

# Posterior Summary

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## Table of Contents

- 1 Diagnostics.....2
  - 1.1 Convergence and Efficiency.....2
  - 1.2 VIF.....3
  - 1.3 Posterior Draws.....3

# 1 Diagnostics

Model is loaded from an RDS object in the repository, so you dont have to wait a long time for it to run.

## 1.1 Convergence and Efficiency

```
## Family: bernoulli
## Links: mu = logit
## Formula: latestage ~ age + sex + raceth + grade + size_z + year_z + marry
+ (1 | patientid) + (1 | regionid)
## Data: seer_df2 (Number of observations: 3031)
## Draws: 4 chains, each with iter = 3000; warmup = 1500; thin = 1;
## total post-warmup draws = 6000
##
## Multilevel Hyperparameters:
## ~patientid (Number of levels: 3026)
##      Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS Tail_ESS
## sd(Intercept)      9.11      1.85      5.69     13.01 1.01      494      593
##
## ~regionid (Number of levels: 3)
##      Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS Tail_ESS
## sd(Intercept)      0.79      0.89      0.02      3.23 1.00     2931     3694
##
## Regression Coefficients:
##      Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS Tail_ESS
## Intercept      -4.32      1.36     -7.17     -1.75 1.00     1677     2623
## age01M04years   -0.34      1.89     -4.05      3.32 1.00     9072     5229
## age05M09years   -1.17      1.92     -4.82      2.58 1.00     9688     5284
## age10M14years    0.09      1.88     -3.47      3.91 1.00     8516     4916
## age15M19years    0.07      1.90     -3.65      3.87 1.00    10007     4664
## age20M24years   -1.28      1.83     -4.95      2.31 1.00     7836     4698
## age25M29years   -0.24      1.67     -3.52      3.03 1.00     6268     4781
## age30M34years    1.14      1.46     -1.81      4.08 1.00     4090     4215
## age35M39years    0.49      1.26     -2.05      2.92 1.00     3444     4116
## age40M44years    0.45      1.09     -1.69      2.63 1.00     3134     4143
## age45M49years    0.38      0.93     -1.44      2.19 1.00     2876     3588
## age50M54years    0.98      0.89     -0.73      2.76 1.00     2511     3412
## age55M59years   -0.12      0.84     -1.78      1.48 1.00     2555     3562
## age60M64years   -0.38      0.81     -1.99      1.16 1.00     2093     3913
## age65M69years    0.36      0.80     -1.22      1.93 1.00     2668     3376
## age70M74years   -0.23      0.82     -1.82      1.38 1.00     2305     3031
## age75M79years    1.42      0.86     -0.24      3.12 1.00     2719     3650
## age80M84years   -0.58      0.94     -2.49      1.24 1.00     2326     3739
## age85M89years   -0.05      1.04     -2.10      2.00 1.00     2787     3505
## age90Pyears     -0.62      1.18     -2.99      1.66 1.00     3452     4375
## sexMale         0.58      0.45     -0.28      1.51 1.00     2666     3249
## raceth0         1.79      0.81      0.29      3.43 1.00     1990     3574
## racethW        -0.03      0.67     -1.37      1.25 1.00     2804     3382
```

```
## gradeStart      6.06      1.13      3.96      8.41 1.01      635      881
## size_z          1.22      0.30      0.69      1.87 1.01      793     1682
## year_z         -0.02      0.21     -0.44      0.39 1.00     2784     3506
## marryUnmarried  0.47      0.46     -0.40      1.41 1.00     2780     2985
##
## Draws were sampled using sample(hmc). For each parameter, Bulk_ESS
## and Tail_ESS are effective sample size measures, and Rhat is the potential
## scale reduction factor on split chains (at convergence, Rhat = 1).
```

We see no scale reduction (Rhat=1.0 in all cases) and ESS are all sufficiently large, and 1 divergent transition, but its small enough to be due to chance.

## 1.2 VIF

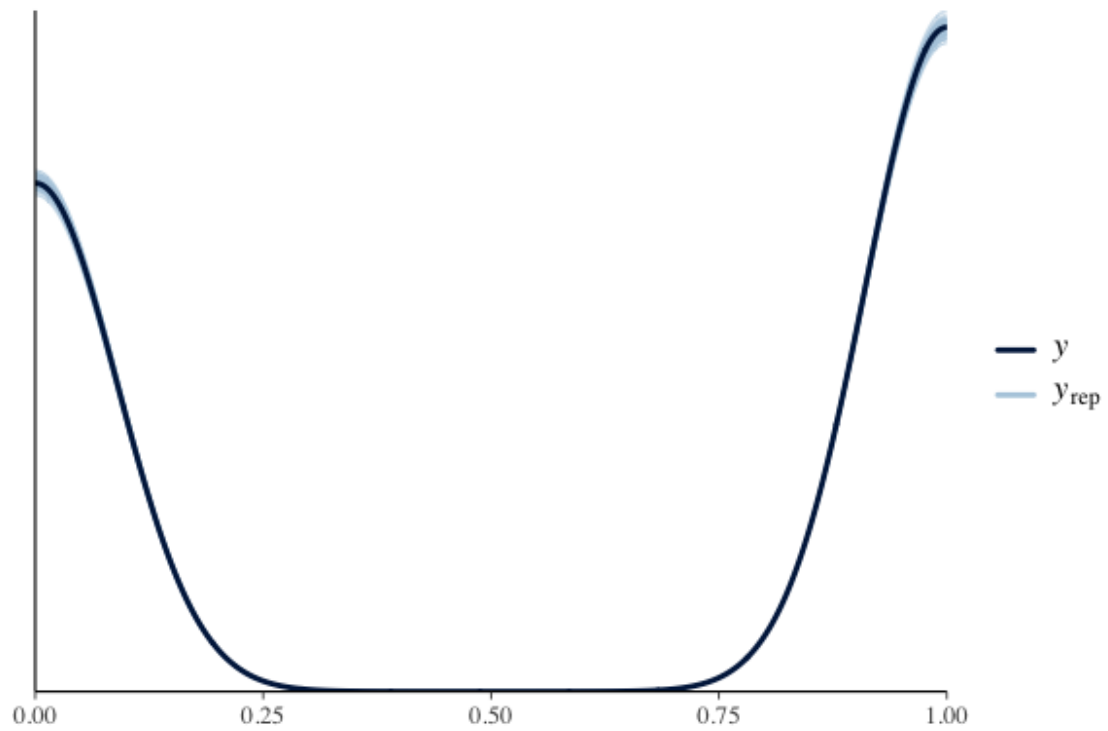
We check VIF, and confirm all values are reasonable.

```
##          GVIF Df GVIF^(1/(2*Df))
## age      1.139013 19      1.003431
## sex      1.103208  1      1.050337
## raceth   1.058497  2      1.014314
## grade    1.053411  1      1.026358
## size_z   1.043417  1      1.021478
## year_z   1.006218  1      1.003104
## marry    1.093198  1      1.045561
```

## 1.3 Posterior Draws

Checking Posterior Draws

```
pp_check(breast, ndraws = 100)
```



Posterior draws look Ok as well.