quintiles of the 2015 Index of Multiple Deprivation (IMD) as a measure of area-level socioeconomic deprivation. We used two measures of multimorbidity: a) basic multimorbidity: two or more chronic conditions; b) complex multimorbidity: at least three chronic conditions affecting at least three body systems. A list of 211 chronic conditions of interest, including long-term mental health conditions and chronic infections, was agreed by a multidisciplinary team. Using standard formulae, we calculated crude and age-sex standardised multimorbidity prevalence and incidence by geographical region. We used quasi-Poisson regression models to calculate risk ratios adjusted for year, sex, age, region, and IMD quintile. Analyses were conducted using R v4.0.4.

Results Our final sample consisted of 989,421 adults: 48.7% male, with median age of 46 years (inter-quartile range 33–62). The overall crude prevalence of multimorbidity in England was 43.7% for basic, and 25.2% for complex multimorbidity over the 16-year study period. London had the lowest crude prevalence of both multimorbidity types (basic: 35.4%; complex: 18.3%), whilst the North East had the highest (basic: 48.6%; complex: 29.6%). In age-sex standardised results, prevalence was still highest in the North East, with London and the South East having the lowest prevalence. Similar regional inequalities were found in the incidence of both multimorbidity types. Compared to London, the North East had higher multimorbidity prevalence in risk ratios adjusted for socioeconomic deprivation and demographic factors (basic multimorbidity: 1.18 (95% confidence interval 1.16, 1.19); complex multimorbidity: 1.26 (95% confidence interval 1.24, 1.29).

Conclusion There are regional inequalities in multimorbidity within England with higher burden in the North, compared to London and the South. These inequalities remained after adjusting for age and socioeconomic deprivation. Strategies aimed at addressing the social determinants of health are needed to reduce future burden on health and social care systems, particularly in the North of England.