

Key 7

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2022-07-22

For the case-control data, suppose we wish to specify a prior with a 5% point for the odds ratio of 0.2 and a 95% point for the odds ratio of 5:

- Use `LogNormalPriorCh` to find the appropriate normal distribution for the log odds ratio

```
library("INLA")
```

```
## Loading required package: Matrix
```

```
## Loading required package: foreach
```

```
## Warning: package 'foreach' was built under R version 4.2.1
```

```
## Loading required package: parallel
```

```
## Loading required package: sp
```

```
## Warning: package 'sp' was built under R version 4.2.1
```

```
## This is INLA_22.05.07 built 2022-05-07 09:52:03 UTC.
```

```
## - See www.r-inla.org/contact-us for how to get help.
```

```
library("SpatialEpi")
```

```
## Warning: package 'SpatialEpi' was built under R version 4.2.1
```

```
# case control data
```

```
x <- c(0,1,2)
```

```
y <- c(6,8,75)
```

```
z <- c(10,66,163)
```

```
cc.dat <- as.data.frame(rbind(y,z,x))
```

```
# find lognormal prior
```

```
lnprior <- LogNormalPriorCh(0.2,5,0.05,0.95)
```

- Use this prior within INLA and report the posterior median and a 95% interval for the log odds ratio

```

M <- lnprior$mu
W <- lnprior$sigma^2
cc.mod <- inla(y~x,family="binomial",data=cc.dat,Ntrials=y+z,
              control.fixed = list(mean.intercept = c(0),
                                   prec.intercept = c(0.1),
                                   mean = M,
                                   prec = 1/W))
cc.mod$summary.fixed["x",]

```

```

##          mean          sd 0.025quant  0.5quant 0.975quant mode          kld
## x 0.4333526 0.2371279 -0.01420007 0.4275493 0.9163443  NA 1.05155e-05

```

- Are these summaries very different from the INLA fit with default priors?

With default priors:

```

cc.mod.default <- inla(y~x,family="binomial",data=cc.dat,Ntrials=y+z)
cc.mod.default$summary.fixed["x",]

```

```

##          mean          sd 0.025quant  0.5quant 0.975quant mode          kld
## x 0.4800466 0.2504508 0.01051285 0.4728756 0.9933464  NA 1.431969e-05

```

... so not much difference, the posterior median OR of 1.5 vs. 1.60 (exponentiating the posterior median of β_0) and posterior SDs are similar.