Exponential

PH

$$S(t) = \exp(-\lambda t) \quad . \quad HR = \frac{\lambda_0}{\lambda_1} \rightarrow \lambda_1 = \frac{\lambda_0}{HR}$$

$$\text{RMST-Ratio} = \frac{\int_0^\tau \exp(-\lambda_1 t)dt}{\int_0^\tau \exp(-\lambda_0 t)dt} = \frac{1-\exp(-\lambda_1\tau)}{\lambda_1} \cdot \frac{\lambda_0}{1-\exp(-\lambda_0\tau)}$$

$$= \frac{\lambda_0\left[1-\exp(-\lambda_1\tau)\right]}{\lambda_1\left[1-\exp(-\lambda_0\tau)\right]} = \boxed{HR \frac{1-\exp\left(-\frac{\lambda_0\tau}{HR}\right)}{1-\exp(-\lambda_0\tau)}} = RR$$

$$\lim_{HR\to 1} RR = 1 \qquad \lim_{HR\to\infty} RR = \frac{\lambda_0\tau\exp(\lambda_0\tau)}{\exp(\lambda_0\tau)-1}$$

$$\lim_{\lambda_0\to 0} RR = 1 \qquad \lim_{\lambda_0\to\infty} RR = HR$$

$$\lim_{\tau\to 0} RR = 1 \qquad \lim_{\tau\to\infty} RR = HR$$

AFT

$$S(\varphi t) = \exp(-\lambda\varphi t)$$

$$\text{RMST-Ratio} = \frac{\int_0^\tau S(t)\,dt}{\int_0^\tau S(\varphi t)\,dt} = \frac{1-\exp(-\lambda\tau)}{\lambda} \cdot \frac{\lambda\varphi}{1-\exp(-\lambda\tau\varphi)}$$

$$= \frac{\varphi\left[1-\exp(-\lambda\tau)\right]}{1-\exp(-\lambda\tau\varphi)}$$

$$\lim_{\varphi\to 1} RR = 1 \qquad \lim_{\varphi\to\infty} RR = \infty$$

$$\lim_{\lambda\to 0} RR = 1 \qquad \lim_{\lambda\to\infty} RR = \varphi \qquad \lim_{\tau\to 0} RR = 1 \qquad \lim_{\tau\to\infty} RR = \varphi$$

Cure models

- $S(t) = p + (1-p) S_\phi(t)$

$$\int_0^\tau S(t)\,dt = \frac{\exp(-\lambda\tau)\left\{\exp(\lambda\tau)\left[p(\lambda\tau - 1) + 1\right] + p - 1\right\}}{\lambda}$$

- $S(t) = p^{\wedge} \bar{F}_\phi(t) = p^{\wedge}(1 - S_\phi(t))$

$\int_0^\tau S(t)\,dt$ = endet in Γ-funktion Interpretation?