Homework 2b

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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.

- Find the log odds ratio for MI with respect to metdis/diabetic directly from the table data.
- Find the log odds ratio for MI with respect to metdis/diabetic from the logistic regression output from HW1 (Hint: $M - D = (M - N) - (D - N)$).
- Write down the logistic regression model formulation in detail for predicting MI from bg. Specifically make sure you have defined the variables and the coefficients in the model.

- Derive the likelihood equation for the model.
- Derive the maximum likelihood estimates for the parameters of the model, using normal as the default level.
- Compute the maximized log likelihood. What is the deviance? Why?