

## ARIC Manuscript Proposal #1105

PC Reviewed: 10/18/05  
SC Reviewed: 10/29/05

Status: A  
Status: A

Priority: 2  
Priority: 2

**1.a. Full Title: Traffic exposure and lung function in adults: the Atherosclerosis Risk in Communities study**

**b. Abbreviated Title (Length 26 characters):**

### **2. Writing Group:**

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I, the first author, confirm that all the coauthors have given their approval for this manuscript proposal. H.K. [please confirm with your initials electronically or in writing]

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**3. Timeline:** A first manuscript should be available for circulation to the ARIC investigators before Dec. 1, 2005,

### **4. Rationale:**

Traffic is a major contributor to air pollution for those who live close to busy roads. An expanding body of epidemiologic research suggests that traffic-related exposures may be associated with acute and chronic respiratory effects<sup>1-10</sup>. In limited studies on occupational-exposed and general population, an association between exposure to automobile exhaust and adverse effects on lung function was found in adults<sup>6-8</sup>, whereas others failed to find such an association<sup>9-10</sup>. Thus the effect of traffic-related air pollution on adult lung function remains inconclusive.

Traffic emissions result in small-scale spatial variations and higher concentrations within short distances from major roads<sup>11-12</sup>. Thus typical use of air pollution data from fixed monitoring

stations may be inadequate to study traffic-related air pollution and health outcomes, especially for those living close to busy roads. In this way, traffic-related assessment can add to the health studies of ambient air pollution in part because local sources are important and also because most people do not live close to the monitoring stations and monitoring stations are purposefully located away from local sources such as busy roads. For people living close to busy roads, air pollution from traffic sources may be more important than the area background.

The pulmonary function test at visits 1 and 2 of the ARIC study could be used to investigate the relation between traffic exposure and lung function.

**5. Main Hypothesis/Study Questions:**

Subjects with higher exposure to traffic-related air pollution have reduced lung function.

**5a. Analysis :**

The main measurement of lung function for this analysis is FEV1 and FVC. We will quantify small-scale spatial variations of traffic exposure by two measurements: geographical information system (GIS)-mapped traffic density assignments at residences, and the distance of residences to nearest roadways of various types. Generally, traffic density values give a relative indication of which residence locations are likely to be most exposed to traffic activity.

The relations between measures of traffic density/distance and lung function will be explored using multiple linear regression. In the regression models, we will examine a number of confounding factors, including gender, research center, race group, age, smoking (status including never, former and current smokers, and pack years), ETS exposure, BMI, occupations, educational level, height, square of height, and background air pollution level. Taking lowest quartiles of traffic density and unexposed in distance as the reference group, we will compare the FEV1 (FVC) difference with various traffic exposure levels after adjustment for the covariates above.

**6. Data (variables, time window, source, inclusions/exclusions):**

Visits 1-2: pulmonary function measures, research center, race group, age, smoking (status including never, former and current smokers, and pack years), exposure to environmental tobacco smoke, BMI, occupations, educational level, census tract income, height, and background air pollution level.

**7.a. Will the data be used for non-CVD analysis in this manuscript?**     Yes  
 No

**b. If Yes, is the author aware that the file ICTDER02 must be used to exclude persons with a value RES\_OTH = "CVD Research" for non-DNA analysis, and for DNA analysis RES\_DNA = "CVD Research" would be used?**   

Yes     No

(This file ICTDER02 has been distributed to ARIC PIs, and contains the responses to consent updates related to stored sample use for research.)

**8.a. Will the DNA data be used in this manuscript?**     Yes     No

**8.b. If yes, is the author aware that either DNA data distributed by the Coordinating Center must be used, or the file ICTDER02 must be used to exclude those with value RES\_DNA = "No use/storage DNA"?**

Yes     No



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7. Raaschou-Nielsen O, Nielsen ML, Gehl J. Traffic-related air pollution: exposure and health effects in Copenhagen street cleaners and cemetery workers. *Arch Environ Health.* 1995, 50(3): 207-13.
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