**TAGRA ACUTE MLC SUBGROUP Thursday 21st July 2016**

**SIMD UNMET NEED ANALYSIS – PROPOSED METHODOLOGY**

**1. Procedure for looking for unmet need related to SIMD income domain.**

Following the method of the 2007 NRAC review, the procedure would be as follows:

(1) Read in SIMD 2016 income domain data: the proportion of the data zone (DZ) population that is income deprived.

(2) Rank the DZs using this proportion, and test the 2007 shortfall model (as done already for ethnicity and urban-rural setting in paper TAMLC55) using the 1%, 5%, 10%, 15%, 20%, and 25% most deprived DZs.

The subgroup may wish to consider use of the overall SIMD score, rather than the income domain, for the analysis.

**2. Procedure for applying an adjustment when there is evidence of unmet need related to both SIMD and the needs index.**

An unmet need adjustment would be implemented by excluding from the regression those data zones believed to be affected by unmet need, and using the resulting linear model to predict costs for *all* data zones.

If there is evidence of unmet need in the data zones with highest deprivation *and* those with the highest needs index values – i.e. two ‘dimensions’ of unmet need – for the same diagnostic group, there are a number of possible options for implementing an unmet need adjustment:

1. Exclude only the data zones with the highest needs index values from the regression (B + C in Figure 1)
2. Exclude only the data zones with the highest deprivation from the regression (A + B in Figure 1)
3. Exclude *both* the above sets of data zones from the regression (A + B + C in Figure 1)
4. Exclude only the data zones in the *overlap* of the two sets from the regression (B in Figure 1)
5. Create a composite variable from the needs index and the deprivation score (perhaps as the sum of the z-scores). Use this variable in a further shortfall method analysis to infer the best cut-off (based on R2). Exclude data zones with values of the combined variable higher than this cut-off value from the regression.

It is worth noting that the simple shortfall method seems to have been neglected during the 2007 NRAC review, in favour of the 2007 shortfall method used to look for unmet need related to deprivation, urban-rural setting, or ethnicity. It could be argued that the 2007 shortfall method has more face validity as it does not rely so heavily on the assumption of a linear relationship between needs index and cost (Figure 2 illustrates this), and, therefore, that option 2 above should be favoured. The equity core criterion would also favour the use of a deprivation measure to make the unmet need adjustment. Additionally, this would be consistent with the current adjustment used in the formula, so would perhaps offer slightly more stability.

If the subgroup does not have a particular preference for any of the options, the choice could be made based on the R2 value obtained by fitting the 2007 shortfall model. The binary variable in each case would be set up to ‘separate out’ the relevant set of data zones. For options 3—5 it would be necessary to optimise the cut-off points used in the two dimensions, based on highest R2 (it will already have been done for options 1 and 2).

data zones with highest deprivation

data zones with highest needs index values

A

B

C

*Figure 1: Illustration showing which subsets of data zones can be considered for exclusion from the regression in an unmet need adjustment*

**Utilisation**

cut-off point

slope *β2*

slope *β1*

**Acute needs index**

L2

**Utilisation**

**Acute needs index**

L1

subset of data zones with high deprivation (or other characteristic)

*Figure 2: Illustration of the simple shortfall method (top) vs the 2007 shortfall method (bottom). In the 2007 method, unmet need is inferred not from a break of slope (as in the simple shortfall method) but from observing systematically lower utilisation in the subset of data zones with the characteristic of interest (such as high deprivation) compared to the bulk of data zones. This is achieved by allowing both the slope and intercept to be different in the selected data zones, effectively fitting two linear models (L1 and L2).*