Study Title
Principal Investigator
University Affiliation
Year funded
Keywords

Nutrition Assessment in Chronic Renal Insufficiency Cohort (CRIC) Study Population Cheryl Anderson, PhD, MPH The Johns Hopkins University 2002 nutrition, cerebrovascular disease, protein-energy malnutrition, metabolism

A Structural Approach to Renal Bone Disease in CRIC
Mary Leonard, MD, MSCE
Children's Hospital of Philadelphia
2003
renal bone disease, renal osteodystrophy, bone mineral density

Hypertension and Hypercholesterolemia Control in Patients with CKD
Paul Muntner, PhD
University of Alabama at Birmingham
2003
hypertension, hypercholesterolemia, cardiovascular disease, hemodynamics, nutrition

CRIC Heart Failure Detection Cohort and the CRIC Heart Failure Progression Cohort Michael Shlipak,
University of California, San Francisco
2003

Development and Validation of GFR Estimating Equations
Andrew Levey, MD
Tufts University
2004
estimated glomerular filtration rate, meta analysis, equation

Carotid Intima-Media Thickness in Chronic Kidney Disease
Sylvia Rosas, MD, MSCE
University of Pennsylvania
2004
carotid intima-media thickness, carotid plaque, progression, cardiac outcomes

Hispanic Recruitment in CRIC Julio Vijil, Jr., MD University of Illinois, Chicago 2004 recruitment, Hispanic

\*Please note that this list is limited to approved CRIC ancillary studies that have received funding. The CRIC Steering Committee reviews and approves new proposals on a rolling basis and maintains a separate list of approved but not yet funded proposals which are also considered when vetting new submissions.

Study Title
Principal Investigator
University Affiliation
Year funded
Keywords

Cognitive Function in Chronic Renal Insufficiency Kristine Yaffe, MD University of California, San Francisco 2005 cognitive function, gfr, depression

Pulse Wave Velocity and Chronic Kidney Disease
Raymond Townsend, MD
University of Pennsylvania
2005
pulse wave velocity, hypertension, cardiovascular disease

Sleep Disturbances as a Non-traditional Risk Factor in CKD Eve Van Cauter, PhD University of Chicago 2005 sleep, risk factor, c-reactive protein

Diabetic and Hypertensive Retinopathy and CRI
Juan E. Grunwald, MD
University of Pennsylvania
2005
retinopathy, hypertension, diabetes, ophthalmology

Hispanic Chronic Renal Insufficiency Cohort
James Lash, MD
University of Illinois, Chicago
2005
hispanic, cardiovascular disease, progression

Cytokine Gene Polymorphism in the CRIC Cohort Dominic Raj, MD George Washington University 2006 cytokine, polymorphism, inflammation

Genetics of Atherosclerosis in Renal Disease
Muredach P. Reilly, MBBCH, MSCE
University of Pennsylvania
2006
genetics, atherosclerosis, metabolic syndrome, inflammation

Study Title
Principal Investigator
University Affiliation
Year funded
Keywords

Vitamin D Deficiency, Physical Performance and Cardiovascular Disease Mary Leonard, MD, MSCE Children's Hospital of Philadelphia 2006 vitamin D, calcidiol, frailty, PTH

Sodium and Cardiovascular Disease in Patients with CKD
Jiang He, MD, PhD
Tulane University
2006
Sodium, electrolyte excretion, potassium, cardiovascular disease, cardiac outcomes

Study of Advanced Chronic Renal Insufficiency Chi-yuan Hsu, MD, MSc University of California, San Francisco 2006 progression, transition to ESRD, GFR

KDQOL and the Spanish-Speaking CKD Population Julio Vijil, Jr., MD University of Illinois, Chicago 2007 KDQOL, hispanic, HCRIC

Health Literacy and Acculturation in Hispanic Patients with Chronic Kidney Disease
Claudia Lora, MD
University of Illinois, Chicago
2007
HCRIC, health literacy, Hispanic, acculturation, risk factor, cardiovascular disease

Genomics of myocardial transcription factors in cardiac remodeling Thomas P. Cappola, MD, ScM University of Pennsylvania 2007 genetics, cardiac remodeling, transcription factors

Pulse Wave Velocity and Chronic Kidney Disease
Stephanie DeLoach, MD
Thomas Jefferson University
2007
pulse wave velocity, cardiovascular disease

Study Title
Principal Investigator
University Affiliation
Year funded
Keywords

Corin Allelle and Heart Disease
Daniel L. Dries, MD
Yale University
2007
genetics, cardiovascular disease, natriuretic peptide system, cardiac hypertrophy, corin

CRIC Plus – Race Group Analysis
Vanessa Grubbs, MD, MPH
University of California, San Francisco
2007
racial disparities, progression, CRIC-plus, ESRD

Carotid Intima-Media Thickness in Chronic Kidney Disease (Renewal)
Sylvia Rosas, MD, MSCE
University of Pennsylvania
2007
carotid intima-media thickness, carotid plaque, progression, cardiac outcomes

Using 2-D Gel to Identify Patterns of Urine Protein Excretion that Predict Loss of GFR Chi-yuan Hsu, MD, MSc University of California, San Francisco 2008 two-dimension differential gel electrophoresis, GFR, proteinuria

Molecular Predictors of Progressive Renal Failure in the Chronic Renal Insufficiency Cohort
Matthias Kretzler, MD
University of Michigan
2008
progression, molecular predictors, biomarkers

Clinical Outcomes of Pre-ESRD CKD Patients with Hepatitis C Infection Akinlolu O. Ojo, MD, PhD, MPH University of Michigan 2008 HCV, pre-ESRD

Genetic of Lipoprotein Metabolism and CVD in CKD Daniel J. Rader, MD University of Pennsylvania 2008 lipoproteins, metabolism, genetics

Study Title
Principal Investigator
University Affiliation
Year funded
Keywords

Role of FGF-23 in Mineral Metabolism and CVD in Pre-dialysis CKD Myles S. Wolf, MD, MMSc University of Miami 2008 FGF-23, phosphate therapy, hyperphosphatemia, left ventricular mass

The Renin-Angiotensin-Aldosterone System and Cardiac Arrhythmias
Rajat Deo, MD
University of Pennsylvania
2009
atrial fibrillation, renin, aldosterone, angiotensin, cardiovascular disease

CKD, Metabolic Syndrome and Cardiovascular Disease
Harold I. Feldman, MD, MSCE
University of Pennsylvania
2009
metabolic syndrome, insulin resistance, cardiovascular disease, progression

GWAS in CKD: The CRIC Study Harold I. Feldman, MD, MSCE University of Pennsylvania 2009 GWAS, genetics, GFR, progression

Chronic Kidney Disease Biomarker Validation
Chi-yuan Hsu, MD, MSc and Kathleen D. Liu, MD, PhD, MAS
University of California, San Francisco
2009
biomarkers, kidney injury

The Role of Neuregulin in Human Cardiac Remodeling and Heart Failure Bonnie Ky, MD, MSCE University of Pennsylvania 2009 NRG-1, cardiac remodeling

Hypertension in Advanced Chronic Kidney Disease
Nisha Bansal, MD, MAS
University of California, San Francisco
2010
hypertension, progression, ESRD, blood pressure, cardiovascular disease

Study Title
Principal Investigator
University Affiliation
Year funded
Keywords

The Effect of Sickle Cell Trait upon Progression of Chronic Kidney Disease Vimal Derebail, MD, MPH
University of North Carolina
2010
risk factors, sickle cell trait, hemoglobinopathy

Elevated Nighttime BP – Clinical and Demographic Features, Correlates, and Changes Over Time Paul E. Drawz, MD, MHS
Case Western Reserve University
2010
hypertension, blood pressure, nighttime ABP

Joint Analysis of Longitudinal Outcomes and Clinical Events in Chronic Kidney Disease Cohorts
Tom Greene, PhD
University of Utah
2010
longitudinal analysis, statistical methods, multi-state models, causal models

Health Literacy, Acculturation and Social Support in Hispanics with Chronic Kidney Disease Claudia Lora, MD
University of Illinois, Chicago
2010
HCRIC, health literacy, Hispanic, acculturation, risk factors, cardiovascular disease

Validation of the Beck Depression Inventory in Hispanics with Chronic Kidney Disease
Ana C. Ricardo, MD, MPH, MS
University of Illinois, Chicago
2010
Beck depression inventory, Hispanic, depression,

Carbamylated LDL and Cardiovascular Events
Sudhir V. Shah, MD
University of Arkansas
2010
carbamylated LDL, cardiovascular disease, risk factors, atherosclerosis

Pulse Wave Velocity (Renewal)
Raymond Townsend, MD
University of Pennsylvania
2010
pulse wave velocity, hemodynamics, blood pressure

Study Title
Principal Investigator
University Affiliation
Year funded
Keywords

Modifiable and Novel Risk Factors for and Consequences of Acute Kidney Injury in the Setting of Chronic Kidney Disease: a CRIC Ancillary Study

Amanda Hyre Anderson, PhD, MPH

University of Pennsylvania

2011

acute kidney injury, progression, mortality

Do patient safety events account for adverse outcomes in CKD?
Jeffrey Fink, MD
University of Maryland
2011
safety incidents, outcomes, metabolic disturbance

Abrupt Transition to ESRD from CKD Chi-yuan Hsu, MD, MSc University of California, San Francisco 2011 ESRD, transition

CKD Blood Biomarker Discovery (sub-protocol of the CKD Biomarkers Consortium)
Lesley Inker, MD, MS
Tufts University
2011
biomarkers, progression, proteomics

Hispanic Chronic Renal Insufficiency Cohort (Renewal)
James Lash, MD
University of Illinois, Chicago
2011
Hispanic, cardiovascular disease, progression

Novel Paradigm to Understand Diabetic Complications
Kumar Sharma, MD
University of California, San Diego
2011
mitochondria, urine metabolomics, nephropathy, retinopathy

Cognitive Decline in Chronic Renal Insufficiency (Renewal)
Manjula Tamura, MD, MPH and Kristine Yaffe, MD
Stanford University
2011
cognitive function, gfr, decline, oxidative stress markers

Study Title
Principal Investigator
University Affiliation
Year funded
Keywords

Health Disparities in Chronic Kidney Disease
James Lash, MD
University of Illinois, Chicago
2012
socioeconomic status, health literacy, health disparities

Acidosis, Net Acid Excretion and Morbidity in CKD

Julia Scialla, MD, MHS

Duke University

2012

metabolic acidosis, putrition, hone and mineral metabolism, urinary elec-

metabolic acidosis, nutrition, bone and mineral metabolism, urinary electrolytes, progression, cardiovascular disease, mortality

Genetics of Race and Disordered Mineral Metabolism in CKD
Myles S. Wolf, MD, MMSc
Northwestern University
2012
phosphate, FGF23, klotho, CKD, CVD, genetics, ancestry, racial disparities

Mexico Chronic Renal Insufficiency Cohort (MCRIC)
James Lash, M.D.
University of Illinois, Chicago
2012
Chronic kidney disease progression, Hispanics, Mexico

Metabolomic Studies in Chronic Kidney Disease Harold I. Feldman, MD, MSCE University of Pennsylvania 2012 metabolomics

Gender Disparities and Endogenous Estrogen in Chronic Kidney Disease Outcomes
Ana Ricardo, MD, MPH, MS
University of Illinois, Chicago
2013
Sex hormones, gender disparities

Study Title
Principal Investigator
University Affiliation
Year funded
Keywords

Mediators & Prognostic Value of Muscle Mass & Function in Chronic Kidney Disease Perry Wilson, M.D. Yale University 2013

Sarcopenia, creatinine generation rate, chronic kidney disease, myostatin, caspase-3, activin A, inflammation, tnf-alpha, tgf-beta, frailty

FGF-23 and Clinical Outcomes in ADPKD Patients
Myles S. Wolf, MD, MMSc
Northwestern University
2013
FGF23, CKD, ADPKD, phosphate

Validation of the Kidney Knowledge Survey (KiKS) in Hispanics with Chronic Kidney Disease.
Claudia Lora
University of Illinois at Chicago
2013
Hispanics, Chronic Kidney Disease Knowledge, Spanish language

Estimating GFR from a Panel of Endogenous Filtration Markers (Panel eGFR)
Lesley Inker
Tufts Medical Center
2013
GFR, beta trace protein, beta 2 microglobulin, cystatin C, creatinine

Serum Bicarbonate and Cardiovascular Risk in Patients with Chronic Kidney Disease Mirela Dobre, M.D.

Case Western Reserve University

2013

metabolic acidosis, metabolic alkalosis, cardiovascular disease, mortality

Role of Sclerostin in Disordered Mineral Metabolism in CKD Tamara Isakova, MD, MMSc Northwestern University 2013 CKD, sclerostin, FGF23, PTH, phosphate

Pathophysiological Role of Prorenin
Alfred Cheung, M.D.
University of Utah
2013
Prorenin, chronic kidney disease, retinopathy, cardiovascular disease, diabetes

Study Title
Principal Investigator
University Affiliation
Year funded
Keywords

Enhancing appreciation of the clinical significance of acute kidney injury Raymond Hsu
University of California, San Francisco
2013
Acute kidney injury (AKI), chronic kidney disease (CKD)

Vitamin D catabolism in chronic kidney disease lan de Boer University of Washington 2013 Vitamin D, mineral metabolism, CKD

Plasma KIM-1 and Chronic Kidney Disease Sushrut Waikar Brigham and Women's Hospital 2014 Tubular injury; biomarkers of progression

Novel metabolites associated with renal outcomes
Tammy Sirich
Stanford University
2014
mass spectrometry, metabolomic, CKD

Is there a digital divide in chronic kidney disease?
Clarissa Diamantidis
Duke University
2014
CKD, health information technology, e-literacy, patient safety

Performance of Vitamin D-Binding Protein (DBP) ELISA by Genotype: Validation using Mass Spectrometry Mary Leonard, Michelle Denburg
Stanford University/Children's Hospital of Philadelphia
2014
Vitamin D, vitamin D-binding protein, genotype

Visceral adiposity and fitness among CRIC participants (phase 3)
Sankar Navaneethan
Cleveland Clinic
2014
Obesity, fitness, and kidney disease

Study Title
Principal Investigator
University Affiliation
Year funded
Keywords

Measures of fibrosis and clinical outcomes in chronic kidney disease
Amanda Hyre Anderson, PhD, MPH
University of Pennsylvania
2015
fibrosis, CKD progression, cardiovascular disease, galectin-3, CTGF or CCN2, collagen type III, MMP-2

Heart failure and arrhythmias in CKD
Nisha Bansal, MD, MAS
University of California, San Francisco
2015
heart failure, prediction, cardiac arrhythmias, biomarkers

Whole-exome sequencing study of diabetic nephropathy
Tanika Kelly
Tulane University
2015

diabetic nephropathy; next-generation sequencing; whole-exome sequencing; rare variants; low frequency variants

Longitudinal Changes in Metabolomic Biomarkers and CKD Progression
Eugene Rhee
Massachusetts General Hospital/Broad Institute
2015
metabolomics, CKD, CKD progression

Oxalate in CKD Pathogenesis and Progression
Sushrut Waikar
Brigham and Women's Hospital
2015
oxalate; chronic kidney disease; cardiovascular disease; decline in GFR

Epigenetic dysregulation in diabetic kidney disease Katalin Susztak University of Pennsylvania 2015 cytosine methylation, epigenetics

Prognostic biomarkers in chronic kidney disease Farsad Afshinnia University of Michigan 2015

chronic kidney disease, progression, end stage renal disease, biomarker, metabolomics, Mass spectrometry

Study Title
Principal Investigator
University Affiliation
Year funded
Keywords

Pilot Study on Proteomics of Kidney Disease Progression in the CRIC Study
Rajat Deo
University of Pennsylvania
2015
proteomics, progressive kidney disease, SOMAscan

Targeted Biomarkers of Chronic Kidney Disease (CKD) and its Complications
Jeffrey Schelling
Case Western Reserve University
2015
Chronic kidney disease, diabetic nephropathy, biomarker, case-cohort study

Identifying Modifiable Biomarkers/Mediators for Cardiovascular Disease in Chronic Kidney Disease
Peter Ganz
University of California, San Francisco
2016
cardiovascular risk prediction model; chronic kidney disease; proteomics

Tubular Secretion and Chronic Kidney Disease Complications
Bryan Kestenbaum
University of Washington
2016
tubular secretion, biomarkers, kidney, hippurate

Assessing the accuracy of information in the CMS Medical Evidence Report (form CMS-2728)
Chi-yuan Hsu
University of California, San Francisco
2016
incident ESRD, co-morbidity, information bias

Novel Diagnostics and Therapeutic Targets for Calcification in CKD
Tamara Isakova
Northwestern University
2016
vascular calcification; calcification propensity; calciprotein particles

Assessment of nicotine exposure from toenail clippings of CRIC participants
Edgar Jaimes
MSKCC
2016
nicotine, smoking, chronic kidney disease (CKD)

Study Title
Principal Investigator
University Affiliation
Year funded
Keywords

Metabolomics for Identifying Biomarkers of Dietary Intake & Kidney Disease Progression
Casey Rebholz
Johns Hopkins University
2016
diet; metabolomics; kidney disease progression

The Gut Microbiome and the metabolome in CKD
Amanda Anderson
University of Pennsylvania
2016
gut microbiota, metabolomics, metabolic profiling, CKD

Weight trajectory in chronic kidney disease and risk of adverse outcomes
Elaine Ku
University of California, San Francisco
2016
Weight loss, BMI, CKD, ESRD

Vitamin K status, CVD and arterial stiffness in chronic kidney disease: The Chronic Renal Insufficiency Cohort
Kyla Shea
Tufts University
2017
Vitamin K, matrix gla protein, kidney function, CVD, arterial stiffness

MicroRNAs in progressive renal disease – a pilot study in CRIC (MIRROR-TRIC)
Christos Argyropoulos
University of New Mexico
2017

microRNAs, Chronic Kidney Disease, Proteinuria, RNA-seq, biomarkers, measures of renal function

Developing and validating prognostic metabolomic signatures of diabetic kidney disease
Loki Natarajan
University of California, San Diego
2017
Diabetic kidney disease; metabolomics; prognostic models; variable selection

Health literacy and Self-Management in Chronic Kidney Disease: a CRIC Ancillary Study Sarah Schrauben
University of Pennsylvania
2017
Self-management; CKD progression; Health literacy

Study Title
Principal Investigator
University Affiliation
Year funded
Keywords

Hispanic CRIC Study renewal
James Lash
University of Chicago Illinois
2017
Hispanic/Latino; chronic kidney disease

Soluble Fms-Like Tyrosine Kinase-1 (sFlt-1), Placental growth factor (PIGF) and CVD in Participants with CKD Saif Anwaruddin and Rajat Deo
University of Pennsylvania
2018
Cardiovascular disease, soluble Fms-Like Tyrosine Kinase-1, Placental growth factor (PIGF)

The effects of protein carbamylation in chronic kidney disease (CKD)
Sahir Kalim

Massachusetts General Hospital

2018

Protein carbamylation; CKD; kidney function; mortality; chronic renal insufficiency cohort (CRIC), CKD progression

Statistical Methods for Genomics of CKD
Andrea Foulkes
Mount Holyoke
2018
Genomics, biomarker trajectories, chronic kidney disease

Acute kidney injury among patients with chronic kidney disease Chi Hsu University of California, San Francisco 2018 Acute kidney injury (AKI)

The role of functional iron deficiency in systemic complications of CKD Monique Cho
University of Utah
2018
Iron, chronic kidney disease, hepcidin, cardiovascular disease

Cardiovascular disease risk and risk factors among adults with chronic kidney disease taking moderate or high intensity statins

Paul Muntner

University of Alabama at Birmingham

2018

Chronic kidney disease, statins, cardiovascular disease

Study Title
Principal Investigator
University Affiliation
Year funded
Keywords

Sleep disordered breathing as a predictor of outcomes in chronic kidney disease Ana Ricardo University of Illinois at Chicago 2019

Sleep apnea, chronic kidney disease progression, cardiovascular disease

Population-Based Limits of 24-Hour Urinary Creatinine Excretion Bryan Kestenbaum 2019

Urine creatinine, excretion, height, weight

A Mixed Methods Study of Chronic Kidney Disease Self-Management Sarah Schrauben University of Pennsylvania 2019 Self-management; CKD progression

Dynamic Prediction of Renal Failure Using Longitudinal Prognostic Information among Patients with Chronic Kidney Disease and Kidney Transplant

Liang Li

University of Texas MD Anderson Cancer Center

2019

Dynamic prediction; Prediction model; CKD; Kidney transplant; ESRD; Graft failure

American Indian Chronic Renal Insufficiency Cohort Study (AI-CRIC Study)
Vallabh Shah
University of New Mexico HSC
2019
Native American, Disparity, CKD, CVD

Access to Health Care and Health Outcomes in Chronic Kidney Disease
Stephanie Toth-Manikowski
University of Illinois
2019

Access to care, Healthcare Access, Chronic kidney disease, Health disparities

Adiposity-obesity-related subgroups discovery and metabolomics analysis using machine learning algorithm for chronic kidney disease

Emma Zheng

University of Pennsylvania

2019

Obesity, adiposity, metabolomics, patient subgroups, biomarkers, high dimensional data mining

Study Title
Principal Investigator
University Affiliation
Year funded
Keywords

Characterization of Illness Representation Groups in Chronic Kidney Disease

Eleanor Rivera

University of Pennsylvania

2019

Chronic kidney disease, illness representation, treatment adherence, health literacy, health care utilization

sAREG in urine and serum as a biomarker of CKD severity and progression

Andreas Herrlich

Washington University School of Medicine in St. Louis

2019

Amphiregulin (AREG), epidermal growth factor (EGF), epidermal growth factor receptor (EGFR)

Health Disparities in Chronic Kidney Disease Mentoring Program

Jim Lash

University of Illinois, Chicago

2019

Health disparities, chronic kidney disease, physical activity, sleep disorders

Whole Exome Sequencing of Participants in the Chronic Renal Insufficiency Cohort (CRIC) Study

Harv Feldman

University of Pennsylvania

2020

Genetics, exome sequencing, chronic kidney disease

Cleveland CRIC-KPMP Cohort (CCKC)

Jonathan Taliercio

Cleveland Clinic

2020

KPMP, CRIC, kidney biopsy, biosample, kidney atlas

Natarajan Inference for Functional Principal Components of Kidney Disease Progression in Diabetic Patients Across Albuminuria Groups in the Chronic Renal Insufficiency Cohort (CRIC) Study

Loki Natarajan

**UCSD** 

2020

Albuminuria; chronic kidney disease (CKD); clustering; diabetes; eGFR; functional data analysis; functional principal components analysis (FPCA); nonlinear; statistical inference; trajectory modeling

Lp(a) and the risk for atherosclerotic cardiovascular events among adults with CKD and a history of atherosclerotic cardiovascular disease in the CRIC study

Lisandro Colantonio

University of Alabama at Birmingham

2020

Lipoprotein(a), chronic kidney disease, cardiovascular disease.

Study Title
Principal Investigator
University Affiliation
Year funded
Keywords

Metabolomics and tubular secretory status
Eugene Rhee, Bryan Kestenbaum
Mass General Hospital
2020
Metabolomics, Tubular secretion, CKD

Metabolites and Neuro-Cognition, Sleep and Depression
Eugene Rhee, Rakesh Malhotra
Mass General Hospital
2020
Metabolomics, CKD, Neurocognition, Sleep, Depression

Improving Kidney Function Assessment in Health and Disease Lesley Inker Tufts Medical Center 2020 GFR, metabolites, heart failure, race

Metabolomics and Tubular secretory status Eugene Rhee, Kendra Wulczyn Mass General Hospital Amendment to Existing U01 (Rhee) 2020 Metabolomics, Tubular secretion, CKD

Elucidating the Biology of Cardiovascular Risk in Hemodialysis Patients Using Proteomics Ruth Dubin University of California San Francisco 2020 Proteomics, Hemodialysis

Establishing A New Diagnostic Paradigm for Peripheral Artery Disease among Patients with Chronic Kidney Disease Jing Chen
Tulane University
2020
PAD, ABI, CKD

Patient perceptions about influenza vaccination in nephrology care Junichi Ishigami Johns Hopkins University 2021
Influenza vaccine, chronic kidney disease

Study Title
Principal Investigator
University Affiliation
Year funded
Keywords

Consequences of Clonal Hematopoiesis of Indeterminate Potential in Chronic Kidney Disease Tanika Kelly
Tulane University
2021
CHIP, CKD, Inflammation

Metabolomics and HFpFF in CKD Rupal Mehta Northwestern University 2021 Metabolomics, CKD, HFpEF

CCC-Tobacco (Cross Cohort Collaboration)-a harmonized dataset created by pooling existing de-identified tobacco data across NHLBI-funded cohorts
Michael Blaha
Johns Hopkins University
2021

Cardiovascular disease, cigarette, smoking, subclinical atherosclerosis, tobacco