

ARIC MANUSCRIPT PROPOSAL FORM

Manuscript #060

1. Title (length 26):

Nutrition & Lung Function

2. Writing Group (list individual with lead responsibility first):

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3. Timeline:

Preliminary analyses will be conducted using Visit 01 data and foods or food groupings. Final analyses will be conducted on the closed Visit 01 data set and nutrient data when they are available.

4. Rationale:

Analyze lung function parameters in ARIC participants and associate this with food intake frequency (and nutrient levels of carotenoids, retinol, C, and E when available).

1. Nutritional deficiencies may impair antioxidant protective mechanisms¹

2. Vitamins A, C, and E are known to be efficient antioxidants^{2,3}

3. Antioxidant deficiencies have been related to chronic obstructive pulmonary disease.⁴ Theoretically, antioxidants contribute to control of inflammatory oxidant injury to the lung.

4. Among smokers, those who drank milk reported fewer respiratory symptoms than did nondrinkers, presumably due to antioxidant properties of vitamin A.⁵

5. HANES data suggest a cross-sectional association between vitamin A and impaired lung function.⁶

6. An association between low levels of serum vitamin E, serum beta carotene, and lung cancer has been reported.⁷ It is plausible to propose that the antioxidant properties of beta carotene may also work to protect antiprotease (primarily alpha-1- antitrypsin) activity, thereby reducing protease activity, subsequent destruction of respiratory tissue and lung function.⁸

5. Main Hypothesis:

ARIC participants with higher dietary levels of vitamins A (B-carotene), C and E have better ventilatory function than do participants with lower levels, after controlling for smoking status, vitamin supplement intake, age, race, sex, and height.

The three primary dependent variables will be FVC (forced vital capacity); FEV_{1.0} (forced expiratory volume in one second); and FEV_{1.0}/FVC (forced expiration, a combined measure of airway obstruction). Covariates will include age, race, sex, and height, with analyses conducted separately in smokers and in non-smokers. Primary independent variables will include respiratory symptoms (also to be considered as dependent variables); food frequency information, combined into an estimate of dietary vitamin intake;⁹ and co-morbid conditions which could affect pulmonary function and/or nutrient absorption/utilization. Dietary intake of retinol and beta carotene will be considered separately insofar as this is possible. As the dose and frequency of vitamin supplements are not available, dose-response associations between dietary antioxidants

and lung function will be assessed among non-supplement-users only. Vitamin pill users (defined from the Medication Questionnaire) will be studied separately.

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

Pulmonary function, Respiratory signs & symptoms, Diet (Food, plus nutrients when available), Medications (vitamins), Age, Race, Sex, Smoking, Height [to be further specified].

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8. Janoff A. Elastases and emphysema: Current assessment of the protease-antiprotease hypothesis. *Am Rev Respir Dis* 1985; 132:417-33.
9. Willett WC, Sampson L, Stampfer MJ, Rosner B, Bain C, Witschl J, Hennekens CH, Speizer FE. Reproducibility and validity of a semiquantitative food frequency questionnaire. *Am J Epidemiol* 1985; 122:51-65.