Bugs Code and BRugs

Code for Gamma – Poisson (GP) model

- Brugs_models.txt
- Respiratory cancers incidence in SC counties in 1998

```
model{
   for(i in 1:m){
   Y1998[i]~dpois(mu[i])          # data model
   mu[i]<-Exp98[i]*theta[i]      # mean function
   theta[i]~dgamma(a,b)          # prior distribution for theta
   }
   a~dexp(10)
   b~dexp(10)
   }
```

Run code for BRugs

- setwd("C:/……")
- library(BRugs)
- modelCheck("gamma_poisson_BUGS_model.txt")
- modelData("gamma_poisson_BUGS_data.txt")
- modelCompile(numChains=2)
- modelInits(rep("gamma_poisson_BUGS_inits.txt",2))
- modelUpdate(10000)
- samplesSet(c("theta","mu","a","b"))
- dicSet()
- modelUpdate(2000)
- dicStats()
- samplesStats("*")
- theta<-samplesStats("theta")

BRugs data

list(m=46,Y1998=c(18,90,10,120,12,14,76,96,10,256,37,23,40,29,36,
55,21,63,15,19,129,47,260,60,10,184,22,45,43,44,10,171,11,
34,22,34,51,63,90,201,10,202,87,25,25,91),
Exp98=c(19.334642001146, 105.221991510865, 8.9954123633133, 126.211287025262,
12.9499400671852, 17.0850039703209, 85.5262771111914, 107.178846922884,
11.0291918950188, 248.419380066852, 38.5954996425929, 27.0027208298727,
32.2453350684913, 24.1871410613557, 29.3284980403873, 52.0933278275436,
23.3496100847714, 69.1791167378613, 15.7011547559647, 17.5779462883105,
98.0421453601469, 42.1724712080047, 277.747093167242, 49.9402374163248,
15.0708479385354, 137.177683720537, 13.3400552455942, 38.1425892644401,
46.222761591486, 49.646669857522, 16.011990994697, 161.116783742905,
7.49225226944375, 27.1667732892036, 23.2255895652772, 27.0506021696774,
50.282471254929, 68.9687528187193, 84.0568694371842, 241.020535657027,
13.3636034454982, 194.239681727817, 84.0882670370562, 23.9367452023769,
29.1377576211652, 121.126445726))

BRugs inits

list(a=10,b=10,theta=c(1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
1, 1, 1, 1, 1))

Code and mapped output

```
library(sf)
library(sp)
library(fillmap)
polySC<-st_read("SC_county_alphasort.shp")
polySC<-st_geometry(polySC)
plot(polySC)
fillmap(polySC,"",theta$mean,n.col=5)
```