

Online Supplementary Material

Thompson DM, Fernald DH, Mold JW. Intraclass correlation coefficients typical of cluster-randomized studies: estimates from the Robert Wood Johnson Prescription for Health projects. *Ann Fam Med*. 2012;10(3):235-240.

<http://www.annfammed.org/content/full/10/3/235>

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

$$\text{VIF} = (m\sigma_c^2 + \sigma_w^2) / (\sigma_c^2 + \sigma_w^2).$$

After expanding this expression,

$$\text{VIF} = [m\sigma_c^2 / (\sigma_c^2 + \sigma_w^2)] + [\sigma_w^2 / (\sigma_c^2 + \sigma_w^2)],$$

and then substituting ρ for the quantity $[\sigma_c^2 / (\sigma_c^2 + \sigma_w^2)]$, 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.