**Exercise 2 – Running a basic LCA model in R**

1. Load the dataset that is as a csv file (ex2\_data.csv) in your working directory

df <- read.csv(“ex2\_data.csv”)

1. Create a contingency table / 2x2 table based on the frequency of positives/negatives to test1,test2

table(df$test1, df$test2, dnn=c(“test1”, “test2”))

1. Write the model and save as “basic\_lca.bug”

model{

# Likelihood part:

p[1] <- pi\*se1\*se2 + (1-pi)\*(1-sp1)\*(1-sp2) ###11

p[2] <- pi\*se1\*(1-se2) + (1-pi)\*(1-sp1)\*(sp2) ###10

p[3] <- pi\*(1-se1)\*se2 + (1-pi)\*(sp1)\*(1-sp2) ###01

p[4] <- pi\*(1-se1)\*(1-se2) + (1-pi)\*(sp1)\*(sp2) ###00

# Prior part:

pi ~ dbeta(30,70)

se1 ~ dbeta(90, 10)

se2 ~ dbeta(1, 1)

sp1 ~ dbeta(95, 5)

sp2 ~ dbeta(99, 1)

##likelihood of contingency tables

t[1:4] ~ dmulti(p[1:4], n)

# Hooks for automatic integration with R:

#data# t, n

#monitor# pi, se1, se2, sp1, sp2

#inits# se1

}

# Prior part

###You can use the betaexpert() function from the prevalence R-package to estimate the a,b parameters of the beta distribution.

library(prevalence)

install.packages("prevalence")

betaExpert(best = x, lower = y, p = 0.95)

1. Provide the data of the cell counts

t = c(56, 69, 19, 356)

n=500

1. Provide initial values and run the model

inits1 <- list(se1=0.05, se2=0.05, pi=0.7, sp1=0.05, sp2=0.05)

inits2 <- list(se1=0.95, se2=0.5, pi=0.1, sp1=0.95, sp2=0.95)

results <- run.jags('basic\_lca.bug', adapt = 1000, n.chains=2, burnin=1000, sample=10000, inits=list(inits1, inits2))

plot(results, vars = "se1")

plot(results, vars= "pi")

plot(results, vars = "sp1")

plot(results, vars = "se2")

plot(results, vars = "sp2")

results

summary(results)

1. Things to evaluate – how sensitive is your model to the priors? – How does changing the priors impact on posterior estimates, degree of autocorrelation, effective sample size?