META-ANALYSIS OF HEALTH EFFECTS ASSOCIATED WITH RESIDENTIAL PROXIMITY TO TRAFFIC

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Background and Aims: A growing body of research suggests an association between residential exposure to traffic emissions and a variety of health outcomes, including respiratory and cardiovascular disease and premature mortality. In the U.S., an estimated 30.3 million people live within 500 feet (150 m) of an interstate or highway, and this population is disproportionately low-income and minority. Currently, no national and few state policies exist that address this important environmental health issue. Thus, the U.S. Centers for Disease Control and Prevention conducted a systematic review and meta-analysis of observational studies to better understand the health burden associated with residential proximity to traffic.

Methods: We searched 15 electronic databases for original peer-reviewed articles, abstracts, and dissertations published during 1980–2008. Each reference was independently screened, abstracted, and reviewed for quality by two people. Separate meta-analyses were conducted for each health outcome with enough unique studies. We calculated weighted pooled effect estimates using a random effects model to address variability in study design, assessed study heterogeneity, conducted subgroup analyses, and assessed publication bias.

Results: Over 14,500 references were screened, of which 149 met the inclusion criteria (84 respiratory and allergic diseases, 22 cancer, 10 cardiovascular diseases, 9 reproductive outcomes, 8 mortality, and 16 other). Preliminary analysis of 10 case-control studies suggests that residential proximity to traffic is associated with childhood leukemia (odds ratio=1.5, 95% confidence interval=1.1–2.1); however, the effect estimate varied by study quality and evidence of publication bias was observed. Analysis of other outcomes will be completed by summer 2011.

Conclusions: Roughly 10% of the U.S. population lives near heavy traffic, which may contribute to substantial disease burden, including childhood leukemia. Findings from this review will inform the development of national, state, and local policies to reduce traffic emission exposures and improve population health through zoning and infrastructure changes.