Background Adolescents engage in new and changed behaviours such as substance use or reduced physical activity. Evidence is accruing that these health risk behaviours co-occur at a population level and cluster within individuals. There has, however, been less focus on what the cumulative impact of engagement in multiple risk behaviours might be even in the short term. We sought to assess if engagement in multiple risk behaviours in mid-adolescence is associated with deleterious health and social outcomes in early adulthood.

Methods 5591 young people enrolled in the Avon Longitudinal Study of Parents and Children provided data on 13 risk behaviours from the domains of physical inactivity, substance use, self-harm, sexual health, vehicle-related risk behaviour, and antisocial behaviour when aged 15 to 16. Logistic regression was used to examine any association between the total number of behaviours engaged in and in rates of obesity, harmful alcohol use, problem gambling, anxiety, depression, trouble with the police and unemployment and lack of training at age 18.

Results There was a strong association between multiple risk behaviour and all seven adverse outcomes. For each additional risk behaviour engaged in, the odds of having anxiety or depression, trouble with the police and unemployment and lack of training at age 18 increased by 1.20 [1.13, 1.27] respectively. Adjustment for gender, parental antisocial behaviour, and antisocial behaviour at age 15 to 16, as well as mutually-adjusted models, were used to examine the relationship between baseline predictors and level and change in grip strength in both cohorts.

Results Men in ELSA and HCS had higher average levels of grip strength at baseline, and accelerated rates of loss, compared with women. In ELSA, older age, shorter stature, and increased morbidity were associated with lower level, and accelerated rate of loss, of grip strength in both sexes. For example, accelerated loss of 0.04 (95% CI: 0.00, 0.08) standard deviation (SD) scores per additional morbidity were estimated from mutually-adjusted models; corresponding SD scores per SD decrease in height were 0.06 (95% CI: 0.03, 0.09). In mutually-adjusted analyses, socioeconomic disadvantage, low level of physical activity and poorer self-reported health were also associated with low grip strength level, but not with rate of loss. Analysis in HCS yielded similar results.

Conclusion Our results identify multimorbidity as a modifiable determinant of both level and loss of muscle strength in later life. The association between shorter stature and accelerated loss of grip strength suggests that developmental influences may also impact on rate of loss, as well as on level, of muscle strength in older age. This research will inform the development of lifecourse interventions to promote maintenance, and reduce loss, of muscle strength in later life.