Relative Risk (RR)

Relative risk is a way to measure the effect of exposure to a risk factor on the probability of developing the outcome, or disease. It compares the outcome of an exposed group of individuals to a group of non-exposed individuals and quantifies how much more or less the exposed group is at risk for disease than the non-exposed group. Relative risk is utilized in cohort studies and is calculated by using values from a 2x2 contingency table in the formula RR = [a/(a+b)] / [c/(c+d)].



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Use

Used in Cohort Studies
Cohosts
These observational studies identify two groups based on exposure; individuals exposed to a risk factor and individuals who lack exposure. The researcher can look retrospectively and see who developed the disease among the two groups, or the researcher can follow the two groups prospectively to track who will develop the disease. Cohort studies seek to measure the influence of risk factors on the development of disease and can quantify this influence with calculation of the relative risk.

Formula

Risk of Developing Disease
Risk of becoming Diseased-guy
This is another way of saying relative risk. If all else is held equal outside of exposure, relative risk quantifies how much more or less the exposed group is at risk for disease than the non-exposed group.

Equals =
Equals
Relative risk is equal to risk of developing disease in the exposed group divided by risk in the unexposed group.

Exposed Group
Exposed to radiation
This group of subjects were all exposed to the studied risk factor

a / (a + b)
A-apple Divided by A-apple Plus B-bee body armor
The numerator of the formula is calculated by dividing subjects with exposure and disease (a) by the sum of the subjects with exposure and disease (a) and the subjects with exposure and no disease (b).

Divided by /
Divide
This division step should be carried out last. First, calculate the two terms found in the numerator and denominator respectively before dividing them.

Unexposed Group
Unexposed to radiation
This group of subjects were never exposed to the risk factor.

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c / (c + d)

C-cat Divided by C-cat Plus D-dog

The denominator of the formula is calculated by dividing subjects who lack exposure but have disease (c) by the sum of the subjects who lack exposure but have disease (c) and the subjects who lack exposure and disease (d).

When Low Prevalence Odds Ratio Approximates Relative Risk

Down-arrow Diseased-girl throwing Odds-dice to Approximate Relatives Risk

If a disease has a low prevalence, i.e. rare diseases, the odds ratio approximates the relative risk. You can determine if prevalence is low if a lot of individuals have been exposed but only a few actually manifest with disease; in a 2x2 contingency table, there would be a very small “a” value with a very large “b” value, and thus a + b approximately equals b.

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