Comparison of Moran's I and Geary's C
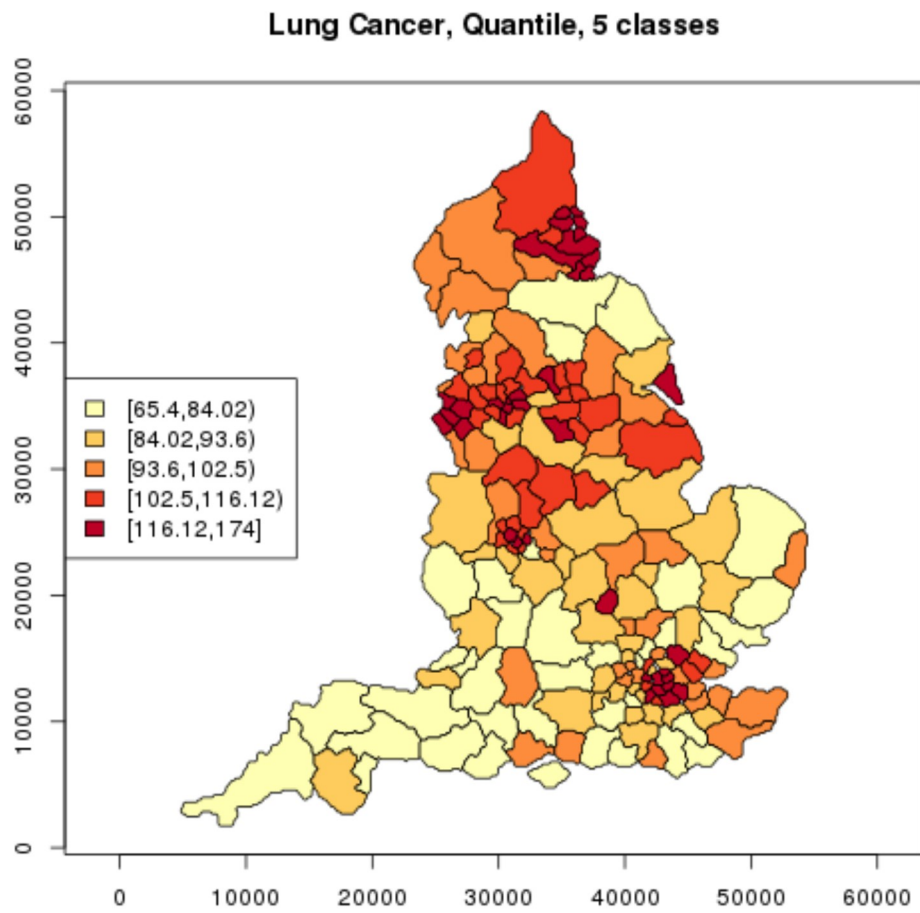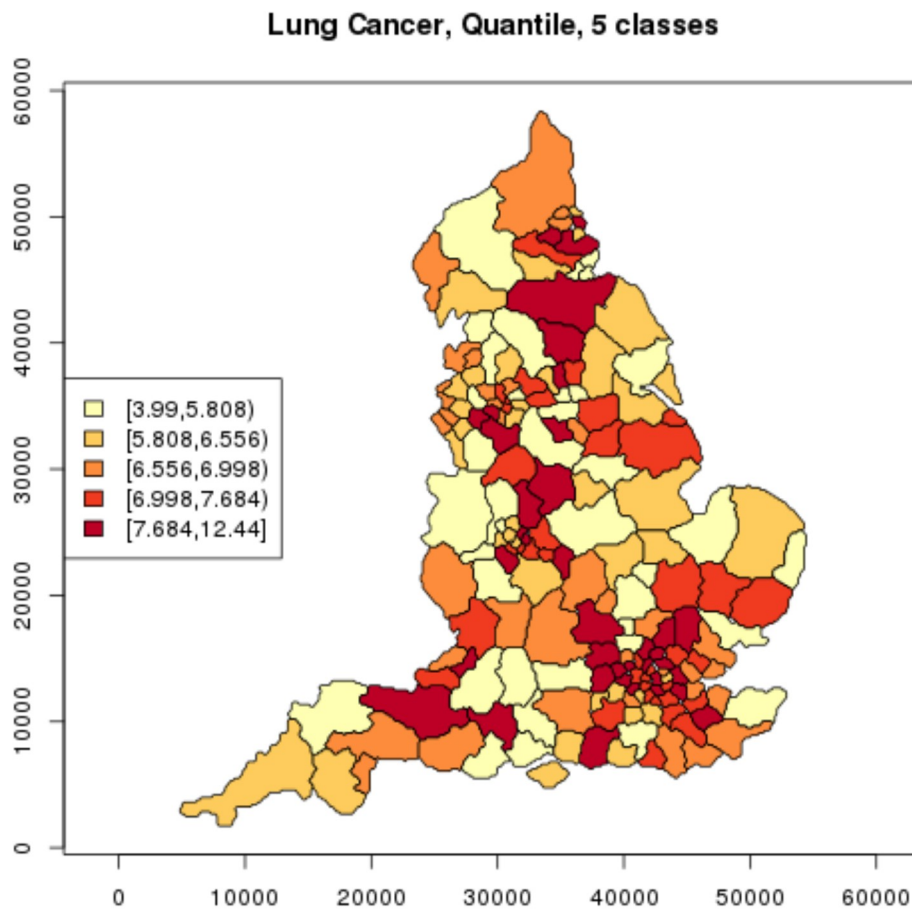
Nearest Neighbors

Consider the English Health Data again. Here is the R code employed to generate results for this page. We consider the impact of variety of weighting schemes on the calculation of I and C. First, let **W** comprises the 3 nearest neighbors ranked equally. Below is a (bad) map of the 3 nearest neighbors for each polygon along with maps of lung cancer and stay length.

English Health Districts: 3 nearest neighbors

Lung Cancer, Quantile, 5 classes

Legend:
- [65.4,84.02)
- [84.02,93.6)
- [93.6,102.5)
- [102.5,116.12)
- [116.12,174]

Lung Cancer, Quantile, 5 classes

Lung Cancer
Moran's I: 0.647
Geary's C: 0.461

Stay Length
Moran's I: 0.101
Geary's C: 0.888

If **W** is enlarged to encompass the 5 nearest neighbors, the values drop (just I reported):
Lung Cancer: 0.599; Stay Length: 0.083

Using the 15 nearest neighbors, the values drop farther (just I reported)
Lung Cancer: 0.381; Stay Length: 0.033

Contiguous Neighbors

As an alternative to nearest-neighbors, contiguous neighbors can be identified from a SpatialPolygon dataset.
Below is a map of these neighbors.

English Health Districts: contiguous neighbors
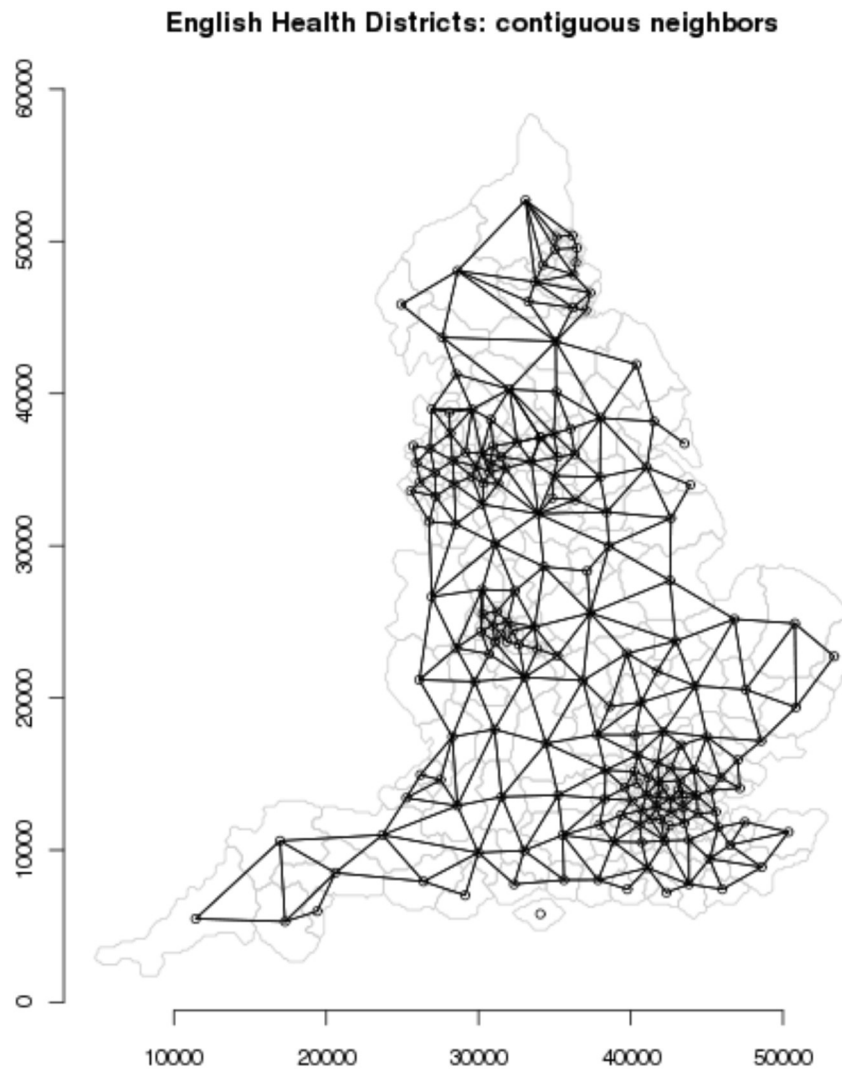
Moran's I for this neighbor scheme is:
Lung Cancer: 0.560; Stay Length: 0.093

Weighted Neighbors

Weights that are an inverse function of distance can also be calculated. Below is a table that lists distances and weights for the first 3 districts using the 5 nn.

Distance	Equal Wts	1/d	$1/d^2$
1190	0.2	0.290	0.383
1495	0.2	0.230	0.243
1622	0.2	0.213	0.206
2219	0.2	0.155	0.110
3074	0.2	0.112	0.057

866	0.2	0.382	0.588
1495	0.2	0.221	0.197
2170	0.2	0.152	0.093
2482	0.2	0.133	0.071
2957	0.2	0.112	0.050
866	0.2	0.377	0.551
1190	0.2	0.275	0.292
2485	0.2	0.132	0.067
2836	0.2	0.115	0.051
3232	0.2	0.101	0.040

Using $1/x$ on lung cancer returns an I of 0.615 of in the 5 neighbor case. Using $1/(x^2)$ returns an I of 0.629.