ANNALS OF FAMILY MEDICINE

Online Supplementary Material

Supplemental Appendix. The Variance Inflation Factor (VIF)

The variance inflation factor (VIF) is based on a ratio that compares an outcome's variance in a study with independent clusters whose average size is m with that outcome's variance calculated in a manner that ignores clustering and, instead, treats each patient as an independent cluster of size $m = 1$.[1]

$$\text{VIF} = (m\sigma^2_c + \sigma^2_w) / (\sigma^2_c + \sigma^2_w).$$

After expanding this expression,

$$\text{VIF} = [m\sigma^2_c / (\sigma^2_c + \sigma^2_w)] + [\sigma^2_w / (\sigma^2_c + \sigma^2_w)],$$

and then substituting ρ for the quantity $[\sigma^2_c / (\sigma^2_c + \sigma^2_w)]$, the formula for the VIF reduces to the familiar one that relies only on estimates of the ICC (ρ) and the mean cluster size (m):

$$\begin{aligned} \text{VIF} &= m\rho + (1 - \rho) \\ &= 1 + \rho(m - 1). \end{aligned}$$

Reference

1. Bland JM. Sample size in guidelines trials. *Fam Pract.* 2000;17(Suppl 1):S17-S20.