The Jackson Heart Study

Where Are We Now--
Where Are We Going?

9th Annual National Summit on Health Disparities
Congressional Black Caucus Braintrust
April 23, 2012

Herman A. Taylor, Jr. MD, MPH, FACC
Professor of Medicine and Shirley Professor for the Study of Health Disparities
Jackson Heart Study Principal Investigator
First Myocardial Infarction Incidence

- **Black Men**
- **White Men**
- **Black Women**
- **White Women**
The Jackson Heart Study
What is the Jackson Heart Study?
The Jackson Heart Study and NIH Sponsors
Jackson Heart Study Community
JHS Recruitment Results

Original Cohort:
5,301 African American men and women age 21 and older

Exam 2: Over 85% of survivors returned~ 4 years later (4203).
What is the JHS?

- Service
- Training
- Research
- A Population Science “Collaboratory”
What is the JHS?

- Service
- Training
- Research
- A Population Science “Collaboratory”
Community Health Advisor Network
What is JHS?

- Service
- Training
- Research

A Population Science
“Collaboratory”
• Minorities make up 28% of the U.S. population but only 3% of medical school faculty.
• Only 7% of all physicians are minorities.
• Only 16% of public health school faculty, and 17% of all city and county health officers.
• Fully 98% of senior leaders in health care management are white.
JHS Scholars

Minority Supplement Awards

Science, Language and Math (SLAM)
NHLBI Diversity Supplement Awardees

Eric Mclendon, PhD, M3, UMC

Joe Brooks, MD

Alyce Stewart, PhD candidate, JSU

Jared Taylor, M3 UMC

Monique White, PhD candidate, JSU

Renaldo Williams M3, UMC
Jackson Heart Study Clinician Mentees

Harsha Nagarajara –Fellow
BNP, CRP - Research

Sushant Khaire – UMC Resident
PAT – CKD, PAT- DM, MetS

Pel Balfour – WFU Fellow
BNP – Metabolic Syndrome

Darryl Pollard- UMC Chief Resident
PAT – Blood Pressure

Jason Taylor – UMC Junior Faculty
CRP- Epidemiology, Heritability, CKD

Derrick Edwards – Fellow
Diastolic Dysfunction - Predictors
K series Awardees

Marino Bruce PhD, Mdiv
Jackson State
Social Epi; CKD; JHS Kids Study

Mario Sims, PhD
UMC
Neighborhood influences on CVD Risk

Ervin Fox, MD, MPH
UMC
Imaging, Heart Failure, Biomarkers Genetics (Recent R01)

Ebony Boulware, MD, MPH
Johns Hopkins
(former awardee)
What is the JHS?

- Service
- Training
- Research
- A Population Science “Collaboratory”
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Selected Results

Adiposity and Risk
BMI Distribution: Comparison of Jackson and Framingham

FHS

BMI Group

JHS

Taylor and C Fox, et al, *Obesity* 2010
CVD risk factors in Normal BMI Groups

Taylor and C Fox, et al, *Obesity* 2009
Ectopic Fat Depots

Visceral Fat (50mm) Histogram
VAT and Risk Factors: Framingham-Jackson Heart Study Comparison

Fatty Liver, Abdominal Visceral Fat, and Cardiometabolic Risk Factors
The Jackson Heart Study
Jiankang Liu, Caroline S. Fox, DeMarc Hickson, Aurelian Bidulescu, J. Jeffery Carr, Herman A. Taylor

Objective—The goal of this study was to examine whether fatty liver and abdominal visceral adipose tissue (VAT) are jointly associated with cardiometabolic abnormalities.

Methods and Results—Black participants were from the Jackson Heart Study (n=2882, 65% women) who underwent computed tomography. Fatty liver was measured by liver attenuation in Hounsfield units (LA), and VAT was quantified volumetrically. Cross-sectional associations between LA, VAT, and cardiometabolic risk factors were assessed using linear and logistic regression, and their joint associations were further examined in 4 subgroups: high-LA/low-VAT (n=1704), low-LA/low-VAT (n=422), low-LA/high-VAT (n=436), and low-LA/high-VAT (n=320). Both LA and VAT were associated with most cardiometabolic traits (all P<0.0001), which persisted after additional adjustment for each other (LA, P<0.01–0.0001; VAT, P<0.0001). In bootstrap analyses, the regression coefficient of VAT was significantly greater than LA for triglycerides, high-density lipoprotein cholesterol, impaired glucose, and metabolic syndrome (P=0.009–0.0001). The interaction between LA and VAT was significant for high-density lipoprotein cholesterol (P=0.002), impaired glucose (P=0.003), and metabolic syndrome (P=0.04). Among 4 subgroups, participants with higher VAT and lower LA had higher prevalence of cardiometabolic traits than those with each condition alone.

Conclusion—Both fatty liver and VAT are independent correlates of cardiometabolic risk, but the associations are stronger for VAT than for fatty liver. (Arterioscler Thromb Vasc Biol. 2011;31:00.00.)

Key Words: Jackson Heart Study ■ abdominal visceral fat ■ cardiometabolic risk factors ■ fatty liver

Both fatty liver and abdominal visceral adipose tissue (VAT) are important risk factors for the development of cardiometabolic complications due to obesity. Epidemiological studies indicate that higher levels of VAT or fatty liver are associated with insulin resistance, metabolic syndrome, dyslipidemia, hypertension, and diabetes. Moreover, because of the anatomic blood circulation between VAT and the liver, free fatty acids and inflammatory adipokines that are produced by VAT can be released into the portal vein and directly transported to the liver, causing fatty liver disease. These observations have led to a hypothesis that fatty liver may be another important characteristic of fat distribution that is associated with different metabolic risk profiles.

Although VAT and the liver are metabolically connected and both are associated with cardiometabolic risk factors, their joint associations with these risk factors remain unclear. In a cross-sectional study, cardiometabolic abnormalities were associated with increased intrahepatic triglyceride content but not with high VAT volume, pointing to the possibility that fatty liver, not VAT, is linked to metabolic complications of obesity. Other studies, however, demonstrated that VAT and fatty liver are jointly associated with cardiometabolic abnormalities, suggesting that these 2 fat deposits are both important with respect to cardiometabolic abnormalities.

Blacks are disproportionately affected by obesity, but the concurrent role of fatty liver and VAT remains unclear. Studies have consistently shown that blacks have a lower quantity of VAT and fatty liver, despite higher rates of insulin resistance, metabolic syndrome, dyslipidemia, hypertension, and diabetes. This paradox suggests that either the associations of fatty liver or VAT with cardiometabolic risk factors vary across different ethnic groups or higher rates of cardiometabolic disorders in blacks are due to factors above and beyond fatty liver and VAT. Therefore, it remains unclear whether fatty liver is an important correlate of cardiometabolic risk after accounting for VAT or whether
The results of the present study demonstrate that both fatty liver and abdominal fat are independently associated with cardiometabolic abnormalities…
Ectopic Depots with predominantly local effect: Pericardial Adiposity

Pericardial fat may promote the development of atherosclerosis.

Coronal CT image of heart

Green indicates fat tissue
Model 1: adjusted for age, sex. Model 2: adjusted for age, sex + VAT.
Model 3: adjusted for age, sex + MV.
Model 4: adjusted for age, sex + VAT + MV.

• PAT, a local visceral fat depot, is associated with local artery calcification.

• Both VAT and SAT are associated with adverse cardiometabolic risk factors, but VAT remains more strongly associated with these risk factors.

• Fatty liver is independently associated with cardiometabolic risk factors.
Social Determinants

- Bruce SES and CKD (*Am J Kidney Disease*)
- Hickson et al. Fast food restaurants and caloric intake (*AJPH*)
- Hickson et al. SEP and “dipping” phenomenon (*Am J Hypertension*)
- Sims, M. et al. Social patterning of diabetes (*Am J of Epidemiology*)
- Sims, et al. Perceived Discrimination and Hypertension (*AJPH*)
Fine mapping of the association with obesity at the FTO locus in African-derived populations

Mohamed T. Haseane1,1,1, Hélène Halbritter2, Kevin Waters1,1, Guillaume Lettre2, Jean-François Dan O. Stram2,1, Johann B. N. Laurence N. Kolonel2, Xiaofeng Herman A. Taylor3,4, Chris
1Department of Preventive Medicine, University of Southern California, Los Angeles, MA 90115, USA; 2Program in Medical Sciences, University of California, Los Angeles, CA 90095, USA; 3Jackson Heart Study, University of Minnesota, Minneapolis, Minnesota, USA; 4Génopole, Centre for Biotechnology and Biomedicine, Montpellier, France

Arrhythmia/Electrophysiology

European Ancestry as a Risk Factor for Atrial Fibrillation in African Americans

Gregory M. Marcus, MD, Guillaume Lettre, PhD, Eric J. Ehm, MD, James G. Wilson, MD, PhD, Okinashi D. O. Sido, BS, Noël Burt, MD, PhD, Kalyan V. Patel, MD, MPH, PhD, Susan R. B. M. Taylor, MD, MPH, PhD, Distinguished Professor of Medicine, Vanderbilt University Medical Center, Nashville, TN

Background—Atrial fibrillation (AF) is a common arrhythmia associated with increased risk of stroke and other cardiovascular diseases. The prevalence of AF is higher in African Americans than in other racial groups. We hypothesized that European ancestry is associated with a lower prevalence of AF in African Americans.

Methods—The Jackson Heart Study is a prospective cohort study of African Americans in the United States. Participants were interviewed at baseline and followed up to determine the incidence of AF. We calculated the prevalence of AF and its association with European ancestry.

Results—Among 30,047 African Americans, the prevalence of AF was 5.1% (95% confidence interval [CI], 4.8%-5.5%) in participants with European ancestry and 6.8% (95% CI, 6.3%-7.3%) in participants without European ancestry. After adjustment for age, sex, and body mass index, the prevalence of AF was lower in participants with European ancestry (odds ratio, 0.71; 95% CI, 0.59-0.86).

Conclusion—European ancestry is associated with a lower prevalence of AF in African Americans, independent of age, sex, and body mass index.

Biological, clinical and population relevance of 95 loci for blood lipids

Cholesterol, high-density lipoprotein cholesterol, and triglycerides are strongly associated with plasma lipids in African Americans. The landscape of recombination in African Americans

nature

The landscape of recombination in African Americans


Affiliations | Correspondence

Received 26 July 2011; accepted 27 June 2011; published online 20 July 2011

Abstract

Recombination, together with mutation, gives rise to genetic variation. Here we leverage the recent diversity of people in Africa to identify the landscape of recombination in African Americans.

Nature 478, 170–177 (1 August 2011) | doi:10.1038/nature10336

Circulation

Cardiovascular Genetics

Journal of the American Heart Association

Admixtiture Mapping of White Cell Count: Genetic Locus Responsible for Lower White Blood Cell Count in the Health ABC and Jackson Heart Studies

Michael A. Nalls1, James G. Wilson2, Nick J. Patterson3, Arti Tandon4, Joseph M. Zmuda4, Scott Huntsman5, Melissa Garcia1, Donglei Hu2, Rongling Li3, Brock A. Beamer5, Khashayar V. Patel1, Liming L. Akyildiz6, Joe C. Files7, Cheryl L. Hardy7, Sarah G. Buxbaum8, Herman A. Taylor9,10, David Reich3,11,12, Tamara B. Harris4,13 and Elad Zitz

White blood cell count (WBC) is an important clinical marker that varies among different ethnic groups. African Americans are known to have a lower WBC than European Americans. We surveyed the entire genome for loci underlying this difference in WBC by using admixtiture mapping. We analyzed data from African American participants in the Health ABC, Aging, and Body Composition Study and the Jackson Heart Study. Participants were genotyped or typed across ~1132 single nucleotide polymorphisms that were pre-selected to be informative for African versus European ancestry and span the entire genome. We used these markers to estimate genetic ancestry in each chromosomal region and then tested the association between WBC and genetic ancestry at each locus. We found a locus on chromosome 1q strongly associated with WBC (p < 10^-12). The strongest association was with markers known to affect the expression of the Duffy blood group antigens. Participants who had both copies of the common West African allele had a mean WBC of 7.1 (SD 1.3) participants who had both common European alleles had a mean WBC of 7.9 (SD 1.2). This variant explained 20% of the phenotypic variation in WBC. We used admixtiture mapping, a novel method for conducting genetic association studies, to find a region that was significantly associated with WBC on chromosome 1q. Additional studies are needed to determine the biological mechanism for this effect and its clinical implications.
- Molecular basis of ethnic neutropenia
- Development of the most accurate map of the human genome to date
- Discovery of a novel class of recombination hot spots
- Identification of a set of polymorphisms that together explain over 70% of the ethnicity-based differences in Lp(a) levels...
Where Are We Going?
The Heart of the JHS

- Service
- Training
- Research

- A Population Science “Collaboratory”
2011 Ancillary Studies by Outcome / Broad Topic Area

Number

- CKD
- Diabetes
- Cancer
- Genetics
- LVM
- CVD

- 4
- 3
- 2
- 2
- 1
- 1

Ancillary Studies
Selected Ancillary Studies

HEALTHY HEART HEALTHY YOU
Tandaw Samdarshi, MD, MPH
UMC

Bettina M. Beech, DrPH, MPH
Wake Forest University

Mario Sims, PhD
Co-PI

Diabetic Retinopathy and Genetics: PI—Lucia Sorbin, MD, Mass Eye and Ear

Hearing and CVD Study: PI—John Schweinfurth-UMC

JHS Vascular Laboratory: PI—Ervin Fox, MD, MPH
UMC
The Heart of the JHS: Collaborations

1. Working groups
2. JHS Vanguard Centers
3. RFA: Targeted Analysis Groups
4. Consortia (Genetic)
JHS Future Scientific Directions for the Elimination of Disparities
The JHS is positioned to provide better understanding of the independent and joint effects of lifestyle, psychosocial factors, nutrition, and genetics on the risk and progression of metabolic disorders (e.g., prediabetes and diabetes) and cardiovascular diseases (e.g., hypertension, heart failure, stroke, chronic kidney disease)…
...and thereby elucidate the **modifiable** risk and prognostic factors for morbidity and mortality that can provide the **evidence base** for the development and implementation of **effective interventions** for population subgroups at increased risk of disease and mortality.
5% Body Weight Increase from Baseline by DASH Score at Exam 2

Percentage of 5% BW Increase

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<tr>
<td>Q2</td>
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\[ p = 0.0003 \]
By identifying earlier or subclinical stages of disease, the JHS will help enable the identification of prevention measures or interventions that slow or stop the natural progression of some chronic disorders (e.g., chronic kidney disease, heart failure).
Understanding the Cause of Heart Failure in AA men and women (40-50 yrs)

Bibbons-Domingo, et al
1,400 exams completed to date

- Comprehensive measures of cardiac function
- Detailed measure of heart “strain”, an indicator predictive of future heart failure
- Detailed measure of aortic stiffness closely related to high blood pressure
By studying early markers of disease such as cardiac structure and function, novel biomarkers and traditional measures, and non-cardiac markers of risk (e.g., renal function), and the predictive value of such biomarkers, the JHS will help to identify stages of disease that may be reversible or more amenable to intervention.
Socioeconomic Position Is Positively Associated With Blood Pressure Dipping Among African-American Adults: The Jackson Heart Study

DeMarc A Hickson, Ana V Diaz-Roux, Sharon B Wyatt, Samson Y Gebreab, Gbenga Ogedegbe, Daniel F Sarpang, Herman A Taylor, and Marion P Wolford

BACKGROUND
Blunted nocturnal blood pressure (NPB) dipping is a significant predictor of cardiovascular events. Lower socioeconomic position (SEP) may be an important predictor of NPB dipping, especially in African Americans (AA). However, the determinants of NPB dipping are not fully understood.

METHODS
The cross-sectional associations of individual and neighborhood SEP with NPB dipping, assessed by 24-h ambulatory BP monitoring, were examined among 857 AA adults (mean age 59.2 ± 10.7 years; 59.2% women), after adjustment for age, sex, hypertension status, body mass index (BMI), health behaviors, office, and 24-h systolic BP (SBP).

RESULTS
The mean hourly SBP was consistently lower among participants in the highest category of individual income compared to those in the lowest category, and these differences were most pronounced during sleeping hours. The odds of NPB dipping (defined as ≥10% decline in the mean awake SBP compared to the mean awake SBP increase by 31% [95% confidence interval 13–53%] and 18% [95% confidence interval 0–39%] for each SD increase in income and years of education, respectively, after multivariable adjustment).

CONCLUSIONS
NPB dipping is patterned by income and education in AA adults even after accounting for known risk factors. These results suggest that low SEP is a risk factor for insufficient NPB dipping in AA.

Keywords: ambulatory blood pressure monitoring; blood pressure; hypertension; Jackson Heart Study; nocturnal dipping; socioeconomic position; systolic

We investigated associations of individual and neighborhood SEP with cardiovascular risk factors, including elevated BP in well-recognized20-24 Adverse neighborhood characteristics (e.g., socioeconomic disadvantage) have also been linked to poorer cardiovascular outcomes and higher BP even after adjustment for individual-level SEP (e.g., annual household income).25-29 Few studies have investigated the associations of individual and neighborhood SEP with BP dipping. Although three studies have reported associations of BP dipping with individual-level measures of SEP, sample sizes were small (the largest being 174 participants).20-22 We hypothesized that lower individual and neighborhood SEP would be associated with less BP dipping during sleep and that these associations would be independent of behavioral factors, body mass index (BMI), and other potential confounders.

METHODS
The Jackson Heart Study (JHS) is a population-based observational study of the epidemiology of CVD in AA. Details of the study design30 and recruitment31 are provided elsewhere. Institutional review board approval was obtained from the JHS institutions (Jackson State University, Tougaloo College, and the University of Mississippi Medical Center) and informed

Figure 1 | Twenty-four hour circadian rhythm of systolic blood pressure (SBP) among African-American men and women in the Jackson Heart Study, 2000–2004. Mean hourly unadjusted SBP across categories of (a) education, (b) income, and (c) median neighborhood income. HS, high school.

American Journal of Hypertension 00, 000-000 (2013)
Socioeconomic Position is Positively Associated With Blood Pressure Dipping Among African-American Adults: The Jackson Heart Study

DeMarc A. Hickson1,2*, Ana V. Diez Roux3, Sharon B. Wyatt4, Samson Y Gebreab3, Gbenga Ogedegbe5, Daniel F. Sarpeng6, Herman A. Taylor1,2,7, and Marion P. Wolford2

BACKGROUND

Blunted nocturnal blood pressure (BP) dipping is a marker of cardiovascular risk in African Americans. It is not fully understood why BP dipping is blunted in African Americans.

METHODS

The cross-sectional study examined BP dipping, a measure of circadian BP variation, in African Americans. The study enrolled 2,300 participants, including 1,160 with normal blood pressure and 1,140 with hypertension.

RESULTS

A blunted blood pressure dipping was associated with cardiovascular risk factors, including higher waist circumference, smoking, and diabetes.

Figure 1: Twenty-four hour circadian rhythm of systolic blood pressure (SBP) in the Jackson Heart Study, 2000-2004. Mean hourly unadjusted SBP across categories of (a) education, (b) income, and (c) median neighborhood income. MS, high school.

Our study is the first to examine the association between socioeconomic position (SEP) and BP dipping in a large population-based sample of middle-aged and elderly AA. BP dipping was strongly patterned by SEP, especially income, even after adjustment for BP dipping risk factors. Although AA, as a group, have lower rates of BP dipping than whites, there is substantial socioeconomic heterogeneity in BP dipping within AA.

Although three studies have reported associations of BP dipping with SEP, the sample sizes were small. The largest study (74 participants) hypothesized that lower education level and neighborhood SEP measures with diurnal and nocturnal ambulatory BP measures in a large population-based sample of AA adults. We hypothesized that lower SEP and neighborhood SEP would be associated with less BP dipping during sleep and that these associations would be independent of behavioral factors, body mass index (BMI), and other potential confounders.

METHODS

The Jackson Heart Study (JHS) is a population-based observational study of the epidemiology of cardiovascular disease in AA. Details of the study design and recruitment are provided elsewhere. Institutional review board approval was obtained from the JHS institutions (Jackson State University, Tougaloo College, and the University of Mississippi Medical Center) and informed consent was obtained from all participants.

* Correspondence: Hickson@msstate.edu

Received 11 December 2010, revised 30 January 2011, accepted 14 April 2011.

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Social Determinants

Socioeconomic Position Is Positively Associated With Blood Pressure Dipping Among African-American Adults: The Jackson Heart Study

DeMarc A. Hickson1, Ana V. Dez Roux, PhD, Adam E. Smith, BA, Katherine L. Tucker, PhD, Larry D. Gore, BS, Lei Zhang, PhD, and Sharon B. Wyatt, PhD

BACKGROUND
Blood pressure dipping (BP dip), a predictor of cardiovascular events,1-3 may be an important predictor among African Americans (AA). However, its mechanisms are not fully understood.

METHODS
The cross-sectional association of BP dipping with NBP dipping, assessed by 24-hour ambulatory blood pressure monitoring (24-h ABPM), examined by age, sex, body mass index (BMI), and health behaviors.

RESULTS
The mean hourly SBP was consistently in the highest category of individual dip.

A blunt blood pressure (BP) dipping is a significant predictor of mortality1-3 and cardiovascular (CVD) related outcomes,4-6 and hypertension,7-9 and, interestingly, African American whites experience the pressor response to BP dipping. However, the different patterns of BP dipping exist, particularly in African American subgroups.10-12

The association of low socioeconomic status (SES) with cardiovascular risk factors is well recognized.13-16 Adverse SES is associated with lower educational attainment, lower income, and higher unemployment rates, which are all associated with increased risk of hypertension.

The ecological determinants of the obesity epidemic have received increased attention over the past decade.17-20 Obesity is a significant determinant of BP dip. Therefore, obesity is likely a contributing factor to BP dipping, as it is associated with increased risk of CVD and mortality.21-24

The availability of fast food restaurants (FFRs) is an important factor that influences dietary intake and weight among African Americans.25-28 The availability of FFRs is particularly influenced by urban design and transportation features that limit opportunities to walk or exercise.29-30 The availability of FFRs is particularly influenced by urban design and transportation features that limit opportunities to walk or exercise.29-30

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The availability of fast food restaurants (FFRs) is an important factor that influences dietary intake and weight among African Americans.25-28 The availability of FFRs is particularly influenced by urban design and transportation features that limit opportunities to walk or exercise.29-30

Conclusions. FFR availability may contribute to greater energy intake in younger African Americans who are more likely to consume fast food.
Socioeconomic Position Is Positively Associated With Blood Pressure Dipping Among African-American Adults: The Jackson Heart Study

DeMarc A. Hickson, Ana V. Decz Rouk, MD, Adam L. Smith, BA, Katherine L. Tucker, PhD, Larry D. Gore, BS, Lei Zhong, PhD, and Sharon B. Wyatt, PhD

BACKGROUND
Blood pressure dipping (BPd), a failure of nocturnal blood pressure (BP) decrease, is associated with cardiovascular disease (CVD) and all-cause mortality in diverse populations. However, the mechanisms responsible for these associations remain unclear.

METHODS
We examined the association between BPd and 10-year risk of CVD (National Cholesterol Education Program Adult Treatment Panel III [ATP-III] guidelines) among participants in the Jackson Heart Study (JHS), a large, prospective study in African Americans.

RESULTS
BPd was associated with an increased risk of CVD (HR: 1.5; 95% CI: 1.1-2.0) in unadjusted models. This association persisted after adjustment for age, sex, ethnicity, and BP measurements in models that included demographic, sociodemographic, behavioral, and clinical factors. The association was stronger among older individuals and those with higher baseline BP.

CONCLUSIONS
BPd is independently associated with an increased risk of CVD in African Americans, highlighting the importance of interventions to improve nighttime BP control in this population.
Social Determinants

Socioeconomic Position Is Positively Associated with Blood Pressure Dipping Among Adults

Associations of Fast Food Restaurant Dietary Intake and Weight Among African Americans in the Jackson Heart Study, 2000–2004

DeMarc A. Hickson, PhD, Ana V. Dez Roux, MD, Adam L. Smith, GA, Kath Sharon B. Wyatt, PhD

The ecological determinants of obesity epidemic have received increased attention over the past decade. Obsesogenic environments are thought to promote high energy intake through the greater availability and low price of energy-dense foods, to discourage physical activity through the lack of resources for exercise and because of safety concerns, and to contain urban design and transportation features that limit opportunities to walk in daily life. The obesity epidemic is in particular the availability of inexpensive, energy-dense, high-fat, and low dietary micronutrients (e.g., fiber, magnesium, and potassium foods), as provided by the availability of fast foods. This is an aspect that has received increased attention, especially in low-income and minority communities.

There is growing evidence that obesity among African Americans is occurring increasing numbers of adults away from home. Many of these meals are fast food. US fast food sales have grown 7-fold, from $182.2 billion in 1975 to an estimated $80 billion in 2004. Increased consumption of fast foods has been linked to an obesity epidemic and higher weight and body mass index (BMI). A number of epidemiological studies have demonstrated that the availability of fast food restaurants (FTRs) is cross-sectionally associated with weight outcomes, after adjusting for demographic characteristics, socioeconomic status (SES), and behavioral factors. However, findings have been inconsistent; some studies have reported an association between fast food consumption and obesity, while others have not. Moreover, a few studies have found that the availability of FTRs is positively associated with obesity, while other studies have found no association. It is important to note that the relationship between obesity and fast food consumption is complex, and that additional research is needed to better understand the mechanisms by which fast food consumption may contribute to weight gain and obesity.
“Although religious participation and spirituality were not cross-sectionally linked to weight... religiosity and spirituality might promote certain health behaviors”
Ectopic Depots with predominantly local effect: Pericardial Adiposity

Pericardial Fat and Echocardiographic Measures of Cardiac Abnormalities

The Jackson Heart Study

OBJECTIVE—Previous studies (7,8) have reported that fat depots adjacent to the myocardium, may influence the complex relation between obesity and cardiac left ventricular (LV) abnormalities. We sought to evaluate the association of PAT with echocardiographic measures of LV abnormalities in the Jackson Heart Study (JHS).

RESEARCH DESIGN AND METHODS—A total of 4,144 African Americans (55% female; age 58 years) from the JHS underwent computed tomographic assessments of PAT and adiposity visceral adipose tissue (VAT) from 2007 to 2009 and echocardiography examined between 2000 and 2006. Echocardiographic measures of left and right atrial diameter, LV mass, LV ejection fraction (LVEF), and LV wall thickness were performed by blinded research echocardiographers. VAT and PAT were measured in relation to PAT, VAT, BMI, and waist circumference (WC).

RESULTS—PAT adiposity measures were positively correlated with LA diameter and LV mass and negatively correlated with EF (r = 0.50 to 0.0001) and were not with LVEF (P = 0.36-0.61). In women, with 1.3 kg/m² increments of VAT, we observed associations with higher LV mass (a = 1.7 g/m², P = 0.0001) and LA diameter (a = 0.1 mm, P = 0.0001). However, the magnitude of the association between PAT and cardiac measures was similar compared with VAT (a = 0.65; LV mass, a = 0.36; LA diameter) and was not in comparison with BMI (a = 0.003 LV mass, a = 0.04 LA diameter) and WC (a = 0.08 LA diameter).

CONCLUSIONS—PAT is correlated with echocardiographic measures of cardiac LV abnormalities, but the association is no stronger than other adiposity measures.

Pericardial adipose tissue (PAT) is an active endocrine organ (1). Because of the close proximity of PAT to the underlying myocardium, it has been hypothesized that PAT may have a local detrimental effect on cardiac structure and function (2-4). Several clinical studies have suggested that PAT is associated with increased left ventricular (LV) mass (5), left atrial (LA) enlargement, impaired LV diastolic filling function (6), and lower cardiac indices (7). However, small sample sizes, the use of echocardiography to estimate the thickness of pericardial fat instead of direct volumetric quantification, and the lack of adjustments for important confounders limits the interpretation of these prior studies. Recent data from the Framingham Heart Study (FHS), a large population-based cohort, suggested that pericardial fat volume is correlated with LV structure and function defined by cardiac magnetic resonance (CMR) but not to other measures of adiposity, including visceral adipose tissue (VAT). However, these results from the FHS are derived predominantly from a European American population and may not be generalizable to African American populations where obesity and LV hypertrophy are highly prevalent (9).

Thus, to better understand the impact of PAT on cardiac structure and function in African Americans, we examined the association of computed tomography (CT) measures of PAT with echocardiographic measures of LV structure and function in the Jackson Heart Study (JHS) cohort.

RESEARCH DESIGN AND METHODS

Study sample

The JHS recruited 5,301 African Americans from the Jackson, MS, metropolitan area between September 2000 and March 2004. The cohort was composed of four components: 1) 31% of the cohort members were participants from the African Americans in Communities (AAC) study recruited to the JHS; 2) 30% were representative community volunteers who were not census-derived age, sex, and socioeconomic status eligible for the AAC study and included in the JHS cohort; 3) 17% were randomly ascertained from Jackson, MS, through community methods described previously (10); and 4) 22% were in the JHS family study. The sampling frame for the family study was participants in any one of the AAC, random, or volunteer samples whose family size met eligibility requirements as detailed previously (10). The cohort consisted of 1,635 males aged 35-81 years and an additional 266 participants 623 participants aged 62-86 years who were added as a part of the JHS family study. This resulted in a final age range of 21 to 94 years (10). The current study included participants who underwent multidetector CT scanning from 2007 to 2009 as a part of the second JHS examination (JHS Exam 2).

Overall, 4,200 participants attended the JHS Exam 2. Of these, 1,914 (39%) men underwent multidetector CT assessment for VAT and PAT. Of these, 1,414

Coronal CT image of heart

Green indicates fat tissue
Rate of Incident Metabolic Syndrome by Quintiles of DASH Score

$p < 0.02$
Education and Training
Jackson Heart Study
2008 Freshmen Scholars

Carenza Cezar
Amber Clark
Jalonda Coats
Laneetra Cooper
Kesha Hayes
Jessica Jenkins
Marcus Johnson
E. “Jenae” Jones
Shardale McAfee
Jamilah Perkins
Yolanda Ross
Charmane Smith
Figure. Ectopic fat deposits and their potential systemic and local effects.
1) Working Groups

- Phase 1 WG (Feb-Mar):
  - Diabetes, Obesity, Imaging, Psychosocial, ECG

- Phase 2 WG (Apr-May):
  - HF, Stroke, MI, HTN, CKD, Diet, Physical Activity

Approach:
- Update WG charges, chairs & memberships
- Identify & prioritize WG questions/hypotheses
- Develop writing teams & assignments
- Submit manuscript proposals to P&P
- WG co-chairs implement productivity timelines
- JHS WG liaison-members report to CSO on progress
What do results from an all-African American study in the South have to do with the rest of us?
National and Global Relevance

- The 2050 Imperative
- Sutton’s Law
- A global epidemic persists
- Social stressors are universal
- Specific focus can yield broad perspective
A Special Link

THE PROMISED LAND

THE GREAT BLACK MIGRATION AND HOW IT CHANGED AMERICA

NICHOLAS LEMANN
Global Deaths from Coronary Heart Disease

New Information concerning Heart Failure in AA: Combining CT, MRI and Clinical Data

African Americans with excess pericardial fat, after adjusting for VAT and other risk factors, show evidence of reduced heart performance.
KATHMANDU, Dec 10 (Reuters) - A Nepali minister and three deputies from the ethnic Madhesi community resigned on Monday, saying the government had ignored the grievances of the people living in the Himalayan nation's southern plains.

Madhesis say they were discriminated against by the hill-dominated ruling elites ...

"The state has devalued the aspirations of the Madhesi people - and (the ruling) political parties have ignored calls for their rights," they said in a statement read out to reporters.
Social Context of Health

- 75% female head of household
- Gang violence
- High crime rate
- 85% on welfare
Social Context of Health

- 75% female head of household
- Gang violence
- High crime rate
- 85% on welfare

--a description of a section of the all-white neighborhood of South Boston, MA

MacDonald, M.  All Souls: A Family Story from Southie
“…a white underclass. In raw numbers, European-American whites are the ethnic group with the most people in poverty, most illegitimate children, most women on welfare, most unemployed men, and most arrests for serious crimes.”

A Special Link
What does all this have to do with Boston?

- The 2050 Imperative
- Sutton’s Law
- A global epidemic persists
- Social stressors are universal
- Specific focus can yield broad perspective
The Heart of the JHS

- Service
- Training
- Research
- A True “Collaboratory”
BMI Increase from Baseline by Quintiles of DASH Score

Percentage of 5% BMI Increase

DASH Score Quintiles

Q1  Q2  Q3  Q4  Q5

$p = 0.0006$
Creating a Pipeline…
1) Working Groups

- **JHS WG Concept:**
  - **National Level:** Experts around the country participate in monthly conference calls around a working group focus area to discuss progress, priorities, and form writing teams.
  - **Local Level:** Each working group prioritizes top papers, forms writing teams for these papers which meet weekly/bi-monthly to complete and publish the prioritized papers.

- **JHS WG Support:**
  - Administrative: Meeting logistics/Websites
  - Analytical: WGs are paired with a JHS Analyst liaison.
  - Communication: WG web-site homes connect researchers and distribute useful deliverables
Collaboratories
4) Genetic Consortium Participation

- **CARe:**
  - Candidate-gene Association REsource

- **Exome Sequencing Project:**
  - Sequence all protein coding regions from extreme CVD phenotypes

- **Targeted Re-sequencing Project**
  - 225 well-established candidate CVD genes compared in FHS & JHS

- **T2D – GENES:**
  - Type 2 Diabetes

- **COGENT Consortium:**
  - Continental Origins Genetic Epidemiology Network
  - Unfunded consortium Organized by Wilson & Taylor, (JHS), currently includes 50 cohorts having >25,000 African Americans with GWAS data.

1) Working Groups

Webhome examples for Imaging & Psychosocial Working Groups

JHS Imaging

Manuscripts

Pericardial fat and LV structure and function
PI: Jeff Carr
Analyst: Sean Simpson
JHS Liaison: Mike Griswold

Higher Strain (closer to zero) => Worse LVF
2) JHS Vanguard Centers

Give them Data & they will come…

- 15 JHS VCs
  - 4+ potentials
- JHS data access
- Deliverables:
  - 2+ papers / yr
  - 1+ Anc Study proposal / yr
  - Participation in WGs & quarterly mtg
- Support Model:
  - Central + Local (hub & spoke)
  - Like the recent RFA

<table>
<thead>
<tr>
<th>JHS Vanguard Center Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broad Institute</td>
</tr>
<tr>
<td>Brigham and Women’s Hospital</td>
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<tr>
<td>Framingham Heart Study/Boston Univ. Medical Center</td>
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<tr>
<td>Jackson State University</td>
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<tr>
<td>University of Mississippi Medical Center</td>
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<tr>
<td>University of Michigan School of Public Health</td>
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<td>Wake Forest University Health Sciences Center</td>
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<td>Tougaloo College</td>
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<td>Tufts University</td>
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<td>Cardiovascular Research Institute, Morehouse College</td>
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<tr>
<td>Research Centers in Minority Inst. Translational Research Network (RTRN)</td>
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<tr>
<td>Brown University</td>
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<td>Emory University</td>
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<td>Mayo Clinic</td>
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<td>University of Rochester</td>
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<td>University of California San Francisco (UCSF)</td>
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<td>University of Alabama at Birmingham (UAB)</td>
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<tr>
<td>Tuskegee University</td>
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<tr>
<td>Northeastern University</td>
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</tbody>
</table>
Partners soon to come:

Department of Health and Human Services

Part 1. Overview Information

<table>
<thead>
<tr>
<th>Participating Organization(s)</th>
<th>National Institutes of Health (NIH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Components of Participating Organizations</td>
<td>National Heart, Lung, and Blood Institute (NHLBI)</td>
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<tr>
<td>Funding Opportunity Title</td>
<td>Targeted Analyses of Jackson Heart Study Data (R01)</td>
</tr>
<tr>
<td>Activity Code</td>
<td>R01 Research Project Grant</td>
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<tr>
<td>Announcement Type</td>
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<tr>
<td>Funding Opportunity Announcement (FOA) Number</td>
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<tr>
<td>Companion FOA</td>
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<tr>
<td>Number of Applications</td>
<td>See Section III. 3. Additional Information</td>
</tr>
<tr>
<td>Catalog of Federal Domestic Assistance (CFDA) Number(s)</td>
<td>93.337, 93.347</td>
</tr>
<tr>
<td>FOA Purpose</td>
<td>This FOA will fund external top analyses that are of particular relevance to cardiovascular, diabetes and obesity, physical activity and nutrition, heart failure, and chronic kidney disease.</td>
</tr>
</tbody>
</table>

5 Topical Areas of expertise:
- hypertension,
- diabetes and obesity,
- physical activity and nutrition,
- heart failure,
- chronic kidney disease
Educ\Training Grants

- NIMHD P60: Diez-Roux CIAHD renewal
- NIMHD P20: Jones\Griswold
  - Research, Education and Community Outreach COE
- NIMHD R25: Griswold\Rockhold
  - Mentoring and Educ\training grant: *Research METHODS pgm*
- Concepts: Motivate Research Educ\Training using JHS data

Research-based Minority Education & Training in Health Outcomes & Disparities Scholars program

**Abstract**

Journal of Clinical Lipidology

Article in Press, Corrected Proof

do i:10.1016/j.jacl.2011.02.002 | How to cite
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**Figure**

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**Table**

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**Graph**

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**Question:** HDL vs AGE – Gender Effects?

**EDA Interpretations:**
- Typical value approx 53
- More bimodal than normal
- 50% of Ages between 44
- 95% approx between 32
- How sure are we of the

**Exploratory Data Analysis (EDA)**

Michael Griswold, PhD
Center of Biostatistics

**Grants.gov Tracking Number:**

**Applicant DUNS:**

**CFDA Number:**

**CFDA Description:**

**Funding Opportunity Number:**

**Funding Opportunity Description:**

**Agency Name:**

**Application Name of this Submission:**

**Date/Time of Receipt:**
Both Abdominal VAT or SAT are Associated with Key Risk Factors

* adjusted for age, smoking and alcohol status antihypertensive, diabetic or lipid lowering medication, respectively.

Liu J et al. J Clin Endocrinol Metab. 2010
Prevalence and Awareness of CKD Among African Americans: The Jackson Heart Study

Michael F. Fissinger, MD, PhD,1 Sharon B. Wyatt, PhD,1,2 Ermey L. Ayekuola, PhD,1,3 Sean Coady, PhD,1 Tibor Puskas, MD,1 Frederick Lee, MD,1 Herman A. Taylor, MD,1 and Emiel Crook, MD5

Background: Chronic kidney disease (CKD) leads to end-stage renal disease and is a growing epidemic throughout the world. In the United States, African Americans have an incidence of end-stage renal disease 4 times that of whites.

Study Design: Cross-sectional to examine the prevalence and awareness of CKD in African Americans.

Setting & Participants: Observational cohort in the Jackson Heart Study (JHS).

Predictors: CKD was defined as an estimated glomerular filtration rate <60 mL/min/1.73 m² or proteinuria or dialysis therapy.

Outcomes & Measurements: Data from the JHS were analyzed. Medical history, including renal and drug therapy, antemortem measurements, and serum and urine samples obtained from JHS participants at the baseline visit. Associations between CKD prevalent factors and selected demographic, socioeconomic, and disease status data were assessed by using logistic regression models.

Results: The prevalence of CKD in the JHS was 29.4%. CKD awareness was only 15.9%. Participants had a greater prevalence of cardiovascular disease, hypertension, diabetes, and overweight, and age and waist circumference were associated with CKD. Only 45.6% of patients had access to adequate health care resources.

Limitations: Cross-sectional assessment; single urinal measurement.

Conclusions: The JHS has a high prevalence and low awareness of CKD, especially in the least severe disease status. This emphasizes the need for earlier diagnosis and increased education among health care providers to identify and prevent CKD.

INDEX WORDS: Nephrotic syndrome, proteinuria, African American, chronic disease, epidemic population.

Recent studies show that the prevalence and incidence of end-stage renal disease (ESRD) and chronic kidney disease (CKD) have reached epidemic proportions in the United States and worldwide. An estimated 50 million people are affected, with approximately 1 million receiving renal replacement therapy.1,2 In the most recent National Health and Nutrition Examination Survey (NHANES) report, calculated estimates of 8 million adults with stage 3 CKD (estimated glomerular filtration rate [eGFR] <60 mL/min/1.73 m²) and 12 million with microalbuminuria places more than 6% of the US population at risk of the complications of ESRD. The CKD in adults in NHANES was 1999 to 2002, which was 16% higher than that of 1990 to 1994.3 The US Renal Data System 2009 Annual Data Report shows that the proportion of the CKD population had conditions of diabetes and hypertension.

Although recent ESRD incidence doubled at approximately 340 cases per million people per year, the rate of hospitalization and younger employed population delay in the incidence rate because of low awareness of CKD.5 Older Americans (age ≥65 years) in the United States are more likely to have CKD compared to their younger counterparts.4,5 This highlights the importance of screening and early intervention to prevent the progression of CKD to ESRD.

Figure 1. Chronic kidney disease prevalence by sex and age group.
Figure 3. A through C, Relation of brain natriuretic peptide (BNP) to body mass index (BMI). The results of fitting a penalized cubic spline reveal a significant negative relationship between BNP concentration and BMI in the pooled sample (A), in hypertensive individuals (B), and in normotensive individuals (C). The relationship for BMI <40 kg/m² is linear but levels off at BMI >45 kg/m².