

# Threshold Regression Models and Applications

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## **Abstract:**

The threshold regression model is an alternative regression methodology for time-to-event and survival data. The model is useful in many applications, including environmental research, occupational health studies and AIDS research. The model has an underlying latent stochastic process that represents the health status of a subject. The time to reach the primary endpoint or failure (death, disease onset, etc.) is the time when the latent health status process first crosses a failure threshold level. Hence the model is also called the first hitting time model. This model does not require the proportional hazards assumption and hence can be widely applied.

Diesel exhaust is considered to be a probable lung carcinogen. Using data from a case-control study, our research group consider the use of threshold regression methodology in examining the relationship between diesel exhaust exposure and mortality from lung cancer, cardiovascular disease and other causes, while considering the effects of smoking and other covariates.