Supplementary material

| Variable | Category and definition |
|----------------------|---|
| Race | Non-Hispanic White, Non-Hispanic Black, Hispanic, and Other |
| Poverty income ratio | <1.3, 1.3-3.5, and >3.5 |
| Physical activity | Physical activity is evaluated in terms of metabolic equivalent of task (MET), taking into account the duration, frequency, and intensity of vigorous and moderate exercise during leisure time each week, and then divided into low (<600 MET-min/week), medium (600-<1200 MET-min/week), and high (\geq 1200 MET-min/week) |
| Body mass index | Body mass index is calculated by dividing weight (in kilograms) by the square of height (in meters) |

 Table S1 Category and definition of covariates.

| Variable | β (95% CI) | P value |
|--------------------------|-------------------------|---------|
| Total femur BMD | | |
| CMI | -0.035 (-0.076, 0.005) | 0.086 |
| HDL-C | -0.028 (-0.060, 0.004) | 0.083 |
| LDL-C | -0.024 (-0.034, -0.014) | < 0.001 |
| LDL-C/HDL-C | -0.015 (-0.028, -0.003) | 0.017 |
| TC | -0.024 (-0.033, -0.015) | < 0.001 |
| Femoral neck BMD | | |
| CMI | -0.052 (-0.087, -0.018) | 0.004 |
| HDL-C | -0.001 (-0.032, 0.031) | 0.963 |
| LDL-C | -0.024 (-0.031, -0.016) | < 0.001 |
| LDL-C/HDL-C | -0.021 (-0.031, -0.010) | < 0.001 |
| TC | -0.021 (-0.029, -0.013) | < 0.001 |
| Trochanter BMD | | |
| CMI | -0.033 (-0.070, 0.004) | 0.082 |
| HDL-C | -0.028 (-0.055, -0.001) | 0.045 |
| LDL-C | -0.022 (-0.031, -0.012) | < 0.001 |
| LDL-C/HDL-C | -0.014 (-0.025, -0.003) | 0.014 |
| TC | -0.022 (-0.031, -0.014) | < 0.001 |
| Intertrochanter BMD | | |
| CMI | -0.031 (-0.078, 0.015) | 0.183 |
| HDL-C | -0.039 (-0.077, -0.002) | 0.042 |
| LDL-C | -0.025 (-0.037, -0.012) | < 0.001 |
| LDL-C/HDL-C | -0.014 (-0.029, 0.002) | 0.078 |
| TC | -0.026 (-0.036, -0.015) | < 0.001 |
| Lumbar spine (L1-L4) BMD | | |
| CMI | -0.048 (-0.085, -0.011) | 0.013 |
| HDL-C | -0.014 (-0.042, 0.014) | 0.314 |
| LDL-C | -0.022 (-0.032, -0.011) | < 0.001 |
| LDL-C/HDL-C | -0.017 (-0.028, -0.006) | 0.004 |
| TC | -0.021 (-0.030, -0.012) | < 0.001 |

Table S2. Association between cardiometabolic index and traditional lipid indicators and bone mineral density.

The models were adjusted for BMI, age, sex, race, poverty income ratio, physical activity, total calcium, phosphorus, total protein, systolic blood pressure, diastolic blood pressure, and glycohemoglobin. CI, confidence interval; BMD, bone mineral density.

| Variable | β (95% CI) | P value |
|--------------------------|-------------------------|---------|
| Total femur BMD | | |
| Continuous variable | -0.034 (-0.074, 0.007) | 0.100 |
| Categorical variable | | |
| Q1 | Reference | |
| Q2 | -0.006 (-0.032, 0.019) | 0.599 |
| Q3 | -0.012 (-0.036, 0.012) | 0.311 |
| Q4 | -0.020 (-0.053, 0.013) | 0.224 |
| Femoral neck BMD | | |
| Continuous variable | -0.051 (-0.086, -0.017) | 0.005 |
| Categorical variable | | |
| Q1 | Reference | |
| Q2 | 0.001 (-0.024, 0.027) | 0.913 |
| Q3 | -0.012 (-0.037, 0.013) | 0.336 |
| Q4 | -0.030 (-0.058, -0.002) | 0.035 |
| Trochanter BMD | | |
| Continuous variable | -0.031 (-0.068, 0.005) | 0.092 |
| Categorical variable | | |
| Q1 | Reference | |
| Q2 | -0.003 (-0.028, 0.021) | 0.774 |
| Q3 | -0.006 (-0.026, 0.014) | 0.551 |
| Q4 | -0.017 (-0.045, 0.010) | 0.207 |
| Intertrochanter BMD | | |
| Continuous variable | -0.029 (-0.076, 0.018) | 0.215 |
| Categorical variable | | |
| Q1 | Reference | |
| Q2 | -0.008 (-0.036, 0.020) | 0.560 |
| Q3 | -0.013 (-0.041, 0.014) | 0.332 |
| Q4 | -0.017 (-0.056, 0.022) | 0.372 |
| Lumbar spine (L1-L4) BMD | | |
| Continuous variable | -0.045 (-0.081, -0.008) | 0.018 |
| Categorical variable | | |
| Q1 | Reference | |
| Q2 | -0.012 (-0.036, 0.011) | 0.293 |
| Q3 | -0.024 (-0.044, -0.004) | 0.020 |
| Q4 | -0.033 (-0.062, -0.004) | 0.027 |

Table S3. Association between cardiometabolic index and bone mineral density after additional adjustments for alanine aminotransferase, aspartate aminotransferase, alkaline phosphotase, blood urea nitrogen, and uric acid.

The models were adjusted for BMI, age, sex, race, poverty income ratio, physical activity, total calcium, phosphorus, total protein, systolic blood pressure, diastolic blood pressure, glycohemoglobin, alanine aminotransferase, aspartate aminotransferase, alkaline phosphotase, blood urea nitrogen, and uric acid. CI, confidence interval; BMD, bone mineral density.

| Variable | β (95% CI) | P value |
|--------------------------|-------------------------|---------|
| Total femur BMD | | |
| Continuous variable | -0.050 (-0.080, -0.021) | < 0.001 |
| Categorical variable | | |
| Q1 | Reference | |
| Q2 | -0.002 (-0.020, 0.016) | 0.817 |
| Q3 | -0.009 (-0.027, 0.010) | 0.366 |
| Q4 | -0.026 (-0.047, -0.005) | 0.015 |
| Femoral neck BMD | | |
| Continuous variable | -0.054 (-0.082, -0.025) | < 0.001 |
| Categorical variable | | |
| Q1 | Reference | |
| Q2 | 0.005 (-0.012, 0.023) | 0.549 |
| Q3 | -0.005 (-0.023, 0.014) | 0.611 |
| Q4 | -0.025 (-0.045, -0.004) | 0.018 |
| Trochanter BMD | | |
| Continuous variable | -0.049 (-0.076, -0.021) | < 0.001 |
| Categorical variable | | |
| Q1 | Reference | |
| Q2 | -0.006 (-0.023, 0.011) | 0.475 |
| Q3 | -0.008 (-0.026, 0.009) | 0.342 |
| Q4 | -0.029 (-0.048, -0.009) | 0.004 |
| Intertrochanter BMD | | |
| Continuous variable | -0.050 (-0.083, -0.016) | 0.004 |
| Categorical variable | | |
| Q1 | Reference | |
| Q2 | -0.001 (-0.021, 0.020) | 0.936 |
| Q3 | -0.007 (-0.029, 0.014) | 0.496 |
| Q4 | -0.025 (-0.048, -0.001) | 0.045 |
| Lumbar spine (L1-L4) BMD | | |
| Continuous variable | -0.062 (-0.089, -0.036) | < 0.001 |
| Categorical variable | | |
| Q1 | Reference | |
| Q2 | -0.003 (-0.019, 0.014) | 0.745 |
| Q3 | -0.017 (-0.034, 0.000) | 0.046 |
| O4 | -0.033 (-0.052 -0.014) | <0.001 |

Table S4. Association between cardiometabolic index and bone mineral density using unweighted data.

The models were adjusted for BMI, age, sex, race, poverty income ratio, physical activity, total calcium, phosphorus, total protein, systolic blood pressure, diastolic blood pressure, and glycohemoglobin. CI, confidence interval; BMD, bone mineral density.



Figure S1. Flow diagram of the study participants included in NHANES 2005-2010.