1.a. **Full Title**: Food intake, dietary patterns and IMT progression

b. **Abbreviated Title (Length 26 characters)**: Dietary factors & IMT

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

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4. **Rationale**: The association of major risk factors and common carotid IMT change has been explored by ARIC, but this analysis did not examine dietary variables. Several aspects of diet are of interest.

   **Food intake.** Several recent epidemiologic studies have reported beneficial effects of individual food groups on risk of death or chronic disease. For example, greater whole grain food intake is consistently associated with lower risk of all-cause (1, 2) and CHD mortality (1) and incident CHD (2,3). Intake of fruit and vegetables is associated with lower risk of incident CHD and stroke (4, 5); however, these findings are inconsistent among studies (6). Because, both whole grain and fruit and vegetables are good sources of folate, antioxidants, and other beneficial food substances, consuming a greater number of servings of these foods may be associated with lower IMT progression. Red and processed meats are rich sources of saturated fat intake and therefore, may be considered atherogenic (7, 8); whereas, fish or omega 3 fatty acids inhibit development of atherosclerosis (9, 10). Dairy products are associated with adverse cholesterol levels, however calcium and dairy intake are also associated with lower body mass index (11-13). It is unknown whether meat and dairy products are positively associated with IMT or whether fish is inversely associated with IMT.

   **Dietary patterns.** Dietary patterns are associated with lower risk of mortality, lower prevalence of CVD risk factors (14), incident CHD (15, 16), and colon cancer (17). Factor analysis was used in these studies to derive major dietary patterns in their datasets. One such pattern, the ‘western diet’ characterized by high intake of red meat, high-fat foods, and refined grains and low intakes of fruit and vegetables, was associated with an atherogenic risk profile among participants in the Health Professionals' Study (14). In the ARIC (16) and Health Professionals (17) studies, the ‘western diet’ was associated with an increased risk of all-cause mortality and incident CHD.
Cluster analysis was used in the Framingham Nutrition Study to identify 5 different dietary patterns, including the heart health light eating, wine and moderate eating, high fat, and empty calorie dietary patterns. Women who consumed a heart health diet had lower odds of carotid stenosis than women who consumed ‘high fat’ or ‘empty calorie’ type diets (18).

Using ARIC data, we propose to examine whether specific foods and dietary patterns rich in saturated fat are associated with increased IMT progression. In contrast, foods rich in omega three fatty acids and antioxidants, as well as dietary patterns rich in these nutrients, are anti-atherogenic and we anticipate will be associated with decreased progression of IMT.

5. **Main Hypothesis/Study Questions:**
   a. Is IMT progression associated with food group intake, including meat/fish/poultry, fruit and vegetables, whole grain, refined grain, and dairy foods?
   b. Is IMT progression associated with eating patterns, such as the ‘Prudent diet’ or ‘Western diet’ eating patterns, for example?

6. **Data (variables, time window, source, inclusions/exclusions):**
   The main independent variables are baseline and visit 3 food variables and derived dietary patterns. The main outcome is reader and drift adjusted common carotid IMT change. Analysis will be modeled after those used in ARIC's previous common carotid IMT change paper. We will examine the association of dietary variables with IMT progression. Models will consider possible confounding risk factors, but also carefully avoid over adjusting for those potentially on the causal pathway (e.g., plasma lipids). Models will also take into account, where possible, measurement error, following methods outlined in manuscript proposal 803.

7.a. Will the data be used for non-CVD analysis in this manuscript? ___ Yes ___x___ 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 ___x___ No
   (This file ICTDER02 has been distributed to ARIC PI's, 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? ___x___ 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”?

   ___x___ 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://bios.unc.edu/units/cscc/ARIC/stdy/studymem.html](http://bios.unc.edu/units/cscc/ARIC/stdy/studymem.html)

   ___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)?


ARIC ms no. 803 (Guallar)….We have established that there is no overlap with this proposal.

11. 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.

References

16. Steffen LM. Eating patterns, all-cause mortality, and incident CHD: ARIC (unpublished data)