

Pregnancy and birth outcome improvements for American Indians in the Healthy Start program of the Inter-Tribal Council of Michigan, 1998-2008: an 11-year cohort study

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Presenter Disclosures

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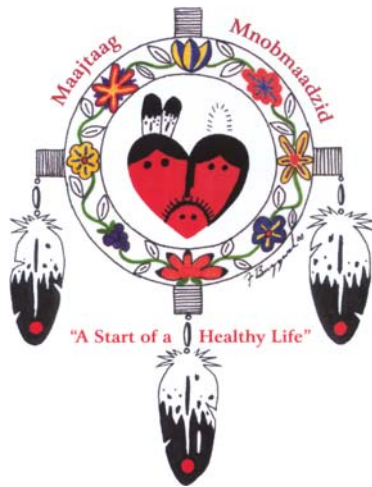
- (1) The following personal financial relationships with commercial interests relevant to this presentation existed during the past 12 months:**

No relationships to disclose.

Healthy Start

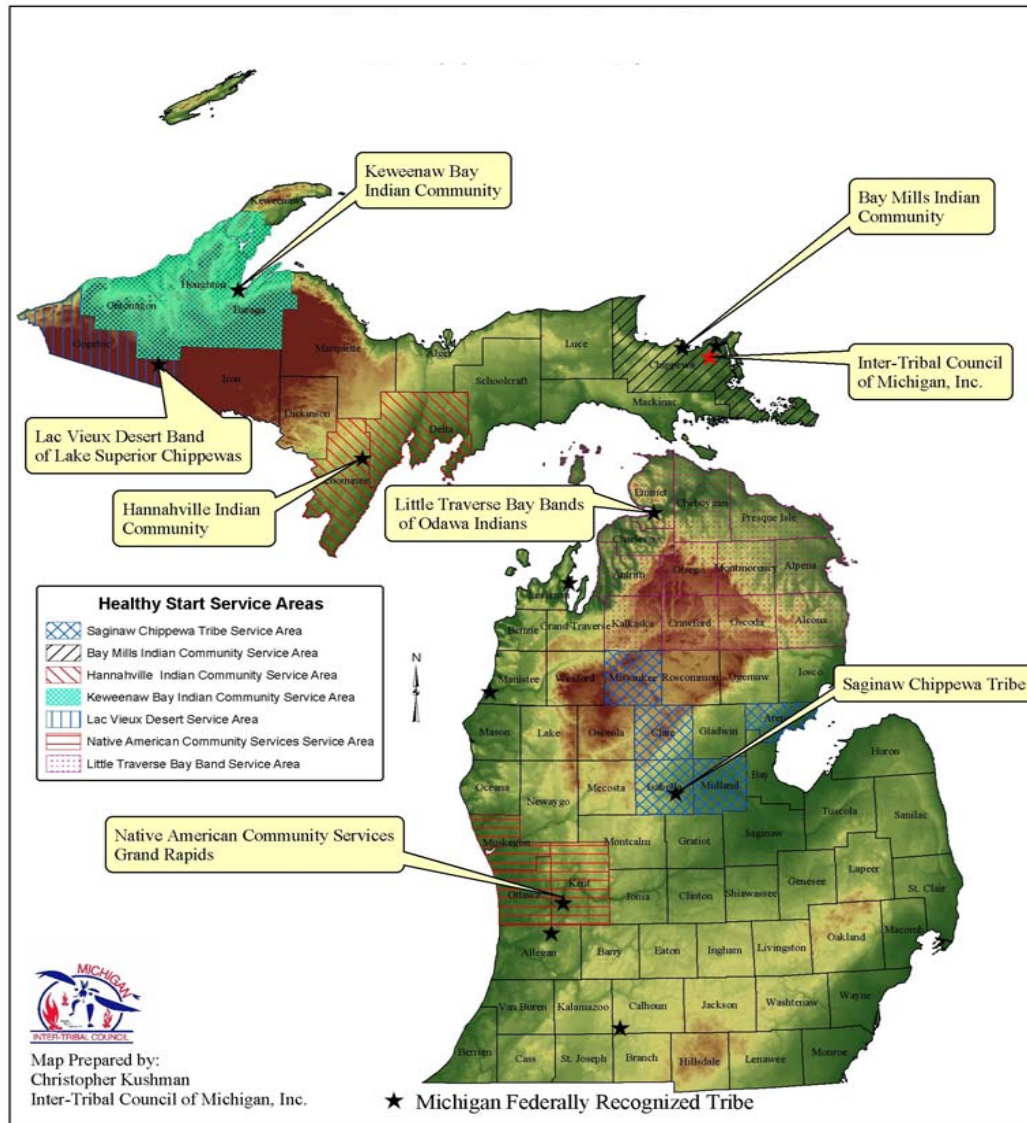
- Initiated in 1991, national program aiming to reduce infant mortality and improve pregnancy and birth outcomes
- Home visiting program that emphasizes community-driven and population-specific interventions
- Operates in communities with infant mortality rates at least 1.5 times the national average IMR
- Federally funded through HRSA

Maajtaag Mnobmaadzid: The Start of a Healthy Life



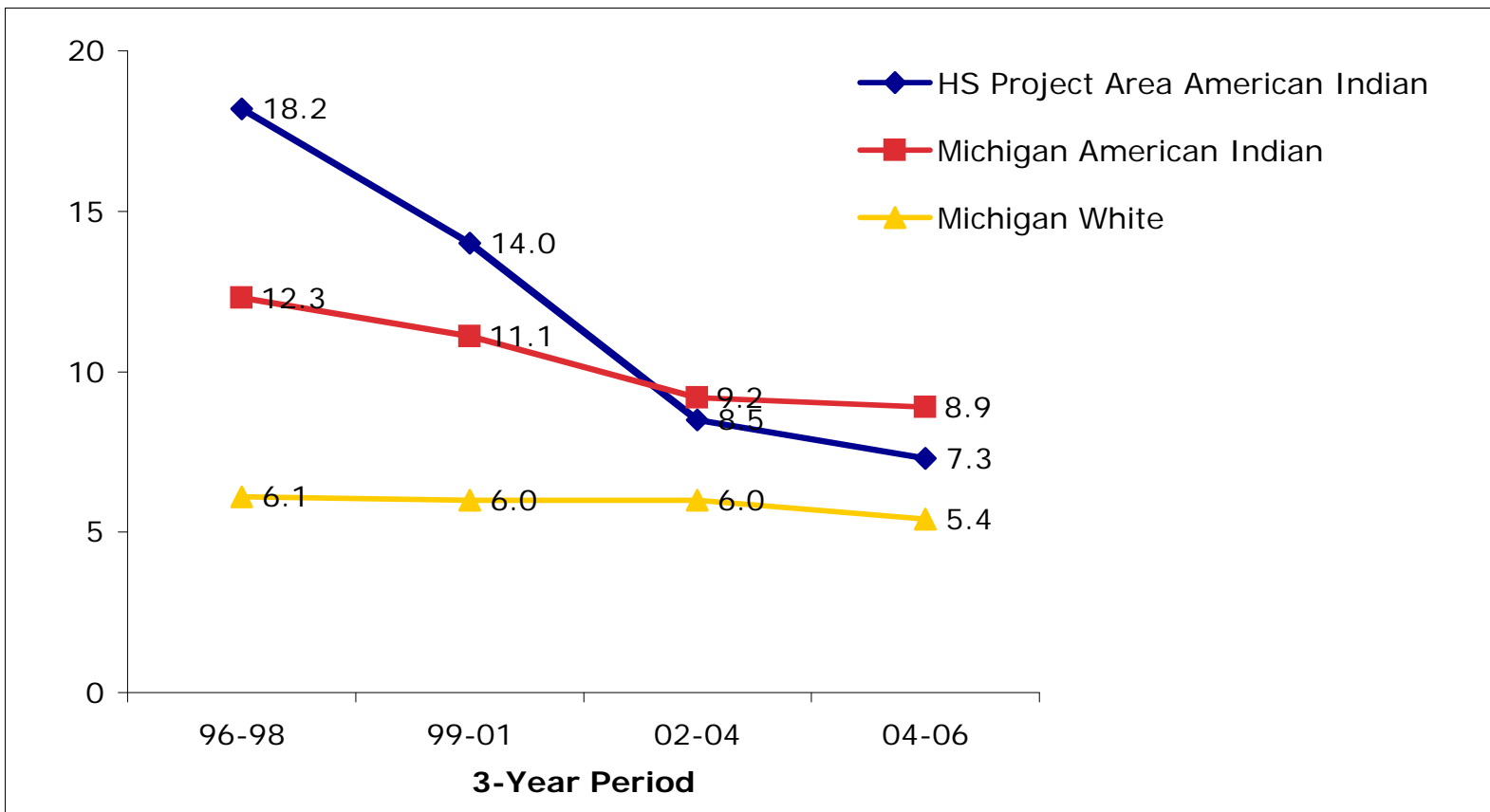
- American Indian IMR in Michigan is 9.7, 1.8 times the White, Non-Hispanic IMR of 5.5 (2006-2009).
- Total Project area is 27 counties.
- 5 U.P. communities are very rural, isolated, economically challenged areas, severe weather.
- High stress profile (poverty, smoking, DV history, substance use, depression, housing, job issues, discrimination).
- No income or “risk status” eligibility requirements.
- Based at tribal sites and managed by tribes.
- Nurse and outreach worker teams.

Inter-Tribal Council of Michigan, Inc. Healthy Start Sites



Outcomes and Progress

Three-Year Average Infant Mortality Rates,
Michigan, 1996-2006



Study Questions

- Do Healthy Start mother-infant pairs have improved pregnancy and birth outcomes when compared to non Healthy Start pairs?
- Does the impact of Healthy Start differ in rural vs. urban areas?
- Does the impact of Healthy Start differ in higher vs. lower income areas?

Study Design and Sample Size

- Retrospective cohort study
- American Indian births in Michigan between January 1, 1998 and December 31, 2008
 - Singleton births
 - Counties where at least 5% of all American Indian births were to HS participants
- Final cohort: 4,149 infants
 - 872 Healthy Start participants
 - 3,277 Non-Healthy Start participants

Data and Exposure Groups

- State of Michigan live birth records, 1998-2008
- Identified Healthy Start participants and a comparison group by linking Healthy Start participant records to state of Michigan live birth records
 - Link Plus 2.0
 - Identified 95.6% of 1,402 infants in HS records
- Exposed: Infants born to women who enrolled in Healthy Start prenatally (participants)
- Unexposed: American Indian infants born to women who did not enroll prenatally (non-participants)

Outcome Variables

- Low Birth Weight:
 - <2500 g vs. ≥ 2500 g
- Preterm Birth:
 - <37 weeks vs. ≥ 37 weeks
- Inadequate Prenatal Care:
 - Revised Kessner Index=Inadequate vs. Revised Kessner Index=Adequate or Intermediate

Potential Confounding Factors

- Parity
- Infant's Sex
- Number of Maternal Risk Factors
- Mother's Tobacco/Alcohol Use During Pregnancy
- Source of Payment for Delivery
- Mother's Age
- Mother's Education

Analysis

- Chi-square tests and independent samples t-tests to determine difference in risk factors between HS and non-HS participants.
- Logistic regression models to calculate odds ratios describing association between HS exposure and each outcome.
- Confounding assessed using change in estimate criterion.
- Analyses conducted using SAS 9.2.

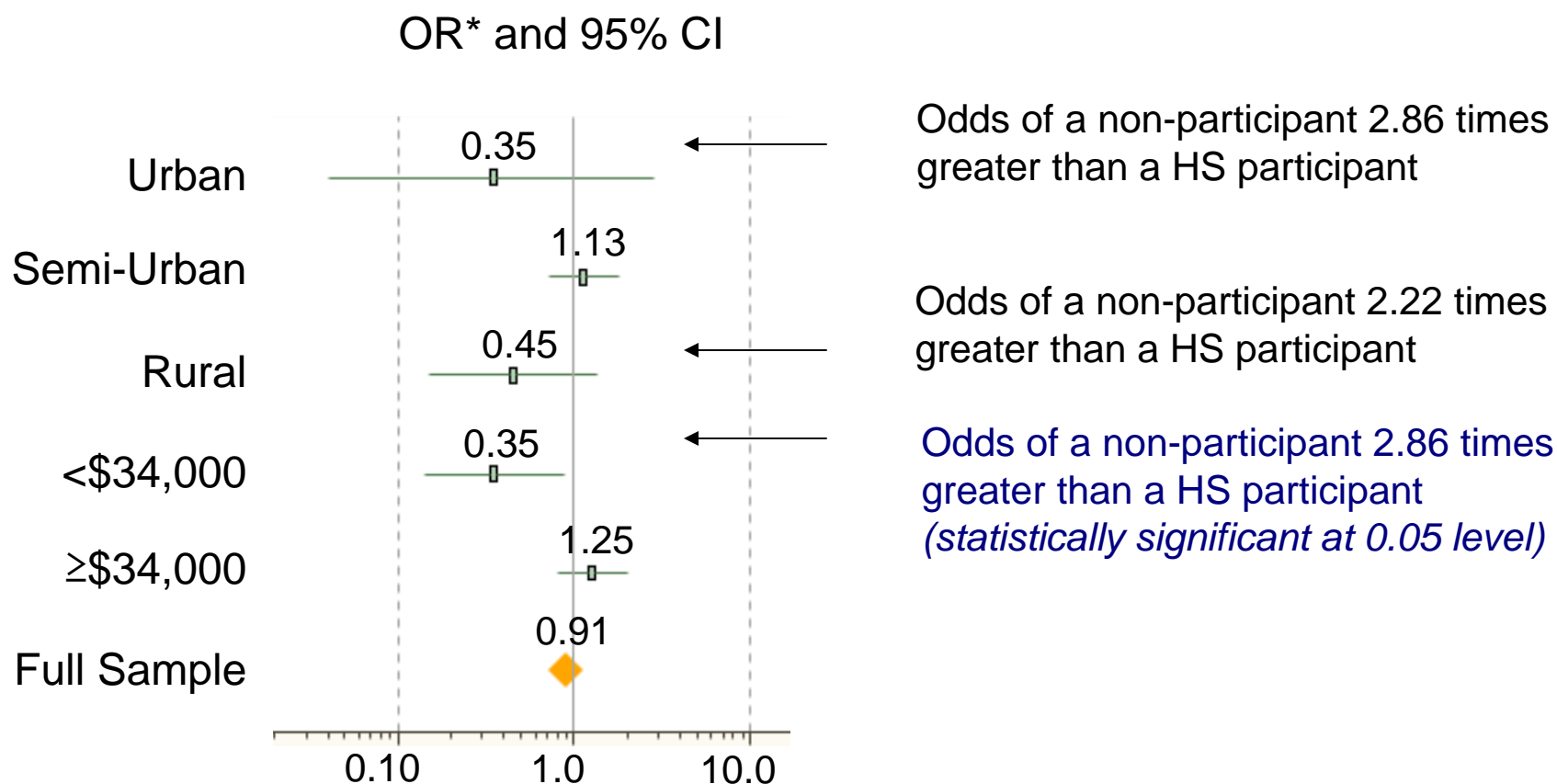
County-Level Stratifications

- To test hypothesis that HS had different impacts in rural and urban settings, data stratified by urbanicity (2003 U.S. Dept. of Agriculture data).
- To test hypothesis that HS had different impacts in lower and higher income settings, data stratified by median household income (2000 U.S. Census data).

Results

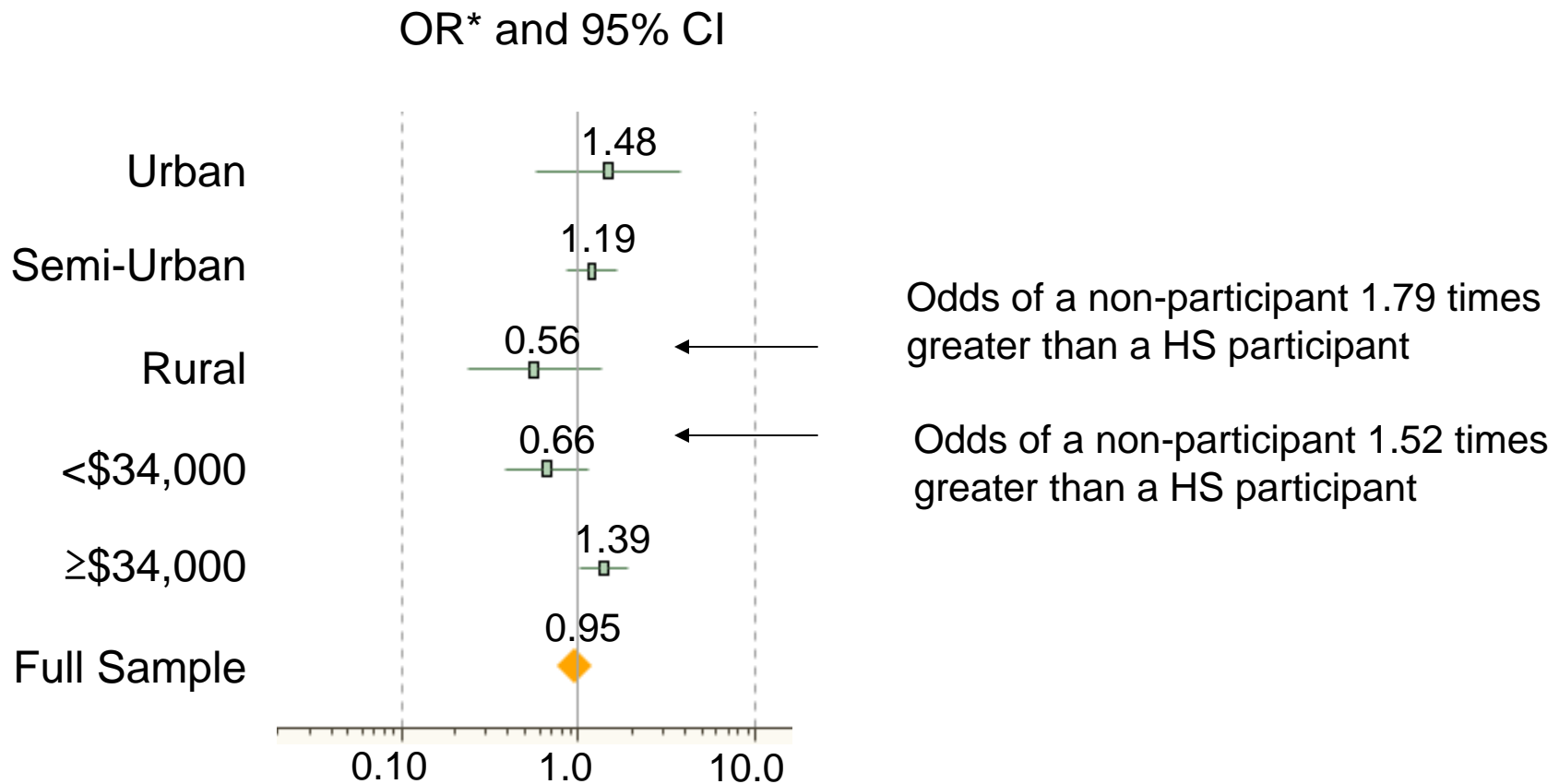
- Final sample size: 4,149 births, of which 872 were Healthy Start participants
- Healthy Start participants tended to:
 - Be slightly younger (24.5 years vs. 25.1 years)
 - Have greater number of risk factors (maternal morbidity)
 - Live in rural counties
 - Live in counties with lower median household incomes
- There was no difference between participants and non-participants in infant sex, parity, maternal education, or tobacco and alcohol use.

Odds of Low Birth Weight, Participants vs. Non-Participants



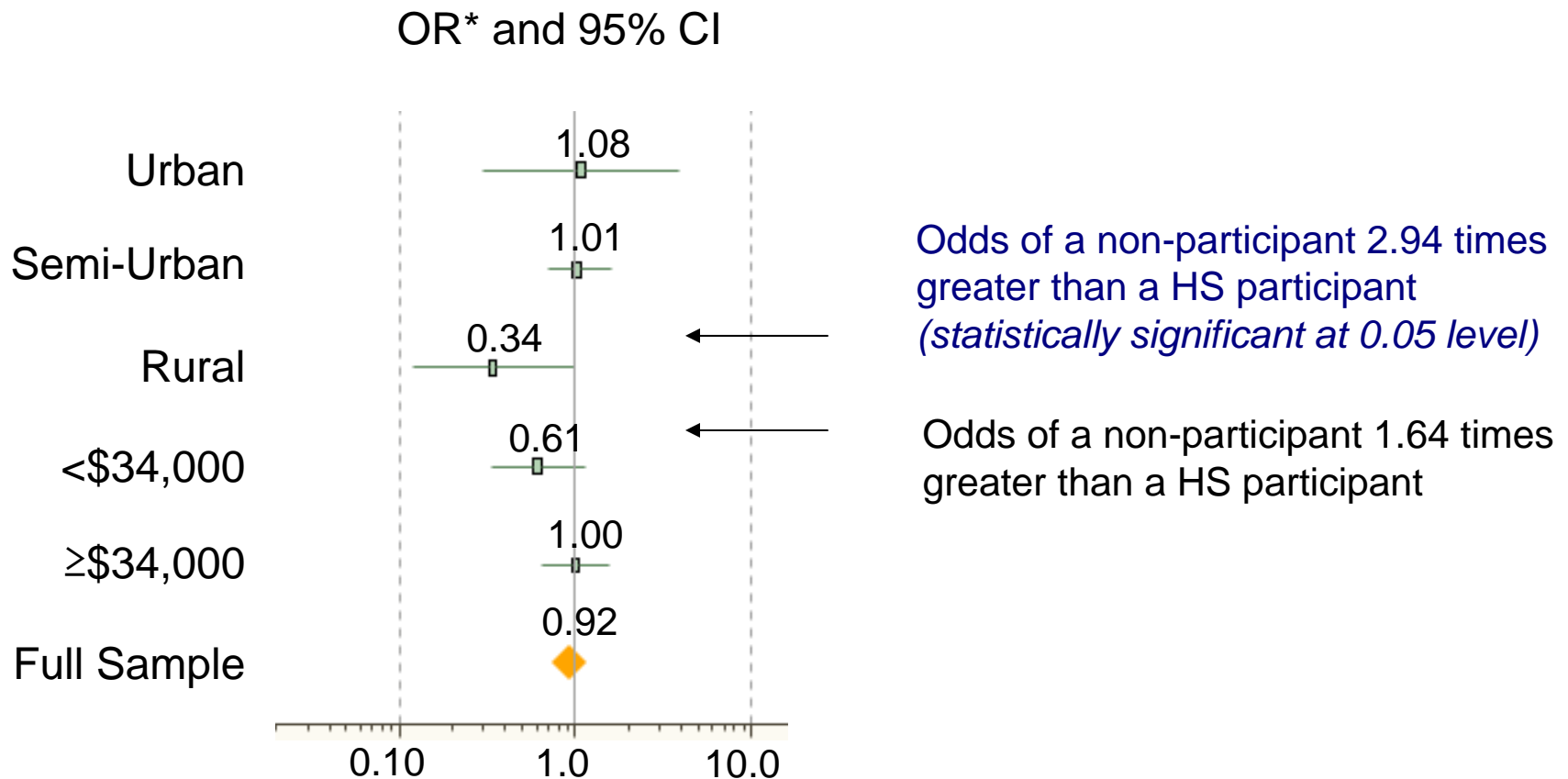
*Odds Ratios adjusted for mother's age, number of maternal risk factors, and delivery payment source.

Odds of Preterm Birth, Participants vs. Non-Participants



*Odds Ratios adjusted for number of maternal risk factors, delivery payment source, tobacco/alcohol consumption during pregnancy.

Odds of Inadequate Prenatal Care, Participants vs. Non-Participants



*Odds Ratios adjusted for mother's age and delivery payment source.

Summary of Program Effects

- Low Birth Weight:
 - Protective for participants living in urban, rural, and lower income counties
 - Increased odds for participants living in higher income counties
- Preterm Birth:
 - Protective for participants living in rural and lower income counties
 - Increased odds for participants living in urban and higher income counties
- Inadequate Prenatal Care:
 - Protective for participants living in rural and lower income counties

Limitations

- Healthy Start participation was not randomly assigned; participants and non-participants lack comparability and unmeasured factors may confound results.
 - Classification of American Indian race
- No analysis of program contact or extent of exposure to Healthy Start interventions.
- Weak assessment of health care access: income, urbanicity, and method of paying for delivery used as proxies.
- Income and urbanicity assessed at county level and at one time period only, individual-level data unavailable.
- Maternal risk factors, tobacco/alcohol consumption, and source of payment for delivery are all specifically targeted by HS interventions. Including them in models may have biased results.

Conclusions

- Infant Mortality Rate for participants was lower than for non-participants, but number of infant deaths too small to assess statistically.
- Healthy Start participation is associated with improved outcomes in rural and lower income counties.
- By positively impacting three risk factors for infant mortality, HS is making significant contributions towards decreasing infant mortality among American Indians in Michigan.



Acknowledgements

- Healthy Start families
- Healthy Start nurses and community outreach workers who collected project data over 11 years
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