LETTER

No association between urbanisation, neighbourhood deprivation and IBD: a population-based study of 4 million individuals

We read with interest the recently published work in *Gut* by Imhann *et al*.[1] Although this paper suggests that genetics plays an important role in IBD,[1] environmental factors clearly contribute to its aetiology.[2] When Ng *et al*[2] reviewed environmental risk factors for IBD in this journal they noted that urbanisation may be linked to both Crohn's disease (CD) and ulcerative colitis (UC).

We used Cox regression to estimate the effect of urbanisation and deprivation during childhood on future IBD.

From the Swedish Total Population Register,[3] the government agency Statistics Sweden selected all individuals born in Sweden between 1973 and 2013 (n=4 161 280). Among these there were 3 177 828 siblings nested within 2 331 062 families. Within this cohort we identified individuals with IBD, defined as having ≥2 relevant International Classification of Diseases codes in the Swedish National Patient Register, as earlier described.[4] Data from the Swedish Agency for Economic and Regional Growth were used to construct a rural index. Rural index category 1 represents major urban area, with increasing level of rurality in categories 4 and 5. Neighbourhood was defined according to the government agency Statistics Sweden's 'Small Area Marketing Statistics' (SAMS) classification system. We estimated the neighbourhood deprivation for each SAMS area based on school qualification, proportion of unmarried individuals, proportion born outside the Nordic countries and neighbourhood crime rate. The crude intraclass correlations for the neighbourhood factors were calculated to capture an aggregate of all factors. These estimates assume that individuals live in different areas randomly.

Individuals who had been diagnosed with IBD prior to the age of 10 years were excluded in the models examining parental income measured across the first 10 years (to avoid reverse causation).

In total, 20 183 individuals had an incident diagnosis of IBD after the age of 10 years (CD: n=6598; UC: n=10 332; IBD unclassified (IBD-U): n=3253). We found no statistically significant association between childhood rural living and risk of developing IBD after the age of 10 years (figure 1). Except for a negative association between low median neighbourhood income (where a high income was linked to a lower risk of IBD-U) which was not supported controlling for familial effects (figure 1), there were no associations between deprivation and CD, UC or IBD-U (table 1). The intraclass correlation estimates for neighbourhood were small.

Table 1 Intraclass correlation (with 95% CI), adjusted for sex, birth year and birth order, and IBD as well as subtypes of the disease

	Neighbourhood (at birth)
Any IBD	2.1% (1.7% to 2.6%)
CD	3.3% (2.4% to 4.5%)
UC	3.0% (2.3% to 3.8%)
IBD-U	3.7% (2.4% to 5.9%)

CD, Crohn's disease; IBD-U, IBD unclassified.

While neighbourhood deprivation has been linked to health and disease,[5] data on IBD are scarce.[6] In this nationwide study of more than 4 million Swedish residents, some 20 000 individuals developed IBD after the age of 10 years. We found no consistent associations between childhood living areas and future IBD.

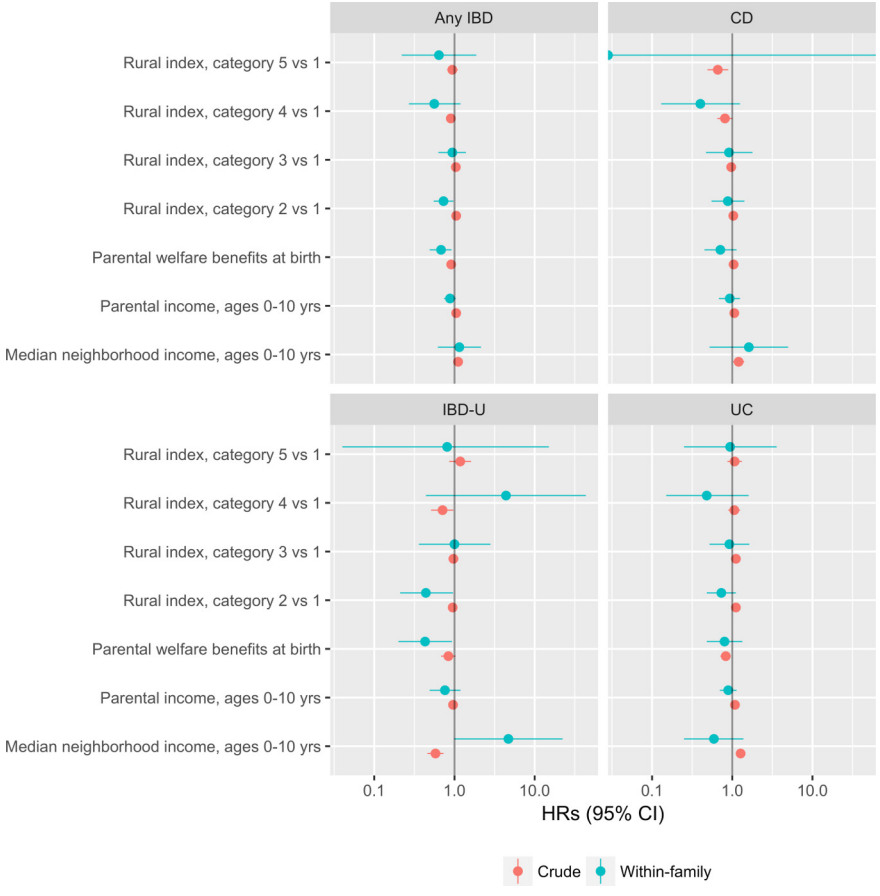

Figure 1 Crude and within-family HRs for future IBD. CD, Crohn's disease; UC, Ulcerative colitis; IBD-U, IBD unclassified.

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