To return to the untransformed scale we have to antilog the lower and upper values of this CI given by equation (2.13), take the negative of these and then antilog again. The result of this quite involved process is summarised by

$$S(t)^{\exp(+1.96SE_{Tr})} \text{ to } S(t)^{\exp(-1.96SE_{Tr})}. \quad (2.14)$$

Note that the signs attached to 1.96 in equation (2.14) are correct.

Since $S(t)$ is confined to values between 0 and 1, and since further $\exp(+1.96SE_{Tr})$ and $\exp(-1.96SE_{Tr})$ are both larger than 0, the CI of equation (2.14) will then always be in the range of 0 and 1 also. This is an important advantage of the transformation method.

***Example** – transformation method CI at a fixed time-point – patients with colorectal cancer*

Repeating the earlier example for $S(12) = 0.6522$, we have from equation (2.12), that

$$SE = \sqrt{\left[\frac{4}{23(23-4)} + \frac{2}{19(19-2)}\right] \Big/ \left[-\log\left(\frac{23-4}{23}\right) - \log\left(\frac{19-2}{19}\right)\right]}$$

$$= \sqrt{[(0.014345)/(+0.191055 + 0.111226)]}$$

$$= 0.4098.$$

From this $\exp(+1.96SE_{Tr}) = 2.2327$, $\exp(-1.96SE_{Tr}) = 0.4479$ and finally the 95% CI is $S(t)^{2.2327} = 0.3851$ to $S(t)^{0.4479} = 0.8258$ or 39% to 83%

This CI is not symmetric around $S(12) = 0.6522$ (65%) and is wider than that for all the methods presented earlier.

However, all but the Peto method are computationally complex and really require appropriate statistical software for their implementation.

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