

# Generalized Linear Models – Inference and Deviance

Grinnell College

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snoring	yes	no	x
never	24	1355	0
occasional	35	603	2
nearly_every_night	21	192	4
every_night	30	224	5

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# Summary of Binomial GLM

```
1 > summary(fit)
2
3 Call:
4 glm(formula = yes/n ~ x, family = binomial, data = heart,
      weights = n)
5
6 Coefficients:
7           Estimate Std. Error z value      Pr(>|z|)
8 (Intercept)  -3.866      0.166  -23.26 < 0.00000000000000002
9 x              0.397      0.050    7.95  0.00000000000000019
10 ---
11
12 (Dispersion parameter for binomial family taken to be 1)
13
14 Null deviance: 65.9045  on 3  degrees of freedom
15 Residual deviance:  2.8089  on 2  degrees of freedom
16 AIC: 27.06
17
18 Number of Fisher Scoring iterations: 4
```

# Saturated Models

```
1 glm(formula = yes/n ~ snoring, family = binomial, data = heart,
2     weights = n)
3
4 Coefficients:
5             Estimate Std. Error z value Pr(>|z|)
6 (Intercept)    2.010     0.194  -10.34 < 0.000002
7 nearly_every_night -0.203     0.301   -0.67  0.5011
8 never          -2.023     0.283   -7.14  0.000000091
9 occasional     -0.836     0.261   -3.21  0.0013
10 ---
11
12 (Dispersion parameter for binomial family taken to be 1)
13
14 Null deviance: 65.90 on 3 degrees of freedom
15 Residual deviance: -0.000000012457 on 0 degrees of freedom
16 AIC: 28.25
17
18 Number of Fisher Scoring iterations: 3
```