

The objective of this test is to test whether a mean, μ , is different from a gold standard reference value, μ_0 . For example, we may wish to test whether a new product is equivalent to an existing, industry standard product. Here, the 'burden of proof', so to speak, falls on the new product; that is, equivalence is actually represented by the alternative, rather than the null hypothesis.

$$\begin{aligned}H_0 &: |\mu - \mu_0| \geq \delta \\H_1 &: |\mu - \mu_0| < \delta\end{aligned}$$

Formulas

This calculator uses the following formulas to compute sample size and power, respectively:

$$n = \left(\sigma \frac{z_{1-\alpha} + z_{1-\beta/2}}{\delta - |\mu - \mu_0|} \right)^2$$

$$1 - \beta = 2[\Phi(z - z_{1-\alpha}) + \Phi(-z - z_{1-\alpha})] - 1, \quad z = \frac{|\mu - \mu_0| - \delta}{\sigma/\sqrt{n}}$$

where

n is sample size

σ is standard deviation

Φ is the [standard Normal distribution function](#)

Φ^{-1} is the [standard Normal quantile function](#)

α is Type I error

β is Type II error, meaning $1 - \beta$ is power

δ is the testing margin

References

Chow S, Shao J, Wang H. 2008. Sample Size Calculations in Clinical Research. 2nd Ed. Chapman & Hall/CRC Biostatistics Series. page 54.