ARIC Manuscript Proposal #1105

PC Reviewed: 10/18/05	**Status: _A__**	**Priority: __2_**
SC Reviewed: _10/29/05_	**Status: _A__**	**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:

Writing group members: **Haidong Kan, Gerardo Heiss, Kathryn M. Rose, Eric Whitsel, Fred Lurmann, Stephanie London**

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[1-10]. 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[6-8], whereas others failed to find such an association[9-10]. 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[11-12]. 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 visits1 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? _X_ 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? _X_ 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 _X_ 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

9.The lead author of this manuscript proposal has reviewed the list of existing ARIC Study manuscript proposals and has found no overlap between this proposal and previously approved manuscript proposals either published or still in active status. ARIC Investigators have access to the publications lists under the Study Members Area of the web site at: http://www.cscc.unc.edu/ARIC/search.php

__X__ Yes _____ No

10. What are the most related manuscript proposals in ARIC (authors are encouraged to contact lead authors of these proposals for comments on the new proposal or collaboration)?

 # 450, 760, 782, 860, 861, 907

11. a. Is this manuscript proposal associated with any ARIC ancillary studies or use any ancillary study data? _X___ Yes __ _ No

11.b. If yes, is the proposal

_x__ A. primarily the result of an ancillary study (list number*AS#2003.03)

___ B. primiarly based on ARIC data with ancillary data playing a minor role (usually control variables; list number(s)* _____ _____)

Note – original ancillary study proposal expansion to include cardiovascular endpoints was approved by the Steering Committee at the meeting on April 14, 2004.

*ancillary studies are listed by number at http://www.cscc.unc.edu/aric/forms/

12. Manuscript preparation is expected to be completed in one to three years. If a manuscript is not submitted for ARIC review at the end of the 3-years from the date of the approval, the manuscript proposal will expire.

Reference:

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2. Heinrich J, Topp R, Gehring U, Thefeld W. Traffic at residential address, respiratory health, and atopy in adults: the National German Health Survey 1998. Environ Res. 2005, 98(2):240-9.
3. Venn A, Yemaneberhan H, Lewis S, Parry E, Britton J. Proximity of the home to roads and the risk of wheeze in an Ethiopian population. Occup Environ Med. 2005, 62(6):376-80.
4. Hwang BF, Lee YL, Lin YC, Jaakkola JJ, Guo YL. Traffic related air pollution as a determinant of asthma among Taiwanese school children. Thorax. 2005, 60(6):467-73.
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6. Evans RG, Webb K, Homan S, Ayres SM. Cross-sectional and longitudinal changes in pulmonary function associated with automobile pollution among bridge and tunnel officers. Am J Ind Med. 1988, 14(1):25-36.
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12. Brauer M, Hoek G, van Vliet P, Meliefste K, Fischer P, Gehring U, Heinrich J, Cyrys J, Bellander T, Lewne M, Brunekreef B. Estimating long-term average particulate air pollution concentrations: application of traffic indicators and geographic information systems. Epidemiology. 2003, 14(2):228-39.