

Odds Ratio vs Risk Ratio vs Risk Difference

The same 2x2 event table can be summarized three different ways. Adjust the baseline risk below to see the odds ratio, risk ratio, and risk difference computed from the exact same underlying data, and watch how far the odds ratio drifts from the risk ratio as events become common.



Odds Ratio vs Risk Ratio vs Risk Difference

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Baseline (control group) event risk: 10.0%

Treatment effect (true risk ratio applied to baseline): 0.70

Control group risk	10.0%
Treatment group risk	7.0%
Risk difference	-3.0 percentage points
Risk ratio	0.700
Odds ratio	0.677

At a 10.0% baseline risk, the risk ratio is 0.700 and the odds ratio is 0.677, a gap of 0.023.

What this answers

This page answers "why do the odds ratio and risk ratio give different numbers for the same data, and which one should I read?" using a fixed 2x2 comparison you can adjust by baseline

risk and treatment effect.

Three ways to summarize the same table

Risk difference is the treatment group's event risk minus the control group's event risk, expressed in the outcome's own probability units. Risk ratio is the treatment group's risk divided by the control group's risk. Odds ratio is the treatment group's odds of the event (risk divided by 1 minus risk) divided by the control group's odds. All three are computed from the identical event counts; they are different lenses on the same table, not competing estimates.

Why odds ratio and risk ratio diverge

When an event is rare in both groups, odds and risk are numerically close, so odds ratio and risk ratio nearly agree. As baseline risk rises, odds grow faster than risk (odds has no upper bound while risk is capped at 1), which pushes the odds ratio further from the risk ratio, usually making the odds ratio look like a more extreme effect than the risk ratio for the same underlying data. Move the baseline risk slider above from a small value toward a large one to see this gap widen.

Worked example

With a 10 percent baseline risk and a true risk ratio of .70, the treatment group's risk is 7 percent, giving a risk difference of 3 percentage points and a risk ratio of .70. The corresponding odds ratio is close to but not exactly .70, since 10 percent is still a fairly low baseline. Raise the baseline risk toward 50 percent with the same relative effect and the odds ratio noticeably overstates the risk ratio's more direct message.

Which one to report

Risk difference answers an absolute question: how many more or fewer events per group. Risk ratio and risk difference are usually the most directly interpretable for a reader outside the study. Odds ratio is the natural output of logistic regression and case-control designs where risk itself cannot be estimated directly, and is not wrong, but it should not be read as if it were a risk ratio when baseline risk is not small.

What none of these measures decide

None of the three measures establishes that the treatment caused the difference; that depends on the study design, not the arithmetic. None of them tells you whether the difference is

clinically or practically meaningful; a small risk difference can matter enormously at a large population scale, and a large relative effect on a rare event can be a small absolute effect.

Source

This comparison follows the measures-of-effect guidance in the Cochrane Handbook and the shared statistical reasoning contract every StatReason engine is built against.

Limitations

This page uses a fixed hypothetical baseline and treatment effect to illustrate the relationship between the three measures; it does not compute a confidence interval or test a hypothesis. Use the linked engines below for a confidence interval or hypothesis test on your own event counts.

Next action: get a confidence interval for your own data with the [Odds Ratio Confidence Interval Calculator](#) or [Risk Ratio Confidence Interval Calculator](#). Test whether two proportions differ with the [Two-Proportion z-Test](#).