If "odds ratio inference" is part of logistic regression?

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My Answer so far:

- For categorical data, assuming there are r categories and the r^{th} category is set to be reference. From logistic regression:

$$ln\frac{\pi}{1-\pi} = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + ... + \beta_{r-1} x_{r-1}$$

$$If\ x \in r^{th}\ category,\ then\ Odds_r = e^{\beta_0}$$

$$If\ x \in j^{th}\ category,\ then\ Odds_j = e^{\beta_0 + \beta_j}$$

  Now we have $\frac{Odds_j}{Odds_r} = e^{\beta_j}$ which is the Odds Ratio we want.
  In conclusion, inference of Odds Ratio is equal to inference of corresponding coefficient in logistic regression.

  - A little more about the case when x is continuous:

$$ln\frac{\pi}{1-\pi} = \beta_0 + \beta_1 x$$

$$Odds = \frac{\pi}{1-\pi} = e^{\beta_0 + \beta_1 x}$$

    When x adds 1 unit, then $Odds' = e^{\beta_0 + \beta_1 x + \beta_1}$, and the change of the $Odds$ comparing to the original $Odds$ is: $\frac{Odds' - Odds}{Odds} = e^{\beta_1} - 1 \approx \beta_1$ (Taylor expansion ignoring higher order term, it can be done when β_1 is small ^_^ Prof. Chen's favourite). **It means that when β_1 is small, the change of the $Odds$ is similar to $100\beta_1\%$ with x adds 1 unit.**