

## *Non-parametric, Semi- parametric and Parametric survival*

*When to use?*

	Advantages	Disadvantages
<b>Non-Parametric Survival Kaplan Meier</b>	It is very flexible and model complexity grows with the number of observations.	It is not easy to incorporate covariates.
	They approach a smooth estimator as the sample size grows.	The survival functions are not smooth. They are piecewise constants.
		For small samples they are far from smooth and can have unrealistic properties.
<b>Semi-parametric Survival Cox Regression</b>	The nonparametric estimate of the hazard function offers much greater flexibility than most parametric approaches.	The survival function is not smooth.
		The log-linear assumption (proportional hazards) must be satisfied.
<b>Parametric Survival Weibull, Exponential, Log-Logistic, Logistic, Gaussian etc.</b>	We choose a continuous distribution. The survival function is smooth.	The parametric model needs to be a good description of our data. This can be tested either by graphical procedures or by formal hypothesis testing.
	Having a parametric survival function constrains the model flexibility. For example, if we don't have a lot of data our choice of parametric model is appropriate because it estimates fewer parameters.	
	It is easy to incorporate covariates into the model.	
	We can extrapolate beyond the range of the data.	
	If the parametric model matches some underlying mechanism associated with our data, we end up with more relevant interpretations of our model.	