

## Sample size to detect a significant difference between 2 proportions

$$N = \frac{\left( Z_{\alpha/2} \sqrt{2p(1-p)} + Z_{1-\beta} \sqrt{p_1(1-p_1)p_2(1-p_2)} \right)^2}{(p_1 - p_2)^2}$$

Where,

N= Sample Size

$Z_{\alpha/2}$  = critical value of the Normal distribution at  $\alpha/2$  (confidence level)

$Z_{1-\beta}$  = critical value of the Normal distribution at  $\beta$  (power)

d= difference of population proportion

$p_1$ = population proportion 1

$p_2$ = population proportion 2

$P = (p_1+p_2)/2$