## Analysis of Scottish QOF withdrawal in terms of variation between practices

First paper covers “whole population” changes with a comparison to England. The purpose of this analysis is to examine variation between practices:

1. In general (does between practice variation increase after withdrawal?)
2. By practices grouped in terms of practice-level characteristics? Candidate groups are:
   1. Deprivation of the population served (need to define how we measure that, and probably in quintiles because we have 16 indicators so rapidly get very large numbers of analyses)
   2. Urban-rural status (need to define how we categorise that, and probably not 6 or 8 category SEURC but something more aggregated, where the choice is to aggregate by remoteness [eg city/urban, accessible, remote, very remote, or by settlement size [city, urban, small town, rural] – remoteness is more important I think)
   3. Baseline performance before withdrawal

Note that in principle we aren’t constrained to the 16 indicators we compared to England (ie there may be some Scotland only indicators we can use here, and we might not need to have all the ones we compared to England)

### Analytical steps

#### Choose which indicators

Likely the 16 we compared to England, but should see if there are others we could use as well, or instead.

#### Decide how to handle deprivation, rurality and baseline performance

For deprivation, we typically have proportion of the registered list in each deprivation quintile or decile, or we can assign deprivation based on practice postcode (undesirable). Not entirely clear how to calculate practice deprivation from the former. Median or modal quintile/decile? Mean quintile/decile? Rank in some way and create quintiles/deciles? Anyone got a method.

For rurality, there should be an 8 category variable (city, urban area, accessible small town, remote small town, very remote small town, accessible rural, remote rural, very remote rural) where they historically provided the modal category at patient level or the practice postcode category. The two almost always agree, but modal patient seems best. However, an eight category variable seems too many categories to me. I’d suggest we recategorise to city/urban, accessible, remote and very remote (remoteness is defined in terms of drive time to a city/urban area <30, 30-60, >60 minutes) and captures what most people think ‘rurality’ is than rurality per se (which is settlement size). The other advantage of collapsing like this is that the original variable isn’t ordinal (because has both remoteness and settlement size in it), but the collapsed ones are ordinal.

For baseline performance, I think I’d just take practice performance n 2015/16 (last year of QOF) and create quintiles. It would be useful to then see how baseline performance in 2015/16 varies by deprivation and rurality.

#### Descriptives

Intervention timepoint and autocorrelation decisions are easy, so first step is plotting and visually inspecting the time series for all 16 indicators.

1. Whole population for each indicator line plot (just to check looks right)
2. Whole population for each indicator plotted as a box plot for each year (quick look at between practice variation)
3. Line plot for deprivation categories
4. Line plot for rurality categories
5. Line plot for baseline performance categories

#### ITS modelling

What we do next may depend on what the line plots look like.

1. Single group ITS for each deprivation, rurality and baseline performance category. Easy to do but there will be a LOT of data (16 indicators x Y categories, where Y is likely to be 5 deprivation + 4 rurality + 5 baseline performance). Bog standard regression. This is the simplest and in principle the easiest to interpret but will generate a lot of data.
2. If there are very clear gradients in all three groups, then we could do a controlled ITS comparing top and bottom categories. In other words, we estimate “changes in the most deprived compared to changes in the least deprived”. Doesn’t make much sense though if we don’t see a clear social/remoteness/baseline performance gradient for all or most indicators. There is a package in Stata called itsa which will do this (and bog standard), and there is probably/may be an R analogue. If this is feasible, then it’s a more contained analysis (16 indicators x 1 deprivation, 1 rurality, 1 baseline performance) for the purposes of showing results in a paper (where the line plots tell the story really).

Evan Kontopantelis was also keen to do more on ‘variation between practices’ in general (graphically examined in the box plot [2] above), but I can’t think what else you could do with that at population level, and think the subgroups are the most interesting way to approach this.