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

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Abstract

Birth defects are examined in mountaintop coal mining areas compared to other coal mining areas and non-mining areas of central Appalachia. The study hypothesis is that higher birth-defect rates are present in mountaintop mining areas. National Center for Health Statistics natality files were used to analyze 1996–2003 live births in four Central Appalachian states ($N=1,889,071$). Poisson regression models that control for covariates compare birth defect prevalence rates associated with maternal residence in county mining type: mountaintop mining areas, other mining areas, or non-mining areas. The prevalence rate ratio (PRR) for any birth defect was significantly higher in mountaintop mining areas compared to non-mining areas ($PRR=1.26$, 95% $CI=1.21, 1.32$), after controlling for covariates. Rates were significantly higher in mountaintop mining areas for six of seven types of defects: circulatory/respiratory, central nervous system, musculoskeletal, gastrointestinal, urogenital, and 'other'. There was evidence that mountaintop mining effects became more pronounced in the latter years (2000–2003) versus earlier years (1996–1999.) Spatial correlation between mountaintop mining and birth defects was also present, suggesting effects of mountaintop mining in a focal county on birth defects in neighboring counties. Elevated birth defect rates are partly a function of socioeconomic disadvantage, but remain elevated after controlling for those risks. Both socioeconomic and environmental influences in mountaintop mining areas may be contributing factors.

Highlights

► In this paper we examine the prevalence of birth defects in central Appalachia. ► We control for covariates and compare birth defect prevalence rates in coal mining vs. non-mining areas. ► Higher birth-defect rates are present in mountaintop-removal coal mining areas than in other areas.

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Detection of Unknown

Keywords: Mountaintop coal mining; Coal pollutants; Health impacts; Birth defect outcomes; Ecological study; Central Appalachia

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References

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