

Results of the spatial BYM model in WinBUGS

1 Fitting the BYM model to Spain's mortality data in WinBUGS.

```
### Preámbulo ###
library(R2WinBUGS)
library(spdep)
library(RColorBrewer)
source("/home/corpas_fra/Trabajo/Utilidades R/Pbugs.0.4.4.r")
load("/home/corpas_fra/Trabajo/Mortalidad nacional/DatosSinTemporal.Rdata")
Paleta.RR <- brewer.pal(9, "BrBG")[9:1]
Paleta.P.RR <- brewer.pal(9, "RdYlBu")[9:1]
Veci <- nb2WB(CartoMuniSinIslas.nb)

model.BYM <- function() {
  for (i in 1:n) {
    O[i] ~ dpois(mu[i])
    log(mu[i]) <- log(E[i]) + m + sd.phi * phi[i] + sd.theta * theta[i]
    SMR[i] <- exp(m + sd.phi * phi[i] + sd.theta * theta[i])
    theta[i] ~ dnorm(0, 1)
  }

  phi[1:n] ~ car.normal(map[], w[], nvec[], 1)

  m ~ dflat()
  sd.phi ~ dunif(0, 5)
  sd.theta ~ dunif(0, 5)
}

# Función que ejecuta BYM en WinBUGS
Ejecuta.BYM.WinBUGS <- function(Sexo, Causa) {
  O <- MorTabu[Sexo, Causa, ]
  E <- Esperados[Sexo, Causa, ]

  datos <- list(O = O, E = E, n = length(O), map = Veci$adj, nvec = Veci$num,
    w = rep(1, length(Veci$adj)))
  iniciales <- function() {
    list(m = rnorm(1, 0, 0.1), sd.phi = runif(1, 0, 1), sd.theta = runif(1,
    0, 1), phi = rnorm(length(O)), theta = rnorm(length(O)))
  }
  param <- c("SMR", "mu", "sd.phi", "sd.theta")
  Res.t <- system.time(Res <- Pbugs(data = datos, inits = iniciales, parameters = param,
    model.file = model.BYM, n.iter = 11000, n.burnin = 1100, DIC = F))

  Res.BYM[[Sexo]][[Causa]] <- list()
  Res.BYM[[Sexo]][[Causa]]$tiempo <- Res.t
  Res.BYM[[Sexo]][[Causa]]$summary <- Res$summary
  Res.BYM[[Sexo]][[Causa]]$RR <- Res$mean$SMR
  Res.BYM[[Sexo]][[Causa]]$P.RR <- apply(Res$sims.matrix[, substr(dimnames(Res$sims.matrix)[[2]],
    1, 3) == "SMR", 2, function(x) {
    mean(x > 1)
  })
}
```

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})
Res.BYM[[Sexo]][[Causa]]$Res <- Res
}

Res.BYM <- list(Hombres = list(), Mujeres = list(), Ambos = list())

indice <- as.numeric(dimnames(MorTabu[1, , ])[[1]][apply(MorTabu[1, , ], 1,
sum) >= 10000])

for (i in indice) {
  Ejecuta.BYM.WinBUGS(1, i)
}

save(Res.BYM, file = "/home/corpas_fra/Trabajo/Mortalidad nacional/BYM/Res.BYM.Rdata")

```

2 Descriptive principals.

Cause	Time	sigma_phi	sigma_theta	max.Rhat	min.n_eff
(9) Mouth and pharynx	2706.8	0.3318 [0.2919,0.3741]	0.0895 [0.0362,0.1283]	1.02	176.69
(10) Esophagus	2619.6	0.2972 [0.2606,0.3363]	0.0449 [0.0036,0.0919]	1.03	115.19
(11) Stomach	2657.3	0.3246 [0.2986,0.3506]	0.0266 [0.001,0.0624]	1.02	174.22
(12) Colon	2670.1	0.24 [0.2126,0.2682]	0.1015 [0.0816,0.1194]	1.03	140.62
(13) Rectum	2733.1	0.2025 [0.1674,0.2454]	0.1206 [0.0935,0.1468]	1.07	14.41
(14) Liver	2667.8	0.3112 [0.276,0.3491]	0.1462 [0.1224,0.1699]	1.02	206.59
(15) Pancreas	2707.8	0.2137 [0.1835,0.2498]	0.0597 [0.0146,0.089]	1.03	128.46
(16) Other digestives	2649.5	0.2036 [0.16,0.249]	0.0469 [0.002,0.1019]	1.05	121.17
(17) Larynx	2665.6	0.347 [0.3015,0.3927]	0.0821 [0.0218,0.1265]	1.05	94.08
(18) Lung	2765.2	0.36 [0.3315,0.3907]	0.0836 [0.061,0.1023]	1.03	109.81
(22) Other skin	2650.0	0.2404 [0.1854,0.2956]	0.046 [0.002,0.1096]	1.03	136.96
(28) Prostate	2685.7	0.1989 [0.1719,0.228]	0.0592 [0.0211,0.0826]	1.03	149.15
(30) Kidney	2671.0	0.29 [0.2465,0.3318]	0.0453 [0.0024,0.0995]	1.03	105.87
(31) Bladder	2715.9	0.3061 [0.2738,0.3397]	0.0783 [0.0332,0.1075]	1.03	129.38
(33) Brain	2682.4	0.15 [0.1056,0.1936]	0.0858 [0.0507,0.1167]	1.03	102.55
(35) Poorly defined	2666.2	0.2239 [0.1948,0.2546]	0.098 [0.0768,0.1175]	1.02	151.03
(36) Other lymphatics	2703.6	0.1759 [0.1441,0.2084]	0.0756 [0.0504,0.0987]	1.04	156.53
(37) Leukemias	2701.3	0.1466 [0.1094,0.1883]	0.0679 [0.0228,0.1022]	1.05	49.37
(41) Other tumors	2671.7	0.2997 [0.2579,0.3415]	0.048 [0.0028,0.095]	1.02	175.13
Mediana	2671.7	0.24	0.08	1.03	129.38