

# Logistic Regression Assignment

David M. Roche

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Suppose we have data on 100 cases of myocardial infarction and 150 healthy individuals ( $mi = 1$  if MI, 0 otherwise) matched the the MI group by age and sex. From their medical records before the MI (if they had one), we classify the individuals as diabetic, metabolic disorder, and normal blood glucose ( $bg = norm, metdis, diabetic$ ). The table on the next page shows the number of individuals in each group.

	norm	metdis	diabetic	Total
Control	85	50	15	150
MI	35	30	35	100
Total	120	80	50	250

**Table:** Hypothetical Results of a study relating myocardial infarction to diabetes status.

- If the three parameters are  $\beta_0$  (the intercept),  $\beta_{\text{metdis}}$ , and  $\beta_{\text{diabetic}}$  in that order, and if the covariance matrix of the parameters is

$$\begin{pmatrix} 0.04034 & -0.04034 & -0.04034 \\ -0.04034 & 0.09367 & 0.04034 \\ -0.04034 & 0.04034 & 0.13557 \end{pmatrix}$$

test the hypotheses (separately) that each of the two non-intercept parameters is zero. (You computed the parameter estimates in HW 2).

- Test the hypothesis that diabetic and metabolic disorder subjects have a log-odds ratio vs. MI of 0.
- Find a 95% confidence interval for the odds ratio for MI with respect to normal/diabetic that you computed in the first part.
- How would you perform the likelihood ratio test for the given model vs. the null model?