, it is possible that the selected population studied was often not appropriate for the selected intervention. Efficacy of social support should be assessed among women who have low social support or who need support because of unfavorable psychological environment. In these studies, women were often enrolled not because of low social support, but because of medical or obstetrical risks. None of the trials accurately assessed the women’s psychological health prior to and at the end of pregnancy after intervention. Second, it is possible that interventions were not substantial enough to affect pregnancy outcome. In most studies, only three to four visits were planned for each woman, except in the interventions by Olds, et al., (247) (nine visits) and Rothberg, et al., (seven visits) (248,249). Furthermore, it is not known if the content of the sessions were adequate. The psychosocial support provided often does not address chronic social stressors that women experience on a daily basis, such as housing conditions, neighborhood violence or racial
discrimination. Furthermore, little is known about the cultural competency of the psychosocial support provided. To expect psychosocial support, in a few sessions, to reverse the impact of early-life programming and cumulative wear and strain (allostatic load) from neuroendocrine, immune-inflammatory, vascular, and other biological, psychological and behavioral responses to stress during pregnancy, may be expecting too much of psychosocial support.

Most intervention studies have evaluated the impact of psychosocial support on immediate birth outcomes. More recently, Olds, et al. (248) published findings from long-term (15 years) follow-up of a randomized trial on home visitation. The program of prenatal and early childhood home visitation by nurses, while it had little impact on reducing low birth weight, was found to reduce the number of subsequent pregnancies, the use of welfare, child abuse and neglect, and criminal behavior on the part of low-income, unmarried mothers, as well as serious antisocial behavior (running away, arrests, convictions, violations of probation) and emergent use of substances (cigarettes and alcohol) on the part of adolescents born into high-risk families, for up to 15 years after the birth of the first child (247,248,250-253). Results from these clinical trials are shown in Table 4.

Table 4. Outcomes from Nurse Home Visitation Clinical Trials shown for the Los Angeles Children’s Planning Councils “Five Desired Outcomes for Children”.

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<th>Category of Health Improvement</th>
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| Good Health                   | ➢ 25% reduction in cigarette smoking during pregnancy among women who smoked cigarettes; (254)  
➢ 25% reduction in the rates of hypertensive disorders of pregnancy and less severe cases among those with the condition; (253) and a  
➢ 56% reduction in the rates of children’s health care-encounters for injuries and ingestion of poisons from birth through child’s second birthday (251,253). |
| Social & Emotional Well-Being | ➢ 43% reduction in subsequent pregnancy among low-income, unmarried women by first child’s fourth birthday (250);  
➢ 6% fewer arrests among the 15 year old children (mother’s first born child) (255);  
➢ 44% fewer behavioral problems among the mothers due to substance abuse (253);  
➢ Delayed birth of the second child an average of 12 months longer than participants not receiving Home Visitation services (250,252). |
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| Safety & Survival             | ✓ 80% reduction in rates of maltreatment among at-risk families for children 0-2 years (248);  
|                               | ✓ 79% fewer verified reports of child abuse and neglect through the first child’s 15th birthday (248);  
|                               | ✓ 69% fewer arrest among the mothers (248). |
| Economic Well-Being           | ✓ 83% increase in the rates of labor force participation by first child’s fourth birthday (255);  
|                               | ✓ 30-month reduction in Aide to Dependent Families and Children (welfare) utilization among low-income, unmarried women by first child’s 15th birthday (248). |

In addition to achieving the stated outcomes, subsequent research on this home visitation model demonstrate that the relatively high program costs are returned to society by the time the child is four years old (256). This home visitation model is now being disseminated nationally (and locally) as the Nurse Family Partnership.

**Partner, family and community involvement**

Despite the well-known importance of partner, family and community involvement in pregnancy and parenting, few studies have examined the effectiveness of interventions to enhance the capacity of the partner, family, and community to provide psychosocial support. Most programs on partner support/father involvement have focused on efforts to reduce the rising number of father-absent families. These programs focus on preventing unintended pregnancy among unmarried women, especially teen girls. Several programs have met with success; those programs seeking to alter adolescents' life opportunities in addition to providing education or family planning services appear to hold the most promise. Efforts to encourage greater father involvement by focusing almost exclusively on increasing absent parents' child support payments reap only minimal benefits for poor children because their absent parents often have few resources and little incentive to make support payments. To date, efforts to increase the emotional involvement of unmarried fathers with their children have produced disappointing results, but new research suggests that such programs can make a difference when targeting fathers at the time of a child's birth.

Even less is known about the effectiveness of family and community support for improving birth outcomes. An example of an intervention to strengthen community capacity for providing psychosocial support is the *One Hundred Intentional Acts of Kindness toward a Pregnant Woman* developed by Healthy African American Families II (HAAF), Los Angeles, California (257). This program was started in 2001 as a media campaign aimed at increasing social support for pregnant African American women in south and central Los Angeles. The *Hundred Intentional Acts of Kindness* were compiled from the responses of participants in several focus groups who were asked to name five things they wish their families, friends, or even strangers could do to make their pregnancies better. The responses included such acts as giving up seats.
on a bus, carrying groceries to the car, and assisting with transportation to prenatal visits. The Hundred Intentional Acts of Kindness were then listed on a fan, with “Healthy African American Families is the biggest fan of pregnant women” along with contact information printed on the back. The fans have been distributed to local churches, stores, and even barber shops frequented by African American men. The goal of the program is to buffer pregnant women against psychosocial stress by creating a supportive community around them. The effectiveness of the program for increasing social support is currently being evaluated.

In sum, interventions to provide psychosocial support through outreach, case management, and home visitations have yielded mixed results. While some programs such as the long-term follow-up on the “Olds model”, now called Nurse Family Partnership program have demonstrated impressive long term successes, several studies and a Cochrane review have not demonstrated consistent benefits on reducing low birthweight. The difference may be in the content of support and intensity of follow-up. Little data exist to evaluate the effectiveness of interventions to enhance the capacity of partners, families, and communities to provide psychosocial support through local community programs, however, programs such as the Hundred Intentional Acts of Kindness toward Pregnant Women appear promising.

3. Interventions at the Institutional/Community Level

Several community-based program interventions will be reviewed including the National Healthy Start Program, the National Fetal-Infant Mortality Review, the Black Infant Health, the Harlem Birthright project, and the Early Head Start program.

National Healthy Start Program

The National Healthy Start program was started in 1990 to assist communities with high infant mortality rates in developing innovative, multi-level community approaches to reduce infant mortality. Originally, 15 demonstration programs were funded for a five-year period; including 13 urban and two rural programs located around the country (Phase I). As of fiscal year 2002, 96 Healthy Start programs were being funded (Phase II). Since Phase II projects are ongoing, only Phase I programs will be reviewed.

The projects developed their own interventions, and over the course of the 5-year demonstration there were nine “models” of intervention that evolved. These were:

- Risk prevention and reduction
- Enhanced clinical services
- Community-based consortia
- Family resource centers
- Care coordination/case management
- Outreach and client recruitment
- Education and training
- Facilitating services
- Adolescent programs
Projects developed different combinations and versions of the models. The primary issues addressed by the projects regardless of intervention models were teenage pregnancy and schooling, inadequate prenatal care, poor nutrition, and absence of family and community support, as well as the use of tobacco, alcohol and drugs.

One unique feature of all Healthy Start programs is their community involvement. From inception, Healthy Start has been a community-based, community-driven initiative in which local programs designed and implemented interventions targeting women, infants, and their families. Oversight by a community consortium was mandated by Health Resources and Service Administration (HRSA) for all Healthy Start programs. The community consortia were generally large groups with diverse membership made of providers and community members, including consumers, government representatives, and other concerned individuals, who came together to provide input or governance.

The principal results from evaluation of the National Healthy Start program (258) are

- Healthy Start was associated with improved prenatal care utilization in 8 of 15 project areas,
- Healthy Start was associated with reduced preterm birth rate in 4 areas, LBW rates in 3 areas, and VLBW rates in 3 areas,
- Healthy Start was associated with reduced infant mortality that was statistically significant in 2 areas, and nearly statistically significant in 3 other areas.

While these results appear promising, they are limited by several methodological considerations. First, random assignment into intervention and comparison areas was not feasible for evaluating community-wide initiatives such as Healthy Start. Second, because comparison areas also had high baseline infant death rates, they also had other program interventions that may have been operating in their areas. Third, no single program consistently showed improvements across all of the outcome areas, and it is not clear which program or implementation features led to which outcomes.

There were several important lessons learned from the Healthy Start program around 1) outreach and case management, 2) health education, and 3) community partnership.

**Outreach and Case Management**

One of the most successful “models” in the Healthy Start program is outreach and case management, which included (1) initial contact or outreach, (2) intake, (3) assessment, care planning and referrals, and (4) ongoing contact and tracking. All programs implemented some kind of outreach and case management program, and improved access to and utilization of prenatal care was reported in the majority of programs. Examples of innovative programs include:
• Pittsburgh Healthy Start workers go to local banks on paydays to perform prenatal care registration and to laundromats, where outreach workers have an opportunity to talk with women.

• At the Northern Plains site which provides services to 19 Native American tribal communities in Iowa, North Dakota, South Dakota and Nebraska, case managers help women through pregnancy, childbirth and the challenges of new parenthood.

• In New Orleans, with its unique cultural heritage, Nanans (godmothers) and Parrains (godfathers) identify residents who are pregnant, facilitate their entry into services, often transport the clients to care, and provide counseling and health education.

While all Healthy Start programs employed a mix of lay and professional case management staff, several programs relied heavily on lay community workers as their primary case managers. These programs demonstrated that including community lay workers as members of case management teams was feasible, cost-effective, and helpful in identifying and enrolling high-risk women, provided that the case management

• is implemented by teams with low ratios of lay workers to professional workers;

• incorporates intensive and ongoing training and mentoring; and

• keeps caseloads low for the lay workers.

Employing lay community workers also increased the employment of community residents, thus investing in the community and facilitating community buy-in and support for Healthy Start.

Health Education

Health education was another successful “model” common to all Healthy Start programs. Health education was provided at the community level using various media; most projects used a multi-level, and multifaceted approach. These include one-on-one health education during case management contacts. Clients seemed most interested in and comfortable with concrete and relevant subjects related to daily life, with an emphasis on positive behaviors, such as nutrition, parenting, and child development. Health education also occurred in classes. Participation in classes improved when support services (transportation, childcare) were provided. Other factors that improved participation included incentives, convenient class times, high-quality presenters, interesting topics, refreshments, and good advertising. Public information campaigns were one of the most important and innovative parts of the Healthy Start program. These community-wide public information campaigns were most valuable early on. Later, after a program had an image, word-of-mouth was the best publicity.

National evaluation found Healthy Start health education activities during Phase I too diffuse. It recommended that health education be refined, better targeted, and more clearly focused on a defined set of core health education topics, utilizing proven health promotion approaches. For example, health education topics could focus on fetal movement records or “kick counts”,

January 2005

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breastfeeding promotion, back-to-sleep, smoking cessation, folic acid supplementation, infant/child safety measures and infant stimulation/development.

Community Partnership

Healthy Start had a strong emphasis on community involvement. All programs took this mandate seriously, but all found it difficult and challenging. Only one community involvement strategy was mandated by HRSA that of community consortia with required consumer membership. The community consortia were time-consuming and labor-intensive, and often resulted in slower implementation and community tension. Additionally, consumer involvement in the central consortia was weak across all programs, despite a variety of innovative strategies to involve consumers.

Based on national evaluation, there were several important lessons learned from the Healthy Start community involvement experience.

- Despite the difficulties of community involvement, Healthy Start’s community focus is a step in the right direction. From the perspective of the communities served, Healthy Start’s community focus (1) gave consumers a voice in the care they receive, (2) gave community members an opportunity to impact policy and program decisions, and (3) provided financial resources and needed services to economically depressed communities. From the perspective of the MCH/public health world, Healthy Start (1) provided significant resources to address the special needs of high-risk communities, (2) provided a means to work with “hard-to-reach” communities and develop service delivery/implementation approaches that fit the culture of those communities, and (3) gained acceptance for public health among high-risk communities.

- Expectations for the Community Consortia need to be clarified. Consortia could be much more effective if representation were more reflective of the full range of stakeholders. At a minimum, the consortia should include health care consumers and consumer advocates, providers, public health agencies and programs, and leaders of key institutions and organizations that help shape the culture and economy of the community. The consortia can best serve in two capacities: (1) as a policy/program advisory body to the Healthy Start grantee, and (2) as a means of mobilizing the political will of the broader community.

- One of the unique strengths of the Healthy Start Initiative is its emphasis on tapping community voices. The special relationship to community and consumers is the feature of the Initiative that is most frequently lauded by Healthy Start Projects. This approach is important because (1) it is inclusive and respectful of communities served by Healthy Start, and (2) it is the best means of developing the local political will and knowledge base to reduce infant mortality and improve health of women and infants. In addition to the Community Consortia, it has been recommended that a consumer advisory group be developed for independently tapping a consumer voice, and a provider advisory group be developed for engaging the expertise of providers in the community.
Healthy Start’s efforts for community capacity building need to be narrowed and better focused. In some instances, those efforts went far afield from more immediate, known and effective health interventions. While the link between broad community development and reduced infant mortality may be real, it requires long-term commitments and vast resources that are way beyond the resources of any Healthy Start Project. Given limited resources and given that Healthy Start goals are in the health arena, Healthy Start capacity building efforts should be focused on the skills needed to build a strong and effective health care system. This may include activities to improve management skills or analytic capacity among community contractors, training community residents as outreach workers and case managers, and working with community members to develop the leadership skills needed to make them an effective voice in promoting healthy births.

Other Community-Based Interventions

Other community-based interventions to improve birth outcomes exist locally and nationally; however, these programs often lack methodological rigor in program design and evaluation, making it difficult to establish program benefit. Nonetheless, a brief review of several examples of promising community-based interventions to improve birth outcomes is included.

National Fetal-Infant Mortality Review (NFIMR)

The NFIMR program begun in 1992 and established community-level FIMRs to examine health, behavior, and psychosocial factors, as well as health and social service factors, in families that experience fetal and infant deaths. Major aspects of the FIMR program included: examining social, economic, cultural, safety, and healthy systems factors associated with fetal and infant mortality through review of individual cases; planning a series of interventions and policies that addressed these factors to improve the services systems and community resources, participating in community-based interventions and policies, and assessing the progress of the interventions.

While the quantitative impact of the FIMR programs has not been formally evaluated, the results of one FIMR program in particular merit some attention. In Aiken County, South Carolina, the coroner who started reviewing the cases and causes of infant death noticed a growing number of deaths that appeared to have socially-linked causes as a growing differential between Blacks and Whites (259). The coroner notified the newly elected mayor. The deaths proved to be “a red flag for a host of serious societal problems.” The Infant Mortality Task Force (later renamed the “Growing into Life: Healthy Community Collaborative” to signify its transformation from a “medical model” into a “social model”) began to address multiple social determinants of infant deaths:

- The “MOMS and COPS” program put rural police on bicycles to get to know their community, its children and parents, and to find out what people needed to take care of their pregnancies and infants and to help them get it.

- The Collaborative expanded its mission to address issues of domestic violence, poverty, lack of education, and other psychosocial issues.
During the mayor’s first term, the running 3-year averages for infant mortality in Aiken declined steadily from 11.6 to 7.9 per 1,000 live births, while statewide the rates fell from 10.5 to 8.3 live births. The important lesson from the Aiken County experience is that what started out as post-hoc review of infant deaths by a few members of the Infant Mortality Task Force developed into multi-level, multi-dimensional interventions that addressed the multiple determinants of birth outcomes, in large part because they were able to build community partnerships and mobilize community participation to bring about real societal changes. This example points to the importance of community building for improving birth outcomes.

Black Infant Health program

The Black Infant Health (BIH) program was established in 1989 to eliminate the disproportionate African American infant mortality rates and to improve related health status indicators in the African American communities of California. Programs in 17 jurisdictions developed their interventions based on four “best practice” models:

- Outreach and tracking
- Social support and empowerment
- Case management
- Role of men

Program activities include conducting culturally competent outreach and health education to providing continuous care coordination. Classes on social support and empowerment were designed to enhance self-esteem and self-reliance of pregnant women. While there was no significant difference in preterm and LBW births between BIH clients and the comparison group (Medi-Cal clients in the same zip codes), BIH programs were associated with lower rates of early preterm (< 32 weeks) births (3.5% vs. 4.2%) and VLBW (<1,500 g) births (1.9% vs. 2.9%). In Los Angeles County in 2002, 4 of the 5 BIH programs had lower rates of LBW compared to Los Angeles County average (8.7% for Harbor UCLA Research Education Institute (REI), 10.7% for Great Beginnings for Black Babies (GBBB), 11.1% for Mission City Community Network (MCCN), and 10.0% for prototypes (PRO) vs. 12% for Los Angeles County). Statewide evaluation attributed the success of the BIH programs in part to community buy-in and local capacity building.

Qualitative Research on Pregnancy and Pregnancy Outcomes for Black Women in the U.S.

In 1993 the Centers for Disease Control and Prevention (CDC-P), together with the National Institutes of Health (NIH), held a conference to determine what could be done to reduce racial-ethnic disparities in preterm birth rates for Black and White women (260). The result was the introduction of the concept of community empowerment to maternal and infant health research demonstration projects. Four coordinated demonstration projects, including a site in Los Angeles, used qualitative ethnographic, community-partnered, and participatory research methods. The guiding principles of the research approach are 1) there is a high degree of community participation, 2) the community identifies issues that it wants to address, 3) the research has as its purposes both collective learning and action to address the issue, 4) methods
of research are flexible and appropriate to the community, and 5) the goal of the demonstration project is to benefit the community.

**Harlem Birth Right Project.** One of the four projects, the Harlem Birth Right Project, has recently published findings from its ethnographic survey. The authors uncovered important aspects of the social context of women's lives using qualitative methods and community partnership that may not have emerged through traditional epidemiologic research. They found that pregnancy may serve as a catalyst to increase perception of the magnitude of preexisting social stressors. Several stressors and chronic strains associated with structural forces were identified. For example, the high percentage of households headed by women is seen as one consequence of larger structural forces. They conclude that community participatory research can be successfully conducted to support public health goals and can derive important new information on the social context of women's lives.

**Healthy African American Families.** The qualitative findings from the Los Angeles research sponsored by the CDC-P/NIH beginning in 1992 and implemented through the community-based organization Healthy African American Families (HAAF) are currently being summarized for publication. Of the four programs started by the CDC-P/NIH initiative Healthy African American Families is the only ongoing program. One of the many projects that was derived from this community participatory research is the *One Hundred Intentional Acts of Kindness towards a Pregnant Woman* previously discussed. Work from the original qualitative research has progressed to now focus on development of prevention and intervention strategies through the work of a multi-disciplinary working group supported by over 20 agencies. On going projects target increasing community level social support for pregnant women as a means to prevent preterm birth and low birthweight. Projects that are underway include the implementation of a curriculum developed for faith-based organizations to implement social support activities through their auxiliary groups, and narrow cast health messaging “bathroom door-knob” cards with the pregnancy danger signs and signs and symptoms of preterm labor. Each of these strategies to provide information or promote social support was developed by community members.

**Early Head Start**

Early Head Start (EHS) is a child development program for low-income families that was created by Congress in 1994 as part of the reauthorization of the Head Start Act. Its mission is to promote healthy prenatal outcomes for pregnant women, enhance the development of young children, and promote healthy family functioning. Since its inception, EHS has grown to over 700 community-based programs serving over 60,000 children nationwide. Services offered may include quality early education, parenting education, comprehensive health and mental health services, nutrition education, and family support services. Often, these services are provided to women before, during, and after pregnancy. In addition, services may be center-based, home-based, and/or a combination of both. EHS combines current research and best practices as well

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as community and family assessments to determine which programs and services best meet the needs of women, children, and families.

In order to impact children at risk for health and development problems, EHS provides comprehensive services to pregnant women beginning in the prenatal period. These services consist of prenatal and postpartum health care, breastfeeding education, and prenatal education, which may include information on fetal development, risks of smoking and alcohol intake, expectations during labor and delivery, nutrition education, maternal depression, and postpartum recovery. In addition, every pregnant woman in EHS develops a unique Family Partnership Agreement, which describes the program her family will receive during the prenatal period. This agreement is individualized to the pregnant woman and her family, and it helps to determine what services they need and how they will be delivered. EHS also collaborates with community agencies when serving pregnant women in order to promote a safe and nurturing environment for pregnant women and their families. Community partners may include child care providers, transportation services, or translation services for non-English speaking families.

In order to evaluate the impact of the Early Head Start Program, the Administration on Children, Youth and Families (ACYF) selected 17 EHS programs from across the U.S. to participate in a large-scale evaluation. Although this study did not directly evaluate the effects of EHS on pregnancy outcomes such as low birthweight and preterm births, results from this study showed that EHS had positive impacts on outcomes for low-income families with infants and toddlers. EHS children (2-3 year olds) scored higher, on average, on standardized assessments of cognitive development, language development, and social-emotional development than their control group peers. EHS parents were more emotionally supportive, provided more support for language and learning, were more likely to report reading daily to their child, and less likely to engage in negative parenting behaviors than their control group parents. In addition, EHS mothers were less likely to have subsequent births during the first two years after enrollment, and EHS fathers had more positive interactions with their child compared to controls. The results of the study also suggest that earlier intervention has a greater impact on children. The impacts on child outcomes (cognitive, language, and social-emotional development) and emotionally-supportive parenting behavior were greater for children whose mothers enrolled in EHS during pregnancy compared to mothers who enrolled after the birth of their child.

The Los Angeles Children’s Planning Council

The Children’s Planning Council (CPC) is a public/private planning body created by the Los Angeles County Board of Supervisors to improve outcomes for children and families. The CPC is committed to encouraging and supporting community engagement efforts that will yield better results for children and families. One of the strategies they use is to build countywide commitment to five outcome areas:

1. Good health
2. Safety and survival


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3. Economic well being
4. Social and emotional well being
5. Educational and workforce readiness

Outcomes in these five areas are tracked through the publication of the Children’s Scorecard.

In sum, to date the National Healthy Start program is the best evaluated community-based intervention for improving birth outcomes. Several programs demonstrated improvements in prenatal care utilization and decrease in preterm birth, LBW, and infant mortality. The most successful components of the Healthy Start program are outreach and case management, health education, and community partnership. Other promising community-based interventions include the Early Head Start, National Fetal-Infant Mortality Review, Black Infant Health Program, and projects such as the Harlem Birth Right Project and Healthy African American Families and the Children’s Planning Council.

4. Policy Interventions

As previously discussed, institutional and public policy can have profound impacts on birth outcomes, and yet providers and communities, for the most part, are ill-equipped to address policy issues. Lawrence O. Gostin identified five models of policy interventions to advance the population’s health (261):

- Economic incentives and disincentives (taxing and spending powers),
- The informational environment (education, labeling, and commercial speech regulations),
- Direct regulation (penalties for engaging in risk behavior),
- Indirect regulation (the tort system), and
- Deregulation (dismantling legal barriers to desired public health behaviors).

In addition to folic acid fortification policy interventions previously outlined, other examples of effective policy interventions in public health include:

- Cigarette tax (a 10% increase in price of cigarettes decreases cigarettes demand by 8% in youths and 4% in adults (262); Proposition 10 in California generates approximately $750 million a year in cigarette surtax earmarked to improving early childhood development).

- Seatbelts and child restraints laws (child restraints use doubled and head injuries decreased significantly following an Orange County statute that mandated restraints for children under 4 (263), rates of seatbelt use rose from 73% to 96% following California’s enactment of the primary enforcement provision of the mandatory seatbelt law (264).

- Tobacco litigations (a Settlement Agreement between tobacco companies and 46 states required industry to compensate states in perpetuity, with payments totaling
$206 billion through the year 2025; California’s Proposition 99 Tobacco Funds funded the Comprehensive Perinatal Outreach Program (CPOP) which later became the Perinatal Outreach and Education (POE) programs.

- Deregulation of restricted access to syringes and support of syringe exchange programs have been shown to reduce the incidence of HIV transmission (265).

Perhaps the most notable example of policy interventions to promote healthy births is the Medicaid expansion to increase access to perinatal health services for low-income women in the 1990s. Following publication of the IOM report and other studies which concluded that the “overwhelming weight of the evidence is that prenatal care reduces low birthweight,” the U.S. Congress enacted a series of legislative initiatives that incrementally expanded Medicaid eligibility to low income pregnant women and children independent of their welfare status. Many states followed with further expansion of Medicaid eligibility and streamlining of the process of enrollment into prenatal care. California raised Medi-Cal eligibility for pregnant women to 200% of federal poverty level, and enacted “presumptive eligibility” whereby pregnant women can initiate prenatal care prior to final determination of their eligibility for Medi-Cal. It also enacted the CPSP program which increases significantly fee-for-service payment to providers for providing enhanced services; the increase in payment led to increased participation of obstetricians in the Medi-Cal program, thereby improving access to perinatal health services for low-income women. Partly as a result of these national and state policies, the use of early and adequate prenatal care has increased substantially over the past decade. Figures showed the increase over the past decade in first trimester initiation and adequate use of prenatal care in Los Angeles County and California:
The previous policy interventions demonstrates a “top-down” perspective involving the use of the government’s taxing authority or regulatory power. It is important to recognize that a “bottom-up” approach could also be effective in promoting healthy births through policy and advocacy initiatives. While grassroots organizations cannot levy taxes or regulate working conditions, they can advocate for policy changes in local communities. Several effective models for grassroots policy advocacy exist and are discussed in the Appendices.

In sum, policy interventions on the local, county and state level are important mechanisms for impacting pregnancy and birth outcomes. Both a “top-down” and a “bottom-up” approach is needed.

Toward an Integrated Model

This section reviewed the literature on adverse pregnancy outcomes, related to low birthweight, preterm birth, birth defects, and infant mortality. Increasingly, pregnancy and birth are recognized as complex processes that are impacted by multiple determinants operating at multiple levels of society and interacting with each other over time, likely in non-linear ways. For example, stress is related to preterm delivery through multiple biological (e.g., genetic, neuroendocrine, immune-inflammatory, and vascular), psychological (e.g., stress appraisal, pregnancy anxiety, maternal depression), and behavioral (e.g., cigarette smoking, substance use, nutrition) pathways. Stress, in turn, may result from interpersonal (e.g., lack of partner support,
intimate partner violence), institutional and community (e.g., neighborhood and environmental stressors, lack of social capital, racial discrimination, acculturation), and policy factors (e.g., welfare policy, working conditions, parental leaves). Therefore, addressing any one single risk factor (e.g., cigarette smoking) out of context, without addressing other related factors (psychosocial stress resulting from the lack of partner support, intimate partner violence, neighborhood stressors, racial discrimination) is unlikely to have a major impact on birth outcomes.

Addressing these factors during pregnancy may also do too little too late. As evidenced in the literature review, most current interventions address these interconnected risk factors one at a time and only during pregnancy. Improving birth outcomes will require an integrated approach – integrated across levels of interventions (contextually integrated) and over time (longitudinally integrated) – which led the LABBC to develop the integrated strategies proposed in the Recommendations section.
VI. RECOMMENDATIONS

The health and well being of infants and children is of paramount importance to parents, families and society at large. Yet each year in Los Angeles County, one out of every 225 families with a newborn child suffers the death of that child within the first year of live. Being born too small (i.e., with low birthweight, weighing less that 2500 grams or 5 and ½ pounds) or too soon (i.e., prematurely, born before completing 37 weeks gestation) is a leading cause of these infant deaths, as well as a leading cause of long-term developmental and neurological disabilities. Increased understanding of the biologic determinants of health has increased our understanding of the complex interactions between biology, and the social, psychological and environmental strengths and stressors that mediate health.

This section presents the eight core strategies recommended as a means to improve pregnancy and birth outcomes across Los Angeles County. Along with these strategies this section describes five guiding principles that serve as the foundation for implementation of the recommended strategies.

The conceptual frameworks, described in Section III guided the development of this blueprint for action. Specifically, the Health Field Model emphasizes the need to consider all the contextual factors that can impact birth outcomes. The Women’s Health Continuum is a longitudinal model that considers factors not only during pregnancy, but before and in between pregnancies as well. And the Community-Based Approach guides the engagement of community partnerships in the planning, implementation and evaluation processes. Together these frameworks guide the community assessment, literature review, formation of the Healthy Births Learning Collaboratives and the development of the final multi-level, longitudinal and community-driven strategies.

The community assessment, described in Section IV guides where action is most needed. While there are great disparities within and across SPAs, some common themes emerged. Repeatedly, the Healthy Births Learning Collaborative (HBLC), participants stated concerns about the access to and the quality and content of prenatal care. These issues were echoed by the Advisory Board. Additionally, most HBLC attendees and the Advisory Board identified stress and mental health, as well as nutrition, substance use, domestic violence as priority issues that impact healthy pregnancies and births. Further, several HBLC representatives called attention to the need to address teen pregnancy issues, and the full economic needs in their communities.

The review of the literature in Section V provides the scientific rationale for selecting these recommendations. Multiple, interconnected factors operating at multiple levels that can impact on birth outcomes were outlined. Literature that was reviewed demonstrated evidence of effectiveness of interventions at multiple levels for improving birth outcomes. The primary
The conclusion drawn from this literature review is that to achieve significant improvement in birth outcomes, strategies and programs need to move beyond interventions that address individual and isolated perinatal risk factors. Instead, programs must develop interventions that are multi-disciplinary, comprehensive approaches that work at multiple levels (i.e. individual, family, community, and societal) and begin to address the multiple determinants of birth outcomes before, during, and between pregnancies.

In this section, the recommendations are described in two parts. The first are five guiding principles, which outline the conceptual framework for implementing these recommendations and then eight core strategies for improving pregnancy and birth outcomes.

**Guiding Principles**

Interventions to improve birth outcomes must be:

1. Comprehensive
2. Multi-level
3. Collaborative
4. Community-driven
5. Evidence-based
6. Culturally competent

1. **Comprehensive and Integrated**—Interventions should address multiple risk factors simultaneously, using multiple approaches thereby creating a comprehensive and integrated approach.

Many attempts to improve pregnancy outcomes have addressed one perinatal risk factor at a time, often with limited success. Limited success is understandable when one considers the complex interactions that influence health behaviors. For example, smoking cessation counseling is unlikely to succeed until the underlying reason that a woman is smoking (i.e., to reduce weight gain, relieve depression or stress) is addressed. Similarly, providing health education about healthy nutrition may be effective in increasing the woman’s knowledge, but it will be less effective in improving the health of her pregnancy without follow-up to ensure that she has sufficient financial resources to access healthy foods, knowledge about where to acquire the food, and/or local, convenient access to stores to acquire healthy foods. What is needed is a comprehensive, integrated approach for improving birth outcomes.

2. **Multi-level**—Interventions should address multiple influences at the individual, interpersonal, neighborhood/community, service systems and societal levels. The multi-levels of influence on health are illustrated by First 5 LA’s Circle of Influence.
Historically interventions to improve birth outcomes have focused on changing individual behaviors without considering how those behaviors are influenced by partners, families, neighborhoods, communities, institutions, social norms and public policy.

3. Collaborative– Interventions should be undertaken in collaborative partnerships representing diverse disciplines, knowledge and skills (i.e., health and social service providers, academics and researchers, policy makers, advocates, and clients).

National efforts through the Healthy Start Initiative show that communities that work together can improve pregnancy outcomes. An important lesson learned is that no one individual or organization can do it alone, particularly in undertaking a comprehensive, multi-level approach to improving birth outcomes. While collaborative work can be at times challenging, each partner brings unique strengths and resources to the project, and the sum of the whole is far greater than its parts. For example, in advocating for policy change (i.e. to expand coverage for interconception care), prenatal care providers can contribute their clinical perspective, outreach workers or case managers can contribute their understanding of systems barriers, while policy advocates can contribute their skills and experience in mobilizing the community.

4. Community-Driven– Interventions should be developed, implemented and evaluated by local communities.

Communities have the expertise and passion to identify the issues intrinsic to their neighborhood, develop implementation plans that are culturally competent to local needs, and participate fully in the evaluation process. The community-driven process has begun; priority areas identified thus far by the HBLCs and the Advisory Board include smoking, substance abuse, nutrition, stress, mental health (including depression), nutrition, breastfeeding, infections, intimate partner violence, diabetes, cultural competency, quality of care, teen pregnancy, pre- and interconception care. The core approaches should be operationalized to address these community-identified priority areas.

5. Evidence-Based– Interventions should be supported by evidence of effectiveness.

In this time it is not appropriate to finance untested and untried efforts to improve the health and well being of pregnant women and newborns. There is abundant scientific evidence to support the implementation of proven strategies that can improve birth outcomes.

6. Culturally Competent - Interventions to identify, treat and follow women and their families at-risk should be designed in a culturally competent manner.
Core Approaches

As a result of the numerous dialogues conducted throughout the community at the HBLC meetings, information garnered from local data and the literature as well as feedback from the LABBC advisory board, eight proven or promising approaches for improving birth outcomes have been developed for the Healthy Births Initiative. The eight strategies are:

1. Policy and Advocacy
2. Health Education and Messaging
3. Prenatal Care Quality Improvement
4. Interconception Care
5. Outreach
6. Case Management
7. Community Building
8. Social Support

It is important while reviewing the core approaches that all of the guiding principles be considered to obtain maximum impact. While the selected approaches may seem to primarily impact one level of society, it should be recognized that each core approach could intervene at multiple levels. For example, social support could be strengthened at the individual level through case management to role model empowering decisions and communication styles, at the interpersonal level by creating a male involvement program, family resource center, or advocacy and support groups for pregnant victims of domestic violence, at the community level by changing social norms and increasing social capital through a program like Hundred Intentional Acts of Kindness toward Pregnant Women, at the systems level by expanding case management, and at the policy level by enhancing employment safeguards and parental leaves. Similarly, the aims of health education can include changing individual behaviors, promoting partner support, institutional practices, social norms, and public policy.

Each approach alone can have an impact on the health and well-being of each child and their families. Each approach can lead to improving the chances of each child being ready for school.
Approach (1)

Policy and Advocacy

Goal: To promote healthy births in Los Angeles County through local and countywide policy and advocacy initiatives.

Objectives:
- To foster and promote healthy births through grassroots policy and advocacy initiatives
- To participate with local community experts in networks and coalitions that support improved pregnancy and birth through policy and advocacy initiatives

Rationale

Institutional and public policy can have a profound impact on birth outcomes and shape the community that cares for pregnant women and their families. While “all politics are local,” many policy issues are decided at the state or county levels leaving little voice at the local level to determine the services that are needed in each community. Throughout the HBLC meetings, community members gave rise to the concerns that their voices were not heard and that policy and decision makers were frequently missing from the conversation of how to improve the circumstances that impact maternal and child outcomes. The community identified a clear need for establishment and/or strengthening of linkages between community and decision-makers as a means to improve pregnancy and birth outcomes in Los Angeles County. To accomplish these linkages the community expressed the need for knowledge about how policy decisions are made and how to best influence them.

Implementation

Policy and advocacy efforts exist at two levels: those addressing Federal, State and local decision making and those at the grassroots level. Examples of the former include the traditional policy processes of legislation, regulation, budget formulation and administrative rule making. Examples of grassroots policy and advocacy may include:
- Workplace initiatives that focus on policy changes to enhance working conditions, safety, the reduction of toxic exposures or the provision of adequate family leave.
- Clinic or medical practice based policies that limit office hours to the standard work-week or lack of support for bringing young siblings to prenatal care visits.
- Local efforts to restrict the dispensing of liquor licenses to reduce the communities’ exposure to alcohol, domestic violence and neighborhood violence.

Both levels of policy and advocacy are critical and must build upon and support each other through coordination of efforts between the grassroots and countywide levels.
Local policy and advocacy initiative

The following steps are needed to address a local policy initiative:
- Define public problems and issues in a precise manner
- Obtain facts and data on the issue and its impact on the community
- Determine a approach for problem and/or conflict resolution
- Engage with various decision and policy makers to influence local process
- Evaluate outcome

Countywide policy and advocacy coordination

The LABBC will serve to connect public policy initiatives conducted by the HBLCs to existing countywide policy efforts. Functions may include:
- Disseminating relevant local, State and Federal policy information
- Serving as a linkage to local stakeholders and coalitions working on the various priority issues that impact pregnancy and birth outcomes
- Providing education on the mechanisms necessary to influence public policy and community-based advocacy
Approach (2)

Health Education and Messaging

**Goal:** To promote healthy births by providing health education and messaging to pregnant and parenting women, families, and communities.

**Objectives:** To provide multi-level health education and messaging aimed at:

- Promoting healthy behaviors during pregnancy and the interconception period
- Enhancing interpersonal support for healthy behaviors during pregnancy and the interconception period, and
- Changing institutional practices and social norms to support healthy behaviors before and during pregnancy, and in the interconception period

**Rationale:**

Health education is the primary means for changing risk behaviors and promoting healthy behaviors during pregnancy and the interconception period. A number of health education interventions have demonstrated a significant impact in promoting healthy births, including the National Healthy Start program, the March of Dimes/CDC/National Council on Folic Acid campaign on preconceptional and prenatal use of folic acid, and the CDC’s Back to Sleep campaign to reduce the incidence of Sudden Infant Death Syndrome.

Presently much of the health education received by pregnant women takes place during the prenatal visits or prenatal classes, and targets only the pregnant woman. Health education needs to be expanded beyond the provider office and be available for pregnant and parenting women, their partners, friends and families at home, school, work, grocery stores, association meetings, or faith-based gatherings. Further health education and messaging must target more than individual pregnant women and their behaviors. It must expand to include interpersonal (partners, families, and peers) behaviors and support, community norms, and institutional (worksite, health care systems) practices that affect the health of pregnant women.

**Implementation**

Criteria to promote successful implementation of health messaging include:

1) **Scientific Basis.** Proposed health education and messaging interventions should be based on mass communication or behavioral change theory.

2) **Identified Audience.** Proposed interventions should be capable of reaching the population of interest, and the population should be able to achieve the desired outcome. This means using
a variety of ways to disseminate the message (i.e., radio, television, posters), making sure that the audience is exposed to the message (validating that the audience saw or heard the message), and providing a clear and specific action or behavior change for the individual to take.

3) **Multiple Channels.** Proposed intervention should use multiple channels to get the health messages out to pregnant and parenting women and families. Health education channels can include one-on-one health education, childbirth or parenting education classes, helplines (“warmlines”), print materials, radio and television public service announcements, billboards, as well as newer media outlets such as narrow-casting or the internet.

4) **Formative Research.** Proposed intervention should include formative research such as focus groups in order to develop messages and inform campaign strategy. Social marketing strategies such as market segmentation, channel analysis, and message pretesting can be used.

5) **Community Partnership.** Proposed intervention should link media strategies with community programs, thus reinforcing the health education message and providing local support for desired behavior changes. Given the cultural and linguistic diversity of the Los Angeles communities, it is imperative that the health education intervention be developed, tested, implemented, and evaluated in collaboration with community partners.

6) **Core Content.** The content of health education should be driven by 1) priorities identified in each SPA; 2) scientific evidence; and 3) the “fit” with the overall approach to promote healthy births in each SPA. The priority areas identified thus far include smoking, substance abuse, nutrition, stress, mental health (including depression), nutrition, breastfeeding, infections, intimate partner violence, diabetes, cultural competency, teen pregnancy, pre- and interconception care.
Approach (3)

Prenatal Care Quality Improvement

Goal: To improve pregnancy and birth outcomes by improving the quality and content of prenatal care.

Objectives: To increase screening, referral and treatment for several risk factors of poor birth outcomes by assisting organizations to implement the system changes required to support implementation of standard, evidence based, and nationally recommended Clinical Practice Guidelines. The following eight components of prenatal care will be addressed:

1. Smoking screening, cessation counseling, and referral
2. Nutrition screening, counseling, and referral
3. Screening and referral for intimate partner violence (domestic violence)
4. Screening and referral for maternal depression and stress
5. Screening and treatment for urinary, reproductive tract and periodontal infections
6. Screening, treatment, and referral for substance use
7. Screening for pregestational and gestational diabetes
8. Cultural competency

Rationale

As previously discussed, over 95% of pregnant women in Los Angeles receive prenatal care at some point during pregnancy. Prenatal care is still the most widely-used, individual-focused, population-wide intervention for improving birth outcomes, and the best way for reaching the greatest number of pregnant women. Evidence-based clinical guidelines have been established to address a number of factors that can impact pregnancy outcomes. However, in practice these guidelines are often not followed. According to one national survey, one third or more of U.S. women who had a live birth reported receiving no advice on tobacco or other substance use from their prenatal care providers (266). Other national and local studies demonstrated low rates of screening for infection, maternal depression, intimate partner violence, and nutritional counseling.

Implementation

Based on the community assessment, literature review, and input from the HBLC participants and Advisory Board, eight topics have been identified for prenatal care quality improvement. These are: smoking cessation, nutrition, intimate partner violence, depression and stress, urinary and reproductive tract infections, substance use, diabetes and cultural competency. Each of these factors were chosen specifically because:

1) Linked to birth outcomes,
2) Evidence-based best practice guidelines have been established, and
3) The literature review and reports from the community based Advisory Board and HBLC members suggest that these guidelines are not universally implemented in prenatal care.

The plan to improve the quality of prenatal care is drawn from successful efforts to improve the care for individuals with chronic illnesses such as diabetes, hypertension, and asthma. The components of the so called “Chronic Care Model” demonstrate the basic elements for improving care in health systems at the community, organization, practice and individual levels, and can easily and effectively be applied to caring for pregnant women. The goal of this model is to change the system through which prenatal care is provided to promote client centered, up-to-date clinical management through team care and community partnerships. This model of health care recognizes that life’s impact on pregnancy extends beyond the provider’s office and clinic. This model recognizes that improved health can best be accomplished by involving the pregnant woman, and her “family” in her care, and further by forming partnerships with community agencies and businesses to expand the support and resource serving new families. To accomplish this system change requires an informed and pro-active health care team, pregnant woman and her family, agencies and businesses, community, and society.

The Breakthrough Series (BTS) method for health care quality improvement has been successfully employed to introduce the rapid and broad-based system and organizational change that this approach outlines. The BTS method integrates evidence-based best practice guidelines with the types of system changes suggested by the chronic care model and through rapid quality improvement cycles assist teams with change efforts. The BTS has shown remarkable improvements in health of individuals living with diabetes, hypertension, asthma, improved child immunizations rates, and chlamydia screening among adolescent girls (267-270). In addition, these improvements were associated with increased client satisfaction with their care, decreased staff turnover. The BTS method can easily and effectively be applied to teach and implement the concepts of organizational, system, practice, provider and individual level changes that will improve the care of pregnant women.

A targeted partnership with the National Initiative for Children’s Healthcare Quality (NICHQ) is needed to provide training and coordination for implementing the BTS model. NICHQ is a non-profit organization that grew from the Boston-based Institute for Healthcare Improvement (IHI), the founders and leaders of the BTS model. Since 1999, NICHQ has used the BTS model extensively to address a number of children’s health issues such as asthma, cystic fibrosis, and attention deficit hyperactivity disorder. Most recently, NICHQ has initiated a collaborative in Vermont to work on improving the quality of prenatal health care.

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Family is placed in quotation marks to indicate the concept of family as including a broad array of supportive individuals in persons life who may or may not be related by blood.
Approach (4)

Interconception Care

**Goal:** To reduce the recurrence of adverse birth outcomes.

**Objectives:** To provide interconception care to women whose prior pregnancy was affected by one of the following:

1. Early preterm or VLBW birth
2. Fetal or infant death
3. Congenital anomalies
4. Adolescent pregnancy
5. Chronic medical conditions

**Rationale**

Women who have had a poor birth outcome are at risk for having another poor birth outcome during their subsequent pregnancy. Many biobehavioral risk factors (i.e., poor nutrition, substance use, psychosocial stress) are carried from one pregnancy to the next. The interconception period offers an important window of opportunity for optimizing women’s health prior to their next pregnancy. Presently most women do not receive interconception care. Further, those women whose care was provided for under the Medi-Cal system lose coverage/benefits at 60 days postpartum, even if they have had a poor birth outcome. In a five-year interconception demonstration program, women participating for at least six months had 34% fewer subsequent LBW infants, no infants requiring NICU admission, and fewer closely spaced pregnancies. (240). The goal of this approach is to reduce the recurrence of adverse birth outcomes by providing interconception care to the aforementioned target populations.

**Implementation**

The core components of interconception care consist of the following:

1) **Risk Assessment**

- Medical and obstetrical assessment
- Psychological assessment
- Nutritional assessment
- Reproductive health assessment
- Periodontal disease assessment
- Social service needs assessment

2) **Health Promotion**
- Provision of information about medical and psychological factors that may impact pregnancy and parenting;
- Provision of information on preventive health measures;
- Promotion of healthy behaviors;
- Advice and information on pregnancy preparedness, family planning and pregnancy spacing;
- Advice and information about need for on-going care for chronic health conditions; and
- Support of healthy parenting behaviors and practices.

3) Medical and Psychosocial Interventions

- Primary preventive health care and treatment for mothers and infants;
- Nutritional screening, treatment and referral;
- Genetic screening, treatment and referral;
- Screening, treatment and referral for mental health conditions including stress, depression and pregnancy anxiety;
- Screening, treatment and referral for intimate partner violence;
- Gynecological health including screening and treatment for genitourinary tract infections and cervical cancer screening;
- Screening for immunity to communicable diseases including rubella, hepatitis, HIV, gonorrhea, chlamydia and other sexually transmitted infections, and bacterial vaginosis;
- Referrals to appropriate treatment of medical, nutritional, genetic, dental, and mental health conditions through established referral networks;
- Family planning services; and
- Referral for treatment of adverse health behaviors.

4) Outreach and Case Management

- Psychosocial assessment for personal resources and social stressors;
- Assist clients to increase self-efficacy in health behaviors;
- Assist clients to identify personal and community resources;
- Assist clients to develop a set of health goals and objectives;
- Provide health information;
- Provide care coordination and case management;
- Counseling and referral; and
- Assist clients to identify and overcome personal barriers.
Approach (5)

Outreach

**Goal:** To improve pregnancy and birth outcomes through outreach activities targeted to at-risk women and families.

**Objectives:**
- To improve access to and utilization of prenatal and/or interconception care for at-risk women and families
- To increase early (first trimester) entry and consistent prenatal care
- To identify and connect at-risk women and families to needed resources and services
- To ensure clients receive referred services through follow-up activities
- To collaborate with community stakeholders to establish a relationship and build trust
- To increase consumer empowerment and satisfaction with services
- To increase coordination and collaboration among prenatal care and social service providers

**Rationale**

Many factors can impact a pregnant woman’s access to resources and services. Environmental and social factors, such as lack of access to quality and culturally competent prenatal and other services, lack of transportation, lack of health insurance, inconvenient hours of operation, lack of work leave, institutionalized racism and other system barriers. Personal and interpersonal barriers can also influence access to resources and services. Factors such as beliefs, perceptions of need, victimization from domestic violence, and lifestyle issues can all contribute to one’s ability to access services. In addition, “community outreach and ongoing support are essential to identify and bring difficult to-reach women into prenatal care.” Strategies that incorporate a multidisciplinary approach to service delivery, utilizing professional and paraprofessional staff, have been effective in reducing barriers to needed health care services.

**Implementation**

Implementation activities should occur in several phases and include the following components:

1) Build a community support network that includes key community stakeholders to garner program acceptance, community trust and buy-in, and program implementation and sustainability.
2) Utilize a collaborative approach that incorporates a team model of service delivery. The role of the team leader is essential to determine the appropriateness of the referral and provide technical consultation to the Outreach Worker
3) Engage community members as active participants in outreach activities.
4) Develop memoranda of understanding (MOU) agreements between agencies to ensure that each partner has a clear understanding of the program vision, expectations, role, and responsibility to ensure program success.
5) Develop data collection and an evaluation framework to document processes and outcomes of the program.

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**Approach (6)**

**Case Management**

**Goal:** To improve pregnancy and birth outcomes through case management for at-risk women and families.

**Objectives:**
- To improve access to and utilization of prenatal and/or interconception care for at-risk women and families
- To connect at-risk women and families to needed resources and services
- To ensure follow-up with service plans
- To increase personal and interpersonal health related behaviors
- To increase consumer empowerment and satisfaction with services
- To increase coordination and collaboration among prenatal care and social service providers
- Assist parents to improve child’s health and development by providing healthy parenting practices
- Assist mothers and families to develop a plan for their future, continue education, find employment and become economically self-sufficient

**Rationale:**

Even if a system is in place to provide quality prenatal and interconception care to every pregnant and parenting woman and family in Los Angeles, it will have limited impact if the ability to navigate the complex maze of services is not understood. Learning how to access prenatal/interconception care, implement the steps necessary to follow-through with health care recommendations and understand the importance of being connected to the community support services is often difficult and assistance through case management services is needed. The most vulnerable populations at risk for poor birth outcomes are also those most likely to struggle to access and coordinate services.

**Implementation:**
As discussed in the literature review, several local models of case management demonstrate impressive success in increasing utilization of and improving satisfaction with prenatal care and associated ancillary services, and with a few of the programs showing an improvement in birth outcomes. There are numerous definitions of “case management” but the general consensus is that case management assists with the assessment of the strengths and challenges evident in the woman and family, recognition of areas where intervention is indicated, and developing and implementing a plan that has been jointly developed by all involved. Case management involves an extensive amount of service coordination so as not to overwhelm or add difficulty to the life of a woman who may be managing multiple challenging situations. It depends upon a good initial and ongoing assessment of the woman, her social support network, and her ability to care for herself and others. To be effective, case management relies heavily on ongoing assessments to determine the success of the applied interventions (i.e., whether appointments were kept, problems resolved or new problems identified), and there must be an inherent flexibility in the plan so it can be adapted to better fit with the demonstrated capabilities of the mother and family system. Most importantly to be effective case management requires the establishment of a trusting relationship with the woman and her family.

Most prenatal case management programs are modeled after the National Healthy Start programs, or the rigorously evaluated Nurse Family Partnership. In general, case management consists of four steps:

- Initial contact and outreach;
- Intake;
- Assessment, care planning, and referrals; and
- Ongoing contact and tracking.

These steps detail the very basic process used to begin case management services, but it should be noted that many programs utilize case management as only one approach to fully serving the mother, child and family system. For example, in the Nurse-Family Partnership (i.e., “NFP” or nurse home visiting model), case management is an approach that is embedded within strict program protocols that call for a registered nurse to provide full in-home assessments of the mother’s and child’s health, child development, and social support network. In addition to performing standardized assessments, the NFP nurses give in-home education and training to the mother and family on having a healthy pregnancy, health behaviors, social skills, available benefits, child health and development, methods to improve infant brain development and stress reduction techniques. Case management is provided when there are referrals made or issues that the family is having difficulty in managing alone.
Approach (7)

Community Building

Goal: To improve pregnancy and birth outcomes through community building.

Objectives:

- To strengthen community infrastructure for promoting healthy births, and
- To change community norms and increase social capital for promoting healthy births

Rationale

Much as it takes a village to raise a child, it takes a community to promote healthy births. The literature review suggests that there are many neighborhood and community factors that impact birth outcomes, including residential segregation, neighborhood violence, social capital, or social networks, and environmental pollution. With respect to perinatal health, HBLC members reported that the following issues impact healthy births: access to services, lack of transportation, cultural competency, and the lack of community resources to name a few. Improving clinical screening for maternal depression will have limited impact if mental health services are not available in the community. Similarly, the lack of shelter beds or infrastructural support in the community for battered pregnant women serves as an important deterrent to routine screening for intimate partner violence. The objective of this approach is to use the Healthy Births Initiative to build the infrastructure needed in the community to promote healthy births and to leave a lasting legacy throughout Los Angeles County. Since community norms (‘normalize’ pregnancy and birth) and social capital (trust and collaboration amongst individuals and organizations) also impact birth outcomes, another objective of this approach is to change social norms to enhance pregnancy and birth outcomes (breastfeeding as the best infant nutrition) and strengthen social capital (effectiveness of the networking through the HBLCs) in the community to promote healthy births.

Implementation

For this approach, we define “community” as “a group of people with diverse characteristics who are linked by social ties, share common perspectives, and engage in joint action in geographical locations or setting.” This definition of “community” is broad enough to allow each community to define itself, rather than be defined by an external agent.

Several models of community building have been developed. Successful community building efforts include the following steps:

- Assessing community needs and resources
• Defining the problem
• Building community coalition
• Engaging collaborative planning
• Developing an action plan
• Implementing community and systems change
• Developing an evaluation plan
• Creating sustainability

An important lesson learned from the Healthy Start program was that several projects lost their focus (and weakened their effectiveness) by going too far in their community building efforts. Therefore, it is recommended that communities focus their efforts on building community infrastructure and social capital as they relate directly to the perinatal health priorities raised by the HBLC members and discussed in the Community Assessment (Section V). To support these community building activities it is recommended that applicants for Healthy Births Initiative engage in collaborative partnerships that include individuals who are not traditionally thought of as part of the maternal and child health world. This could include partnerships with faith-based organizations, businesses, and schools among others.
Approach (8)

Social Support

Goal: To promote healthy births by ensuring that there is adequate social support for pregnant and parenting women and families.

Objectives:

To protect women and families against psychosocial stress during pregnancy and/or the interconception period by strengthening

- The capacity of partners and families to provide psychosocial support at the interpersonal level
- Community support and social capital at the community level
- Case management and service coordination at the systems level

Rationale

Human society has long understood that social relationships are important for the health and well-being of pregnant women. A growing body of literature now links the concepts of so-called “psychosocial support” to improved health and most studies show improved pregnancy outcomes. Social support can take the form of emotional and informational support, and direct material support through provision of resources (48). Interventions aimed at providing social support to pregnant women include one-on-one “case management” or “care coordination,” outreach to access resources, support groups, adolescent mentoring programs, and doulas. Of these one-on-one home visitation or case management programs have been the most widely studied and successful. While the most successful one-on-one interventions are those that provide comprehensive services and address multiple concerns simultaneously, they may not be the most effective means by which to address all the chronic stressors that pregnant women experience on a daily basis. The aim of this approach is not only to involve health care providers and home visitors, but also the woman’s partners, families, and the community in providing social support to pregnant women.

Implementation

Partner and Family Support

As discussed earlier, partners can be an important source of psychosocial support for the pregnant woman, yet many partners may not have the skills or resources to provide adequate or effective support. Included in the Social Support Brief in the Appendices, are implementation strategies for male involvement programs, that aim to enhance the knowledge, attitudes, skills
and self-efficacy of partners in providing psychosocial support for their pregnant spouse. These programs are considered promising strategies for improving pregnancy outcomes.

Families (including grandparents, siblings, and extended families) can also be an important source of social support for pregnant women, but many families in Los Angeles find it difficult to provide adequate support to each other because of the multiple challenges they face. Based on several successful local models, implementation strategies can be employed within family resource centers to provide this support through peer group and grandparents as parents meetings for pregnant women.

Social Support through Community

There is little information about how to best provide community support around pregnant and parenting women and families. Given the growing body of literature linking community support to health disparities, the LABBC recommends that innovative programs in this area should be explored even though no rigorously evaluated interventions exist. One notable example is the One Hundred Intentional Acts of Kindness toward Pregnant Women project. This program was started in 2001 by Healthy African American Families II with support from the Kellogg Foundation and the Center for Disease Control and Prevention as a media campaign aimed at increasing social support for pregnant African American women in south and central Los Angeles. The One Hundred Intentional Acts were compiled from the input of participants in several focus groups who were asked to name five things they wish their families, friends, or even strangers could do that would make their pregnancies better. The responses included such acts as giving up seats on a bus, helping to carry groceries to the car, and assisting with transportation so the pregnant woman can make her prenatal appointments. Publicizing these One Hundred Intentional Acts of Kindness in churches, barber shops, and in other locations around the community, promotes awareness and creates a supportive community that helps to reduce her level of psychosocial stress that contributes to poor birth outcomes.
Further Recommendation

Extend the Healthy Births Initiative to Five Years

It takes more than two years to improve birth outcomes.

One of the most important lessons learned from the past two decades of clinical and community-based interventions to improve birth outcomes is that there is no quick fix. It takes time to change individual health behaviors and it takes even more time to change social norms that reinforce pregnancy behaviors. It took programs like the Healthy Start Initiative over five years to begin to demonstrate some impact (258). Clinical trials of home visitation programs that seek to impact maternal life course and birth outcomes have also proven that long-term relationships between clients and providers demonstrate the most measurable and sustainable behavioral change, and costs are returned to society by the time the child is four years old (243,248,250,251,271). Consistently, feedback from LABBC community engagement activities included the need for a long-term commitment to improving birth outcomes in Los Angeles County if real change was to be realized. Thus, to expect programs funded by the Healthy Births Initiative, to demonstrate significant improvement in birth outcomes in less than two years, may be unreasonable and setting programs up to fail. This may especially be the case for projects that implement interconception interventions that involve extended services over extended time, where an important measure of their success is the prolongation of the interpregnancy interval beyond two years. If the projects end in two years, their impact on subsequent pregnancy outcomes could not be demonstrated.

It takes time to reduce disparities.

An important goal of the Healthy Births Initiative is to reduce disparities in birth outcomes. Racial-ethnic and other sociodemographic disparities in birth outcomes have persisted despite significant improvement in early and adequate utilization of prenatal care over the past decade reminds us that there is no quick and easy solution.

It has taken programs like the Black Infant Health program over five years to begin to demonstrate some reduction in early preterm birth and very low birth weight infants. If these programs were eliminated after two years, they may not have had the chance to demonstrate these important benefits resulting from their intervention.

It takes time to build capacity.

Why extend to Five years?
- There are no “quick fixes”
- Reduce disparities
- Build capacity
- Build collaborations
- Build the infrastructure
- Leverage resources
An important objective of the Healthy Births Initiative is to build community capacity to address issues that impact pregnancy and birth outcomes. While some of the capacity building activities involve filling the gaps within existing systems, others may include creating entirely new services or programs, all of which will take time. This may be particularly the case for innovative programs that take time to develop and implement. There also is a need to strengthen the capacities of communities to improve birth outcomes through health messaging and public policy and advocacy intervention. Much time is needed to acquire the necessary knowledge, skills, experiences, and relationships to conduct effective health messaging and policy advocacy. If communities are expected to carry on the work of applied interventions, health messaging and policy advocacy to improve birth outcomes after the completion of the Healthy Births Initiative, they need to have enough time and support to build that capacity.

It takes time to build collaboration.

Another very important objective of the Healthy Births Initiative is to build collaboration among key stakeholders in maternal and child health. Through the Healthy Births Learning Collaboratives, researchers, providers, consumers, advocates, public health professionals and other stakeholders are brought together to improve birth outcomes in their communities. Collaboration presents both opportunities as well as challenges as these partners share different perspectives, priorities, and agendas. For effective collaboration to take place, partners need to be given sufficient time to learn about each other, develop trust, establish a framework for decision-making and problem resolution and planning. Time is a critical factor needed to create programmatic success. If sustainability is to be maintained long after the completion of the Healthy Births Initiative, then creating a strong foundation is critical.

It takes time to build organizational and collaborative infrastructure.

While many communities have considerable expertise in research, data collection and analysis, and information technologies, some collaborative entities lack the basic tools to track, measure, interpret and utilize data. Community-based organizations and community collaboratives typically spend most of their project dollars on services to clients, and typically may not have had sufficient opportunity to invest in the time saving technologies, such as computer systems, that are available in the more established programs. Further, evaluation, quality improvement and basic client charting and tracking is often done by untrained and overburdened administrative staff that could streamline their functions with better equipment and integrated information systems. The LABBC in its capacity as the Planning and Network Support Provider will have considerable obligations over the long-term trajectory of the Healthy Births Initiative to assist and support these less-established collaboratives in developing evaluation methods, data management plans as well as analyzing and translating data into useful formats to improve birth outcomes.

It takes time to leverage resources.

An important measure of the success of the Healthy Births Initiative is its ability to leverage additional resources toward improving birth outcomes in Los Angeles County. Such resources
may come from federal (see section “National and International Perspective”) or state funds, foundation grants, and private donations. To leverage these additional funding sources, grantees and non-funded partners in the HBLCs will often need to demonstrate the effectiveness of their program which may take more than two years. Additionally, time is needed for many partners to acquire the knowledge, skills, experiences, and relationships to leverage additional resources. Considerable opportunity exists with regard to leveraging the Healthy Births Initiatives efforts to draw down federal Title V MCH Block grant monies, however, the details of successfully accomplishing this would take time to design. To go outside of MCH (i.e., monies set aside for parks and recreation through Proposition K), another set of knowledge, skills, experiences, and relationships may need to be developed. The federal, state, and local budget deficits and the slow economic recovery present even greater challenges to leveraging additional resources over the next few years. In short, from an investment perspective, rather than looking for a quick return within the next year or two that will be difficult to demonstrate, and the Healthy Births Initiative will have a greater impact by focusing on the long-term yield, five or ten years down the road. In order to demonstrate the type of lasting change in the health of Los Angeles women, infants and families that is the vision of the Healthy Births Initiative, long-term sustainable change is needed.
VII. Impact of the Healthy Births Initiative

The approaches recommended for the Healthy Births Initiative were developed by integrating the voices of Los Angeles communities, with data highlighting resources and needs in Los Angeles County and information from the scientific literature on risk factors and evidence-based interventions. This section provides data on the potential impact of the recommended intervention strategies on the birth outcomes in Los Angeles County.

The eight approaches listed below are designed to be implemented as an integrated initiative. Actions in all eight of these areas are needed in order to have a sustained impact on pregnancy outcomes in Los Angeles County. Community members will work together and turn these strategies into a network of comprehensive programs best suited to serve the families of our communities. Implementation of these approaches must be viewed in terms of the numbers of lives (infants and their families) touched by these interventions, the number of infants born at healthy birth weights instead of born low birth weight or preterm, the life-long sequelae averted, and the cost savings to society.

Health is influenced by multiple factors in our internal and external physical, and social environments. Interventions at the community level to support and reinforce efforts to improve health and well-being of pregnant and parenting women and their families can yield sustained improvement. Local communities have been working for years with specific populations and programs to enhance pregnancy and birth outcomes. Knowing what works in a specific community or population is a commodity to be respected and acknowledged when planning further community-based interventions.

The potential impact is not just for today, but also for the future. Changing knowledge, behavior, clinical practice interventions, community capacity, health care systems, and policy initiatives have immeasurable potential impact for future generations in Los Angeles County.
Table V. Eight recommended approaches to improve pregnancy and birth outcomes in Los Angeles County.

### Recommended Approaches

- Health Education and Messaging
- Prenatal Care Quality Improvement
- Interconception Care
- Outreach
- Case Management
- Community Building
- Social Support

### Impact of Policy and Advocacy

Institutional and public policy can significantly impact birth outcomes. Changes in policies that affect pregnant women can have a profound impact on a large population. Well-studied examples of policy change that improved public health were presented in the literature review (Section V) and include policies that reduced smoking in public places and work settings, and those that established folate enriched foods (272,273). Important policy and advocacy changes can occur locally as well as at the county, state and national levels.

The LABBC’s Policy and Advocacy Approach is designed to work towards policy change at two levels. First, the approach provides resources to local communities to strengthen and expand grassroots activities to promote policy or social change. It enhances community capacity to address policy or social issues that impact birth outcomes through the technical assistance available through the Healthy Births Learning Collaboratives, and by broadening the opportunity for collaborative partnering with experts in policy and advocacy to exchange ideas, activities and lessons learned. Through these efforts community members will have the opportunity to use their voice in the policy making process. Most importantly, it strengthens the political will to promote healthy births. Secondly, as the Network Support Provider the LABBC will serve in a coordinating role to link local stakeholders and coalitions working on various priority issues that impact pregnancy and birth outcomes and by communicating local activities through announcements and website postings. The Policy and Advocacy Approach provides the mechanisms (resources, knowledge exchange, networking, coordination and communication) by which communities can mobilize to work for policy and social change that will promote healthy births, both at local community and county levels.

The short-term impact on pregnancy and birth outcomes will depend on which community priority is selected to be addressed. Worksite policies that enforce bans on smoking and/or promote breastfeeding will significantly impact the health of mothers and infants. If working conditions
were addressed as a means to reduce stress and strain for pregnant women such that employment policies were altered allowing pregnant women relief from physically demanding work (i.e., lifting more than 25 lbs), standing for five or more hours, working night shift, and other measures to reduce fatigue, then for every 1000 pregnant women affected by this policy change, between five and 83 preterm births could be prevented. This could result in savings from direct newborn medical care costs of between $268,500 and $4,457,000\(^{23}\) for every 1000 pregnant women served(Table 5).

Addressing such issues at workplaces or industries that employ large numbers of pregnant women in Los Angeles County (i.e., garment industry, custodial services, health care facilities) could have a significant impact on pregnancy outcomes. With only small changes in working conditions (i.e., flexible schedules, more frequent breaks, preferential shift assignments, altered assignments to avoid prolonged standing) dramatic improvements could be realized.

<table>
<thead>
<tr>
<th>Change in Work Condition</th>
<th>Number of Preterm Births Prevented for Every 1000 Women with Work Modification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physically demanding work (i.e., repetitive lifting over 25 lbs, significant physical exertion)</td>
<td>15-27</td>
</tr>
<tr>
<td>Discontinue prolonged standing (i.e., reduce period of continuous standing to less than 5 hours)</td>
<td>12-37</td>
</tr>
<tr>
<td>Discontinue shift or night work.</td>
<td>5-43</td>
</tr>
<tr>
<td>Modify work schedule to reduce fatigue (i.e., reduce long hours to not more than 40 hrs/wk, and 8 hrs/day).</td>
<td>31-83</td>
</tr>
</tbody>
</table>


Implementation of these work change policies for 50,000 or about one third of the approximately 160,000 births in Los Angeles County would reduce the percent of preterm birth from 10.2% to 9.2%; approximately 1575 preterm births would be prevented. This would also realize an estimated $84,500,000 in direct medical care cost savings from the preterm births that were prevented. Similar calculations can be completed if the community selects a policy initiative related to access to nutrition education and resources.

The long-term impact of this approach will be the local and countywide increased capacity for addressing policy and advocacy initiatives to promote health birth outcomes.

\(^{23}\) This estimate is based on the difference in direct medical care costs for the preterm infant during the first year of life over the costs for a term infant. It is important to note that this is an underestimate of the savings to society that would be accrued over the infants lifetime, in terms of costs for medical care for chronic problems related to prematurity, special education and child abuse, among other issues.
Impact of Health Education and Messaging

A number of health messaging interventions demonstrate significant increase in health knowledge that when combined with behavior change, lead to improved birth outcomes. These include the March of Dimes/CDC/National Council on Folic Acid campaign on preconceptional and prenatal use of folic acid, which has increased the proportion of women who are aware of the benefits of folic acid in reducing certain birth defects (in particular neural tube defects) from 52% in 1995 to 75% in 2000 (272). Similarly, the CDC’s “Back to Sleep” Campaign played a significant role in reducing the incidence of Sudden Infant Death Syndrome in California. The total SIDS deaths in California in 1990 were 717. The number of deaths fell to 222 in 2000.24 Both the “Folic Acid” and the “Back to Sleep” campaigns used multi-level and multi-channel health messaging strategies.

The potential impact that can be achieved from an individual level, health education program can be estimated from data from the West LA Preterm Birth Prevention Program conducted in the mid 1980’s. As previously described in the literature review, the West LA Preterm Birth Prevention Program provided intensive individual level health promotion and health education, in conjunction with more frequent prenatal visits and home visitation follow-up and support services to high-risk pregnant women. Over three years, preterm birth was reduced by 19% among women randomized to receive this intervention compared with similar women receiving standard prenatal care (181). While it is inappropriate to attribute the benefits of this program solely to the health education component, health education and health promotion were critical components. From this study it is possible to estimate one preterm birth was prevented for every 59 women that received prenatal care through this comprehensive program. The study was also evaluated for cost effectiveness by Ross et al and showed a net savings of more than $1700 (1992-1993 dollars) per mother baby pair (274).

Impact of Prenatal Care Quality Improvement

Access to quality and culturally competent prenatal care was an identified need at each HBLC meeting held by the LABBC throughout Los Angeles County and by the Advisory Board. The vast majority of mothers in Los Angeles County will, at some point during their pregnancy, come in contact with a health care provider. This may be initiated by the mother, family, work, or outreach contact. For many mothers, contact with a health care provider may be the only service they access during pregnancy. The Prenatal Care Quality Improvement Approach is designed to enhance the process through which prenatal care is delivered from a model that only focuses on the pregnant women as a patient (disease-based model) to a more holistic model that incorporates partnering with the woman, her designated family and her community (strengths-based and client centered). This approach uses the Breakthrough Series25 techniques to teach participants how to implement organizational, system, practice and individual level changes that will facilitate improvements in services including increased screening, treatment and referral for

25 The Breakthrough Series Model is described in detail in the Appendices.
psychosocial and medical risk factors linked to poor pregnancy outcomes. Creation of linkages to community-based organizations for referral sources, as well as outreach and case management services are integral parts of this integrated model of prenatal care. The Healthy Births Initiative has the potential to impact large numbers of pregnant women quickly, by relying on the established practice of women accessing prenatal care, but changing the structure, process and content of prenatal care to facilitate including implementation of best practice clinical guidelines in a culturally appropriate way, as well as establishing a referral network to community-based organizations for needed social service follow-up.

The following community driven priority areas for improving birth outcomes will be directly addressed:

- Smoking cessation
- Poor nutrition
- Domestic Violence
- Maternal depression and stress
- Urinary, reproductive tract, and periodontal infection
- Substance use and abuse
- Diabetes
- Cultural Competency

As part of this approach prenatal care providers will be required to identify and collaborate with community-based organizations that provide such needed services as outreach, case management, domestic violence shelter and counseling, WIC and dietary counseling services, mental and dental health, and establish relationships with Community Assessment Centers for substance abuse referral.

How many women can be reached? For every 1000 women who are followed with the integrated approach using health education, outreach, case management, prenatal care quality improvement, and social support it is estimated that 52 preterm births will be prevented. The March of Dimes estimates the average hospital charges for a preterm infant in the year 2000 at $58,000 compared to $4,300 for the usual infant’s stay (1). Prevention of even 52 preterm births in Los Angeles County could reduce costs for the care of these fragile infants by $2,792,400 for every 1000 women served through these strategies. If services were provided to 16,000 pregnant women, or approximately 10% of the women giving birth in Los Angeles County every year, it is anticipated that up to 830 preterm births could be prevented, with resulting immediate direct health care cost savings of $44,678,000. The community and society would realize additional savings over the course of the child’s lifetime through reduced need for health care for chronic medical conditions related to prematurity, as well as services for prematurity-associated social and developmental challenges. Reduced numbers of preterm infants yields reduced costs for schools through reduced special education needs from reduced numbers of former preterm children with developmental delay and prematurity associated health needs, and to the justice system through reduced child abuse and neglect.

The reduction in preterm birth just discussed is in addition to the potential reductions in low birthweight and preterm birth that can be realized through policy and advocacy changes and through implementation of interconception care described below.
The impact of improved prenatal care quality extends beyond LBW to positively affect the health and behaviors of women, children and families. These benefits are likely to be greater given the synergy of the integrated, multi-level approach. Most importantly, in two years, Los Angeles County will have built an infrastructure and developed local expertise to implement quality improvement methodologies, and to continue the diffusion of best practice guidelines for prenatal care throughout Los Angeles County, beyond the current proposed funding period for the Healthy Births Initiative.

**Impact of Interconception Care**

The greatest risk for having a poor pregnancy or birth outcome is having a prior poor outcome. Most social, behavioral and medical problems that are known to contribute to poor birth outcomes do not resolve once the baby is born. In fact, the ideal time to intervene to treat these problems is before or between pregnancy(ies). Women do not always seek follow-up services for medical problems that developed during pregnancy for a multitude of reasons. Some women may lack the knowledge that the medical condition might continue once the pregnancy has ended while others may lose access to health care benefits within 60 days of giving birth, still others may not even realize there was a problem that could be treated (like periodontal disease or asymptomatic infections); therefore, the problems are not treated and their risk of a subsequent poor birth outcome increases dramatically.

While existing locally based case management programs work with families during pregnancy through the infant’s second birthday, most activities following birth are focused on parenting and child development rather than prevention of subsequent high-risk pregnancies. Further, none of the high-risk follow-up programs provide the necessary level of integrated social support, case management, and medical care recommended by the LABBC to support healthy subsequent pregnancies as well as enhance infant/child development.

This approach is based on a five-year interconception care demonstration program. In this demonstration project, women participating for at least six months had 34% fewer subsequent low birthweight infants, no infants requiring NICU admission and fewer closely spaced pregnancies. Estimates indicate that among the women who had subsequent children, one low birthweight birth is prevented for every three women who participated in the interconception care program for at least six months (240).

Annually, approximately 2000 infants are born weighing less than 1500 grams (3.3 pounds) in Los Angeles County. For every 100 of these women who were enrolled and followed using this interconception care approach approximately 33 low birthweight births would be prevented, and an estimated $1,772,000 would be saved in direct medical care costs for the newborn.
Table VII: Evidence-based risk factors that can lead to reduced low birthweight or preterm birth.

One low birthweight or preterm birth can be prevented, for every
- 56 women who stop smoking in pregnancy (275).
- 4 pregnant women who receive WIC services (276).
- 59 pregnant women who receive prenatal care through a comprehensive, integrated approach that provided intensive health education, more frequent prenatal visits, home visitation follow-up and social support services (181).
- 21 pregnant women with asymptomatic bladder infections who are treated (23).
- 10 pregnant women treated for bacterial vaginosis (35,277).
- 10 pregnant women treated for chlamydia (32).
- 3 pregnant women treated for gonorrhea (95).
- 6 pregnant women who receive comprehensive substance abuse treatment during and after pregnancy.
- 3 women who had a prior very low birthweight infant who receive comprehensive interconception care (240).

One fetal death can be prevented for every
- 31 pregnant women with asymptomatic bladder infections who are treated (23).

One infant with developmental delay or mental retardation can be prevented for every
- 45 pregnant women with asymptomatic bladder infections who are treated (278)

Impact of Outreach

The outreach approach can be instrumental in assisting pregnant women to access needed community resources including access to prenatal health care services, nutritional, child birth, parenting and other health education opportunities, as well as resources for basic needs such as transportation, food, and shelter. The LAC/DHS Perinatal Outreach and Education (POE) Programs were examples of effective outreach and education programs that reached pregnant and parenting women. These programs provided outreach to women needing access to prenatal health care, medical insurance, transportation, and other services as well as conducted health education classes on a variety of topics. From 2001 to 2002 the POE programs provided outreach services to nearly 4,700 clients and held 578 health education classes for over 5,100 clients. The proportion of women who were referred and enrolled in a health insurance program increased 129% above the prior year, and the proportion of women who received the health services that they were referred to increased 235% over the prior year (279). Providing outreach to engage clients and ensure access to resources and needed services is a critical first step to impacting health. While the POE programs lost funding in 2003, implementation of similar outreach programs linked to case management and prenatal care providers as well as other community resources should have similar results.

Impact of Case Management
Case management has been demonstrated to improve utilization of and satisfaction with prenatal care services. Case management, while an intervention in itself, also provides the foundation for integration of other interventions to improve pregnancy outcomes. The impact of case management on birth outcomes should not be evaluated out of context of the integrated, multi-level approach that also includes outreach, prenatal care quality improvement, health education and messaging, interconception care, psychosocial support, community building and policy and advocacy. It is through the integrated system of outreach, prenatal care and case management that long lasting and positive outcomes are obtained.

The case management approach can reinforce and augment health promotion education, coordinate care with health care and social care providers, as well as other needed resources. Further case management will provide the opportunity for working with family and friends to reinforce breastfeeding, parenting and other health messages. Case management provides the opportunity to work closely with women and families building trust so that long-term behavior changes to improve health can be reinforced and sustained.

The California Black Infant Health (BIH) program is one example of a model of community-based interventions that uses outreach and tracking, social support and empowerment, case management and the role of men to improve birth outcomes in African American communities. Preliminary evaluation of the BIH programs showed a nearly 20% reduction in very preterm birth, and 36% reduction in VLBW rates (280). Community-based interventions such as the Los Angeles Nurse Family Partnership program demonstrates similar numbers for improved pregnancy outcomes locally with only 7% of their extremely high risk clients (mean age 17, mean income $10,500) having preterm and 6% low birthweight births. In comparison, in LA County as a whole 10.2% of births are preterm and 6.4% are LBW. It is important to note that neither of these programs use case management exclusively; case management is closely integrated with outreach, education, and social support interventions to achieve these results.

**Impact of Community Building**

Measuring the impact of community building is dependent on the issues addressed, the resources built, and the number of lives touched. Community and individual-level maternal health can be strengthened by building social capital. By enhancing social capital through community-building interventions, the Healthy Births Initiative can:
- Influence pregnancy-related behaviors;
- Influence access to maternal child services and amenities; and
- Provide psychosocial support and resources at the community level.

Each of these factors has been shown to impact pregnancy outcomes.

**First,** community building can improve pregnancy and birth outcomes by developing social norms that influence behaviors that will reduce preterm birth and other risk factors for perinatal morbidity. The change in smoking practices that have occurred with the institution of smoke free public buildings, restaurants and work places are examples of how social norms can change behavior. The integrated, multi-level approach that California took toward tobacco control is credited with the low rate of smoking in California today. Estimates from the California
Maternal and Child Health Survey show only 6% of pregnancy women in Los Angeles County report smoking. **Second**, building social capital within a community creates trust and establishes cohesive neighborhoods and communities, which is essential for coordinating existing services and resource sharing. **Lastly**, cohesive communities lead to empowered social environments, which can serve as a source of support, self-esteem and respect for individuals in the community.

**Impact of Social Support**

It is difficult to predict the exact impact of efforts to increase social support for pregnant women because of its departure from more conventional interventions designed to provide psychosocial support, largely through one-on-one case management and care coordination by home visitors. However, both the community assessment and literature review point to the need for a multi-level approach to providing social support. The LABBC will assist the external evaluator in the design of an evaluation plan to assess the impact of this approach.

**Overall Impact of the Healthy Births Initiative**

Estimates of the impact of the Healthy Births Initiative are best obtained by looking at the impact of the combined strategies. When the members of HBLCs and the Healthy Births Advisory Board were asked to prioritize the strategies they responded, “all are needed”. It is only through this integrated approach that pregnancy outcomes can be improved. The pregnant woman, her family, her community, and the Los Angeles community as a whole are all interconnected and all aspects must be addressed to improve pregnancy outcomes. While this may sound very complex and difficult to implement, in fact it may be the only way to successfully create the environment needed to change the system.

The effect of health messaging is greatly enhanced when supported by individualized health education through multiple interventions, including provider counseling, educational classes and case management. Similarly, the full benefits of outreach and case management cannot be realized if barriers exist in reaching the community resources that clients require, including health care. Similarly, the prenatal care quality improvement approach can only be realized if the efforts within the prenatal care office are carried out of the office to the client’s family, friends, and community. This continuation of care can occur through the following activities: 1) provision of educational materials and community-wide health messages; 2) outreach to friends and family; 3) coordination with case management programs to reinforce health messages and assist with completion of care prescriptions or referrals to community resources; 4) expansion of community resources to meet the needs of pregnant women and families; and 5) provision of community educational opportunities to increase support for pregnant women. Ultimately, it is small changes at all levels of our society that will bring about the incremental steps towards improving health and well-being for pregnant women, infants, families and communities.

The LABBC strategies propose to improve pregnancy and birth outcomes by intervening throughout and at each of First 5 LA’s Circles of Influences. The strategies will impact:

- the individual level using outreach, case management, health education, interconception and prenatal care quality improvement
the family level through outreach, case management, health education, and health messaging
♦ the community level through health messaging, social support and community building
♦ the organizational and system level through prenatal care quality improvement
♦ the society level through policy and advocacy.

By integrating the eight recommended strategies into comprehensive programs in multiple locations around Los Angeles County and by sharing implementation strategies and lessons learned through the HBLCs a more profound impact on each community will take place. Cooperation and communication between programs will serve to strengthen each intervention and increase the likelihood for a healthy pregnancy and birth, and sustained change.

One can conservatively estimate, that from the $15,000,000 investment of the Healthy Births Initiative that reaches at least 16,000 pregnant women, and prevents 830 preterm births, Los Angeles County will receive a return of nearly $3.00 in cost savings for every dollar invested by First 5 LA. Additional, savings will be incurred incrementally from each of the eight core strategies. The lasting effect of implementing these eight strategies as integrated comprehensive programs will be the infrastructure that will be established to sustain the impact of the Healthy Births Initiative beyond the proposed three-year funding period.
VIII. Recommended Implementation Plan  
By First 5 LA

First 5 LA recognized the current state of perinatal health in Los Angeles – that there is significant room for improvement in perinatal outcomes. First 5 LA also recognized the significant disparities by race and ethnicity and by geographic region. The LABBC proposed improving pregnancy and birth outcomes by intervening at multiple levels. The approaches can impact:

- the individual level using outreach, case management, health education, interconception care, and prenatal care quality improvement
- the family level through outreach, case management, health education, and health messaging
- the community level through health messaging, social support, and community building
- the organizational and systems level through prenatal care quality improvement
- the society level through policy and advocacy

The HBI is intended to challenge organizations to work together to link and build on existing services in an effort to meet the comprehensive needs of pregnant women and their families and reduce subsequent poor birth outcomes. By integrating the approaches into comprehensive programs in multiple locations around Los Angeles County, and by sharing implementation strategies and lessons learned through the Healthy Births Learning Collaboratives, a more profound impact on each community can take place. Cooperation and communication between programs can serve to strengthen each intervention and increase the likelihood for a healthy pregnancy and birth and sustained change.

First 5 LA adopted the vision, goals and the seven guiding principles of the Healthy Birth Initiative as recommended by the Los Angeles Best Babies Collaborative.

The vision of the Healthy Births Initiative (HBI) is to optimize the health and well-being of each mother, child and family in Los Angeles County. It is our basic premise that the most important factors needed to optimize an individual child’s potential for early childhood development, intellectual capacity and lifelong good health are: to identify and address the adverse medical, psychosocial and environmental risk factors prior to pregnancy so that babies should be born on time, well-nourished and at a healthy birthweight.
The goals of the HBI are to: 1) Improve outcomes for all pregnant women and their families; 2) Focus on reducing subsequent poor birth outcomes in vulnerable populations, with high need and state of readiness and 3) Build sustainable networks to address the needs of pregnant women, infants and new families.

The Healthy Birth Initiative developed objectives that focus on strengthening the capacity of organizations to provide services and building a network of providers that will create integrated, coordinated and comprehensive services for pregnant women, infants and new families. The objectives are as follows: 1) Facilitate coordinated, integrated, continuous quality care to families at-risk for poor pregnancy and birth outcomes; 2) Facilitate, coordinated, integrated, continuous quality care for pregnant women, and families; 3) Strengthen leadership and service capacity in order to sustain long-term improvement in the delivery of services to pregnant women; 4) Strengthen community capacity for improving pregnancy and birth outcomes through shared learning and mobilizing action; 5) Strengthen family and community support so parents are able to bond with and provide optimal care and nurturing environments for their newborns; 6) Build strategic partnerships and utilize existing networks whenever possible to ensure efficiency of efforts and long-term sustainability and 7) Promote systems change via a policy and advocacy agenda focused on improving pregnancy and birth outcomes in Los Angeles County.

A Framework for the Healthy Births Initiative

The proposed framework is intended to impact all births in Los Angeles County and optimize an investment in geographic regions where the disparities are greatest, namely Antelope Valley and the Central Harbor Freeway Corridor. The evidenced-based approaches include:

- Policy and Advocacy
- Community Building
- Health Education and Messaging
- Social Support
- Prenatal Care Quality Improvement
- Interconception Care
- Outreach
- Case Management

Communities that work together can impact birth outcomes instead of working in competition or isolation. Collaboration presents an opportunity to simultaneously improve the coordination of services, the quality of services and the capacity of organizations and communities. Adopting the approaches will require a centralized coordinated collaborative approach.

The Healthy Births Initiative will have both a universal and focused approach. The Initiative will be organized into three components: Best Babies Collaboratives (BBCs), Center for Healthy Births (CHB) and Healthy Births Learning Collaboratives (HBLCs).
A. Best Babies Collaboratives (BBCs) will be organized by geographic regions in Los Angeles County identified by the state of perinatal health, service capacity and level of readiness. Best Babies Collaboratives will facilitate collaboration among existing organizations in order to provide a comprehensive, integrated model of continuous care serving pregnant women in communities of greatest need. The Best Babies Collaboratives will be designed to implement five evidenced-based and community proven approaches (interconceptional care, case management, health education, health messaging, and support services) to reduce disparities in birth outcomes in their area. These focused interventions during and after pregnancy will prevent poor birth outcomes; improve the capacity of perinatal providers and the quality of care they provide. In addition, the BBCs will work in coordination with the LABBC Center for Healthy Births on the prenatal care quality improvement, policy and advocacy and community building approaches. The LABBC Center for Healthy Births will facilitate collaboration and provide support to the BBCs to provide a comprehensive, integrated model of continuous care serving pregnant women in communities of greatest need.

B. The LABBC Center for Healthy Births will act as the coordinating arm of the Healthy Births Initiative. The Center will house the Prenatal Care Quality Improvement, Policy and Advocacy and Healthy Birth Learning Collaborative components of the Initiative. The Center will provide coordination of technical assistance and network support to the Healthy Births Learning Collaboratives and Best Babies Collaboratives.
1. **Healthy Births Learning Collaboratives (HBLC)** will be coordinated by the LABBC Center for Healthy Births. These collaboratives will provide opportunities to perinatal providers including representatives from Best Babies Collaboratives, and other community stakeholders not funded through the Best Babies Collaboratives, to participate in shared learning, and planning in order to better meet the needs of pregnant women, infants and new families in their communities. The Healthy Birth Learning Collaboratives will provide the HBLC participants with continued network support and capacity building to promote collaboration and improved quality of care.

2. **The Prenatal Care Quality Improvement Core Approach** will be implemented in partnership with the Best Babies Collaboratives, but not exclusive to the Best Babies Collaboratives. The goal of this universal approach to the HBI is to improve the quality and content of prenatal care in Los Angeles County. All Best Babies Collaboratives will include a prenatal care quality improvement approach coordinated through the LABBC Center for Healthy Births.

3. **The Policy and Advocacy Core Approach** is designed to work towards policy change at two levels. First, the approach provides resources to local communities to strengthen and expand grassroots activities to promote policy or social change. It enhances community capacity to address policy or social issues that impact birth outcomes through the technical assistance available through the Healthy Births Learning Collaboratives, and by broadening the opportunity for collaboration with experts in policy and advocacy to exchange ideas, activities and lessons learned. Through these efforts community members will have the opportunity to use their voice in the policy making process. Most importantly, it strengthens the political will to promote healthy births. Secondly, the LABBC Center for Healthy Births will serve in a network support provider role to coordinate and link local stakeholders and coalitions working on various priority issues that impact pregnancy and birth outcomes. The Policy and Advocacy Approach provides the mechanisms (resources, knowledge exchange, networking, coordination and communication) by which communities can mobilize to work for policy and social change that will promote healthy births, both at local community and county levels.

Estimates of the impact of the Healthy Births Initiative are best obtained by looking at the impact of combined strategies. It is expected that through this integrated approach pregnancy outcomes can be improved. The pregnant woman, her family, her community, and the Los Angeles community as a whole are all interconnected and all aspects must be addressed to improve pregnancy outcomes. The effect of health messaging is greatly enhanced when supported by individualized health education through multiple interventions, including provider counseling, educational classes and case management. Similarly, the full benefits of outreach and case management cannot be realized if barriers exist in reaching the community resources that clients require, including healthcare. Equally, the prenatal care quality improvement approach can only be realized if the efforts within the prenatal care office are carried out of the office to the client’s family, friends, and community. This continuum of care can occur through the following activities: 1) provision of educational materials and community-wide health messages; 2) outreach to friends and family; 3) coordination with case management programs to reinforce health messages and assist with completion of care prescriptions or referrals to community...
resources; 4) expansion of community resources to meet the needs of pregnant women and families; and 5) provision of community educational opportunities to increase support for pregnant women. Ultimately, it is small changes at all levels of our society that will bring about the incremental steps towards improving health and well-being for pregnant women, infants, families and communities.

The development of Best Babies Collaboratives is intended to bring multiple organizations with a full commitment to a shared common mission. The aim of the Best Babies Collaboratives (BBCs) is to invest in geographic regions extending from the Antelope Valley through the Central Harbor Freeway Corridor to help link existing resources and strengthen the capacity of existing organizations already providing perinatal services in these areas.

In order to reduce poor birth outcomes and the factors contributing to it, it is expected that the Best Babies Collaboratives will cover the pregnancy and interconceptional phases for at risk women and new mothers residing in the proposed geographic regions. In order to promote longer interconceptional periods and prevent risk behaviors, it is anticipated that the Best Babies Collaboratives will follow the woman for two years following delivery.

The “at risk group of pregnant women and new mothers” who will be the focus of this initiative include:

- Pregnant women or new mothers living on incomes below 300% of the federal poverty level who are at increased risk for having a low birthweight or preterm infants, fetal or infant death, or birth of an infant with a potentially preventable congenital anomaly.
- Pregnant women or new mothers with a chronic medical condition related to pregnancy complications and/or birth of low birthweight or preterm infants, fetal or infant death, or birth of infants with potentially preventable congenital anomalies.
- Pregnant teens or teen mothers.

In addition, the Los Angeles Best Babies Collaborative (LABBC) Center for Healthy Births will coordinate the universal approaches of the Healthy Births Initiative, namely the care quality improvement component, policy and advocacy and community building. Each Best Babies Collaborative will commit to actively participating and partnering with the LABBC Center for Healthy Births on these components of the Healthy Births Initiative as a mechanism to encourage linking of existing services and promoting a perinatal policy agenda in their community that is timely and relevant.
IX. Evaluation

The Healthy Births Initiative, with a focused and universal approach, is intended to demonstrate that:

- A coordinated, integrated system of care utilizing evidenced-based and community proven interventions will reduce the risk of subsequent poor birth outcomes.
- Linking existing networks will build long-term sustainability.
- Coordinated policy and advocacy efforts can have long-term systemic impact.

From the initial planning stages, the LABBC Center for Healthy Births, the Best Babies Collaboratives and the Healthy Birth Learning Collaboratives will be working closely with the External Evaluator of the Healthy Births Initiative in developing and implementing an evaluation plan within a community participatory model.

First 5 LA has committed, in its 2004-2009 strategic plan under the Health Goal Area, to increase the percentage of babies born in Los Angeles County at term and at a healthy birth weight. In order to track the progress toward this objective the Healthy Births evaluation will seek to demonstrate how all of the components of the Healthy Births Initiative contribute to (not an exhaustive list):

- Decreasing the number of low birth weight babies in the focus areas
- Decreasing the number of preterm births in the focus areas
- Decreasing the incidence of infant mortality in the focus areas
- Decreasing the number of repeat poor birth outcomes in the focus areas
- Increasing the quality of prenatal services in the focus areas
- Increasing the reported levels of social support for pregnant mothers in the focus areas
- Increasing the access to care for women at risk for poor birth outcomes
- Increasing the cultural competence of care for pregnant women and new families

Just as important, the evaluation will closely examine the impact of the collaborative process on BBC and HBLC members and the relationship between the collaborative process and the Initiative outcomes. In particular, First 5 LA is interested in documenting the story from the development of the collaboratives through their implementation and demonstrating how effective collaboration improves outcomes for pregnant women and children. The evaluation will also examine the success of linking existing networks for sustainability and the long-term impact of coordinated policy efforts.
X. Integration of Recommendations with First 5 LA

The process by which the LABBC arrived at the proposed strategies as well as the strategies themselves reflect the values, mission, and strategic plan of First 5 LA. Each of the proposed strategies gets at the heart of First 5 LA’s mission statement:

“to optimize the development and well-being of all children, from the prenatal stage until their fifth birthday by increasing resources, ensuring access to services and improving the abilities of families, communities, and providers of service.”

Congruent with the guiding principles of First 5 LA’s 2001-2004 strategic plan, the process and the resulting proposed strategies have:

- Honored the social, cultural and ethnic diversity of families and communities;
- Respected families’ capacities and skills;
- Identified and built upon the strengths of the communities in a way that engages community and fosters cooperation;
- Focused on reducing disparities in access to services;
- Supported family-promotion services;
- Promoted the inclusion of tobacco prevention and cessation in the design of programs and services;
- Promoted flexibility in the use of funds, and
- Defined anticipated results and tracking of efforts to achieve results.

The process by which the LABBC developed its strategic direction mirrors the process used by the First 5 LA when developing its strategic plan:

1. LABBC utilized local, state, and national data and literature on the status of birth outcomes in LA County and best practices and promising interventions.
2. Through HBLC and Advisory Board meetings, meetings with local agencies, and a review of existing documents, the LABBC gathered local community assessments of strengths, needs and resources.
   - Over 536 community members representing over 227 agencies attended the 29 HBLC meetings,
   - Six Advisory Board meetings were held,
One-on-one meetings were conducted with over 40 key agencies who did not attend these community events.

3. Community input was combined with known data and literature and the developing strategies were presented for feedback to the Advisory Board and community members and revised accordingly.

The proposed approaches focus on improving birth outcomes in Los Angeles County, by:

1) Proposing a comprehensive, integrated model of evidence-based, and community proven interventions to be implemented at multiple levels of society;

2) Increasing identification and treatment for specific factors identified by the community as priorities and known to be linked to low birthweight, preterm birth, or other common perinatal health problems;

3) Strengthening family and community support to pregnant women through outreach, case management, health education and messaging, and community-driven social support initiatives;

4) Increasing community capacity by providing resources to enhance, expand and link needed services to implement each of the eight core strategies.

The overriding goal of this initiative is to increase the number of infants born at a healthy birthweight in Los Angeles County. The potential physical and developmental problems facing a low birth weight infant has been well documented throughout this report. Therefore, by proposing interventions aimed at preventing low birth weight, these strategies will help First 5 LA impact its long-term goal of improving school readiness in Los Angeles County. In addition, the strategies also impact the outcomes of good health; safety and survival; economic well-being, and the social and emotional well-being of children ages 0 to 5.

The approaches recommended in this proposal rely heavily on the integration and coordination of the various initiatives of First 5 LA, specifically:

- **School Readiness Initiative.** Is designed to create centers and programs that offer an array of services, including early care and education, health and social services, parenting education and support to promote school readiness. In July 2003, the Children’s Planning Council and First 5 LA finalized and the Board of Supervisions for the County of Los Angeles adopted the strategic “Framework for Tracking and Measuring the Core Set of School Readiness Indicators”. This framework includes the county wide goals for children and family well-being (i.e. good health, economic well-being, safety and survival, social and emotional well-being, and education/workforce readiness). The Countywide goal in this framework, addressing “good health” is that “Children are born with healthy birthweights.” The Healthy Births Initiative and the LABBC recommended Core strategies directly address this goal and provide a direct link between the Healthy Births Initiative and the School Readiness Initiative.
- **Home Visitation Initiative.** The LABBC has identified this as a best practice for improving birth outcomes and a gap in services within LA County. The grantees of the Healthy Births Initiative and the members of the HBLCs will need to work closely with the twenty-nine funded agencies providing home visitation services to mothers and families in order to fill gaps and coordinate services.

- **Universal Access to Preschool and Early Child Initiative.** In addition to its focus on universal access to preschool for 3 and 4 year olds, the two initiatives need to work closely to meet the Universal Access’ goal of supporting the systems of child development services for 0-5 year olds. Progress towards this goal will better serve both initiatives.

- **Healthy Kids Initiative.** This initiative will provide a crucial service for the babies, mothers and families involved in the Healthy Births programs. It is the caregiver, and often the mother, who may have to prioritize basic needs for herself and her baby such as nutrition over needs such as health insurance for her child, which for many is a “luxury item.”

- **First 5 LA Connect.** The information, referral, parent support and assistance to both expectant parents and parents of children up to age five will be a great resource for the providers, HBLC participants, grantees and the populations served. Through the HBLCs and the nature of the proposed collaboration process, key maternal and child health stakeholders will be able to share their knowledge and experience of existing programs and services in the county. The direct information that is provided to the First 5 LA Connect team is crucial for the success of both initiatives.

### Links to National and International Initiatives

As research knowledge increased over the past 30 years it has become increasingly clear that the problems of low birthweight and preterm birth are consistent with what we now refer to as a “complex disease”. Complex diseases are described as an “epigenetic phenomenon” because conditions such as preterm birth and low birth weight are thought to result from the effects of the environment and personal behaviors on the expression of specific genes that are associated with preterm and low birth weight. This perspective is being addressed world-wide and Dr. Calvin Hobel, the Project Director of the LABBC is involved with national as well as international collaboratives on these topics. The purpose of these collaboratives is to develop consensus as to why preterm births and low birth weight have been increasing, and how to develop programs to address this.

There are two major benefits from these complementary national and international collaborative efforts.

- **First,** it provides the opportunity to participate in the developing consensus as to what are the best practices for the identification of women at risk for preterm birth and what interventions are thought to decrease this risk and maybe prevent preterm birth.
- **Second** it provides an opportunity to explore new approaches to the study of this problem and take new and innovative approaches to addressing this major health problem.
NATIONAL PARTICIPATION:

March of Dimes
In 2003 the March of Dimes (MOD) initiated a five year, $75 million research, awareness, and education campaign to help families have healthier babies. The MOD campaign goals are to: 1) increase public awareness of the problems of prematurity to at least 60% and 2) decrease the rate of preterm births by at least 15%. The MOD established a Scientific Advisory Committee on prematurity. This committee is composed of multidisciplinary experts who have been studying the problem of prematurity. Dr. Calvin Hobel was selected to be one of the Maternal Fetal Medicine members of this committee and he will be in a position to support and coordinate local and national MOD programs to augment the Healthy Births programs to improve birth outcomes in Los Angeles County.

National Institutes of Health (NIH)
In June of 2002 NIH sent out a Request for Application (RFA) for community driven research projects to address the health care disparities between African Americans and Caucasians in the U.S. Twelve new investigators were added to the LABBC and this expanded collaborative submitted a proposal suggesting two proposed research studies: 1) working with Neal Halfon and Michael Lu at UCLA we proposed an integrative approach using the “Life Course Health Development” approach for the study of the role of maternal stress on the risk of preterm births and the risk of infection, and 2) using a similar methodology, we designed a second study assessing the role of environmental stress and the biology of these interactions leading to a greater risk of asthma in children and adults. Dr. Calvin Hobel is the principal investigator of this project and during the first two years, this team will work with the other four national centers to identify the most promising research studies to be carried out in communities to address racial health disparities. These research opportunities will allow the LABBC and other collaboratives to address some of the gaps in knowledge about preterm birth and low birthweight.

INTERNATIONAL PARTICIPATION:
In June 1999, Cedars-Sinai developed an international collaboration between Cardiology, Internal Medicine and Obstetrics and Gynecology at Cedars-Sinai and the 2nd Department of Obstetric and Gynecology, Semmelweis University in Budapest, Hungary. First, a Telemed project was established between the respective departments of Obstetrics and Gynecology and over the past two years 20 teledmed conferences have been completed establishing an ongoing exchange of education and new ideas of collaborative research. Next, Dr. Calvin Hobel has established the Eastern European Collaborative between investigators in Hungary, Poland, the Ukraine and Romania to develop collaborative research and the exchange of ideas and training of young investigators from Eastern Europe.

This link with national and international collaborations ensures that the work of the Healthy Births Initiative in Los Angeles County is “cutting edge” while relevant to community needs.
XI. TOPICS FOR FURTHER INVESTIGATION

During our community assessments (40 needs assessments), county data evaluations, 29 Healthy Births Learning Collaborative meetings (HBLC’s), a review of the literature and discussions with the nutrition focus group, several areas needing further data or investigation were identified. The LABBC believes that additional information, in these areas will assist in ongoing efforts to improve the pregnancy and birth outcomes in Los Angeles County.

The six areas on the LABBC research agenda are:

1) Assessment of prenatal nutrition resources and needs in Los Angeles County
   - WIC currently provides services for pregnant women and children with incomes up to 185th% of poverty. However there is little information about the needs and available resources for nutrition education and counseling available for pregnant women living on incomes above 185% of poverty.
   - Needs and resources for pregnant women requiring nutrition interventions (medical nutrition therapy) need to be identified and quantified.

2) Assessment of services provided and subsequent pregnancy and birth outcomes of patients seen by the so-called “Docs in the Box” or “Medi-Cal Mills”
   - Current data on the source/locations through which women receive prenatal care and the content of prenatal care in Los Angeles County is currently fragmented and exists within individual health plans.
   - A study to examine the location and services provided by the “Doc in the Box” providers, as well as the pregnancy outcomes and benefits of this care as perceived by the women who receive care in these settings is needed.
   - This information will inform efforts to improve the content and quality of prenatal care.

3) Assisted Reproductive Technology (ART) Services
   - How do these services contribute to poor pregnancy and birth outcomes in Los Angeles County?
   - What proportion of the costs for caring for LBW and preterm infants are attributable to ART?
   - How can these services and outcomes be monitored in Los Angeles County?
   - If ART practices contribute significantly to poor pregnancy outcomes in Los Angeles County, what policy changes can be facilitated to improve pregnancy and birth outcomes for couples needing ART services?
4) Assessment of existing preconception services
   - What resources are available for preconception care in Los Angeles County?
   - What proportion of clients receive preconception counseling in Los Angeles County?

5) Sources of stress impacting pregnant women
   - What are the main sources of stress related to adverse reproductive outcomes in different neighborhoods?
   - What is the impact of inadequate housing on birth outcomes?

6) Fetal and Infant Mortality Review (FIMR) data for Los Angeles County
The report on the LA FIMR project will be available for review within the next several months. The information within this report may provide vital information that could support or provide direction for the LABBC recommendations.
   - Additional analysis may be provide insight into specific questions about pregnancy and birth outcomes.
XII. Lessons Learned

There were several important lessons learned from Phase I of the Healthy Births Initiative:

1. Time

Perhaps the most difficult lesson for us to learn was the importance of sufficient time to carry out our scope of work. The LABBC did not fully anticipate how long it took to:

- Move this project through the administrative processes at CSMC, UCLA and First 5 LA (e.g. it took nearly three months for the subcontract to UCLA to be approved);

- Come to consensus on priorities and strategies given the diversity of perspectives within the LABBC (e.g. we debated the face validity of the evidence supporting our recommendation to screen for bacterial vaginosis for an entire meeting);

- Engage collaborative planning to develop a blueprint that is truly “community-driven” (e.g. we gathered community input from 600 individuals representing 400 organizations at 30 HBLC meetings across Los Angeles County).

- Change paradigm – what we are proposing is nothing short of a paradigm shift. It takes time for adoption and diffusion of new ideas (e.g. it would have taken us considerably less time to design a service program to address one single perinatal risk factor like cigarette smoking than to develop a comprehensive, multi-level and integrated approach for improving birth outcomes).

Lessons Learned:
1) Allow sufficient time for Phase II projects to build collaborative partnerships, develop capacity and show results. We recommend extending Phase II to five years.
2) For future projects undertaking similar endeavor (especially if the project is multi-level and community-driven), allow sufficient time (e.g. 12 months) for collaborative planning.

2. Collaboration

As described in the Methods section, our first step was to build collaborative partnerships amongst ourselves in the LABBC, with the Advisory Board, and with the HBLC’s.
LABBC -- the diversity of the LABBC was both a strength and a challenge. Because each partner brings somewhat different perspectives, expertise, and agenda to the table, we had to learn how to work together despite our differences. In retrospect, several activities contributed to our success:

- Hiring an organizational development specialist, Dr. Laura Peck, to do a one-day workshop on clarifying our collective vision, setting common goals and objectives, and develop group processes for shared leadership, decision-making, and conflict resolution.

- Developing guiding principles which outlined the framework for LABBC meetings, process for decision-making, and facilitator responsibilities to ensure equal participation by all partners. An example of a tool that facilitated consensus building is the decision-making gradient.

Healthy Births Advisory Board – initially the LABBC made several mistakes with our Advisory Board. Because of conflicting schedules, we were not able to convene our first Advisory Board meeting until January 2003. During that meeting, we solicited Advisory Board input on our first set of recommendations around smoking cessation, which we had already submitted to First 5 LA. Soliciting input after the fact had the effect of making Advisory Board members feel that their input was not valued. During our second meeting, we left only 15 minutes after our presentations for discussion, which also made them feel that their input was not valued. We are grateful for the patience and continued support of our Advisory Board. We learned from our mistakes and subsequent Advisory Board meetings have centered on obtaining board feedback and discussion.

Healthy Births Learning Collaboratives (HBLCs) – we have also learned a great deal about collaborative partnerships in working with the HBLCs. Important lessons include understanding barriers to community participation (e.g. transportation was an important barrier to attendance when we held one countywide meeting at a central location) and the use of verbal and body language (we are indebted to our Advisory Board co-chair, Ms. Loretta Jones for her tireless effort to teach us how to work with the communities as equal partners).

Lessons Learned:
The two critical elements in our success in building collaborative partnerships within the LABBC and with the Advisory Board and the HBLCs are 1) creating a structure and process that ensure equal partnership, and 2) building trust.

3. Development of Strategies

We also had to overcome several barriers in translating our knowledge base into strategies for improving birth outcomes:

- Imperfect knowledge base – Despite all the scientific advances in recent years, we still do not have all the answers for improving birth outcomes, such as preventing LBW. While
we know enough to act now, there remains a great need for continued research on both causes of and effective interventions for LBW.

- **Medical versus social** – An ongoing debate exists in the field about whether the “medical model” or the “social model” is more effective for improving birth outcomes, such as combating LBW. As Paul Wise articulated recently, the choice is not an either-or; we have to do both. There are clinical interventions (e.g. screening for smoking or infections) that have been clearly demonstrated to be effective, but addressing these clinical factors devoid of their social context may have limited impact. Ultimately our blueprint moves beyond the “medical model” and the “social model” to propose a comprehensive, multi-level approach.

- **Service delivery versus community building** – there is also great tension between a service-delivery approach and a community-building model for improving birth outcomes. Clearly there are gaps in services that need to be closed, especially in light of recent budget crises, but there is also a great need for capacity building in the communities. Over the course of the planning phase, we became increasingly aware that the choice is not either-or; we have to do both. The challenge for First 5 LA is to make strategic investments in needed services while at the same time nurturing and fostering the development of community capacity to promote healthy births. It is a balancing act.

1) **Improving birth outcomes** will take both a “medical model” as well as a “social model,” a “service delivery approach” as well as a “community building approach.” What is needed are comprehensive, multi-level strategies that both address service needs at the individual and interpersonal levels, as well as strengthening capacity building at the institutional, community and policy levels for promoting healthy births.

2) **More research on causes and interventions for improving birth outcomes, such as LBW are needed.**
XIII. Conclusion

We heard repeatedly from HBLC participants around Los Angeles County not to “do business as usual.” “If you keep doing the same old thing,” one participant remarked, “you’re going to get the same old result.” What we are recommending is nothing short of a paradigm shift. Instead of looking for yet another quick fix, we are recommending a comprehensive approach integrating eight proven or promising core strategies. Instead of addressing only individual behaviors, we are recommending a multilevel approach targeting multiple circles of influence. Instead of focusing only on the nine months of pregnancy, we are recommending including interconception care for at-risk women and families. Instead of simply paying lip-service to community participation, using community-based participatory research we developed a plan to improve birth outcomes that is truly community-based, community-driven. Instead of doing the same old things that don’t work, we conducted a comprehensive search for strategies that do. And in addition to programs to close service gaps and strengthen systems capacity (a service delivery model), we are also recommending strategies to improve community infrastructure and increase social capital (a community building model). This is the most innovative and ambitious plan to improve pregnancy and birth outcomes in the United States – the children and families of Los Angeles County deserve nothing less.
XIV. References


74. Olsen SF, Secher NJ, Tabor AeaL. Randomised clinical trials of fish oil supplementation in high risk pregnancies. Fish Oil Trials in Pregnancy Team (FOTIP) BJOG. 2000;107. 382-95.


132. Dietz PM, Spitz AM, Anda RF, Williamson DF, McMahon PM, Santelli JS et al. Unintended pregnancy among adult women exposed to abuse or household dysfunction during their childhood. Jama 1999;282:1359-64.


207. Papiernik E, Breart G. Should a prevention program be proposed to high-risk patients or to all patients? [comment]. American Journal of Obstetrics & Gynecology 1994;171:1676-77.

209. Recommendations for the use of folic acid to reduce the number of cases of spina bifida and other neural tube defects. [Review] [14 refs]. Morbidity & Mortality Weekly Report 1992;Recommendations & Reports. 41:1-7.


