1.a. Full Title: The risk of left ventricular hypertrophy associated with moderate kidney dysfunction and anemia among African Americans

b. Abbreviated Title (Length 26 characters): Renal function, anemia and LVH

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

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3. Timeline: The data are available as part of ARIC visits 1 through 3. We project that analyses and manuscript preparation will take place over the next year.

4. Rationale:

   The incidence and prevalence of kidney failure in the United States have increased substantially in the past 20 years, with the number of patients treated for kidney failure with dialysis or transplantation reaching over 300,000 by the end of 1997.\textsuperscript{1} This number is projected to exceed 650,000 by 2010.\textsuperscript{2} There is growing recognition of the much larger number of individuals with moderate kidney dysfunction, recently estimated at 5.6 million (serum creatinine levels 1.6 mg/dL or greater in men and 1.4 mg/dL in women).\textsuperscript{3} We recently reported on the association between kidney function and hemoglobin levels in the general population, using data from NHANES III.\textsuperscript{4} We found that below an estimated glomerular filtration rate (GFR) of 60 ml/min/1.73m\textsuperscript{2}, lower kidney function was strongly associated with lower hemoglobin levels and a higher prevalence of anemia. African Americans with moderate kidney dysfunction had an even higher risk of anemia than did their white counterparts. No prospective data are available on this association in patients without severe chronic kidney disease.

   Kidney failure is known to cause anemia,\textsuperscript{5} and anemia is associated with left ventricular hypertrophy (LVH) among patients receiving chronic dialysis.\textsuperscript{6,7} Data on the association of kidney dysfunction and reduced hemoglobin levels with the presence or development of LVH among patients not receiving chronic dialysis are limited. Levin et al found higher serum creatinine and lower hemoglobin levels among patients with prevalent LVH in a cross-sectional
study of 175 patients with chronic kidney disease. A Canadian prospective cohort study showed that lower hemoglobin levels predicted left ventricular growth one year after enrollment among 246 patients with chronic kidney disease. The relationships between kidney function, anemia, and LVH among patients with milder kidney dysfunction have not been studied. Prospective data are especially needed to determine the levels of hemoglobin and kidney function at which individuals may be at increased risk of LVH. Other factors that may be related to LVH among individuals with moderate kidney dysfunction and/or anemia (e.g., sex, hypertension, diabetes mellitus, obesity) have not been identified. The higher prevalence of anemia and LVH among African Americans makes this an important subgroup to study.

ARIC provides an excellent opportunity to explore these associations prospectively. Serum creatinine, as measured at visits 1 and 2, will be used in conjunction with demographic information to estimate GFR as a measure of kidney function. Hemoglobin was measured at each visit. Echocardiograms were performed on 2,445 African-American participants in Jackson, Mississippi at visit 3, providing a reliable measure of the primary outcome. Individuals with LVH at visit 1, as demonstrated by electrocardiographic results or responses to the questionnaire, will be excluded from some analyses.

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

What is the prospective association between declining kidney function and hemoglobin levels among African Americans? What other factors influence this association?

What is the association between moderate kidney dysfunction, hemoglobin level, and the incidence of LVH among African Americans? What other factors influence this association?

Does the presence of both moderate kidney dysfunction and anemia interact to increase the risk of LVH among African Americans?

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

The following variables will be needed for these analyses: age, sex, race, center, serum creatinine, hemoglobin, electrocardiographic results to define LVH (S amplitude in lead V3 and R amplitude in lead aVL), echocardiographic results. Covariates of interest include blood pressure, anthropometric data, and diabetes status. All participants at the Jackson field center will be included.

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 ____ 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://bios.unc.edu/units/cscs/ARIC/study/studymem.html](http://bios.unc.edu/units/cscs/ARIC/study/studymem.html)

____X__ Yes  _______ No

Reference List