

While previous studies find links between telomere length (TL) and health, these have been exclusively correlational. We apply causal inference methods, testing the hypothesis that shorter TL results in poor health. We use data from the Health and Retirement Study (N = 3896). Genetic instrumental variables analyses are employed to examine impacts on several health outcomes. We construct a polygenic risk score (PRS) of single nucleotide polymorphisms associated with TL, which serves as an instrument for log-TL. We also conduct Cox proportional hazards models to examine the relationship between the PRS and mortality. Log-TL is predictive of lower risk of heart disease, with a 10% increase in TL (300 base pairs) associated with a 0.085% decreased risk (95%CI: -0.17, -0.0020). We find no associations with other health outcomes, and no association between the PRS and mortality. This study represents a major advance in understanding the role of telomeres in health.