

Additional file 3 - Appendix B: Parametric Bootstrap Derivation of Moran's *I* statistic.

R Code

```
#####
# read in the shapefiles; calculate adjacent neighbours and weights
#####
library(maptools)
WDGPHU_LungM9903_nocov_DA2001.shp <- readShapePoly(
  fn="P:\\PopStudies\\OHEIS\\Studies\\WellingtonDufferinPHU\\Shapefiles\\WDGPHU_LungM9903_nocov_DA2001.shp",
  IDvar="DA2001")

#####
# define neighbours and weights
#####
library(spdep)
WDGPHU_DA2001.nb <- poly2nb(WDGPHU_Prost9903_nocov_DA2001.shp,
  WDGPHU_Prost9903_nocov_DA2001.shp$DA2001, queen=T) #constructs neighbours list
WDGPHU_DA2001.listw <- nb2listw(neighbours=WDGPHU_DA2001.nb, style="B", zero.policy=FALSE) #create weights
plot.listw(x=WDGPHU_DA2001.listw, coords=coordinates(WDGPHU_Prost9903_nocov_DA2001.shp), col="black", points=T,
  add=T, arrows=F) #plot neighbourhood definition

#####
# bootstrap Moran's I from DCluster package
#####
library(DCluster)
#####lung male
#create a data frame
WDGPHU_LungM9903_nocov_DA2001.ObsExp <-
  data.frame(Observed=WDGPHU_LungM9903_nocov_DA2001.shp$Observed)

#add Expected to data frame
WDGPHU_LungM9903_nocov_DA2001.ObsExp <- cbind(WDGPHU_LungM9903_nocov_DA2001.ObsExp,
  Expected=WDGPHU_LungM9903_nocov_DA2001.shp$Expected)
WDGPHU_LungM9903_nocov_DA2001.ObsExp.moran.pboot <- boot(WDGPHU_LungM9903_nocov_DA2001.ObsExp,
  statistic=moranI.pboot, sim="parametric", ran.gen=poisson.sim, R=999, listw=WDGPHU_DA2001.listw,
  n=length(WDGPHU_DA2001.nb), S0=Szero(WDGPHU_DA2001.listw) )
WDGPHU_LungM9903_nocov_DA2001.ObsExp.moran.pboot #t0 is Moran's I
plot(WDGPHU_LungM9903_nocov_DA2001.ObsExp.moran.pboot) #Display results
mean(abs(WDGPHU_LungM9903_nocov_DA2001.ObsExp.moran.pboot$t)>abs(WDGPHU_LungM9903_nocov_DA2001.Obs
  Exp.moran.pboot$t0)) #calculates p-value
```