

Cox model

A Cox model is a well-recognized statistical technique for exploring the relationship between the [survival](#) of a patient and several explanatory variables. A Cox model provides an estimate of the treatment effect on survival after adjustment for other explanatory variables.

[Proportional hazards models](#) are a class of [survival models](#) in statistics. Survival models relate the time that passes before some event occurs to one or more covariates that may be associated with that quantity of time. In a proportional hazards model, the unique effect of a unit increase in a covariate is multiplicative with respect to the hazard rate. For example, taking a drug may halve one's hazard rate for a stroke occurring, or, changing the material from which a manufactured component is constructed may double its hazard rate for failure. Other types of survival models such as accelerated failure time models do not exhibit proportional hazards. The accelerated failure time model describes a situation where the biological or mechanical life history of an event is accelerated.

Sir David Cox observed that if the [proportional hazards](#) assumption holds (or, is assumed to hold) then it is possible to estimate the effect parameter(s) without any consideration of the hazard function. This approach to survival data is called application of the [Cox proportional hazards model](#), sometimes abbreviated to Cox model or to [proportional hazards model](#). However, Cox also noted that biological interpretation of the proportional hazards assumption can be quite tricky.

Cox regression (or [proportional hazards regression](#)) is method for investigating the effect of several variables upon the time a specified event takes to happen. In the context of an outcome such as death this is known as Cox regression for survival analysis. The method does not assume any particular "survival model" but it is not truly nonparametric because it does assume that the effects of the predictor variables upon survival are constant over time and are additive in one scale. You should not use Cox regression without the guidance of a [Statistician](#).

Provided that the assumptions of Cox regression are met, this function will provide better estimates of survival probabilities and cumulative hazard than those provided by the Kaplan-Meier function.

Hazard and hazard-ratios Cumulative hazard at a time t is the risk of dying between time 0 and time t , and the survivor function at time t is the probability of surviving to time t (see also Kaplan-Meier estimates).

The coefficients in a Cox regression relate to hazard; a positive coefficient indicates a worse prognosis and a negative coefficient indicates a protective effect of the variable with which it is associated.

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Last update: **2025/05/13 02:10**



