

$$\bar{X}_h = \frac{\sum X_{hi}}{N_h}$$

$$P_h = \frac{\sum Q_{hi}}{N}$$

$$\bar{X}_{ST} = \sum \bar{X}_h W_h$$

$$P_{ST} = \frac{\sum P_h N_h}{N} = \sum W_h P_h$$

$$W_h = \frac{N_h}{N}$$

$$S_h^2 = \frac{\sum (X_{hi} - \bar{X}_h)^2}{n_h - 1}$$

$$n = \frac{N z^2 \sum W_h S_h^2}{N E^2 + z^2 \sum W_h S_h^2}$$

$$n = \frac{N^2 z^2 \sum W_h P_h Q_h}{N E^2 + z^2 \sum W_h P_h Q_h}$$

$$\bar{X}_{ST} \pm t \sqrt{\left[ \frac{1}{N^2} \sum N_h (N_h - n_h) \frac{S_h^2}{n_h} \right]} \quad \langle \text{PROPORTION} \rangle$$

$$\bar{X}_{(ST)T} = N \bar{X}_{ST} \pm t \sqrt{\sum N_h (N_h - n_h) \frac{S_h^2}{n_h}} \quad \langle \text{TOTAL} \rangle$$

$$\hat{P}_{ST} = P_{ST} \pm t \sqrt{\frac{1}{N^2} \left[ \sum N_h (N_h - n_h) \frac{P_h Q_h}{n_h} \right]} \quad \langle \text{PROPORTION} \rangle$$

$$\hat{A}_{ST} = N P_{ST} \pm t N \sqrt{\frac{1}{N^2} \left[ \sum N_h (N_h - n_h) \frac{P_h Q_h}{n_h} \right]} \quad \langle \text{TOTAL} \rangle$$