Preterm Birth in Alabama

*We Can...and We Have to...Do Better*

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Department of Obstetrics and Gynecology
Scope of the problem: National

• 30% Increase in preterm birth from 1980’s – 2006
• ~450,000 – 500,000 infants/yr
• Peaked in 2006
  • PTB < 37 wk  12.8 %
  • PTB < 34 wk  3.7 %
  • PTB 34-36 wk  9.2 %

Hamilton et al, NVSR, NCHS 2014
Why the increase in PTB until 2006?

• Increase utilization of ultrasound dating
  • Diminishes potential error of LMP dating
• Fertility treatment
  • Increase in multiples
• Scheduled preterm birth
  • Byproduct of improved neonatal care
Why the decrease since 2006?

• Changes in fertility treatment
  • Fewer higher order multiples
• Progesterone availability
  • Probably only a small contributor
• Efforts to reduce elective early delivery
Why does preterm birth matter?

• Major cause of neonatal death and long term morbidity

• Major societal burden
  • Increased utilization of healthcare and social service resources
  • Costs increase for each lower week of GA at birth
  • Decreases school performance and productivity
Economic costs of Preterm Birth

• $26.2 billion/year
• Term infant
  • $3,330 for first yr
  • LOS 1.3 d
• Preterm infant
  • $32,000 for first yr
  • LOS 13 d

IOM, Preterm Birth: Causes, Consequences and Prevention, 2006
WHO: Global Action Report on PTB

15 countries account for two-thirds of the world's preterm births

1. India
2. China
3. Nigeria
4. Pakistan
5. Indonesia
6. United States of America
7. Bangladesh
8. Philippines
10. Brazil
11. Ethiopia
12. United Republic of Tanzania
13. Uganda
14. Sudan
15. Kenya
Why does the problem persist?

• Multiple pathways converge to cause PTB
  • Various contributors
  • Extent of contribution
  • Triggering events
• Lack of understanding interferes with:
  • Risk identification
  • Targeted intervention
March of Dimes 2014 Premature Birth Report Card
**Premature Birth Report Card for 2013**

**United States**

<table>
<thead>
<tr>
<th>Goal</th>
<th>Rate</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.6%</td>
<td>11.4%</td>
<td>C</td>
</tr>
</tbody>
</table>

- PTB < 37 wk 11.4%
- PTB < 34 wk 3.4%
- PTB 34-36 wk 8%

All states, the District of Columbia and Puerto Rico pledged to reduce the preterm birth rate by 8% by 2014.
Premature Birth Report Card for 2013

**Alabama**

<table>
<thead>
<tr>
<th>Goal</th>
<th>Rate</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.6%</td>
<td>15.1%</td>
<td>F</td>
</tr>
</tbody>
</table>

- PTB < 37 wk  
  - 2012 10.0 %  
  - 2013 9.7 %

- PTB 34-36 wk  
  - 2012 10.0 %  
  - 2013 9.7 %

Alabama has pledged to reduce the preterm birth rate by 8% by 2014.
Rate of Preterm Birth in Alabama

<table>
<thead>
<tr>
<th>Year</th>
<th>LMP</th>
<th>CLINICAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>15.3</td>
<td>11.9</td>
</tr>
<tr>
<td>2012</td>
<td>14.9</td>
<td>11.9</td>
</tr>
<tr>
<td>2013</td>
<td>16.4</td>
<td>11.8</td>
</tr>
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</table>
Preterm Birth < 35 wk: Alabama

<table>
<thead>
<tr>
<th>Year</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>7.2</td>
</tr>
<tr>
<td>2004</td>
<td>7.5</td>
</tr>
<tr>
<td>2005</td>
<td>8.0</td>
</tr>
<tr>
<td>2006</td>
<td>7.9</td>
</tr>
<tr>
<td>2007</td>
<td>7.8</td>
</tr>
<tr>
<td>2008</td>
<td>7.3</td>
</tr>
<tr>
<td>2009</td>
<td>7.4</td>
</tr>
<tr>
<td>2010</td>
<td>7.0</td>
</tr>
<tr>
<td>2011</td>
<td>6.8</td>
</tr>
<tr>
<td>2012</td>
<td>6.7</td>
</tr>
<tr>
<td>2013</td>
<td>8.0</td>
</tr>
</tbody>
</table>
Preterm Birth < 32 weeks: Alabama

- 2003: 3.0
- 2004: 3.1
- 2005: 3.3
- 2006: 3.2
- 2007: 3.3
- 2008: 3.0
- 2009: 3.0
- 2010: 2.9
- 2011: 2.8
- 2012: 2.7
- 2013: 3.6
What does this translate to?

- In Alabama, on average each week:
  - 164 babies are born prior to 37 weeks
  - 28 are born prior to 32 weeks
  - 113 weigh less than 2500 gm at birth
  - 21 weigh less than 1500 gm at birth

www.marchofdimes.com/peristats
PTB and Infant Mortality in Alabama: 2013

• 500 infant deaths
  • 331 <37 wk – 66% of deaths
  • 294 <35 wk – 59% of deaths
  • 255 <32 wk – 51% of deaths
  • 218 <28 wk – 44% of deaths
PTB related to perinatal and infant mortality

- LBW (<2500 gm)
  - US: 7.9% of births $\rightarrow$ 66% of deaths
  - Alabama 2012: 10% of births

- VLBW (<1500 gm)
  - 1.5% of births $\rightarrow$ 50% of deaths
  - Alabama 2012: 1.9%
INFANT MORTALITY RATES
LOW vs. NORMAL WEIGHT BIRTHS
ALABAMA, 2003-2013

LOW WEIGHT
57.7

NORMAL WEIGHT
3.0
Racial Disparities in US in Preterm Birth

![Graph showing racial disparities in preterm birth rates from 1990 to 2013.](chart)

**SOURCE:** CDC/NCHS, National Vital Statistics System.
Racial Disparities in Preterm Birth Rate: Alabama vs US

<table>
<thead>
<tr>
<th>Race</th>
<th>Alabama</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>12.3</td>
<td>10.3</td>
</tr>
<tr>
<td>Black</td>
<td>19</td>
<td>16.5</td>
</tr>
<tr>
<td>Hispanic</td>
<td>14.3</td>
<td>11.6</td>
</tr>
<tr>
<td>Native American</td>
<td>19.8</td>
<td>13.4</td>
</tr>
<tr>
<td>Asian</td>
<td>13.2</td>
<td>10</td>
</tr>
</tbody>
</table>
Significance of Disparity in PTB Rates

• Leading cause of infant death
  • Caucasian and Hispanic—Congenital Anomalies

• African American—Preterm Birth
Racial Disparity: Infant Mortality in Alabama 2012

- White: 7.0 per 1,000
- African American: 13.1 per 1,000
- Hispanic: 7.4 per 1,000
INFANT MORTALITY RATES
ALABAMA AND UNITED STATES\(^1\) BY RACE, 2003-2013

Rate per 1,000 Live Births

- AL-BLACK: 12.6
- US-BLACK: 11.4
- AL-WHITE: 6.9
- US-WHITE: 5.1

Years: 2003-2013
Preterm Birth: Causes and Contributors
Epidemiologic and Sociodemographic Risk Factors for PTB

• Maternal Stress
• Maternal Age
• Smoking
• Poverty
• Education

• Health Status
• Nutrition
• Prenatal Care
• Interpregnancy Interval
Causes and Contributors to PTB

- PROM
- Cervical Insufficiency
- Decidual Hemorrhage
- Placental Insufficiency
- Infection/Inflammation
- Maternal co-morbidities
- Uterine Distension
- Prior PTB/Genetics

NICHD GPN for PTB Research, unpublished data
Strongest Contributors to PTB

• Infection/Inflammation
  • Especially with early Spontaneous PTB

• Decidual Hemorrhage

• Cervical Insufficiency
Racial Disparity in Contributors

- African American
  - Maternal Stress
  - Cervical Insufficiency
- Caucasian
  - Decidual hemorrhage
  - Placental dysfunction
  - Uterine distension
Preterm Birth MOD Targeted Factors: Alabama 2013

- Uninsured Women
- Late Preterm Birth
- Smoking

<table>
<thead>
<tr>
<th>Factor</th>
<th>Previous rate</th>
<th>Latest rate</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uninsured women</td>
<td>21.1%</td>
<td>21.2%</td>
<td>✗</td>
</tr>
<tr>
<td>Late preterm birth</td>
<td>10.0%</td>
<td>9.7%</td>
<td>★</td>
</tr>
<tr>
<td>Women who smoke</td>
<td>27.3%</td>
<td>21.7%</td>
<td>★</td>
</tr>
</tbody>
</table>
Disparity in Preterm Birth: Not just racially defined

- State and Regional Geographic Diversity
  - Poverty
  - Education
  - Employment
  - Health Status
Disparity in Preterm Birth: Not just racially defined

- Neighborhood Level
  - Housing
  - Crime
  - Access to Healthy Food
  - Social Support
  - Physical Environment
  - Exercise Capability
Geographic Diversity in Alabama

Preterm Birth Rates
2009-2012 Average
Percent of live births (67 Counties)

- Over 16.0 (23)
- 13.8-16.0 (22)
- Under 13.8 (22)

Value ranges are based on an approximately equal number of counties in each range.
Prenatal Care Provision

<table>
<thead>
<tr>
<th>Year</th>
<th>Adequate</th>
<th>Inadequate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>72.8</td>
<td>12.8</td>
</tr>
<tr>
<td>2012</td>
<td>74.1</td>
<td>12.5</td>
</tr>
<tr>
<td>2013</td>
<td>72.8</td>
<td>13.1</td>
</tr>
</tbody>
</table>
Adequate Prenatal Care by Racial Group

- White
- Black
- Hispanic
- Native American
- Asian
INFANT MORTALITY RATES BY ADEQUACY OF PRENATAL CARE
ALABAMA, 2013

Rate per 1,000 Live Births

- Adequate Plus: 12.6
- Adequate: 4.9
- Intermediate: 6.0
- Inadequate: 10.2
BIRTHS WITH NO PRENATAL CARE
ALABAMA 2003-2013

Number of births

727 791 987 1246 1496 1390 1242 1162 1087 926 875

Insurance Status in Alabama

- Medicaid
- Private
- Self Pay

Year-wise data from 2003 to 2013:
- 2003: 44
- 2004: 45
- 2005: 47
- 2006: 48
- 2007: 48
- 2008: 48
- 2009: 50
- 2010: 51
- 2011: 53
- 2012: 51
- 2013: 51
Insurance Status in PTB: Alabama

- Medicaid
- Private
- Self-Pay

Year | Medicaid | Private | Self-Pay
--- | --- | --- | ---
2003 | 50 | 40 | 5
2004 | 50 | 40 | 5
2005 | 51 | 39 | 5
2006 | 51 | 39 | 5
2007 | 51 | 39 | 5
2008 | 53 | 37 | 5
2009 | 54 | 37 | 5
2010 | 56 | 36 | 5
2011 | 58 | 34 | 5
2012 | 56 | 34 | 5
2013 | 56 | 34 | 5
Insurance Status by Racial Group: 2013 Alabama

- White: Medicaid 39.1%, Private 56.4%, Self-Pay 1.7%
- Black: Medicaid 70.9%, Private 24.2%, Self-Pay 2.4%
- Hispanic: Medicaid 75.1%, Private 14.9%, Self-Pay 7.9%
PTB Rate by Insurance Status

- Medicaid
- Private
- Self Pay

Data for years 2003 to 2013.
Insurance Status of Infant Mortality: 2013

- Medicaid: 60
- Private: 32
- Self Pay: 4
Smoking during Pregnancy: Alabama

- 2003: 10.8%
- 2004: 11.2%
- 2005: 11.6%
- 2006: 11.8%
- 2007: 12.0%
- 2008: 11.8%
- 2009: 11.1%
- 2010: 11.2%
- 2011: 10.6%
- 2012: 10.7%
- 2013: 10.8%
Insurance status by Smoking

- Smoker Medicaid
- Non-Smoker Medicaid
- Smoker Private
- Non-Smoker Private

Years: 2003 to 2013
Infant Mortality: Smoker vs Non-Smoker per 1,000 livebirths

- Smoker
- Non-Smoker
Teen Births: Alabama

Percent of Births

<table>
<thead>
<tr>
<th>Year</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>13.9</td>
</tr>
<tr>
<td>2004</td>
<td>14</td>
</tr>
<tr>
<td>2005</td>
<td>13.1</td>
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<td>2006</td>
<td>13.8</td>
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<tr>
<td>2007</td>
<td>13.7</td>
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<td>11.3</td>
</tr>
<tr>
<td>2012</td>
<td>10.7</td>
</tr>
<tr>
<td>2013</td>
<td>9.3</td>
</tr>
</tbody>
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PERCENT OF BIRTHS WITH A BIRTH INTERVAL LESS THAN 2 YEARS, ALABAMA, 2013

<table>
<thead>
<tr>
<th>Year</th>
<th>Percent of Births</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>23.3</td>
</tr>
<tr>
<td>2004</td>
<td>23.9</td>
</tr>
<tr>
<td>2005</td>
<td>24.2</td>
</tr>
<tr>
<td>2006</td>
<td>24.7</td>
</tr>
<tr>
<td>2007</td>
<td>25.5</td>
</tr>
<tr>
<td>2008</td>
<td>26.3</td>
</tr>
<tr>
<td>2009</td>
<td>25.2</td>
</tr>
<tr>
<td>2010</td>
<td>24.1</td>
</tr>
<tr>
<td>2011</td>
<td>23.0</td>
</tr>
<tr>
<td>2012</td>
<td>22.3</td>
</tr>
<tr>
<td>2013</td>
<td>22.5</td>
</tr>
</tbody>
</table>
INFANT MORTALITY RATES BY BIRTH INTERVAL ALABAMA, 2013

Per 1,000 Live Births

Less than 2 Year Interval: 11.4
2 Year or more Interval: 6.9
Late Preterm and Early Term Birth: Significance and Changes
INFANT MORTALITY RATE, GESTATIONS 35-40 WEEKS, ALABAMA, 2013

Per 1,000 Live Births

<table>
<thead>
<tr>
<th>Gestation</th>
<th>Rate</th>
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</thead>
<tbody>
<tr>
<td>35</td>
<td>10.6</td>
</tr>
<tr>
<td>36</td>
<td>8.1</td>
</tr>
<tr>
<td>37</td>
<td>5.0</td>
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<tr>
<td>38</td>
<td>3.3</td>
</tr>
<tr>
<td>39</td>
<td>2.8</td>
</tr>
<tr>
<td>40</td>
<td>2.4</td>
</tr>
</tbody>
</table>
PERCENT OF BIRTHS AT 37-40 WEEKS GESTATION, ALABAMA, 2009-2013

Year
2009 2010 2011 2012 2013

Percent of All Live Births
10 15 20 25 30 35 40 45

37 weeks
38 weeks
39 weeks
40 weeks

35.1 36 38.6 40.7 42.7
23.2 21.6 19.9
15.9 16 16.8
12.5 12.5 11.9
11.8 16.6 16.4
Stillbirths in Alabama: Per 1,000 births

<table>
<thead>
<tr>
<th>Year</th>
<th>&lt;37</th>
<th>37-40</th>
</tr>
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<tbody>
<tr>
<td>2013</td>
<td>9.0</td>
<td>1.8</td>
</tr>
<tr>
<td>2012</td>
<td>9.0</td>
<td>1.8</td>
</tr>
<tr>
<td>2011</td>
<td>9.2</td>
<td>1.5</td>
</tr>
</tbody>
</table>
Summary

- Alabama continues to have one of the highest rates of PTB in the US
- The high rate of PTB is a major contributor to the high perinatal mortality rate
- There are significant racial and geographic disparities
- We have made progress in reducing early elective deliveries
- We have tremendous opportunities for improvement