marginalizedRisk Package Vignette

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1 Computing marginalizedized risk

The disease risk at a marker value s as a function of s is defined as follows (Gilbert et al., 2021), where $Y = 1$ may be replaced by $\Pr(T \leq t)$:

$$\mathrm{E}_X \Pr(Y = 1|X, s) = \int \Pr(Y = 1|s, x) f(x) \, dx,$$

which can be estimated by

$$\frac{1}{N} \sum_{i=1}^{N} \Pr(Y_i = 1|s, x_i)$$

if we have cohort samples $i = 1, \cdots, N$, or by

$$\frac{\sum_i w_i \Pr(Y_i = 1|s, x_i)}{\sum_i w_i}$$

if we have two-phase samples $i = 1, \cdots, n$ with inverse sampling probabilitiy weights w_i.

Similarly, we may define the disease risk as a function of $S \geq s$ as a function of s:

$$\mathrm{E}_X \Pr(Y = 1|X, S \geq s) = \int \Pr(Y = 1|S \geq s, x) f(x) \, dx,$$

which can be estimated by

$$\frac{1}{N} \sum_{i=1}^{N} \Pr(Y_i = 1|S \geq s, x_i)$$

if we have cohort samples $i = 1, \cdots, N$, or by

$$\frac{\sum_i w_i \Pr(Y_i = 1|S \geq s, x_i)}{\sum_i w_i}$$

if we have two-phase samples $i = 1, \cdots, n$ with inverse sampling probabilitiy weights w_i.

References

Gilbert, P., Fong, Y. and Carone, M. (2021), "Assessment of Immune Correlates of Protection via Controlled Risk and Controlled Vaccine Efficacy," *Submitted*.