1.a. Full Title: Coffee consumption and risk of type 2 diabetes in the Atherosclerosis Risk in Communities (ARIC) Study

b. Abbreviated Title (Length 26 characters): Coffee and diabetes risk

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

Lead: Sari Voutilainen
Address: www.uku.fi/nutritionepidemiologists
Phone: (919) 966-1967    Fax: (919) 966-9800
E-mail: Sari.voutilainen@uku.fi

Writing group members: Maria Inês Schmidt, L.E. Chambless, J. Pankow, Gerardo Heiss

3. Timeline:

A manuscript will be submitted for review by the ARIC Publications Committee within one year of approval of this proposal.

4. Rationale:

Although there are many studies concerning the association of coffee drinking on CHD, only few studies of coffee consumption and risk of type 2 diabetes have been published. A Dutch study reported that individuals who drank at least seven cups of coffee a day were 0.50 (95% CI 0.35-0.72) times as likely as those who drank 2 or fewer cups of coffee a day to develop type 2 diabetes (VanDam and Fenskens, Lancet 2002;360:1477-48). Participants in this study drank a mean of 5.2 cups of coffee a day.


Recently The Nurses’ Health Study and Health Professionals’ Follow-up Study researchers published results about coffee consumption and the risk of type 2 diabetes (Salazar-Martinez E, et al. Coffee consumption and risk for type 2 diabetes mellitus. Ann Intern Med 2004;140:1-8). About 84,000 women and 42,000 men were asked about diet every 2 to 4 years and followed for 20 years. During that time, over 5,000 cases of diabetes were diagnosed. Coffee drinking ranged from none to more than 6 cups a day. The risk was cut in half in men and by a third in women drinking the most coffee and the conclusion was that long-term coffee consumption was associated with a statistically significantly lower risk of diabetes both men and women.
Coffee is a major source of phenolic acids and caffeine, and also contains magnesium and other micronutrients. Chlorogenic acid, the main phenolic compound in coffee, has been shown to reduce glucose absorption and oxidative stress in vitro, and also inhibits hydrolysis of glucose-6-phosphate, which could reduce glucose output in the liver. Caffeine also has complex physiological effects in humans, e.g., acute administration of caffeine decreases insulin sensitivity and impairs glucose tolerance, and it stimulates thermogenesis and increases energy expenditure.

As coffee drinking is among the most widespread habits in the world and thus its effects on health may be highly relevant for the public health, we propose to assess the association between reported coffee consumption and the risk of type 2 diabetes in the ARIC Study. Although the questionnaire re. habitual coffee consumption in the ARIC Study does not include decaffeinated coffee, we believe that this source of misclassification would not invalidate a test of the above-mentioned study question. Attention will be given to behavioural and physiologic attributes associated with coffee drinking patterns that may act as covariates and possible confounding factors in the hypothesized association between habitual coffee consumption and the risk of type 2 diabetes. The extensive characterization of the ARIC cohort participants will be an asset in this respect.

5. **Main Hypothesis/Study Questions**: The aim of this work is to quantify the association between coffee consumption and the risk of type 2 diabetes mellitus. The rationale supporting this hypothesis is that nutrients in coffee, such as polyphenols, decrease the risk of diabetes in middle-aged men and women.

6. **Data (variables, time window, source, inclusions/exclusions)**:  
This manuscript is based on nutrition data collected in ARIC’s Visit 2 examination. Data needed are reported coffee consumption, alcohol consumption, other food-frequency data (like intake of total energy, dietary fiber, whole grain, fruit and vegetables), and risk factors for incident diabetes as potential confounders (examination year, sex, age, race, BMI, smoking status, education, physical activity, and field center), length of follow-up period and incident diabetes cases.

Incident case definitions will be based on the work developed for AS 1995.09 - Inflammatory Precursors of Diabetes (J. Pankow, PI).

**Exclusions are:** diabetes or missing diabetes information at visit 2, missing exposure information and missing information on potential confounders.

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.csec.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)?

None evident

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.