Active and passive smoking among pregnant women: a biomarker study in whites, blacks, Hispanics, and 10 other subgroups in California

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Health risks from second hand smoke exposure during pregnancy

• adverse effects on fetal growth
  – increased risk of low birth weight

• prematurity
  – increased risk of preterm birth

• newborn complications
  – increased risk of respiratory distress syndrome


Study aims

To objectively measure active smoking and second hand smoke exposure during pregnancy in:

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<thead>
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<th>Ten minority groups:</th>
<th>Three major subgroups:</th>
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<td>• Asian Indian</td>
<td>• Hispanics</td>
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<td>• Cambodian</td>
<td>• Whites</td>
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<td>• Chinese</td>
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<td>• Samoan</td>
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<td>• Vietnamese</td>
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Study design and population

• Cross-sectional design
• Derived from 180,000+ pregnant women in California’s Prenatal Screening Program
• November 1999 to December 2002
• Imperial, Orange, San Diego Counties
• Maternal serum specimens collected at 15-19 weeks gestation
• Banked by Project Baby’s Breath
• Randomly selected 300 or more pregnancies for each race-ethnicity group
  – Except Native Americans (N=245) and Samoans (N=184) for which all available banked specimens were selected
Nicotine exposure: metabolic pathway

Circled compounds indicate excretion in urine and associated numbers indicate percent of systemic dose of nicotine

Source: Benowitz et al., 1994
Cotinine lab testing
(measurable biomarker of tobacco exposure)

- Highly sensitive method: isotope dilution high performance liquid chromatographic-atmospheric pressure chemical ionization tandem mass spectrometry
- Sensitive assay
  - Quantitation level: 0.018-0.025 ng/mL
  - Used values to 0.001 ng/mL
- Reflects exposure of last several days
Tobacco exposure in total study population, as measured by cotinine levels in ng/mL*

* Data are log transformed

PRELIMINARY DATA
Cotinine distribution in three subgroups

Hispanics

Whites

Blacks

PRELIMINARY DATA
Percent of pregnant women with any detectable cotinine exposure, by race

- Black: 93%
- Samoan: 92%
- Am Indian: 91%
- White: 89%
- Korean: 90%
- Cambodian: 91%
- Japanese: 89%
- Laotian: 88%
- Hispanic: 86%
- Filipino: 84%
- Chinese: 82%
- Vietnamese: 90%
- Asian Indian: 92%

PRELIMINARY DATA
Percent active smokers by race

PRELIMINARY DATA
Percent active smokers and cotinine levels in non-smokers

Percent active smokers

Cotinine levels* among non-smokers

*Cotinine ng/ml, geometric mean of group

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Percent active smokers and cotinine levels in non-smokers

**Percent active smokers**

- Black
- Samoan
- Am Indian
- White
- Korean
- Cambodian
- Japanese
- Laotian
- Hispanic
- Filipino
- Chinese
- Vietnamese
- Asian Indian

**Cotinine levels* among non-smokers**

- Black
- Samoan
- Cambodian
- American Indian
- Vietnamese
- Korean
- Laotian
- Asian Indian
- Hispanic
- Filipino
- Japanese
- White
- Chinese

* *Cotinine ng/ml, geometric mean of group*
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Hispanic
Filipino
Chinese
Vietnamese
Asian Indian

*Cotinine ng/ml, geometric mean of group

PRELIMINARY DATA
Percent active smokers by cotinine levels* in nonsmokers

* Cotinine is log-transformed.
Results summary

Tobacco exposure:

• 79%-95% of women had some type of tobacco exposure during pregnancy

• Active smoking: 0.3%-11% of pregnant women smoked during pregnancy
Results summary – Active smoking

• Highest levels (8-12%):
  – Native Americans, Samoans
  – similar to blacks and whites

• Lowest levels: (< 2%):
  – Asian Indians, Vietnamese, Chinese, Filipinos, Laotians
  – similar to Hispanics

• Whites had high levels of active smoking but low levels of passive smoking
Results summary – Passive smoking

• Highest average exposures:
  – Samoans, Native Americans
  – Similar to Blacks

• Lowest average exposures:
  – Chinese, Japanese, Filipinos, Asian Indians, Laotians
  – Similar to whites and Hispanics

• Some groups had low active smoking but relatively high passive smoking
  – Vietnamese, Cambodians, Koreans

PRELIMINARY DATA
Conclusions & Policy Implications

• Tobacco exposure in pregnancy varies substantially across race/ethnicity groups
• Rates of active smoking may not reflect the patterns of second hand smoke exposure
• Education and other efforts are still needed to bring down active smoking rates in some subgroups
• There are subgroups with low levels of smoking that are still getting exposed to second hand smoke needing attention
Authors and Funder

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