Trends in interpregnancy interval and preterm births in California: Comparison between adolescents and adults

Marina J. Chabot, MSc
Dan (Susan) Sun, MPH
Ingrid Cordon-Alexander, PhD
Mark Damesyn, DrPH

American Public Health Association
November 1, 2016
Denver, CO

Session: Improving Pregnancy Outcomes: Populations at High Psychosocial Risk
Program: Maternal and Child Health

Center for Family Health
Presenter Disclosure
Marina J. Chabot

(1) The following personal financial relationships with commercial interests relevant to this presentation existed during the past 12 months:

No relationships to disclose.
Learning Objectives

- Demonstrate the association between suboptimal interpregnancy interval (IPI) and preterm birth (PTB)

- Compare differences in suboptimal IPI and PTB between adolescents and adults
Why this Topic Area: The Rationale

Healthy People 2020
- Prevention of preterm birth
- Reducing the proportion of pregnancies conceived within 18 months of a previous birth

One-third of infant deaths in the U.S. attributable to preterm birth

High societal cost of preterm birth annually

Rapid repeat births among adolescents
Adolescent Birth Rate (ABR) and Percentage of Repeat Birth (PRB): California, 2000-2012

- **ABR decline:** 44%
- **PRB decline:** 18%

![Graph showing the decline in ABR and PRB from 2000 to 2012](image)
Organizing our Study

- **Data Sources**
  - California’s birth data files:
    - 2000-2002 and 2010-2012

- **Methods**
  - Analyses of singleton second live birth to women aged 44 and below
  - Bivariate analyses
  - Logistic regression
Definitions of key terms

- Preterm birth (PTB) – Births at less than 37 weeks of gestation per 100 live births
  - Very preterm – Births at less than 32 weeks
  - Moderately preterm – Births at 32-36 weeks

- Interpregnancy interval (IPI) – Number of months between a live birth and the conception of the next live birth
  - Gestational age (Based on LMP)
  - Suboptimal IPI – Less than 18 months
## Select Characteristics: California Mothers

### Median Age
- Adolescents: 2000-02: 18, 2010-12: 18
- Adults: 2000-02: 29, 2010-12: 29

### Race/Ethnicity
- **Hispanic**: 2000-02: 68%, 2010-12: 75%, Adults: 2000-02: 47%, 2010-12: 49%
- **White**: 2000-02: 17%, 2010-12: 12%, Adults: 2000-02: 33%, 2010-12: 29%
- **Asian**: 2000-02: 4%, 2010-12: 2%, Adults: 2000-02: 12%, 2010-12: 14%
- **Black**: 2000-02: 8%, 2010-12: 8%, Adults: 2000-02: 6%, 2010-12: 5%

### Prenatal care initiation
- **1st Trimester**: 2000-02: 73%, 2010-12: 69%, Adults: 2000-02: 87%, 2010-12: 85%

### Adequacy of prenatal care utilization
- **Adequate /plus**: 2000-02: 68%, 2010-12: 68%, Adults: 2000-02: 78%, 2010-12: 80%

### % Medi-Cal Paid
- **Prenatal Care**: 2000-02: 70%, 2010-12: 76%, Adults: 2000-02: 38%, 2010-12: 44%
- **Delivery**: 2000-02: 71%, 2010-12: 76%, Adults: 2000-02: 38%, 2010-12: 45%

Adolescents, aged 19 and below
n=23,134  n=15,655

- LT 32 weeks: 1.7% (2000-2002), 1.8% (2010-2012)
- GE 37 weeks: 87.4% (2000-2002), 88.0% (2010-2012)

Adults, aged 20-44
n=429,036  n=429,932

- LT 32 weeks: 1.0% (2000-2002), 0.9% (2010-2012)
- GE 37 weeks: 91.7% (2000-2002), 92.2% (2010-2012)

Adolescents, aged 19 and below

2000-02
- <= 6 months: 21.0%
- 7-11 months: 17.5%
- 12-17 months: 19.8%
- 18-23 months: 14.2%
- 24-36 months: 15.9%
- 37+ months: 6.6%

2010-12
- <= 6 months: 23.0%
- 7-11 months: 14.6%
- 12-17 months: 21.0%
- 18-23 months: 15.6%
- 24-36 months: 15.9%
- 37+ months: 5.6%

Adults, aged 20-44

2000-02
- <= 6 months: 14.6%
- 7-11 months: 21.0%
- 12-17 months: 21.0%
- 18-23 months: 23.0%
- 24-36 months: 19.6%
- 37-59 months: 4.6%

2010-12
- <= 6 months: 20.3%
- 7-11 months: 17.5%
- 12-17 months: 12.2%
- 18-23 months: 11.7%
- 24-36 months: 19.8%
- 37-59 months: 12.5%
- 60+ months: 8.3%
Results: Logistic Regression
IPI as a risk factor for PTB

- Association of PTB and IPI, adjusted for mothers’ age, race/ethnicity, adequacy of prenatal care (PNC), source of payment of PNC, and time period

- IPI less than or equal to 6 months is significantly associated with PTB, both for adolescent and adult mothers

<table>
<thead>
<tr>
<th></th>
<th>Adolescents</th>
<th>Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPI &lt;= 6 months</td>
<td>1.37**</td>
<td>1.37**</td>
</tr>
<tr>
<td>IPI 7 -11 months</td>
<td>1.17*</td>
<td>1.12**</td>
</tr>
<tr>
<td>IPI 12-17 months</td>
<td>1.22*</td>
<td>1.04*</td>
</tr>
<tr>
<td>IPI 18-23 months (ref)</td>
<td>1.00</td>
<td>1.05*</td>
</tr>
<tr>
<td>IPI 24-36 months</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>IPI 37 + months</td>
<td>1.09</td>
<td>1.09</td>
</tr>
</tbody>
</table>

Adolescents | AOR | Confidence Interval
IPI <= 6 months | 1.37** | 1.23 1.53
IPI 7 -11 months | 1.17* | 1.04 1.31
IPI 12-17 months | 1.22* | 1.09 1.36
IPI 18-23 months (ref) | 1.00 | 0.89 1.13
IPI 24-36 months | 1.00 | 0.89 1.13
IPI 37 + months | 1.09 | 0.93 1.28

- AORs decline as the length of IPIs increase; for adult mothers, the risk significantly increased again when IPI departs from the optimal IPI of 18-23 months

AOR=Adjusted Odds Ratio   *p <0.01   **p < 0.0001;
### Results: Logistic Regression... Cont.

#### Age

<table>
<thead>
<tr>
<th>Age</th>
<th>Adolescents (Ref=Aged 19)</th>
<th>Adults (Ref=Aged 20-29)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AOR</td>
<td>CI</td>
</tr>
<tr>
<td>Aged 15</td>
<td>2.00**</td>
<td>1.42</td>
</tr>
<tr>
<td>Aged 16</td>
<td>1.38**</td>
<td>1.17</td>
</tr>
<tr>
<td>Aged 17</td>
<td>1.19*</td>
<td>1.08</td>
</tr>
</tbody>
</table>

#### Race/ethnicity (ref=White)

<table>
<thead>
<tr>
<th>Race/ethnicity</th>
<th>Adolescents</th>
<th>Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AOR</td>
<td>CI</td>
</tr>
<tr>
<td>African-American</td>
<td>1.43**</td>
<td>1.24</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>1.33*</td>
<td>1.09</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1.06</td>
<td>0.95</td>
</tr>
</tbody>
</table>

#### Adequacy of prenatal care (ref=Adequate)

<table>
<thead>
<tr>
<th>Adequacy of Prenatal Care</th>
<th>Adolescents</th>
<th>Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AOR</td>
<td>CI</td>
</tr>
<tr>
<td>Adequate plus</td>
<td>11.45**</td>
<td>10.27</td>
</tr>
<tr>
<td>Intermediate</td>
<td>1.43**</td>
<td>1.21</td>
</tr>
<tr>
<td>Inadequate</td>
<td>4.35**</td>
<td>3.85</td>
</tr>
<tr>
<td>Missing</td>
<td>6.63**</td>
<td>5.58</td>
</tr>
</tbody>
</table>

*AOR=Adjusted Odds Ratio ; CI=Confidence Interval  *p < 0.01  **p < 0.0001*
Discussions

- Significant association between IPI and PTB for both adolescents and adults
  - Tailoring care for adolescents and adults
    - Unique psychosocial needs of repeat pregnant adolescents

- Late and inadequate prenatal care may lead to unfavorable birth outcome
  - Unplanned pregnancy may delay prenatal care initiation
Role of post-partum care

- Provision of LARC helps to reduce rapid repeat pregnancies
- Addressing challenges such as breastfeeding
  - Adolescent mothers are less likely than adult mothers to breastfeed their babies
- Why post-partum is not as common as prenatal care
Next Steps

- Examine post-partum visit and contraceptive use
  - Use MIHA (CA’s version of PRAMS)
  - Provides rich data that captures pregnancy intention, postpartum care and SES among CA mothers

- Promote prenatal and postpartum care
  - Incorporate education about optimal IPI, both during prenatal and postpartum visits
  - Health education about the critical role of birth control plan appropriate to individual woman
Limitations

- Inability to capture women who had previous pregnancy that did not result in a live birth
- Non-existing socioeconomic status data in the birth data file
- Inherent limitations in the birth data file such as missing data and potential inaccuracy of gestational age measure
- Not able to determine pregnancy intention
- Estimated AORs may be biased away from the null since PTB is not a rare outcome
References

Acknowledgement

Connie Mitchell, MD, MPH
Deputy Director, CDPH,
Center for Family Health

Addie Aguirre, Asst. Chief
MCAH Division, CDPH

Shabbir Ahmad, DVM, PhD
Chief, EAPD Branch, MCAH Division,
CDPH

Mike Curtis, PhD
Chief, ASPD Section, EAPD Branch,
MCAH Division, CDPH

This work was supported by the federal Title V block grant administered by the Health Resources and Services Administration (HRSA)
Contact Information:
Marina.Chabot@cdph.ca.gov
916-322-2337