ARIC Manuscript Proposal # 1015

PC Reviewed: 05/21/04	**Status: A**	**Priority: 2**
SC Reviewed: 05/21/04	**Status: A**	**Priority: 2**

1.a. Full Title: Ethnic/Race Disparities in Health-seeking Behaviors, Awareness of CKD and Progression of CKD

b. Abbreviated Title (Length 26 characters): Disparities and CKD

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

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3. Timeline:

Submit Proposal to Publications Committee:	5-04
Complete Preparation of Data:	12-04
Complete Analysis:	4-05
Submit Draft to Publications Committee:	10-05

4. Rationale:

The public health burden of CKD is substantial. More than 10 million U.S. adults have some kidney damage (serum creatinine levels ≥1.5mg/dl), and the number of persons with ESRD exceeds 350,000. Persons with ESRD, who suffer poor quality of life and accrue high health care costs (leading to aggregate costs to US health care of over 13 billion dollars annually), are projected to exceed 600,000 in 2010.[1-4] Ethnic/racial disparities in the incidence and prevalence of CKD are staggering, with ethnic minorities suffering rates of CKD 4 to 6 times greater than their White counterparts.[4] While some of the excess incidence of ESRD in high-risk populations can be explained by sociodemographic, lifestyle, and clinical factors, much of the excess risk of progression toward ESRD remains unexplained.[5,6]Efforts to increase the public's awareness of CKD as an important health risk are currently underway.[7]Evidence in other clinical areas demonstrates that patients' awarness of disease is related to their implementation of changes in health behaviors(such as adherence to prescribed therapies and lifestyle modification) which can improve the control and progression of chronic illnesses. However, such information is lacking for CKD. In addition, it is not clear whether unexplained ethnic/racial disparities in CKD progression rates and CKD related outcomes can be partially explained by ethnic/racial differences in patient health behaviors or patient awareness of CKD.

In longitudinal and cross-sectional analyses, this proposal will: 1)Assess ethnic/racial disparities in the relation between patients' health care-seeking behaviors their awareness and acknowledgement of CKD as a health problem; 2)Assess ethnic/ racial disparities in the impact of patient health care-seeking behaviors on the progression of CKD; 3)Assess ethnic/racial disparities the relation between awarness of CKD and severity of CKD

5. Main Hypotheses/Study Questions:

a. Prospective

Hypothesis 1. Routine preventive care by a physician at baseline will be associated with greater awareness of CKD at follow up after controlling for control of risk factors for CKD progression, rate of CKD progression, access to health care, demographics, and socioeconomic status. The relation between preventive care by a physician and awareness of CKD at follow up may differ by race.

Hypothesis 2. Routine preventive care by a physician at baseline will be associated with slower progression of CKD over follow up after controlling for the presence and treatment of risk factors for CKD progression, access to health care, demographics, and socioeconomic status. The relation between routine preventive care by a physician and CKD progression will be mediated by control of CKD risk factors. The effect of routine preventive care by a physician on CKD progression may be modified by patient awareness of CKD such that patients who are aware of their CKD may have improved CKD risk factor control and slower progression of CKD. The relation between use of routine preventive care and CKD progression may differ between African Americans and Whites.

b. Cross-sectional

Hypothesis 3. Persons with more severe CKD are more likely to be aware of the presence of CKD after control for the presence of CKD risk factors (hypertension, diabetes, hyperlipidemia, history of CVD, smoking history, and BMI). The relation between severity of CKD and awareness differs by race such at the same severity of CKD, African Americans will be less likely to be aware of CKD than Whites.

6. Population, Data, Analysis:

Population: The study population will consist of all ARIC enrollees with hypertension and or diabetes and moderate to severe CKD at baseline (GFR 30-90 ml/min/1.73m^2) (approximately 3600 study participants). I have selected this group for study because of their increased risk of progression toward ESRD as demonstrated in previous analyses of ARIC and other epidemiological studies.[6,8-12]

Data: We will use data from Visit 1(baseline) and Visit 3(follow up) to explore hypotheses 1 and 2. Data from Visit 3 will be used to explore hypothesis 3. (Table)

Table. ARIC variables employed in Hypotothses 1-3

Variables	H1*		H2*		H3*	
	Visit**		Visit**		Visit**	
	1	3	1	3	1	3
Dependent variables						
Estimated GFR (using gender, race, height, weight)			X	X		
Awareness of Kidney Disease		X				X
Primary Independent variable						
Use and frequency of preventive care by physician	X		X			
Estimated GFR (using gender, race, height, weight)					X	X
Potential Confounders						
Sociodemographic variables (age, gender, race, education)	X		X		X	
Access to Health Care	X		X		X	
Presence and control of hypertension, diabetes, and hyperlipidemia, smoking status, body mass index	X	X	X	X	X	X
Estimated GFR (using gender, race, height, weight)	X	X				

*Hypotheses 1-3; **B=Baseline Visit 1 (1987-1989), F=Follow up Visit 3 (1993-1995)

a. Estimated GFR: Biological assessments of kidney function (serum creatinine) were ascertained at baseline (1987-1989) and follow up (1993-1995). Data on height, weight, age, gender, and race are

available for all participants and will be used to estimate GFR using the Modified Diet in Renal Disease equation. Clinically significant progression of CKD will be identified as either a) an absolute increase in serum creatinine ≥0.4mg/dl per year of follow up (twice the minimum statistically significant annual change in kidney function previously observed in the ARIC cohort) (8) or b) a decline in estimated GFR (measured in ml/min/1.73m^2) by 25% or more (a method used to quantify CKD progression in ARIC and other large observational and interventional studies) (8,10).

b. Awareness of Kidney Disease: Awareness of CKD will be derived from interview data in the third visit of ARIC (1993-1995) (AFU Medical History Form, question 2b). During the third interview, participants were asked to report whether they had been told by their physician that they had any kidney disease, apart from kidney stones or an acute infection.

c. Use and Frequency of Preventive Care by Physician: Self-reported use and frequency of preventive care services will be assessed according to respondents' answers to questions regarding the frequency with which they seek preventive care from a physician (ranging from no preventive care to preventive care received at least once a year) ascertained at baseline (1987-1989) from ARIC Medical History Form, Contact Year 1.

d. Sociodemographic Variables: Age, gender, race, and attained education were ascertained at baseline examination

e. Access to Health Care: Presence of health insurance will be used as a proxy for access to care, and was assessed at baseline (1987-1989).

f. Presence and control of hypertension, diabetes, and hyperlipidemia, smoking status, body mass index: *Hypertension:* Hypertension control will be ascertained based on the absolute levels of baseline and follow up blood pressures for persons with previously diagnosed (ascertained via self-reported history or presence of anti-hypertensive medications) and previously undiagnosed hypertension. We will characterize changes in participants' hypertension control (improvement, worsening, or no change) during follow up. Consistent with contemporary guidelines at the time of study enrollment, hypertensive study participants will be considered to have controlled hypertension with SBP <140mmHg and DBP <90mmHg.[10]

Diabetes: Diabetes control will be ascertained based on the absolute levels of baseline and follow up fasting glucose for persons with previously diagnosed diabetes (assessed via self-reported history or presence of glucose lowering medications) and previously undiagnosed diabetes. We will characterize changes in participants' diabetes control (improvement, worsening, or no change) during follow up. Consistent with contemporary guidelines at the time of study enrollment, diabetes will be considered to be controlled at a fasting serum glucose of <140mg/dl.[14] *Presence of hypercholesterolemia:* The presence of hyperlipidemia at baseline and follow up will be defined as respondent self-report of hypercholesterolemia, the presence of anti-hyperlipidemic medications, or total fasting serum cholesterol ≥240mg/dl (this definition for hypercholesterolemia was employed by leading experts during the contemporary time period of enrollment) We will characterize changes in participants' cholesterol during follow up.[15]

History of CVD: History of CVD will be defined at baseline as a self-reported history of a physician-diagnosed heart attack, prior myocardial infarction (MI) by electrocardiography, prior cardiovascular surgery, or prior coronary angioplasty.

Smoking status: Smoking status will be ascertained via self-report, and respondents will be classified as never, past, or current smokers at baseline and follow up.

Obesity: Anthropomorphic measures of height and weight were obtained from all participants at baseline. Obesity will be defined as a body mass index (BMI) of greater than 30kg/m^2. We will characterize participants' changes in BMI (decrease or increase) during follow up.

Analysis:

Hypothesis 1: We will use logistic regression to determine whether seeking routine preventive care at enrollment is associated with increased rates of awareness of CKD at follow up. We will perform analyses with and without adjustment for clinically significant CKD progression over follow up to identify a potential interaction between preventive care seeking and severity of baseline kidney function

or CKD progression on rates of awareness. We will also perform these analyses stratified by race to determine if the relation between seeking routine preventive care and awareness of CKD differs by race.
Hypothesis 2: We will use survival analysis techniques to determine whether frequent (vs. less frequent) routine preventive care at enrollment is associated with decreased risk of CKD progression over the follow up period. Event rates will be calculated by ascertaining the number of individuals with an absolute increase in serum creatinine ≥0.4mg/dl over the total person-years of observation or the number of individuals with a decline in estimated GFR by 25% or more over the total person-years of observation. The time scale will be follow-up time from the baseline questionnaire. Because the interval of follow up is slightly different for participants, we will determine trends in crude incidence rates of CKD progression using Poisson regression. We will also use Poisson regression to determine the adjusted (for potential confounders) relative risk of rise in serum creatinine or decline in GFR associated with levels of seeking routine preventive care. We will use the Wald test to ascertain trends in risk of CKD progression across levels of preventive care seeking behavior, and we will perform analyses with and without adjustment for baseline serum creatinine or GFR to identify a potential interaction between baseline kidney function and the effect of preventive care on CKD progression rates. To ascertain whether the relation between seeking routine preventive care and CKD progression differs by race, we will stratify these analyses by race.
Hypothesis 3: Using estimated GFR, we will classify persons according to the severity of their CKD using the National Kidney Foundation Kidney Disease Outcomes Quality Initiative classification scheme. We will use descriptive statistics to describe rates of awareness according to severity of CKD at the third ARIC visit. Using logistic regression, we will determine whether awareness of CKD at the third ARIC visit is independently associated with severity of CKD while controlling for potential confounders. In a separate analysis, we will assess the proportion of persons with clinically significant CKD progression from baseline to follow up. Using logistic regression, we will determine whether awareness of CKD at the third ARIC visit is independently associated with being classified as having CKD progression during follow up after adjustment for confounders. To ascertain whether the relation between awareness of CKD to severity of CKD (or CKD progression) is similar between African Americans and Whites, we will stratify these analyses by race.

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)?
Manuscript #146: Health Status Awareness [PI: Nieto]
Manuscript# 025: Effects of Diagnosed Hyperlipidemia (Withdrawn)
Manuscript#356: Factors associated with undiagnosed NIDDM in the ARIC population [PI: Maguire]

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.

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