**Analysis plan**

**Population inclusion criteria:** All hospital inpatients seen by specialist palliative care at hospital a and hospital b, between 01.01.16 and 31.12.19, aged 60 and over.

**Estimated number of patients:** 6,000-7,000

**Outcomes:**

3 subscales of the Integrated Palliative Care Outcome Scale (IPOS) at first assessment (or within 3 days after first assessment): physical, emotional, practical/communication

**Main exposure:**

* Quintiles of Index of Multiple Deprivation (IMD) score (linked to patient records using LSOA code)

**Covariates:**

* Age at death
* Sex
* Diagnosis
* Ethnicity
* Living alone status
* Australian-modified Karnofsky Performance Scale (AKPS): a staff reported measure of patient’s overall performance from 100 (perfect health) to 0 (deceased);
* Phase of illness (Phase): staff reported measure classifying patients as stable, unstable, deteriorating, dying or deceased
* Hospital site

**Analysis:**

1. Describe the population in terms of the outcome and exposure variables using counts, proportions and averages (means and medians)

Table 1: descriptives by deprivation quintiles

1. IPOS missing data expected to be high – describe missing data patterns and associations with missing data
2. Impute missing IPOS using median score for non missing items for cases with at least 50% of items non missing (or at least 1 non missing item for practical/communication subscale.
3. MI missing IPOS data using PMM and all other covariates – for sensitivity analysis. Number of sets to reflect % of missing data.
4. Test relationship between IPOS and IMD and other key vars , age and sex – using regression and marginal estimates to understand nature of relationship (linear or non linear) and direction of effects
5. Main model - Multiple linear regression of IPOS subscales (3 separate models) on IMD quintiles, adjusted for other covariates. Report e-values for main effects and predicted means to help interpret. Compare age, sex, site adjusted and fully adjusted models.
6. Add to main model, interaction between IMD and age, and IMD and ethnicity (if ethnicity data quality good enough). Plot interactions to help interpret
7. Sensitivity analysis – main model using complete case, and using MI – see if main effects hold.

In reporting the data, rounding conventions will be adhered to in order to avoid identifiability; cell counts <10 will be supressed.

Data analysis will be carried out in Stata v.17