

Appendix 5: Formulas for estimating the sample size for experimental and analytical survey designs*

Design hypothesis	Formula
<p>Group comparison (2 population means)</p> <p>$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$</p>	$n = \frac{2\sigma^2 [z_{1-\alpha/2} + z_{1-\beta}]^2}{(\mu_1 - \mu_2)^2}$
<p>Group comparison (2 population proportions)</p> <p>$H_0: P_1 - P_2 = 0$ $H_1: P_1 - P_2 \neq 0$</p>	$n = \frac{\left[z_{1-\alpha/2} \sqrt{2\bar{P}(1-\bar{P})} + z_{1-\beta} \sqrt{P_1(1-P_1) + P_2(1-P_2)} \right]^2}{(P_1 - P_2)^2}$

Note: \bar{P} = average proportion = $(P_1 + P_2)/2$; P_1 = estimated proportion (larger); P_2 = estimated proportion; σ = estimated standard deviation (assumed to be equal for each group); μ_1 = estimated mean (larger); μ_2 = estimated mean (smaller); $z_{1-\alpha/2}$ = standard errors associated with confidence intervals (1.00 [68%], 1.645 [90%], 1.96 [95%], 2.58 [99%]).

*Adapted, with permission, from Lemeshow S, Hosmer DW Jr, Klar J, et al. *Adequacy of sample size in health studies*. Chichester (UK): John Wiley & Sons; 1990. p. 19,22,40.