Supplemental Material
Data S1.

Supplemental Methods

The Genetic Network of Arteriopathy (GENOA) study, begun in 1995, follows a well-characterized cohort of hypertensive individuals and their siblings recruited from Jackson, Mississippi (African Americans only) and Rochester, Minnesota (white individuals only; both sites: n=3,437 individuals; 66% female, 57% African Americans, 28-91 years of age). At least two members of each sibship had hypertension before age 60 at enrollment. Recruitment for the GENOA study has been described previously. Briefly, for the GENOA–Rochester cohort, the Mayo Clinic diagnostic index, and medical chart linkage system of the Rochester Epidemiology Project were used to identify non-Hispanic white residents of Olmsted County, Minnesota, with a diagnosis of essential hypertension made before the age of 60 years. When an eligible proband had ≥1 sibling who also reported hypertension, all of the available members of the sibships were invited to the study center for an initial visit. For the GENOA–Jackson, Mississippi, cohort, sibships were recruited through hypertensive probands who had participated in the Atherosclerosis Risk in Communities Study. The Atherosclerosis Risk in Communities cohort in Jackson was a probability sample of 45- to 64-year-old non-Hispanic black residents of that community. When an eligible proband had ≥1 sibling who also reported hypertension, all of the available members of the sibships were invited to the study center for an initial visit.

Ambulatory BP monitoring

Participants underwent 24-hour ABPM using the SpaceLabs model 90202 device (SpaceLabs). The device was attached between 8:00 am and 9:00 am, and BP readings were obtained over the ensuing 24-hour period every 15 minutes between 6:00 am and 10:00 pm and every 30 minutes between 10:00 pm and 6:00 am. At the beginning and end of the recording period, BP was measured simultaneously by the ambulatory device and by a study technician using the auscultatory method. Two parallel sets of 6 readings (2 supine, 2 sitting, and 2 standing) were obtained in this manner. If the averages of the 6 machine and manual readings taken at the beginning and at the end of a recording differed by <9 mm Hg, the ambulatory recording was considered technically satisfactory. Participants recorded when they got into bed at night and when they got out of bed the next morning. These times were used to define the awake (i.e., active) and asleep (i.e., inactive) periods of the day. A computer program processed the raw BP readings from each recording and applied previously established criteria to identify outlier readings.
Readings identified by this program and judged to be invalid by 1 of the investigators were excluded from further analyses.

**Brain MRI assessment**

All MRI scans were performed on identically equipped Signa 1.5-T MRI scanners (GE Healthcare), and images were centrally processed at the Mayo Clinic. Symmetrical head positioning with respect to orthogonal axes was verified by a series of short scout scans. Total intracranial volume (head size) was measured from T1-weighted spin-echo sagittal images, each set consisting of 32 contiguous 5-mm thick slices with no interslice gap, field of view=24 cm, and matrix=256×192, obtained with the following sequence: scan time=2.5 minutes, echo time=14 ms, repetitions=2, and replication time=500 ms.22 Total brain and white-matter lesion volumes (cm3) were determined from axial fluid-attenuated inversion recovery images, each set consisting of 48 contiguous 3-mm interleaved slices with no interslice gap, field of view=22 cm, and matrix=256×160, obtained with the following sequence: scan time=9 minutes, echo time=144.8 ms, inversion time=2600 ms, repetition time=11 s, bandwidth=±15.6 kHz, and 1 signal average. Interactive imaging processing steps were performed by a trained image analyst who had no knowledge of the subjects’ personal or medical histories or biological relationships. A fully automated algorithm was used to segment each slice of the edited multislice fluid-attenuated inversion recovery sequence into voxels assigned to 1 of the 3 categories: brain, cerebrospinal fluid, or white-matter lesion. The mean absolute error of this method was 1.4% for brain volume and 6.6% for white-matter lesion volume, and the mean test–retest coefficient of variation was 0.3% for brain volume and 1.4% for white-matter lesion volume.23 The difference between total intracranial volume and brain volume provided a measure of brain atrophy. White-matter hyperintensities in the corona radiata and periventricular zone, as well as infarcts in the central gray matter, were included in the global white-matter lesion volume measurements. Brain scans with cortical infarctions were excluded from the analyses because of the distortion of the white-matter lesion volume estimates that would be introduced into the automated segmentation algorithm.

**Other covariates**

At the study visit, blood was drawn after an overnight fast of ≥8 hours. Serum creatinine, glucose, and total cholesterol were measured by standard enzymatic methods. Height was measured with the participant standing with her heels together, without shoes, against a vertically mounted ruler. Weight was measured using an electronic balance with participants wearing lightweight clothes. Body mass index was calculated as weight
Ever smoked was defined as a lifetime history of having smoked ≥100 cigarettes. Alcohol use was assessed according to self-report of sometimes versus never drinking alcoholic beverages. The duration of hypertension was determined by participant recall of the year of diagnosis. Educational level was recorded as less than 12 years, 12 years (high school or equivalent degree), some college, or college degree or more. Diabetes mellitus was defined as a self-report of a physician diagnosis of diabetes mellitus and use of hypoglycemic medications or a fasting serum glucose concentration of at least 126 mg/dL. Level of physical activity was calculated as a continuous variable based on the self-reported average number of hours per day that the subject engaged in heavy, moderate, and sedentary activities according the following formula: $2 \times \text{Heavy} + \text{Moderate} - 2 \times \text{Sedentary}$. Each prescription medication was recorded at the study visit and assigned a code based on mechanism of action.

**Cognitive Testing**

Neurocognitive tests were offered to all participants in the same sequence using standardized protocols to assess global mental status, memory, language, processing speed, and executive function. All scores were ordered so that higher values reflect better cognition.

(1) **Global Cognitive Function**

The Mini-Mental State Examination (MMSE, range 0 [worst] to 30 [best]) was administered according to protocol consistent with the Consortium for the Establishment of a Registry for Alzheimer's Disease battery.

(2) **Processing Speed**

The Wechsler Adult Intelligence Scale Revised Digit Symbol Substitution Task was used to test complex visual attention, sustained and focused concentration, response speed, and visuomotor coordination. Because slower times indicate poorer performance, times were multiplied by $-1$ for analyses so that higher numbers represented better performance.

The Stroop test involved 3 trials. In the WORD trial, the subject read words of color names printed in black ink. In the COLOR trial, the subject identified colors. Finally, in the COLOR-WORD response inhibition trial, the subject named the color in which a word was presented while ignoring the printed word. Scoring for each trial type is based on the number of correct responses in 45 s. The sum of the 3 trials was used as the final score. Higher scores indicate better cognitive performance.
(3) Memory
The Rey Auditory Verbal Learning Test (range 0–15) assesses learning and memory using multiple learning trials and a 30-minute delayed recall of 15 items on a list.8

(4) Executive Function
The Trail Making Test Part B was used to assess attention, sequencing, mental flexibility, visual search and motor function using time and error counts.8 A greater time to completion (in seconds) indicated worse performance. Times were multiplied by −1 so that higher scores represented better function.
Table S1. Number and type of imputed variables.

| Cognitive function tests                  |          |
|-------------------------------------------|----------|
| Mini-Mental State Examination (MMSE)      | 0        |
| Digit Symbol Substitution Test (DSST)     | 10       |
| Rey Auditory Verbal Learning Test (RAVLT) | 12       |
| Stroop Test                               | 35       |
| Trail Making Test Part B (TMT-B)          | 82       |

| Brain MRI parameters                      |          |
|-------------------------------------------|----------|
| White matter hyperintensity               | 14       |
| Brain atrophy                             | 11       |

Variables included in imputation are: age; sex; race; education; clinical characteristics (body mass index, estimated glomerular filtration rate, prevalent diabetes, duration of hypertension, use of antihypertensive medications, prevalent stroke, and clinical systolic blood pressure levels); cognitive function tests (MMSE, DSST, RAVLT, Stroop test, and TMT-B); and brain MRI parameters (white matter hyperintensity and brain atrophy).
Table S2. Race-specific associations between nocturnal SBP levels and demographic variables and clinical characteristics (n=755)

| Characteristics                  | Nocturnal SBP levels, total | Nocturnal SBP levels, blacks | Nocturnal SBP levels, whites |
|----------------------------------|----------------------------|------------------------------|-----------------------------|
| Age, years                       | 0.17‡                      | 0.11*                        | 0.20‡                       |
| Body mass index, kg/m^2           | 0.18‡                      | 0.05                         | 0.25‡                       |
| Physical activity, score          | 0.02                       | -0.04                        | 0.03                        |
| Total cholesterol, mg/dL          | -0.05                      | -0.05                        | -0.06                       |
| eGFR, mL/min/1.73 m^2             | -0.09*                     | -0.04                        | -0.12*                      |
| Duration of hypertension, years   | 0.16‡                      | 0.16†                        | 0.17‡                       |
| Clinic SBP, mm Hg                 | 0.35‡                      | 0.45‡                        | 0.29‡                       |
| Daytime SBP, mm Hg                | 0.81‡                      | 0.75‡                        | 0.82‡                       |

Pearson’s correlation coefficients are shown. Statistical significance was defined as $P < 0.05$. *$P<0.05$; † $P<0.01$; ‡ $P<0.001$.

SBP indicates systolic blood pressure; DBP, diastolic blood pressure; eGFR, estimated glomerular filtration rate.
Table S3. Race-specific associations between nocturnal SBP levels and demographic variables and clinical characteristics (n=755)

| Characteristics                              | Nocturnal SBP levels, total | Nocturnal SBP levels, blacks | Nocturnal SBP levels, whites |
|----------------------------------------------|-----------------------------|-----------------------------|-----------------------------|
| Sex                                          |                             |                             |                             |
| Men                                          | 127.1±1.1                   | 127.8±1.7                   | 126.8±1.4                   |
| Women                                        | 125.7±0.8                   | 124.2±1.1                   | 127.0±1.3                   |
| Education: Less than high school             |                             |                             |                             |
| Yes                                          | 126.3±1.6                   | 125.1±1.8                   | 129.4±3.2                   |
| No                                           | 126.2±0.7                   | 125.3±1.1                   | 126.7±1.0                   |
| Smoking status                               |                             |                             |                             |
| Ever smokers                                 | 126.4±1.0                   | 125.3±1.2                   | 127.4±1.4                   |
| Never smokers                                | 126.0±0.9                   | 125.2±1.3                   | 126.5±1.2                   |
| Antihypertensive medication                 |                             |                             |                             |
| Yes                                          | 127.8±0.8‡                  | 127.1±1.1†                  | 128.1±1.1†                  |
| No                                           | 121.4±1.1                   | 120.7±1.4                   | 122.0±1.7                   |
| Use of diuretics                             |                             |                             |                             |
| Yes                                          | 127.4±1.1                   | 125.6±1.5                   | 128.7±1.5                   |
| No                                           | 125.3±0.9                   | 125.0±1.2                   | 125.5±1.2                   |
| Use of renin-angiotensin system inhibitors   |                             |                             |                             |
| Yes                                          | 127.8±1.2                   | 127.0±1.7                   | 128.3±1.6                   |
| No                                           | 125.3±0.8                   | 124.2±1.1                   | 126.1±1.1                   |
| Diabetes                                     |                             |                             |                             |
| Yes                                          | 133.5±1.8‡                  | 130.7±2.0‡                  | 136.8±3.0‡                  |
| No                                           | 124.6±0.7                   | 123.5±1.0                   | 125.2±0.9                   |

P values were obtained by the unpaired t test. Statistical significance was defined as *P<0.05; †P<0.01; ‡P<0.001. SBP indicates systolic blood pressure.
Table S4. Race-specific associations between nocturnal DBP levels and demographic variables and clinical characteristics (n=755)

| Characteristics                      | Nocturnal DBP levels, total | Nocturnal DBP levels, blacks | Nocturnal DBP levels, whites |
|--------------------------------------|-----------------------------|------------------------------|-----------------------------|
| Age, years                           | -0.09*                      | -0.03                        | -0.13†                      |
| Body mass index, kg/m²               | -0.001                      | -0.14*                       | 0.09                        |
| Physical activity, score             | 0.01                        | 0.01                         | 0.01                        |
| Total cholesterol, mg/dL             | 0.01                        | -0.02                        | 0.03                        |
| eGFR, mL/min/1.73 m²                 | 0.02                        | 0.02                         | 0.03                        |
| Duration of hypertension, years      | 0.04                        | 0.03                         | 0.05                        |
| Clinic SBP, mmHg                     | 0.17‡                       | 0.28‡                        | 0.07                        |
| Daytime DBP, mmHg                    | 0.73‡                       | 0.69‡                        | 0.76‡                       |

Pearson’s correlation coefficients are shown. Statistical significance was defined as P <0.05.

*P<0.05; † P<0.01; ‡ P<0.001.

SBP indicates systolic blood pressure; DBP, diastolic blood pressure; eGFR, estimated glomerular filtration rate.
Table S5. Associations between nocturnal DBP levels and demographic variables and clinical characteristics (n=755)

| Characteristics                              | Nocturnal DBP levels, total | Nocturnal DBP levels, blacks | Nocturnal DBP levels, whites |
|----------------------------------------------|-----------------------------|-----------------------------|-----------------------------|
| Sex                                          |                             |                             |                             |
| Men                                          | 72.6±0.6‡                   | 74.3±1.1‡                   | 71.7±0.7‡                   |
| Women                                        | 67.7±0.4                    | 67.2±0.6                    | 68.0±0.6                    |
| Education: Less than high school             |                             |                             |                             |
| Yes                                          | 68.8±0.8                    | 68.8±1.0                    | 68.8±1.5                    |
| No                                           | 69.5±0.4                    | 69.5±0.7                    | 69.6±0.5                    |
| Smoking status                               |                             |                             |                             |
| Ever smokers                                 | 70.6±0.6†                   | 70.2±0.9                    | 70.9±0.7                    |
| Never smokers                                | 68.5±0.5                    | 68.3±0.8                    | 68.6±0.6                    |
| Antihypertensive medication                  |                             |                             |                             |
| Yes                                          | 69.8±0.4                    | 69.6±0.7                    | 69.8±0.5                    |
| No                                           | 68.4±0.7                    | 68.4±1.0                    | 68.3±1.0                    |
| Use of diuretics                             |                             |                             |                             |
| Yes                                          | 68.5±0.6*                   | 67.9±0.8*                   | 69.0±0.7                    |
| No                                           | 70.1±0.5                    | 70.3±0.8                    | 70.0±0.6                    |
| Use of renin-angiotensin system inhibitors   |                             |                             |                             |
| Yes                                          | 69.6±0.6                    | 69.1±1.0                    | 70.0±0.8                    |
| No                                           | 69.3±0.4                    | 69.4±0.7                    | 69.3±0.6                    |
| Diabetes                                     |                             |                             |                             |
| Yes                                          | 69.5±0.9                    | 70.5±1.1                    | 68.3±1.3                    |
| No                                           | 69.4±0.4                    | 68.9±0.7                    | 69.7±0.5                    |

P values were obtained by the un-paired t test. Statistical significance was defined as *P<0.05; † P<0.01; ‡ P<0.001. DBP indicates diastolic blood pressure.
| Characteristics          | Nocturnal SBP dipping, total | Nocturnal SBP dipping, blacks | Nocturnal SBP dipping, whites |
|--------------------------|-------------------------------|-------------------------------|-------------------------------|
| Age, years               | -0.21‡                       | -0.12*                        | -0.28‡                        |
| Body mass index, kg/m²   | -0.04                        | -0.08                         | -0.02                         |
| Physical activity, score | 0.002                        | 0.05                          | -0.10*                        |
| Total cholesterol, mg/dL | 0.07                         | 0.06                          | 0.09                          |
| eGFR, mL/min/1.73 m²     | -0.004                       | -0.001                        | 0.13†                         |
| Duration of hypertension, years | -0.10†                   | -0.05                         | -0.16‡                        |
| Clinic SBP, mmHg         | -0.18‡                       | -0.10                         | -0.22‡                        |
| Daytime SBP, mmHg        | 0.003                        | -0.01                         | -0.05                         |
| Nocturnal SBP, mmHg      | -0.58‡                       | -0.58‡                        | -0.60‡                        |

Pearson’s correlation coefficients are shown. Statistical significance was defined as \( P < 0.05 \).\( ^* P < 0.05; \; \)\( ^\dagger P < 0.01; \; \)\( ^\ddagger P < 0.001 \). eGFR indicates estimated glomerular filtration rate; SBP, systolic blood pressure.
Table S7. Associations between nocturnal SBP dipping and demographic variables and clinical characteristics (n=755)

| Characteristics                                      | Nocturnal SBP dipping, total | Nocturnal SBP dipping, blacks | Nocturnal SBP dipping, whites |
|------------------------------------------------------|-----------------------------|-----------------------------|-----------------------------|
| Sex                                                  |                             |                             |                             |
| Men                                                  | 9.6±7.6                     | 7.3±6.4                     | 10.8±7.8                    |
| Women                                                | 8.9±7.4                     | 7.4±7.0                     | 10.1±7.8                    |
| Education: Less than high school                     |                             |                             |                             |
| Yes                                                  | 7.1±5.8†                   | 6.2±5.4*                   | 9.5±6.2                    |
| No                                                   | 9.5±7.7                    | 7.9±7.3                    | 10.5±7.8                    |
| Smoking status                                       |                             |                             |                             |
| Ever smokers                                         | 8.9±7.4                     | 7.1±6.7                     | 10.5±7.5                    |
| Never smokers                                        | 9.3±7.6                     | 7.7±6.9                     | 10.3±7.8                    |
| Antihypertensive medication                          |                             |                             |                             |
| Yes                                                  | 8.8±7.7*                   | 6.9±6.9                     | 10.0±7.9                    |
| No                                                   | 10.1±6.8                   | 8.5±6.5                     | 11.8±6.8                    |
| Use of diuretics                                     |                             |                             |                             |
| Yes                                                  | 8.6±7.9                     | 7.1±7.0                     | 9.7±8.4                     |
| No                                                   | 9.6±7.1                     | 7.6±6.7                     | 11.0±7.1                    |
| Use of renin-angiotensin system inhibitors           |                             |                             |                             |
| Yes                                                  | 8.5±7.9                     | 6.6±7.2                     | 9.9±8.2                     |
| No                                                   | 9.5±7.2                     | 7.8±6.5                     | 10.7±7.4                    |
| Diabetes                                             |                             |                             |                             |
| Yes                                                  | 7.0±8.4‡                   | 5.5±7.8†                   | 8.8±8.7                     |
| No                                                   | 9.6±7.2                     | 8.0±6.4                     | 10.7±7.5                    |

P values were obtained by the un-paired t test. Statistical significance was defined as *P<0.05; †P<0.01; ‡P<0.001. eGFR indicates estimated glomerular filtration rate; SBP, systolic blood pressure.
### Table S8. Associations between daytime SBP levels and each cognitive function (n=755)

| Variables                          | Low MMSE score  | DSST                  | RAVLT                 | Stroop                | Log TMT-B             |
|------------------------------------|-----------------|-----------------------|-----------------------|-----------------------|-----------------------|
|                                    | OR (95% CIs)    | β (95% CIs)           | β (95% CIs)           | β (95% CIs)           | β (95% CIs)           |
| Model 1*                           |                 |                       |                       |                       |                       |
| Daytime SBP level                  | 1.15 (0.95 to 1.40) | -0.66 (-1.39 to 0.07) | 0.04 (-0.20 to 0.27) | -0.69 (-2.85 to 1.48) | 0.01 (-0.02 to 0.04) |
|                                    | *P=0.16         | *P=0.07               | *P=0.77               | *P=0.53               | *P=0.58               |
| Model 2†                           |                 |                       |                       |                       |                       |
| Daytime SBP level                  | 1.15 (0.95 to 1.40) | -0.64 (-1.37 to 0.10) | 0.07 (-0.16 to 0.31) | -0.67 (-2.85 to 1.51) | 0.01 (-0.02 to 0.03) |
|                                    | †P=0.16         | †P=0.09               | †P=0.53               | †P=0.55               | †P=0.65               |
| Model 3‡                           |                 |                       |                       |                       |                       |
| Daytime SBP level                  | 1.15 (0.95 to 1.40) | -0.69 (-1.42 to 0.03) | 0.02 (-0.21 to 0.26) | -0.72 (-2.89 to 1.44) | 0.01 (-0.02 to 0.04) |
|                                    | ‡P=0.15         | ‡P=0.06               | ‡P=0.84               | ‡P=0.51               | ‡P=0.55               |
| Model 4§                           |                 |                       |                       |                       |                       |
| Daytime SBP level × race           | 0.80 (0.54 to 1.17) | -0.44 (-1.96 to 1.07) | -0.06 (-0.55 to 0.44) | -1.15 (-5.56 to 3.26) | 0.13 (-0.05 to 0.07) |
|                                    | §P=0.25         | §P=0.57               | §P=0.82               | §P=0.61               | §P=0.67               |

OR = odds ratio; β = unstandardized regression coefficient. Adjusted OR or β (95% CIs) associated with 1 SD increase of daytime SBP levels (+16.2 mmHg) is shown.

*Adjustment factors for Model 1 included demographic variables (age, sex, race, education) + clinical characteristics (BMI, eGFR, prevalent diabetes, duration of hypertension, use of antihypertensive medications, prevalent stroke, and clinic SBP levels)

†Adjustment factors for Model 2 included demographic variables + clinical characteristics + WMH volumes

‡Adjustment factors for Model 3 included demographic variables + clinical characteristics + brain atrophy

§Adjustment factors for Model 4 included demographic variables + clinical characteristics + daytime SBP levels × race

Statistical significance was defined as *P <0.05. CIs indicate confidence intervals.

eGFR indicates estimated glomerular filtration rate; SBP, systolic blood pressure; BMI, body mass index; WMH, white matter hyperintensity; MMSE, Mini-Mental State Examination; DSST, Digit Symbol Substitution Task; RAVLT, Rey Auditory Verbal Learning Test; TMT-B, Trail Making Test Part B.
Table S9. Associations between nocturnal SBP levels and each cognitive function (without multiple imputation)

| Variables                          | DSST (n=741)         | RAVLT (n=739)        | Stroop (n=717)        | Log TMT-B (n=670)       |
|-----------------------------------|----------------------|----------------------|----------------------|------------------------|
|                                   | β (95% CIs)          | β (95% CIs)          | β (95% CIs)          | β (95% CIs)            |
| Model 1*                          |                      |                      |                      |                        |
| Nocturnal SBP level               | -0.88 (-1.61 to -0.15) | -0.19 (-0.43 to 0.05) | -0.60 (-2.73 to 1.52) | 0.02 (-0.01 to 0.05)   |
|                                   | *P=0.02              | *P=0.13              | *P=0.58              | *P=0.12                |
| Model 2†                          |                      |                      |                      |                        |
| Nocturnal SBP level               | -0.81 (-1.55 to -0.07) | -0.13 (-0.37 to 0.11) | -0.43 (-2.62 to 1.77) | 0.02 (-0.01 to 0.04)   |
|                                   | †P=0.03              | †P=0.30              | †P=0.70              | †P=0.20                |
| Model 3‡                          |                      |                      |                      |                        |
| Nocturnal SBP level               | -0.87 (-1.60 to -0.13) | -0.17 (-0.41 to 0.07) | -0.56 (-2.71 to 1.59) | 0.02 (-0.01 to 0.05)   |
|                                   | ‡P=0.02              | ‡P=0.16              | ‡P=0.61              | ‡P=0.18                |
| Model 4§                          |                      |                      |                      |                        |
| Nocturnal SBP level × race        | -1.82 (-3.31 to -0.32) | -0.17 (-0.66 to 0.33) | -3.17 (-7.35 to 1.01) | 0.05 (-0.01 to 0.11)   |
|                                   | §P=0.02              | §P=0.51              | §P=0.14              | §P=0.09                |

OR = odds ratio; β = unstandardized regression coefficient. Adjusted OR or β (95% CIs) associated with 1 SD increase of nocturnal SBP levels (+18.3 mmHg) is shown.

*Adjustment factors for Model 1 included demographic variables (age, sex, race, education) + clinical characteristics (BMI, eGFR, prevalent diabetes, duration of hypertension, use of antihypertensive medications, prevalent stroke, and clinic SBP levels)
†Adjustment factors for Model 2 included demographic variables + clinical characteristics + WMH volumes
‡Adjustment factors for Model 3 included demographic variables + clinical characteristics + brain atrophy
§Adjustment factors for Model 4 included demographic variables + clinical characteristics + nocturnal SBP levels × race
Statistical significance was defined as P <0.05. CIs indicate confidence intervals.

eGFR indicates estimated glomerular filtration rate; SBP, systolic blood pressure; BMI, body mass index; WMH, white matter hyperintensity; MMSE, Mini-Mental State Examination; DSST, Digit Symbol Substitution Task; RAVLT, Rey Auditory Verbal Learning Test; TMT-B, Trail Making Test Part B.
Table S10. Race-specific associations between nocturnal SBP levels and each cognitive function (without multiple imputation)

| Variables | DSST (n=741) | Stroop (n=722) | Log TMT-B (n=670) |
|-----------|---------------|----------------|-------------------|
|           | Black individuals (n=305) | Whites individuals (n=436) | Black individuals (n=290) | Whites individuals (n=427) | Black individuals (n=278) | Whites individuals (n=392) |
| **Model 1** | β (95% CIs) | β (95% CIs) | β (95% CIs) | β (95% CIs) | β (95% CIs) | β (95% CIs) |
| Nocturnal SBP levels | -2.00 (-3.28 to -0.70) | -0.37 (-1.21 to 0.47) | -3.05 (-6.83 to 0.74) | -0.08 (-2.69 to 2.52) | 0.07 (0.01 to 0.13) | 0.01 (-0.01 to 0.04) |
| * | P=0.002 | P=0.39 | P=0.11 | P=0.95 | P=0.03 | P=0.34 |
| **Model 2** | β (95% CIs) | β (95% CIs) | β (95% CIs) | β (95% CIs) | β (95% CIs) | β (95% CIs) |
| Nocturnal SBP levels | -1.95 (-3.31 to -0.60) | -0.30 (-1.15 to 0.55) | -2.88 (-6.88 to 1.12) | 0.09 (-2.53 to 2.72) | 0.05 (-0.01 to 0.12) | 0.01 (-0.01 to 0.04) |
| † | P=0.005 | P=0.49 | P=0.16 | P=0.94 | P=0.09 | P=0.37 |
| **Model 3** | β (95% CIs) | β (95% CIs) | β (95% CIs) | β (95% CIs) | β (95% CIs) | β (95% CIs) |
| Nocturnal SBP levels | -1.93 (-3.27 to -0.59) | -0.35 (-1.19 to 0.50) | -2.88 (-6.70 to 0.95) | -0.01 (-2.62 to 2.60) | 0.05 (-0.01 to 0.12) | 0.01 (-0.01 to 0.04) |
| ‡ | P=0.005 | P=0.42 | P=0.14 | P=0.99 | P=0.09 | P=0.35 |

β = unstandardized regression coefficient. Adjusted β (95% CIs) associated with 1 SD increase of nocturnal SBP levels (+18.3 mmHg) is shown.

*Adjustment factors for Model 1 included demographic variables (age, sex, education) + clinical characteristics (BMI, eGFR, prevalent diabetes, duration of hypertension, use of antihypertensive medications, prevalent stroke, and clinic SBP levels)
†Adjustment factors for Model 2 included demographic variables + clinical characteristics + WMH volumes
‡Adjustment factors for Model 3 included demographic variables + clinical characteristics + brain atrophy
Statistical significance was defined as P<0.05.

eGFR indicates estimated glomerular filtration rate; SBP, systolic blood pressure; BMI, body mass index; WMH, white matter hyperintensity; MMSE, Mini-Mental State Examination; DSST, Digit Symbol Substitution Task; TMT-B, Trail Making Test Part B.
**Table S11. Associations between nocturnal SBP dipping and each cognitive function (without multiple imputation)**

| Variables                        | DSST (n=741) | RAVLT (n=739) | Stroop (n=717) | Log TMT-B (n=670) |
|----------------------------------|--------------|--------------|----------------|-------------------|
|                                  | β (95% CIs)  | β (95% CIs)  | β (95% CIs)    | β (95% CIs)       |
| **Model 1***                    |              |              |                |                   |
| Nocturnal SBP dipping            | 0.62 (-0.06 to 1.31) | **0.33 (0.11 to 0.56)** | 0.75 (-1.21 to 2.70) | -0.02 (-0.05 to 0.001) |
|                                 | *P=0.07      | **P=0.003**  | **P=0.45**     | **P=0.06**        |
| **Model 2†**                    |              |              |                |                   |
| Nocturnal SBP dipping            | 0.56 (-1.28 to 1.25) | **0.34 (0.11 to 0.56)** | 0.72 (-1.25 to 2.69) | -0.02 (-0.05 to 0.002) |
|                                 | *P=0.11      | **P=0.003**  | **P=0.48**     | **P=0.07**        |
| **Model 3‡**                    |              |              |                |                   |
| Nocturnal SBP dipping            | 0.54 (-0.16 to 1.25) | **0.32 (0.10 to 0.55)** | 0.68 (-1.34 to 2.70) | -0.02 (-0.05 to 0.001) |
|                                 | *P=0.13      | **P=0.005**  | **P=0.51**     | **P=0.06**        |
| **Model 4§**                    |              |              |                |                   |
| Nocturnal SBP dipping            | 0.53 (-0.18 to 1.25) | **0.32 (0.09 to 0.55)** | 0.68 (-1.32 to 2.68) | -0.02 (-0.05 to 0.002) |
|                                 | *P=0.15      | **P=0.006**  | **P=0.50**     | **P=0.07**        |
| **Model 5||**                   |              |              |                |                   |
| Nocturnal SBP dipping × race     | **2.28 (0.83 to 3.72)** | 0.005 (-0.43 to 0.54) | 3.96 (-0.17 to 8.09) | -0.07 (-0.13 to -0.01) |
|                                 | **P=0.002**  | **P=0.83**   | **P=0.06**     | **P=0.02**        |

OR = odds ratio; β = unstandardized regression coefficient. Adjusted OR or β (95% CIs) associated with 1 SD increase of nocturnal SBP dipping (7.5% reduction of nocturnal SBP from daytime SBP) is shown.

*Adjustment factors for Model 1 included demographic variables (age, sex, race, education) + clinical characteristics (BMI, eGFR, prevalent diabetes, duration of hypertension, use of antihypertensive medications, prevalent stroke, and clinic SBP levels)
†Adjustment factors for Model 2 included demographic variables + clinical characteristics + 24-hour mean SBP levels
‡Adjustment factors for Model 3 included demographic variables + clinical characteristics + 24-hour mean SBP levels + WMH volumes
§Adjustment factors for Model 4 included demographic variables + clinical characteristics + 24-hour mean SBP levels + brain atrophy
||Adjustment factors for Model 5 included demographic variables + clinical characteristics + 24-hour mean SBP levels + nocturnal SBP dipping × race

Statistical significance was defined as *P <0.05. CIs indicate confidence intervals.

eGFR indicates estimated glomerular filtration rate; SBP, systolic blood pressure; BMI, body mass index; WMH, white matter hyperintensity; MMSE, Mini-Mental State Examination; DSST, Digit Symbol Substitution Task; RAVLT, Rey Auditory Verbal Learning Test; TMT-B, Trail Making Test Part B.
Table S12. Race-specific associations between nocturnal SBP dipping and each cognitive function (without multiple imputation)

| Variables                  | DSST (n=741) | Stroop (n=717) | Log TMT-B (n=670) |
|----------------------------|--------------|----------------|-------------------|
| Black individuals (n=305)  |              |                |                   |
| Whites individuals (n=436) |              |                |                   |
| Black individuals (n=290)  |              |                |                   |
| Whites individuals (n=427) |              |                |                   |
| Black individuals (n=278)  |              |                |                   |
| Whites individuals (n=392) |              |                |                   |
| Model 1*                   |              |                |                   |
| Nocturnal SBP dipping      | 1.60 (0.47 to 2.73) | 3.00 (-0.49 to 6.50) | 0.800 (-2.45 to 2.61) |
|                           | P=0.005      | P=0.09         | P=0.95            |
| Model 2†                   |              |                |                   |
| Nocturnal SBP dipping      | 1.52 (0.37 to 2.66) | 2.91 (-0.70 to 6.52) | 0.66 (-2.46 to 2.58) |
|                           | P=0.009      | P=0.11         | P=0.96            |
| Model 3‡                   |              |                |                   |
| Nocturnal SBP dipping      | 1.61 (0.45 to 2.77) | 3.26 (-3.23 to 6.84) | -0.33 (-0.62 to 1.50) |
|                           | P=0.007      | P=0.08         | P=0.23            |
| Model 4§                   |              |                |                   |
| Nocturnal SBP dipping      | 1.56 (0.41 to 2.71) | 3.24 (-0.21 to -6.70) | -0.01 (-0.03 to 0.02) |
|                           | P=0.008      | P=0.07         | P=0.57            |

β = unstandardized regression coefficient. Adjusted β (95% CIs) associated with 1 SD increase of nocturnal SBP dipping (7.5% reduction of nocturnal SBP from daytime SBP) is shown.

*Adjustment factors for Model 1 included demographic variables (age, sex, education) + clinical characteristics (BMI, eGFR, prevalent diabetes, duration of hypertension, use of antihypertensive medications, prevalent stroke, and clinic SBP levels)
†Adjustment factors for Model 2 included demographic variables + clinical characteristics + 24-hour mean SBP levels
‡Adjustment factors for Model 3 included demographic variables + clinical characteristics + 24-hour mean SBP levels + WMH volumes
§Adjustment factors for Model 4 included demographic variables + clinical characteristics + 24-hour mean SBP levels + brain atrophy
Statistical significance was defined as P < 0.05.
eGFR indicates estimated glomerular filtration rate; SBP, systolic blood pressure; BMI, body mass index; WMH, white matter hyperintensity; MMSE, Mini-Mental State Examination; DSST, Digit Symbol Substitution Task; TMT-B, Trail Making Test Part B.
Figure S1. Histogram of nocturnal SBP levels and dipping

Race-specific distribution of nocturnal SBP levels, daytime SBP levels, and nocturnal SBP dipping based on all participants is shown. Gray bars represent BPs in black individuals and transparent bars with black outlines represent BPs in white individuals. SBP indicates systolic blood pressure.
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