

# STATISTICAL PRIMER FOR CARDIOVASCULAR RESEARCH, Logistic Regression

Michael P. LaValley, PhD

Reflection by Prateek Naharia | [nahariap@bu.edu](mailto:nahariap@bu.edu) | MSBA, Boston University.

Dt. 7th November 2023

## Problem Being Addressed

The paper discusses the challenges associated with analyzing binary or dichotomous outcomes in cardiovascular research, especially when dealing with observational data that require adjustments for multiple predictors. Standard linear regression is inadequate for these outcomes as it can lead to unsatisfactory results, such as predicted values falling outside the binary outcome levels or assuming constant variability across all predictor values.

## Contribution Made

LaValley contributes by explaining the logistic regression model, highlighting its basis in odds ratios, and distinguishing these from relative risks. He provides practical examples from cardiovascular research to illustrate the application of logistic regression. Furthermore, the paper goes into detail on how to interpret the results, adjust for multiple predictors, and assess the goodness of fit of the model.

## Evaluation Used (or the Argument Made)

The evaluation of logistic regression's effectiveness is demonstrated using data from the Framingham Heart Study. LaValley analyzes the relationship between serum total cholesterol and the occurrence of new angina pectoris. He uses both unadjusted and adjusted models to show how logistic regression accounts for various predictors and discusses the interpretation of odds ratios, model stability, and the importance of evaluating the model's goodness of fit.

## Opinion on Whether It's a Meaningful Contribution

The contribution is meaningful, especially for researchers in the field of medical statistics and cardiovascular studies. It provides a clear understanding of logistic regression's advantages over linear regression in certain contexts, offers a detailed methodology for implementing logistic regression analysis, and underscores the importance of thorough model evaluation.

## Limitations About the Paper

While the paper is informative, it does not address certain advanced topics in logistic regression, such as dealing with highly unbalanced data or non-linear relationships without categorization. Additionally, while the Framingham Heart Study provides a rich dataset for demonstration, the paper does not extensively discuss the potential limitations of the dataset itself, such as missing data or the representativeness of the sample. Moreover, the paper seems to be written for readers who already have a background in statistics, which may limit its accessibility to a broader audience.