# Supplementary Online Content

Howard G, Cushman M, Moy CS, et al. Association of Clinical and Social Factors With Excess Hypertension Risk in Black Compared With White US Adults. *JAMA.* doi:10.1001/jama.2018.13467



This supplementary material has been provided by the authors to give readers additional information about their work.

## eAnalysis. Exploratory mediation analysis of 9 factors measured only at follow-up

*Introduction*

In addition to factors assessed at baseline that would potentially mediate the black-white differences in incidence of hypertension, REGARDS also assessed a number of factors at the follow-up visit that may potentially mediate the black-white differences in incident hypertension. While these factors are of interest, because of concerns regarding the temporality of these assesses (i.e., reverse causation) these factors are provided in this supplemental material.

*Methods*

| | Source | Classification |
|---|---|---|
| Sleep Apnea | Interviewer-administered self-reported physician diagnosis of sleep apnea | Dichotomized (yes/no) |
| Lack of Physical Activity | Self-administered International Physical Activity Questionnaire[30] | Dichotomized as not having or not having: 1) 3+ days of vigorous-intensity activity of at least 20 minutes per day per week, 2) 5+ days of moderate-intensity activity and/or walking 30+ minutes per day each week, or 3) 5+ days of any combination of walking, moderate-intensity or vigorous intensity activities per week. Higher scores are associated with less physical activity. |
| Low Total Mets of Activity Physical Activity (1000's) | Self-administered International Physical Activity Questionnaire[30] | Calculated continuous variable (inverted: total METS of physical activity subtracted from 15) with a range from 0.7 to 15, so higher scores are associated with less physical activity. |
| Sedentary Time (hours) | Self-administered questionnaire reported hours of sedentary time per week | Continuous variable with a range from 0 to 16, with higher values associated with more sedentary time. |
| Low Mobility | Self-administered Life-Space Mobility Questionnaire[31] | Classification of the number of times moving outside bedroom (5), house (4), neighborhood (3), city/town (2), and out of city/town (1). Range is from 0 to 4, with higher scores are associated with less mobility. |
| Discrimination | Self-administered questionnaire using Experiences of Discrimination questionnaire[34] | Dichotomized as having experienced or not experienced discrimination on any of 9 questions. |
| Lack of Social Support | Self-administered questionnaire using Social Support Inventory from the Enhancing Recovery in Coronary Heart Disease (ENRICHD) Study[35] | Mean scores across 6 questions assessing social support, where each question was scored from 0 to 4, where "0" is support "all of the time" and "4" is support "none of the time". Range from 0 to 4, with higher values are associated with less social support. |
| Poorer Physical Environment | Self-administered questionnaire using Questionnaire from the Multi-Ethnic Study of Atherosclerosis Study[36] | Mean score for 6 questions describing neighborhood safety characteristics that were scored 0 for "not really a problem" to 4 "a very serious problem." Range from 0 to 3.5, with higher scores are associated with poorer physical environment. |
| Poorer Quality Neighborhood Score | Self-administered questionnaire using Questionnaire from the Multi-Ethnic Study of Atherosclerosis Study[36] | Mean score for 7 questions describing negative neighborhood characteristics that were scored 0 for "not really a problem" to 4 "a very serious problem." Range from 0 to 3, with higher scores are associated with lower neighborhood quality scores. |

Supplemental Table 1: Description of potential mediating factors measured only at follow-up. All factors have been defined or rescaled so that higher values are presumed to be associated with higher risk of hypertension.

| | Men | | Women | |
|---|---|---|---|---|
| | White (n = 2430) | Black (n = 695) | White (n = 2660) | Black (n = 1112) |
| Sleep Apnea (Total No. / No. (%)) | 2381<br>400 (16.8) | 678<br>94 (13.9) | 2607<br>287 (11.0) | 1084<br>107 (9.9) |
| Lack of Physical Activity (Total No. / No. (%)) | 1869<br>414 (22.2) | 384<br>115 (29.9) | 2099<br>467 (22.2) | 690<br>228 (33.5) |
| Lower Total Mets of Activity Physical Activity (1000's) (Total No. / mean (SD)) | 1869<br>11.6 (3.0) | 384<br>11.9 (3.0) | 2099<br>11.6 (2.9) | 680<br>12.2 (2.8) |
| Sedentary Time (hours) (Total No. / mean (SD)) | 1813<br>6.2 (3.1) | 370<br>5.8 (3.4) | 2006<br>6.0 (3.0) | 630<br>5.6 (3.2) |
| Lower Mobility (Total No. / median (interquartile range)) | 1877<br>1.0 (0.0 – 1.0) | 390<br>1.0 (1.0 – 2.0) | 2104<br>1.0 (0.0 – 1.0) | 683<br>1.0 (1.0 – 2.0) |
| Discrimination (Total No. / No. (%)) | 1848<br>459 (24.8) | 382<br>309 (80.9) | 2071<br>537 (25.9) | 665<br>485 (72.9) |
| Lack of Social Support (Total No. / median (interquartile range)) | 1839<br>0.3 (0.0 – 1.0) | 375<br>0.7 (0.2 – 1.3) | 2071<br>0.7 (0.2 – 1.3) | 667<br>0.7 (0.2 – 1.3) |
| Poorer Physical Environment (Total No. / mean (SD)) | 1864<br>1.7 (0.4) | 385<br>1.8 (0.4) | 2088<br>1.7 (0.4) | 673<br>1.8 (0.4) |
| Poorer Quality Neighborhood Score (Total No. / median (interquartile range)) | 1862<br>0.3 (0.1 – 0.6) | 385<br>0.4 (0.1 – 0.7) | 2085<br>0.3 (0.1 – 0.6) | 673<br>0.4 (0.1 – 0.9) |

Supplemental Table 2. Participant characteristics by gender and race. See Supplemental Table 1 for description of variable characteristics, range of values, and meaning of higher scores.

| | Sample Size | | Age-Adjusted Risk Factor Levels and Racial Difference | | | Association of Risk Factor with Hypertension | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Absolute Risk Difference in Incidence | | |
| | White | Black | White (95% CI) | Black (95% CI ) | White – Black Difference (95% CI) | OR (95% CI) | Adjusted Proportion for the factor being Absent or 25th Percentile of Factor | Adjusted Proportion for the Factor being Present or 75th Percentile of Factor | Adjusted Difference |
| Sleep Apnea | 2381 | 678 | 0.15 (0.13 to 0.17) | 0.12 (0.09 to 0.15) | 0.03 (-0.00 to 0.07) | 1.28† (1.04 to 1.5) | 34.6 (32.6 to 36.6) | 40.3 (35.2 to 44.9) | 5.7 (0.7 to 10.6) |
| Lack of Physical Activity | 1869 | 384 | 0.24 (0..22 to 0.26) | 0.33 (0.29 to 0.38) | -0.09 (-0.14 to -0.04) | 1.07† (0.86 to 1.33) | 31.8 (29.4 to 34.1) | 33.3 (29.1 to 37.8) | 1.5 (-3.1 to 6.3) |
| Lower Total Mets of Activity Physical Activity (1000's) | 1869 | 384 | 11.8 (11.6 to 11.9) | 12.1 (11.8 to 12.4) | -0.4 (-0.7 to -0.0) | 1.02* (0.93 to 1.12) | 31.9 (29.5 to 34.3) | 32.5 (29.8 to 35.2) | 0.5 (-2.1 to 3.4) |
| Sedentary Time (hours) | 1813 | 370 | 6.32 (6.15 to 6.49) | 5.95 (5.61 to 6.28) | 0.38 (-0.00 to 0.75) | 1.02* (0.93 to 1.12) | 31.7 (29.0 to 34.1) | 32.2 (29.8 to 34.5) | 0.5 (-2.1 to 3.0) |
| Lower Mobility | 1877 | 390 | 0.98 (0.93 to 1.03) | 1.39 (1.30 to 1.49) | -0.41 (-0.52 to -0.31) | 1.04* (0.95 to 1.14) | 31.1 (28.3 to 34.0) | 32.1 (29.9 to 34.1) | 0.9 (-1.3 to 2.9) |
| Discrimination | 2410 | 689 | 0.25 (0.22 to 0.27) | 0.79 (0.74 to 0.83) | -0.54 (-0.59 to -0.49) | 0.92* (0.74 to 1.15) | 32.7 (30.0 to 35.4) | 30.8 (27.1 to 34.6) | -1.8 (-6.8 to 3.2) |
| Lack of Social Support | 1839 | 375 | 0.67 (0.62 to 0.71) | 0.90 (0.82 to 0.99) | -0.24 (-0.34 to -0.14) | 0.96* (0.87 to 1.05) | 32.6 (29.9 to 35.4) | 31.5 (29.2 to 33.8) | -1.1 (-3.8 to 1.4) |
| Poorer Physical Environment | 1864 | 385 | 1.67 (1.65 to 1.69) | 1.80 (1.75 to 1.83) | -0.12 (-0.16 to -0.08) | 1.02* (0.93 to 1.12) | 31.9 (29.4 to 34.3) | 32.5 (29.9 to 35.0) | 0.5 (-1.9 to 3.0) |
| Poorer Quality Neighborhood Score | 1862 | 385 | 0.40 (0.38 to 0.43) | 0.52 (0.47 to 0.57) | -0.12 (-0.17 to -0.07) | 1.13* (1.03 to 1.23) | 30.5 (28.0 to 32.7) | 33.0 (30.6 to 35.1) | 2.5 (0.5 to 4.6) |

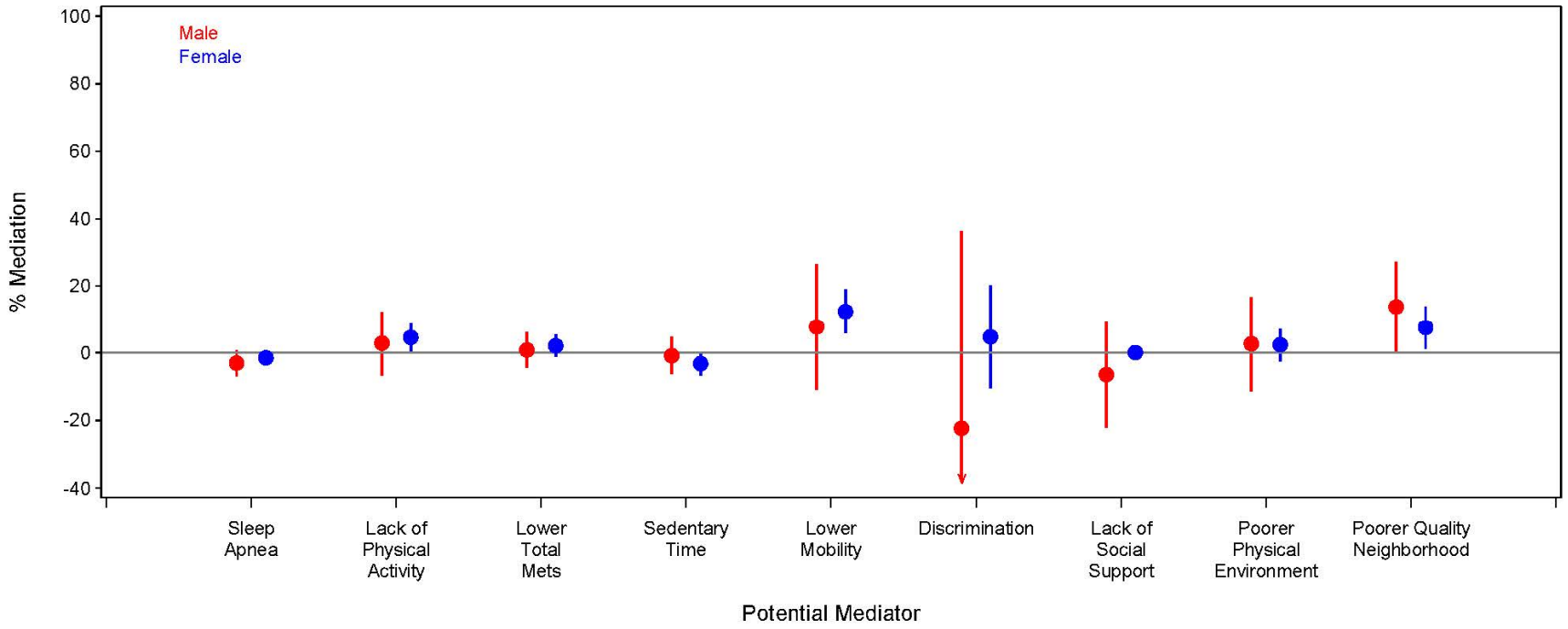
Supplemental Table 3: Mediation analysis for men for factors measured only at follow-up. Panel 1 is the sample size by race. Panel 2 (three columns of results) showing the racial difference in the prevalence or levels of the risk factors, with the least-squared estimate of the age-adjusted mean for white and black participants (with 95% confidence bounds) and the white-black difference (with 95% confidence bounds). For dichotomous variable, the data have been scored "0" for no and "1" for yes, and hence the mean is equivalent to the proportion. Panel 3 is the odds ratio of the risk factor for incident hypertension.

* Odds ratio expressed for a 1 standard deviation difference in a continuous predictor
† Odds ratio expressed as the difference in a dichotomous predictor

| | Sample Size | | Age-Adjusted Risk Factor Levels and Racial Difference | | | Association of Risk Factor with Hypertension | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Absolute Risk Difference in Incidence | | |
| | White | Black | White (95% CI) | Black (95% CI ) | White – Black Difference (95% CI) | OR (95% CI) | Adjusted Proportion for the factor being Absent or 25th Percentile of Factor | Adjusted Proportion for the Factor being Present or 75th Percentile of Factor | Adjusted Difference |
| Sleep Apnea | 2607 | 1084 | 0.10 (0.08 to 0.11) | 0.08 (0.06 to 0.10) | 0.01 (-0.01 to 0.04) | 1.42† (1.14 to 1.78) | 34.0 (32.1 to 35.8) | 42.3 (37.1 to 47.6) | 8.3 (2.8 to 13.8) |
| Lack of Physical Activity | 2099 | 680 | 0.24 (0.22 to 0.26) | 0.36 (0.32 to 0.39) | -0.12 (-0.16 to -0.07) | 1.27† (1.05 to 1.54) | 30.2 (28.2 to 32.5) | 35.5 (31.4 to 39.3) | 5.3 (0.6 to 9.7) |
| Lower Total Mets of Activity Physical Activity (1000's) | 2099 | 680 | 11.8 (11.6 to 11.9) | 12.4 (12.2 to 12.6) | -0.6 (-0.9 to -0.3) | 1.06* (0.97 to 1.15) | 30.8 (28.6 to 33.2) | 32.6 (29.9 to 34.9) | 1.8 (-0.9 to 4.4) |
| Sedentary Time (hours) | 2006 | 630 | 6.04 (5.88 to 6.20) | 5.64 (5.38 to 5.89) | 0.40 (0.10 to 0.71) | 1.12* (1.02 to 1.22) | 29.8 (27.6 to 32.0) | 32.9 (30.5 to 35.2) | 3.1 (0.8 to 5.4) |
| Lower Mobility | 2104 | 683 | 1.07 (1.03 to 1.12) | 1.47 (1.40 to 1.55) | -0.40 (-0.48 to -0.31) | 1.20* (1.10 to 1.30) | 31.1 (26.3 to 33.0) | 35.3 (32.0 to 38.0) | 4.3 (2.0 to 9.0) |
| Discrimination | 2071 | 665 | 0.23 (0.21 to 0.26) | 0.70 (0.66 to 0.74) | -0.47 (-0.51 to -0.42) | 1.06† (0.88 to 1.29) | 31.3 (28.7 to 33.8) | 32.7 (29.4 to 36.2) | 1.3 (-2.8 to 5.7) |
| Lack of Social Support | 2071 | 667 | 0.93 (0.88 to 0.97) | 0.93 (0.86 to 1.00) | -0.01 (-0.09 to 0.08) | 1.07* (0.98 to 1.16) | 30.4 (27.8 to 33.0) | 32.3 (30.2 to 34.5) | 1.9 (-0.5 to 4.3) |
| Poorer Physical Environment | 2088 | 673 | 1.70 (1.68 to 1.72) | 1.82 (1.79 to 1.85) | -0.12 (-0.16 to -0.08) | 1.05* (0.96 to 1.14) | 31.1 (28.8 to 33.1) | 32.3 (30.1 to 34.6) | 1.3 (-1.0 to 3.8) |
| Poorer Quality Neighborhood Score | 2085 | 673 | 0.40 (0.38 to 0.42) | 0.60 (0.56 to 0.63) | -0.20 (-0.24 to -0.15) | 1.11* (1.02 to 1.21) | 30.2 (27.9 to 32.4) | 33.0 (30.5 to 35.3) | 2.8 (0.5 to 5.0) |

Supplemental Table 4: Mediation analysis for women for factors measured only at follow-up. Panel 1 is the sample size by race. Panel 2 (three columns of results) showing the racial difference in the prevalence or levels of the risk factors, with the least-squared estimate of the age-adjusted mean for white and black participants (with 95% confidence bounds) and the white-black difference (with 95% confidence bounds). For dichotomous variable, the data have been scored "0" for no and "1" for yes, and hence the mean is equivalent to the proportion. Panel 3 is the odds ratio of the risk factor for incident hypertension.

* Odds ratio expressed for a 1 standard deviation difference in a continuous predictor
† Odds ratio expressed as the difference in a dichotomous predictor




*Supplemental Figure 1:* Percent mediation (with 95% confidence interval) of the excess risk of incident hypertension in blacks for men (red) and women (blue) for factors measured only at follow-up. Note that the lower 95% confidence interval extends to -80.9%, but was truncated to expand the vertical axis. There was a "negative mediation" for some factors, for example for slow social support for men. This implies that adjustment for this factor resulted in an exacerbation of the black-white difference in the risk of incident hypertension.

## 2. Details of Scoring for Dietary Scales

*Mediterranean Diet Score*

The Mediterranean diet score is an a priori approach to assess diet patterns. For construction of Mediterranean diet score, we followed the most commonly described method that has been previously used by our group as well as other investigators. (Féart C, Samieri C, Rondeau V, et al. Adherence to a Mediterranean diet, cognitive decline, and risk of dementia. JAMA. 2009;302:638–648) First, we identified the nine food groups considered to be part of the Mediterranean-type Diet Score: (i) vegetables, (ii) fruits, (iii) legumes, (iv) cereals (including bread, pasta and rice), (v) fish; (vi) meat; (vii) dairy products; (viii) fat intake and (ix) alcohol intake. Second, we regressed caloric intake (kilocalories) and calculated the derived residuals of daily gram intake for 7 food categories (vegetables, fruits, legumes, cereals, fish, meat and dairy products). Individuals were assigned a value of 1 (i) for each beneficial component (fruits, vegetables, legumes, cereals and fish) whose consumption was at or above the median and (ii) for each detrimental component (meat and dairy products) whose consumption was below the median. For fat intake (eighth food category) we used the ratio of daily consumption (in grams) of monounsaturated lipids to saturated lipids14–16 and we calculated the median separately for each sex. Individuals with ratios at or above the sex-specific median were assigned a value of 1. Alcohol intake was analyzed according to the National Institute on Alcohol Abuse and Alcoholism recommendations.14–16 Moderate consumption was defined as between 1 and 7 drinks per week for women and between 1 and 14 drinks per week for men. More-than-moderate consumption was defined as more than 7 drinks per week for women and more than 14 drinks per week for men. Individuals were assigned a score of 1 (lower risk for cardiovascular disorders or dementia) for moderate consumption (different cut-offs for men and women) and a score of 0 for the other two categories (zero and more-than-moderate consumption).14–16 The Mediterranean diet score was computed as the sum of scores in the nine food categories (range 0–9) with a higher score indicating a higher adherence to Mediterranean diet.

*DASH Diet*

The Dietary Approaches to Stop Hypertension (DASH) diet score is an a priori approach to assess diet patterns. We used standard methods to derive this score (Fung TT, Chiuve SE, McCullough ML, Rexrode KM, Logroscino G, Hu FB. Adherence to a DASH-style diet and risk of coronary heart disease and stroke in women. Arch Intern Med. 2008;168(7):713–720.). The scores range from 8-40 with higher score indicating higher adherence to a DASH style diet. We calculated a DASH score for each FFQ. Component score for fruits, vegetables, nuts and legumes, low-fat dairy products, and whole grains is the participant's quintile ranking. For example, quintile 1 is assigned 1 point and quintile 5, 5 points. For sodium, red and processed meats, and sweetened beverages, low intake was desired. Therefore, the lowest quintile was given a score of 5 points and the highest quintile, 1 point.

*Southern Diet Score*

Factor analysis was used to identify common dietary patterns among REGARDS participants. We followed standard methods using a derivation and validation sample to ensure the patterns were replicable. We also ensure there was congruence across patterns by gender, race and region. The Southern Diet Score was one of the five patterns identified. The score represents the factor score with a higher score indicating higher adherence to the Southern diet pattern. Since this is an *a posteriori* approach, there are not specific foods that are considered to be in the pattern. Rather each of the 56 food groups receives a "weighting" factor to derive the score. The factor weights for foods most aligned with the diet are: higher intake of fried food (0.56), organ meat (0.47), processed meats (0.45), eggs and egg dishes (0.42) higher added fats (0.38), bread (0.37), sugar-sweetened beverages (0.37), soda (0.24), red meat (0.26), high fat milk (0.24), shell fish (0.23), refined grains (0.20), miscellaneous sugar (0.19), 100% fruit juice (0.17), and fried potatoes (0.16); and also lower intake of high fiber low fat milk (-0.42), high fiber cereal (-0.25), yogurt (-0.25), green leafy vegetables (-0.22), low fat dairy (-0.19), and coffee (-0.16).

4. **Sensitivity analysis comparing unweighted mediation analysis (in manuscript) to analysis using inverse probability weighted to account for attrition bias**

Of the 12,262 participants who where normotensive at baseline, 4,935 participants either died or withdrew from the study; and hence, failed to return to second in-person. We appreciate the position that in this situation inverse probability weighting (IPW) should be used to account for potential attrition bias. However, we the current analysis is the appropriate approach as the IPW has the goal of creating an "immortal" population (i.e., bringing the dead back into the analysis). However, the goal of the manuscript is to understand the contributors to the higher prevalence of hypertension in survivors, and as such we suggest the primary analysis presented in the paper is the appropriate approach.

However, we do acknowledge that others could easily disagree with this position, and as such this section is provided to contrast the findings under the "unweighted" approach employed in the manuscript with the IPW approach.

<u>Calculation of weights</u>

Standardized weights were used to not falsely inflate the sample size, with the probability of being a complete case was then modeled as:

$$P(CC) = P(\text{Alive and No Withdrawal}) = P(\text{Alive})P(\text{No Withdrawal}|\text{Alive})$$

Survival and withdrawal are were assumed to be not independent, with the probability of no death modelted separately from the probability of no withdrawal conditional on no death, which we call the 'withdrawal' model. Specifically,

$$\text{Logit}(P(\text{Death}|\text{Race, C}) = \alpha_D + \beta_D I(\text{Race=black}) + \gamma_D C$$

$$\text{Logit}(P(\text{Withdrawal}|\text{Race, C, Alive}) = \alpha_W + \beta_W I(\text{Race=black}) + \gamma_W C$$

where C is a set of predictors consisting of individual participant characteristics. A very broad range of factors was employed in the prediction of withdrawal and death, specifically demographic variables, lifestyle factors and geographic features used were age, sex, region (Stroke Belt, Stroke Buckle, non-Stroke Belt), race (Black or White), education level (Less than High School/High School/Some College/College Graduate and above), income level (Less than $20k/$20k to $34k/$35k to $74k/ $75k and above/Refused), general self-reported health (Excellent/Very Good/Good/Fair/Poor), smoking status (Current/Past/Never), relationship status (Single/Married/Divorced/Widowed/Other), whether the participant reported having health insurance (Yes/No), alcohol use (Yes/No), body mass index categories (<25 kg/m$^2$ /25 to <30 kg/m$^2$/≥30 kg/m$^2$), reported exercise frequency (None/1 to 3 times per week/4 or more times per week), size of the participant's residential census tract (Rural (≤25% urban)/Mixed (>25% to <75% urban) /Urban (≥75% urban)), and neighborhood socioeconomic score (nSES) quartile (17, 18). Clinical baseline predictors included self-reported regular aspirin use (Yes/No), self-reported or ECG-detected atrial fibrillation (Yes/No), self-reported or ECG-detected coronary artery disease (Yes/No), self-reported or ECG-detected myocardial infarction (Yes/No), self-reported transient ischemic attack (TIA) (Yes/No), self-reported diabetes, insulin use, glucose lowering medication, fasting glucose ≥126, or random glucose ≥200 (Yes/No), self-reported use of medication to control blood

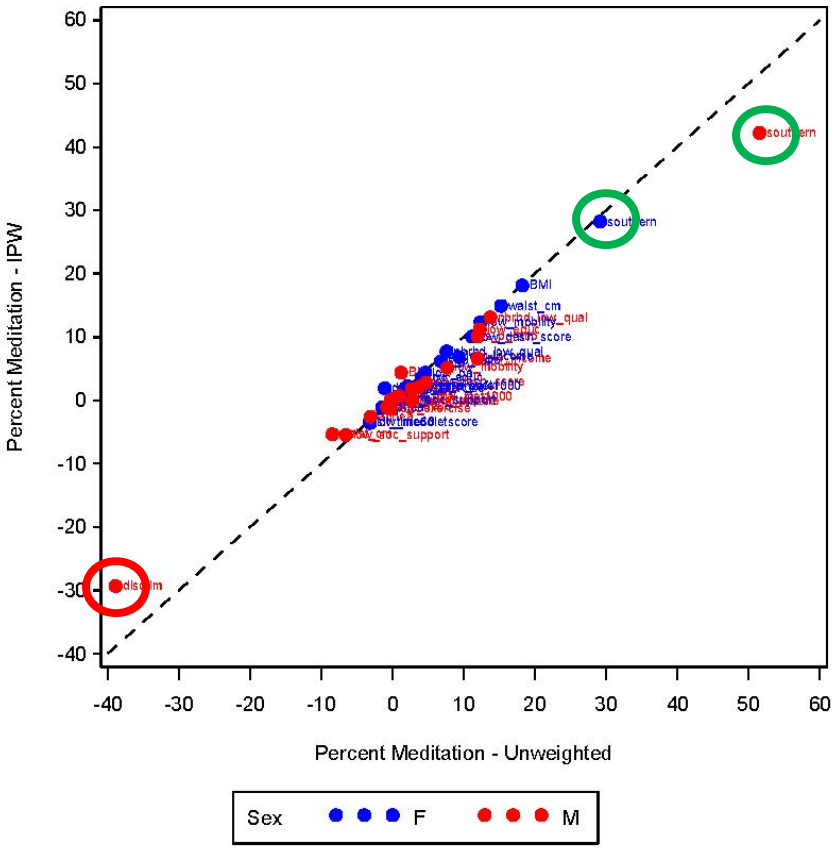
pressure, or measured systolic blood pressure ≥ 140 mmHg or diastolic blood pressure ≥ 90 mmHg (Yes/No).

Given that the relationships of baseline characteristics with withdrawal and death may differ, separate logistic regression models were used to predict the probability of no death and the probability of not withdrawing from the study (conditional on remaining alive). These predicted probabilities were then multiplied to obtain the estimated probability of being a complete case. The model predicted probabilities are inverted and stabilized to create weights used in standard analytic methods. The raw and stabilized weights were carefully investigated for distribution and any extremely large weights. Stabilized weights were created using race, age, sex and region in the numerator of the stabilization ratio.

These stabilized weights were then used in the mediation analysis.

Comparison of Unweighted and IPW findings

The percent mediation using the previously reported unweighted analysis can then be compared to the weighted analysis for both men and women for each of the 21 potential mediating factors (i.e., a total of 42 pairs of estimates). The relationship between these are shown in the figure, where the horizontal axis is the unweighted analysis, the vertical axis is the IPW analysis, and men are in red while women are in blue. The correlation between the unweighted and IPW estimates are 0.99. It could be argued that this correlation is unduly affected by outlying points, specifically by the "discrimination" parameter in men (circled in red), and the "southern diet" parameter in men and women (circled in green); however, deleting these 3 points (number of observations reduced to 39) the correlation remains 0.97.




These estimates of the mediation for the unweighted and weighted analysis is also provided on the table on the next page. If one is strongly vested in testing at $\alpha = 0.05$, this table shows that minor fluctuations around this threshold happened in men for (shown as shaded cells):

1. Waist: there was an unweighted mediation of -8.4% that was reduced to -5.3%, with a change in the p-value from 0.017 to 0.077.

2. Low neighborhood quality score: the mediation of 13.7% changed to 13.1%, with a p-value changing from 0.044 to 0.060.
3. Sodium/potassium ratio: 12.0% mediation changed to 10.1% mediation, with the p-value changing from 0.031 to 0.054.

Whether these are “important” changes is a matter of opinion, but to us these were all only borderline significant findings that became borderline non-significant; that is, there is little/no change the interpretation. As such, we suggest that the IPW analysis only demonstrates the robustness of the original estimates.

| variable | Men | | | | Women | | | |
|---|---|---|---|---|---|---|---|---|
| | Unweighted | | IPW | | Unweighted | | IPW | |
| | Mediation (95% CI) | p-value | Mediation (95% CI) | p-value | Mediation (95% CI) | p-value | Mediation (95% CI) | p-value |
| Low Education | 12.3 (0.6 to 23.9) | 0.040 | 11.1 (1.1 to 21.1) | 0.029 | 4.1 (1.3 to 6.8) | 0.0038 | 3.6 (1.0 to 6.1) | 0.0060 |
| Low Income | 12.0 (-0.5 to 24.4) | 0.059 | 6.6 (-3.0 to 16.2) | 0.18 | 9.3 (4.8 to 13.9) | <.0001 | 6.9 (3.0 to 10.8) | 0.0005 |
| BMI | 1.2 (-4.8 to 7.2) | 0.69 | 4.4 (-1.6 to 10.3) | 0.15 | 18.3 (11.9 to 24.6) | <0.0001 | 18.1 (11.9 to 24.4) | 0.0000 |
| Waist (cm) | -8.4 (-15.4 to -1.5) | 0.017 | -5.3 (-11.2 to 0.6) | 0.077 | 15.2 (9.8 to 20.6) | <0.0001 | 14.8 (9.5 to 20.2) | <0.0001 |
| Sleep Apnea | -3.0 (-6.9 to 0.8) | 0.12 | -2.6 (-6.2 to 0.9) | 0.15 | -1.5 (-3.5 to 0.5) | 0.14 | -1.1 (-2.9 to 0.6) | 0.21 |
| Heavy Alcohol Use | 0.1 (-1.6 to 1.8) | 0.89 | 0.2 (-1.7 to 2.1) | 0.85 | 0.5 (-1.7 to 2.6) | 0.68 | 0.1 (-2.2 to 2.4) | 0.92 |
| Low Physical Activity | 2.8 (-6.7 to 12.2) | 0.57 | 1.8 (-7.7 to 11.3) | 0.71 | 4.6 (0.5 to 8.8) | 0.029 | 4.3 (0.4 to 8.3) | 0.030 |
| Low Total Mets of Physical Activity | 0.9 (-4.3 to 6.1) | 0.73 | 0.6 (-4.7 to 6.0) | 0.81 | 2.1 (-1.1 to 5.4) | 0.20 | 2.2 (-0.8 to 5.2) | 0.15 |
| No Exercise | -0.3 (-3.1 to 2.5) | 0.83 | -1.2 (-4.5 to 2.1) | 0.46 | 1.7 (-0.3 to 3.7) | 0.092 | 1.8 (-0.1 to 3.7) | 0.062 |
| Sedentary Time | -0.8 (-6.4 to 4.8) | 0.78 | -1.0 (-7.3 to 5.3) | 0.75 | -3.2 (-6.6 to 0.3) | 0.071 | -3.6 (-7.2 to 0.1) | 0.055 |
| Low Mobility | 7.7 (-11.0 to 26.5) | 0.42 | 5.2 (-14.7 to 25.0) | 0.61 | 12.4 (5.8 to 18.9) | 0.0002 | 12.3 (6.0 to 18.7) | 0.0001 |
| Depression Scale (CESD) | 3.6 (-2.4 to 9.6) | 0.24 | 2.0 (-2.4 to 6.5) | 0.38 | 2.0 (-0.0 to 4.1) | 0.053 | 1.7 (-0.1 to 3.4) | 0.063 |
| Perceived Stress Scale (PSS) | -0.3 (-5.4 to 4.8) | 0.91 | -1.3 (-6.1 to 3.5) | 0.59 | 0.5 (-1.0 to 2.1) | 0.48 | 0.4 (-0.9 to 1.7) | 0.55 |
| Discrimination Score | -38.9 (-124.3 to 46.5) | 0.37 | -29.4 (-94.8 to 36.1) | 0.38 | -1.1 (-21.2 to 19.0) | 0.92 | 1.9 (-13.7 to 17.6) | 0.81 |
| Low Social Support | -6.5 (-22.2 to 9.1) | 0.41 | -5.5 (-21.5 to 10.6) | 0.50 | -0.0 (-1.3 to 1.3) | 0.99 | 0.0 (-1.1 to 1.2) | 0.98 |
| Poorly-Rated Physical Environment | 2.7 (-11.3 to 16.8) | 0.71 | -0.1 (-15.8 to 15.6) | 0.99 | 2.4 (-2.4 to 7.1) | 0.33 | 2.2 (-2.6 to 6.9) | 0.37 |
| Low Quality Neighborhood Score | 13.7 (0.3 to 27.1) | 0.044 | 13.1 (-0.6 to 26.7) | 0.060 | 7.6 (1.1 to 14.0) | 0.021 | 7.7 (1.5 to 13.9) | 0.015 |
| Low Dash Diet Score | 4.7 (-3.7 to 13.2) | 0.27 | 2.8 (-5.4 to 11.0) | 0.50 | 11.2 (5.6 to 16.8) | <.0001 | 10.0 (4.5 to 15.6) | 0.0004 |
| Low Mediterranean Diet Score | -0.3 (-5.6 to 4.9) | 0.91 | -0.0 (-4.6 to 4.5) | 0.99 | -3.3 (-6.8 to 0.3) | 0.070 | -3.5 (-7.2 to 0.2) | 0.061 |
| Southern Diet Score | 51.6 (18.8 to 84.4) | 0.0021 | 42.1 (12.5 to 71.8) | 0.0054 | 29.2 (13.4 to 44.9) | 0.0003 | 28.1 (11.8 to 44.5) | 0.0008 |
| Sodium/Potassium Ratio | 12.3 (1.1 to 22.8) | 0.031 | 10.1 (-0.2 to 20.3) | 0.054 | 6.8 (1.6 to 11.9) | 0.011 | 6.2 (1.1 to 11.2) | 0.016 |

Supplemental Table 5: Comparison of mediation estimates using the unweighted approach presented in the manuscript and in the supplemental material with estimates using inverse probability weighting to account for potential attrition bias.

## 5. Supplemental analysis of mediation stratified by age

| | | Sample Size | | Difference in Risk Factor Levels | | | | Association of Risk Factor with Hypertension | Mediation of Black-White Disparity |
|---|---|---|---|---|---|---|---|---|---|
| | | White | Black | White (mean (SE) | Black (mean (SE) | # Standard Errors Difference= | p-value | OR (95% CI) | Mediation (95% CI) |
| Low Education | ≤60 years | 984 | 349 | 0.16 (0.01) | 0.34 (0.02) | 6.84 | <0.0001 | 1.27 (0.95 to 1.68) | 19.6 (-6.4 to 45.5) |
| | >60 years | 1446 | 346 | 0.21 (0.01) | 0.40 (0.02) | 7.61 | <0.0001 | 1.16 (0.92 to 1.46) | 7.7 (-5.2 to 20.7) |
| Low Neighborhood Quality | ≤60 years | 727 | 201 | 0.44 (0.02) | 0.57 (0.03) | 3.5 | 0.0006 | 1.16 (1.01 to 1.33) | 34.3 (-12.2 to 80.9) |
| | >60 years | 1135 | 184 | 0.37 (0.01) | 0.49 (0.03) | 3.5 | 0.0005 | 1.08 (0.96 to 1.22) | 7.5 (-5.8 to 20.8) |
| Southern Diet Score | ≤60 years | 807 | 211 | -0.24 (0.03) | 0.92 (0.07) | 15.6 | <0.0001 | 1.23 (1.06 to 1.43) | 94.5 (22.5 to 166.4) |
| | >60 years | 1260 | 211 | -0.29 (0.02) | 0.71 (0.06) | 15.0 | <0.0001 | 1.11 (0.98 to 1.25) | 30.0 (-5.2 to 65.1) |
| Sodium-Potassium Ratio | ≤60 years | 807 | 211 | 0.92 (0.01) | 1.01 (0.02) | 4.2 | <0.0001 | 1.12 (0.98 to 1.28) | 16.4 (-6.3 to 39.2) |
| | >60 years | 1260 | 211 | 0.86 (0.01) | 0.96 (0.02) | 5.7 | <0.0001 | 1.07 (0.96 to 1.20) | 8.2 (-5.8 to 22.2) |

Supplemental Table 6: Mediation analysis for men stratified by age for factors proving significant in pooled analysis. Panel 1 is the sample size by race. Panel 2 (four columns of results) showing the racial difference in the prevalence or levels of the risk factors, with the least-squared estimate of the the age-adjusted mean and standard error of the risk factor by race, the standardized difference (number of standard errors between the two mean levels), and the p-value for a difference by race. For dichotomous variable, the data have been scored "0" for no and "1" for yes, and hence the mean is equivalent to the proportion. Panel 3 is the odds ratio of the risk factor for incident hypertension.

* Odds ratio expressed for a 1 standard deviation difference in a continuous predictor
† Odds ratio expressed as the difference in a dichotomous predictor

| | | Sample Size | | Difference in Risk Factor Levels | | | | Association of Risk Factor with Hypertension | Mediation of Black-White Disparity |
|---|---|---|---|---|---|---|---|---|---|
| | | White | Black | White (mean (SE)) | Black (mean (SE)) | # Standard Errors Difference | p-value | OR (95% CI) | Mediation (95% CI) |
| Low Income | ≤60 years | 1156 | 529 | 0.24 (0.01) | 0.35 (0.02) | 4.73 | <0.0001 | 1.72 (1.35 to 2.19) | 10.7 (2.1 to 18.2) |
| | >60 years | 1119 | 464 | 0.46 (0.01) | 0.62 (0.02) | 5.79 | <0.0001 | 1.40 (1.13 to 1.73) | 8.0 (2.1 to 13.8) |
| Low Education | ≤60 years | 1302 | 581 | 0.19 (0.01) | 0.26 (0.02) | 3.29 | 0.0010 | 1.54 (1.21 to 1.97) | 3.8 (-0.5 to 8.2) |
| | >60 years | 1358 | 531 | 0.32 (0.01) | 0.42 (0.02) | 4.11 | <0.0001 | 1.32 (1.08 to 1.62) | 4.3 (0.4 to 8.2) |
| BMI | ≤60 years | 1300 | 577 | 27.4 (0.2) | 30.7 (0.3) | 11.0 | <0.0001 | 1.24 (1.11 to 1.38) | 17.7 (7.9 to 27.5) |
| | >60 years | 1356 | 529 | 25.6 (0.1) | 29.8 (0.2) | 12.4 | <0.0001 | 1.24 (1.12 to 1.37) | 18.6 (9.3 to 28.0) |
| Waist (CM) | ≤60 years | 1291 | 578 | 85.0 (0.4) | 91.8 (0.6) | 9.0 | <0.0001 | 1.26 (1.13 to 1.41) | 14.2 (6.1 to 22.4) |
| | >60 years | 1353 | 527 | 85.0 (0.4) | 92.1 (0.6) | 10.5 | <0.0001 | 1.23 (1.12 to 1.37) | 15.7 (7.6 to 22.4) |
| Low Physical Activity | ≤60 years | 1026 | 353 | 0.20 (0.01) | 0.31 (0.02) | 4.2 | <0.0001 | 1.40 (1.05 to 1.86) | 6.2 (-0.1 to 12.5) |
| | >60 years | 1073 | 327 | 0.24 (0.01) | 0.36 (0.03) | 4.3 | <0.0001 | 1.18 (0.92 to 1.53) | 3.4 (-2.1 to 8.8) |
| Low Mobility | ≤60 years | 1030 | 354 | 0.96 (0.03) | 1.38 (0.05) | 8.0 | <0.0001 | 1.21 (1.07 to 1.37) | 15.6 (4.2 to 27.2) |
| | >60 years | 1074 | 329 | 1.10 (0.03) | 1.47 (0.05) | 6.1 | <0.0001 | 1.17 (1.05 to 1.32) | 9.8 (2.0 to 17.6) |
| Low Neighborhood Quality | ≤60 years | 1026 | 349 | 0.43 (0.01) | 0.57 (0.02) | 5.3 | <0.0001 | 1.09 (0.96 to 1.23) | 4.7 (-2.6 to 12.0) |
| | >60 years | 1059 | 324 | 0.38 (0.01) | 0.63 (0.03) | 8.6 | <0.0001 | 1.13 (1.01 to 1.28) | 11.7 (0.7 to 22.8) |
| Low Dash Diet Score | ≤60 years | 1128 | 395 | 13.4 (0.1) | 15.2 (0.2) | 7.1 | <0.0001 | 1.35 (1.20 to 1.53) | 23.2 (11.5 to 34.8) |
| | >60 years | 1217 | 355 | 12.4 (0.1) | 13.7 (0.2) | 4.9 | <0.0001 | 1.07 (0.96 to 1.19) | 3.5 (-2.3 to 9.2) |
| Southern Diet Score | ≤60 years | 807 | 211 | -0.24 (0.03) | 0.92 (0.07) | 15.6 | <0.0001 | 1.31 (1.16 to 1.49) | 51.6 (26.5 to 76.7) |
| | >60 years | 1260 | 211 | -0.28 (0.02) | 0.71 (0.06) | 15.0 | <0.0001 | 1.05 (0.93 to 1.18) | 8.2 (-12.8 to 29.2) |
| Sodium-Potassium Ratio | ≤60 years | 1128 | 395 | 0.84 (0.01) | 0.93 (0.01) | 6.0 | <0.0001 | 1.20 (1.07 to 1.34) | 12.7 (3.2 to 22.1) |
| | >60 years | 1217 | 355 | 0.78 (0.01) | 0.85 (0.01) | 4.7 | <0.0001 | 1.04 (0.94 to 1.16) | 2.1 (-3.3 to 7.6) |

Supplemental Table 7: Mediation analysis for women stratified by age for factors proving significant in pooled analysis. Panel 1 is the sample size by race. Panel 2 (four columns of results) showing the racial difference in the prevalence or levels of the risk factors, with the least-squared estimate of the the age-adjusted mean and standard error of the risk factor by race, the standardized difference (number of standard errors between the two mean levels), and the p-value for a difference by race. For dichotomous variable, the data have been scored "0" for no and "1" for yes, and hence the mean is equivalent to the proportion. Panel 3 is the odds ratio of the risk factor for incident hypertension.

* Odds ratio expressed for a 1 standard deviation difference in a continuous predictor
† Odds ratio expressed as the difference in a dichotomous predictor