

What is the interpretation of relative risk and can you provide examples?

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Relative risk is a statistical measure used to assess the likelihood of an event occurring in one group compared to another group. It is calculated by dividing the probability of an event occurring in the exposed group by the probability of the event occurring in the unexposed group. A relative risk greater than 1 indicates that the event is more likely to occur in the exposed group, while a relative risk less than 1 indicates that the event is less likely to occur in the exposed group. For example, if the relative risk of lung cancer for smokers compared to non-smokers is 2, this means that smokers are twice as likely to develop lung cancer than non-smokers. Relative risk is commonly used in medical and epidemiological studies to evaluate the effectiveness of a treatment or intervention, and to identify potential risk factors for diseases.

Interpret Relative Risk (With Examples)

In statistics, relative risk refers to the probability of an event occurring in a treatment group compared to the probability of an event occurring in a control group.

It is calculated as:

Relative Risk = (Prob. of event in treatment group) / (Prob. of event in control group)

As a rule of thumb, here's how to interpret the values for relative risk:

Relative Risk < 1: The event is less likely to occur in the treatment group
Relative Risk = 1: The event is equally likely to occur in each group
Relative Risk > 1: The event is more likely to occur in the treatment group

The following examples show how to interpret relative risk values in practice.

Example 1: Relative Risk < 1

Suppose we want to know if exercise affects the risk of developing some disease.

We collect data and find that 28% of people who exercise regularly develop this disease while 50% of people who do not exercise regularly develop this disease.

In this scenario, we would calculate the relative risk as:

Relative Risk = P(event in treatment group) / P(event in control group)
Relative Risk = P(disease with exercise) / P(disease with no exercise)
Relative Risk = 0.28 / 0.50
Relative Risk = 0.56

Since the relative risk is less than 1, this tells us that this disease is less likely to develop in individuals who exercise.

Specifically, we could say that an individual is 44% less likely ($1 - .56 = .44$) to develop this disease if they

exercise regularly.

Example 2: Relative Risk = 1

Suppose we want to know if some new studying program affects the ability of students to pass a particular exam.

We collect data and find that 40% of students who use the new studying program pass the exam while 40% of students who do not use the studying program also pass the exam.

In this scenario, we would calculate the relative risk as:

Relative Risk = P(event in treatment group) / P(event in control group)
Relative Risk = P(pass with new program) / P(pass without new program)
Relative Risk = 0.40 / 0.40
Relative Risk = 1

Since the relative risk is equal to 1, this tells us that an individual is equally likely to pass the exam whether they use the new studying program or not.

Example 3: Relative Risk > 1

Suppose we want to know if smoking affects the risk of

developing lung cancer

We collect data and find that 70% of people who smoke develop lung cancer while 5% of people who do not smoke develop lung cancer.

In this scenario, we would calculate the relative risk as:

Relative Risk = $P(\text{event in treatment group}) / P(\text{event in control group})$
Relative Risk = $P(\text{lung cancer with smoking}) / P(\text{lung cancer without smoking})$
Relative Risk = $0.70 / 0.05$
Relative Risk = 14

Since the relative risk is greater than 1, this tells us that an individual is more likely to develop lung cancer if they smoke.

Specifically, we could say that an individual is 14 times more likely to develop lung cancer if they smoke.

Interpreting Relative Risk in a Contingency Table

Often you may have to calculate and interpret relative risk using a 2x2 table, which takes the following format:

	Event	No Event
Treatment	A	B
Control	C	D

We can use the following formula to calculate relative risk in a 2x2 table:

Relative risk = /

For example, suppose 50 basketball players use a new training program and 50 players use an old training program. At the end of the program we test each player to see if they pass a certain skills test.

The following 2x2 table shows the results:

	Passed	Failed
New Program	34	16
Old Program	39	11

We would calculate the relative risk as:

Relative Risk = / Relative Risk = / Relative Risk = 0.68 / 0.78
Relative Risk = 0.872

Since the relative risk is less than 1, it indicates that the probability of passing is lower under the new program compared to the old program.

Specifically, we could say that an individual is 12.8% less likely ($1 - .872 = .128$) to pass the skills test if they use the new program.

The following tutorials offer additional information about odds ratios and relative risk:

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