

Sample Size Formula, Common SDs

- Sample size is calculated by use of the following formula:

$$n = \frac{2 (z_{\alpha} + z_{\beta})^2 (sd_c^2 + (W^2 sd_q^2) - (2 W \rho sd_c sd_q))}{(WQ - C)^2}$$

where n = sample size/group; z_{α} and z_{β} = z-statistics for α (e.g., 1.96) and β (e.g., 0.84) errors; sd = standard deviation for cost (sd_c) and effect (sd_q); W = maximum willingness to pay we wish to rule out; ρ = correlation of the difference in cost (C) and effect (Q)



Correlation

- When increasing effects are associated with decreasing costs, a therapy is characterized by a negative (win/win) correlation between the difference in cost and effect
 - e.g., asthma care
- When increasing effects are associated with increasing costs, a therapy is characterized by a positive (win/lose) correlation between the difference in cost and effect
 - e.g., life-saving care
- All else equal, fewer patients need to be enrolled when therapies are characterized by a positive correlation than when therapies are characterized by negative correlation



Willingness to Pay

- Moving willingness to pay "nearer to" or "further away from" the expected point estimate of the cost-effectiveness ratio increases or reduces the sample size we need to be confident of value
 - Caution: "Nearer" and "further away" are not measured on the real number line

Implication: Sample size need not always decrease as willingness to pay increases


