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Documentation of Sample size for comparing two means

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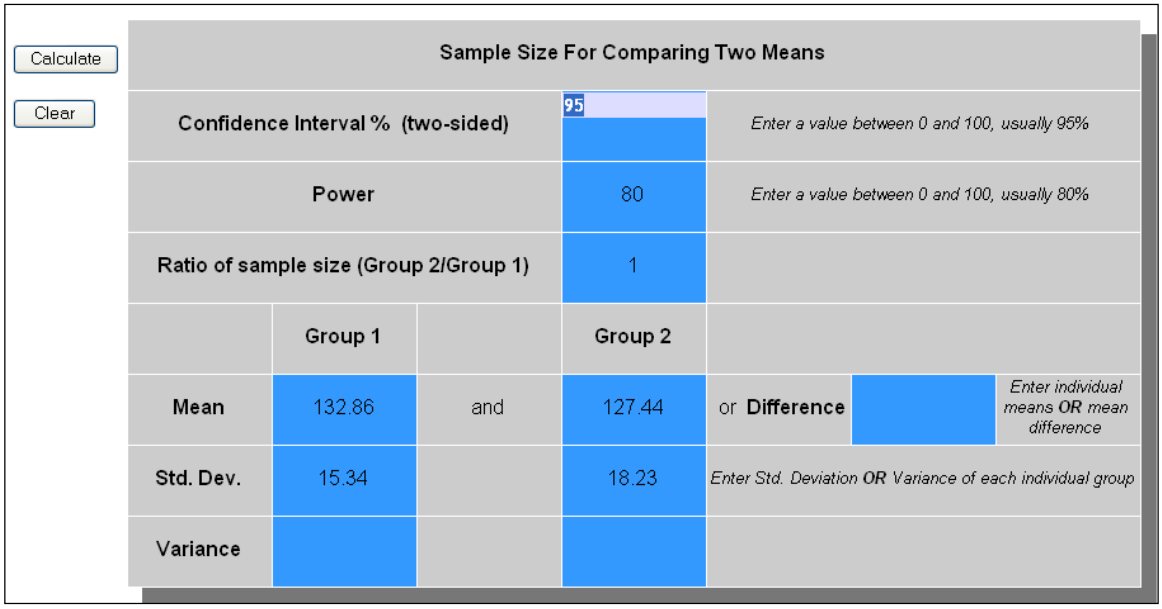
This module estimates sample sizes that are useful in planning studies in which means of two normally distributed samples are compared. The data input screen is as follows:



The input values requested are:

Two sided-confidence intervals (%) that can be chosen are 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 98, 99, 99.5, 99.8, 99.9, 99.95, 99.98 & 99.99.

Power (% chance of detecting a difference) is set at '80%' because this is an acceptable value in the majority of studies. User can also select 60, 70, 80, 90 or 95%, if desired.

Desired ratio of sample size of Group 2 to Group 1 is entered as '1' if two sample sizes are equal. But, in many instances, an imbalance between the groups can be anticipated and it can be predicted in advance that the number of people in Group 2 will be **k** times the number of Group 1.

Means of Group 1 and Group 2 are obtained from a previous pilot study conducted to obtain parameter estimates to plan for a larger study (or) from the literature. Users are

given an option of either entering a mean for each group (or) a difference of the means. The user can enter either standard deviation or variance for each group. The program will calculate variances if standard deviation of each group is entered, and vice visa.

The result of the calculation is shown below:

Sample Size For Comparing Two Means

Input Data

Confidence Interval (2-sided)	95%
Power	80%
Ratio of sample size (Group 2/Group 1)	1

	Group 1	Group 2	Mean difference[1]
Mean	132.86	127.44	5.42
Standard deviation	15.34	18.23	
Variance	235.316	332.333	

Sample size of Group 1	152
Sample size of Group 2	152
Total sample size	304

[1] Mean difference= (Group 1 mean) - (Group 2 mean)

Results from OpenEpi open source calculator--SSMean

file:///C:/OpenEpi/July,%202005/Power/SSMean.htm
Source file last modified on 06/29/2005 14:09:15

Print from the browser, or select all or part of the text and then copy and paste to other programs.
Many browsers have an optional setting to print background colors.

In this study where equal sample size is specified, the minimal sample size for each group is 152.

The sample size formulae used are as follows:

$$n_1 = \frac{(\sigma_1^2 + \sigma_2^2 / \kappa)(z_{1-\alpha/2} + z_{1-\beta})^2}{\Delta^2}$$

$$n_2 = \frac{(\kappa * \sigma_1^2 + \sigma_2^2)(z_{1-\alpha/2} + z_{1-\beta})^2}{\Delta^2}$$

The notation for the formulae are:

n_1 = sample size of Group 1

n_2 = sample size of Group 2

σ_1 = standard deviation of Group 1

σ_2 = standard deviation of Group 2

Δ = difference in group means

κ = ratio = n_2/n_1

$Z_{1-\alpha/2}$ = two-sided Z value (eg. Z=1.96 for 95% confidence interval).

$Z_{1-\beta}$ = power

Reference:

Bernard Rosner. Fundamentals of Biostatistics (5th edition). (based on equation 8.27)

Acknowledgement:

Default values are obtained from example 8.29 (pg. 307) described in 'Fundamentals of Biostatistics' (5th edition) by Bernard Rosner.