The development of fertility rates in Sub-Saharan Africa are of much interest to demographers, as most variability in the most common population projections are dependent on the growth in population on the African continent.

Intro

* What is fertility? How is it measured?
* Why is it important? Especially in Sub-Saharan Africa
  + Proxy for development, linked with underdevelopment high fertility
  + Africa has been in high fertility phase for a long time (examples, Mozambique, Somalia)
* Why Nigeria?
  + Makes up currently 20% of the population on the entire African continent
  + Much heterogeneity within the country – 6 regions and 37 states (including one federal territory) with TFR’s ranging from 3.0 to 9.0 (report uncertainty)
  + Hausa-Fulani, Igbo, Yoruba
* What is DHS, and why use it to compute fertility?
* Goal of the study
  + Use disease mapping techniques to smooth over the fertility estimates, which are very high in many regions. No use of covariates
  + Since disease mapping is predictive – use covariates such as education, child labor, and proportion met need for contraception (probably don’t have time for this step)
  + Observe any clustering and see how that corresponds with the ethnic majority in these regions
  + For each age-specific model, the proportion of variance that is spatial (ICAR)

Data

* Description of the 2013 DHS – quick comparison to previous large DHS 2008
  + Number of women
  + Number of births
  + Summary birth history – average parity (children ever born)
  + All used information – Child ID, Woman ID, survey weights, mother DOB, child DOB, strata, cluster
* What are complete birth histories? How do they differ from summary birth histories?
* Equation or methods to compute ASFR from CBH? Cite DHS Stats guide
  + Numerator is number of births in the period to the age group
  + Denominator is women-years in that age group – more complicated
  + For this study, used DHS standard of period of 3 years and limiting recall to just 3 years as well – due to observed bias and overestimation in older years
* Justification for looking at either age-specific fertility or total fertility rates
  + Low sample sizes at the Nigerian admin2 level for the 40-44 and 45-49 age groups
  + Instability in older age groups – report women-years relative to other age groups and accompanying standard errors of the rate

Methods

* Assume a Poisson data likelihood for the number of births
* Spatial model jsutificaitons
  + Share information between neighbors in space to produce new estimates that are more stable and smooth in space – point out some obvious ones sticking out
  + ICAR model – can code in INLA (maybe compare with multivariate approach – Matern covariance)
* INLA Poisson-Lognormal vs. Poisson-Lognormal-Spatial
  + Scatter of estimates against each other
  + Scatter of Spatial estimate against the data
  + Table of proportion of variance explained by spatial random intercept (ICAR) vs. non spatial latent model
* Clustering statistics – Moran’s, etc.
* Tables
  + Clustering Statistics
  + Most Likely Cluster
  + Population in each subnational
* Maps
  + Data – Raw TFR
  + Data – Select age groups
  + Estimate – TFR and age groups
  + Spatial effect model estimates – comparatively
  + Proportion of variation explained by effects involving space