Reviewer’s report

Title: Neighbourhood deprivation and very preterm birth in an English and French cohort

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Reviewer: Susan Mason

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This study examined the association between four measures of neighborhood socioeconomic deprivation and very preterm birth (VPTB) risk, and, within the very preterm group, examined the association between neighborhood socioeconomic deprivation and the risks of a variety of pregnancy, delivery, and post-partum complications. The study was conducted in both Trent in the UK and in Ile-de-France in France, allowing comparison of these relationships in two populations with different cultural, social, and healthcare contexts (although in both regions, healthcare is universally available). Analyses of neighborhood SES and VPTB were ecological, while the neighborhood SES – complication analyses adjusted for a core of individual-level covariates. The authors articulate the study question clearly, appear to have conducted the analyses carefully, and present the findings fairly. However, I think the authors need to more strongly justify their use of census data, and should include a tighter argument for the need for yet another ecological study on neighborhood effects given that the field has largely moved on to multi-level analyses. Detailed comments below:

Major compulsory revisions:

Introduction:

1. Third paragraph of introduction: The authors note that cross-national comparisons of the relationship between neighborhood deprivation and very preterm are rare. I think it would help bolster the justification for doing this study if the authors stated what they think we will learn from cross-national comparisons.

2. Same paragraph as above: the authors note that finding comparable populations is difficult in cross-national comparisons. More explanation here would be helpful, both as to what the authors mean by comparable populations, and how this study overcomes this limitation.

Methods:

1. Third paragraph of methods: I think the authors need to justify early on why they are using census data for their denominator in the neighborhoods—VPTB analysis. In paragraph 4 of the methods, they state that in most parts of Ile-de-France, birth records do not contain geographic information that enable linkage to census data. However, birth records with geographic information are apparently available in Trent. The authors need to (1) make a strong argument for the need to compare these two regions, and then (2) state very early in the
methods that birth records enabling such a study are not available in one of the regions, hence the use of census data. The MOSAIC cohort has additional detail on very preterm births, which is a strength in the analyses of pregnancy and delivery complications among VPT births, but I am not sure this constitutes a strength in the neighborhoods—VPTB analysis, since any detail on covariates cannot be used because equivalent data aren’t available for non-VPTB births.

Results

1. Fourth paragraph: It sounds like the authors adjusted for gestational age and birthweight in analyses of neighborhood deprivation and gestational hypertension. Is this the case? I think this is overadjustment, since both gestational age and birthweight are downstream of gestational hypertension.

Discussion:

1. First paragraph: “... twins were not more likely to live in poor neighborhoods than census infants.” Is that very preterm twins or twins in general?

2. Third paragraph: “Directly comparable data on maternal socio-economic characteristics at the individual level were not routinely available from medical records in either region...” (1) directly comparable to what? (2) The authors are not using medical records, so I am not sure why they make this note. Are they justifying the use of census data? Census data also have no information on individual-level SES. I think the point the authors are trying to make needs to be clarified.

3. Sixth paragraph: Limitations of the analysis in twins: it is not possible to distinguish the difference between the effect of neighborhood deprivation on VPTB among twins versus the effect on the rate of twinning... so, is this analysis even worth doing?

4. Overall: I think the authors need a more complete discussion of the potential limitations of the census data as a denominator. I think it may be a fatal flaw for the twins analysis, since the majority of the denominator will be singletons and therefore not at risk for being a VPTB twin. For the singleton analysis, the bias seems less severe, because twins will make up only a small proportion of the denominator, but the authors should at least touch on the implications of excluding twins from the numerator when they cannot do the same in the denominator. Strictly speaking, the census data only provide an appropriate denominator to calculate risks of VPTB in twins and singletons combined, which perhaps argues for presenting such an analysis (though I understand the reasons for separating them). At the very least, a sensitivity analysis looking at neighborhood SES and VPTB twins and singletons in Trent using the available birth records would be reassuring if it yielded similar results to the census-based results.

Minor essential revisions:

Methods:

1. Statistical analysis, first paragraph: The first sentence is confusing. Are the authors saying that they looked at the association between neighborhood
deprivation and VPTB separately for VPTB singletons and VPTB twins? Similarly, the second sentence would be clearer if it was something like: “Odds ratios ... were calculated for the risk of very preterm birth as a function of neighborhood deprivation, stratified by multiplicity...”

2. Statistical analysis, second paragraph: First sentence, say “very preterm singletons” rather than just “singletons”. The third sentence is confusing: did the authors test whether the pregnancy/delivery – infant outcome associations varied by neighborhood characteristic or region or both?

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that I have no competing interests