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The association between mountaintop mining and birth defects among live births in central Appalachia, 1996-2003

Study background:

- Compared prevalence of birth defects in mountaintop coal mining areas compared with other coal mining areas and with non-mining areas in central Appalachia.
- Covered two periods of time: 1996-1999 and 2000-2003.
- Studied all live birth outcomes regarding birth anomalies (defects) for the years 1996 through 2003.
- Determined whether the mother lived in a county with mountaintop mining, other mining, or no mining
- Controlled for birth-defect risks including mother's age, race/ethnic origin, education, smoking and drinking during pregnancy, diabetes, and metro/nonmetro location, infant gender, and low prenatal care.

Findings:

- **Significantly higher prevalence rates for birth defects in mountaintop mining areas vs. non-mining areas.**

- Birth defects were significantly higher in mountaintop mining areas vs. non-mining areas for six of seven types of defects: circulatory/respiratory, central nervous system, musculoskeletal, gastrointestinal, urogenital, and 'other'.

- Overall, the prevalence rate for any defect was significant in both periods (1996-1999 and 2000-2003), but was higher in the more recent period (2000-2003). The overall rate of birth defects was 13 percent higher in the earlier period, and **increased to 42 percent higher in the later period**.

- Mountaintop mining in one county contributes to birth-defect prevalence rates in surrounding counties.

- The effect of mountaintop mining on birth defects was even stronger than the effect of maternal smoking.

Conclusions:

- Elevated birth defect rates are partly a function of socioeconomic disadvantage, but remain elevated after controlling for those risks
- This suggests that environmental influences in mountaintop mining areas may be contributing factors to elevated birth defect rates.
- Conclusion is consistent with research showing greater land, water, and air disturbance occurring in mountaintop mining areas.
- Research related to infants has found that mothers residing in coal mining areas are more likely to have a low-birth-weight infant.
- This study extends that research, showing that mountaintop mining areas are associated with elevated levels of birth defect prevalence rates.
- These prevalence rates have risen in more recent years, just as mountaintop mining increased from 77,000 to 272,000 acres between 1985 and 2005, a 250% increase.

Implications:

- This study contributes to the growing evidence that mountaintop mining is done at substantial expense to the environment, to local economies, and to human health.
- The incidence of birth defects increased substantially during the more recent period, 2000-2003. The newest data is currently eight years old. This suggests the question, "How many more birth defects are occurring now, in 2011?"

Policy Considerations:

- Unless mountaintop mining is ended now, many more Appalachian children will begin their lives with disabilities that will compromise their potential and productivity for the rest of their lives
- The public will bear the costs associated with the specialized medical care needed by these children for the foreseeable future
- Economic diversification is critical in mining communities to provide other forms of gainful employment

Study conducted by Melissa M. Ahern, Washington State University and Michael Hendryx, Jamison Conley, Evan Fedorko, Alan Ducatman, and Keith Zullig, West Virginia University. The study was published in the peer-reviewed journal *Environmental Research*, and was not funded by any environmental or advocacy group.