July 11, 2005.

Documentation of Power for Cohort Studies

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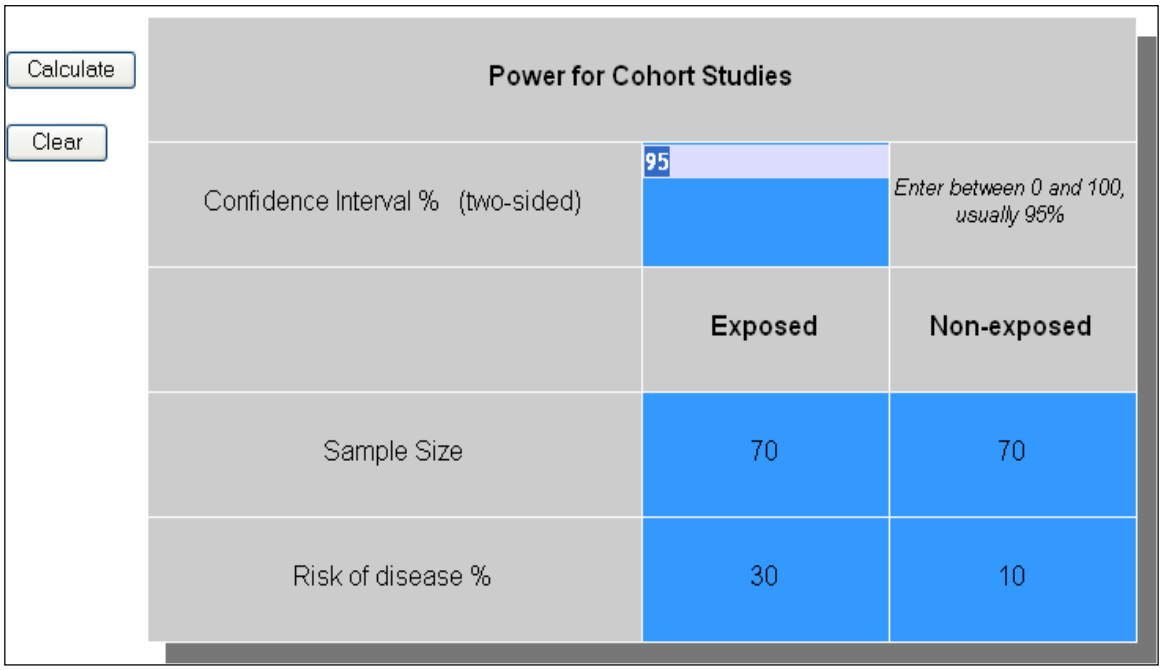
This module estimates power for cohort studies. The data input screen is as follows:



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.
- The available sample size for exposed group and that for non-exposed group are entered.
- The risk of disease among exposed and non-exposed group are entered ranging from 0 to 100%.

The result of the calculation is shown below:

Power for Cohort Studies

	Input Data
Two-sided confidence interval (%)	95
Number of exposed	70
Risk of disease among exposed (%)	30
Number of non-exposed	70
Risk of disease among non-exposed (%)	10
Risk ratio detected	3

Power based on:	
Normal approximation	84.87%
Normal approximation with continuity correction	78.94%

Results from OpenEpi open source calculator--PowerCohort

file:///C:/OpenEpi/July,%202005/Power/PowerCohort.htm
Source file last modified on 06/29/2005 15:18:58

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.

The interpretation of power in this cohort study is as follows: If, in truth, exposed group differs from non-exposed group in their disease outcome given the above values, this study would have 85% chance of detecting a difference without continuity correction.

The formulae for the estimation of power are as follows:

- *Power with normal approximation:*

$$Power = \Phi\left(\frac{\sqrt{(n_1 * \Delta^2)} - z_{1-\alpha/2}\sqrt{(1+1/\kappa) * p * q}}{\sqrt{(p_1 * q_1) + (p_2 * q_2 / \kappa)}} \right)$$

- *Power with continuity correction:*

$$Power = \Phi\left(\frac{\sqrt{(n' * \Delta^2)} - z_{1-\alpha/2}\sqrt{(1+1/\kappa) * p * q}}{\sqrt{(p_1 * q_1) + (p_2 * q_2 / \kappa)}} \right)$$

Where **n'** = n_1 - [(κ +1) / (κ . Δ)];

- *Risk ratio calculation*

RR = (p_1/p_2);

The notations for the formulae are:

Δ = difference of risk of disease between exposed group and non-exposed group;

κ = ratio of sample size: non-exposed group / exposed group;

p_1= risk of disease among exposed group;

p_2= risk of disease among non-exposed group;

p = (p_1*n_1+p_2*n_2) / (n_1+n_2);

q= 1-p;

n_1= available sample size among exposed group;

References:

- James Schlesselman. Case-control studies: Design, Conduct, Analysis (1982). (Formula 6.9 is used for estimation of power)
- Sahai H and KHurshid A. Formulae and tables for the determination of sample sizes and power in clinical trials for testing differences in proportions for the two-sample design: A review. *Statistics in Medicine*, 1996 vol. 15, 1-21. ((In addition to formula 6.9 mentioned above, formula 23 is used to calculate power with continuity correction)