How to Calculate Odds Ratio and Relative Risk in Excel: A Step-by-Step Guide

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The process of calculating odds ratio and relative risk in Excel involves using specific formulas and functions to analyze data and determine the likelihood of an event occurring. These calculations are commonly used in statistics and can be useful in making informed decisions. By inputting the necessary data and utilizing the appropriate Excel tools, one can effectively calculate these measures of probability and gain a better understanding of the potential outcomes in a given situation. This method provides a simple and efficient way to analyze data and make informed decisions based on statistical measures.

Calculate Odds Ratio and Relative Risk in Excel

We often use the odds ratio and relative risk when performing an analysis on a 2-by-2 table, which takes on the following format:

	Event	No Event
Treatment	A	B
Control	C	D

The odds ratio tells us the ratio of the odds of an event occurring in a treatment group to the odds of an event occurring in a control group. It is calculated as:

Odds ratio = (A*D) / (B*C)

The relative risk tells us the ratio of the probability of an event occurring in a treatment group to the probability of an event occurring in a control group. It is calculated as:

Relative risk = /

This tutorial explains how to calculate odds ratios and relative risk in Excel.

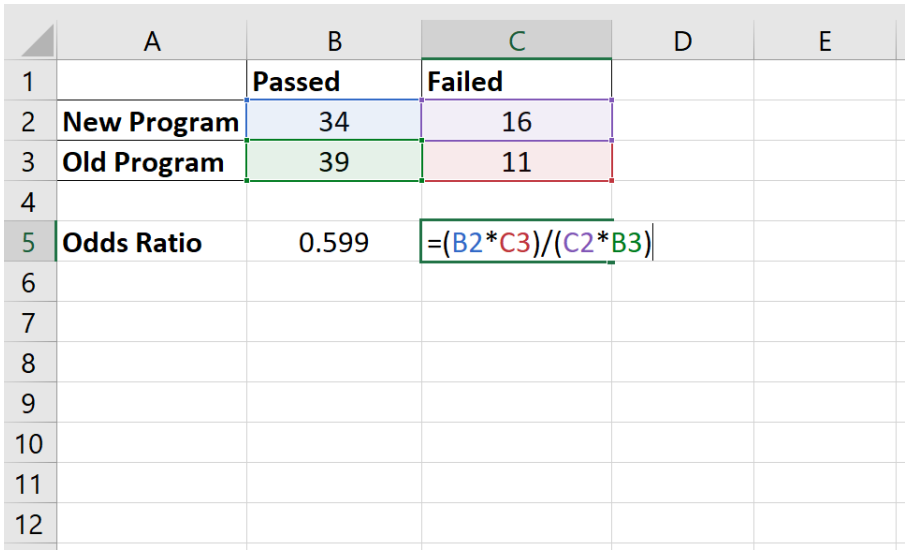
How to Calculate the Odds Ratio and Relative Risk

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 table shows the number of players who passed and failed, based on the program they used:

	A	B	C	D	E
1		**Passed**	**Failed**		
2	**New Program**	34	16		
3	**Old Program**	39	11		
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					

The odds ratio is calculated as (34*11) / (16*39) = 0.599

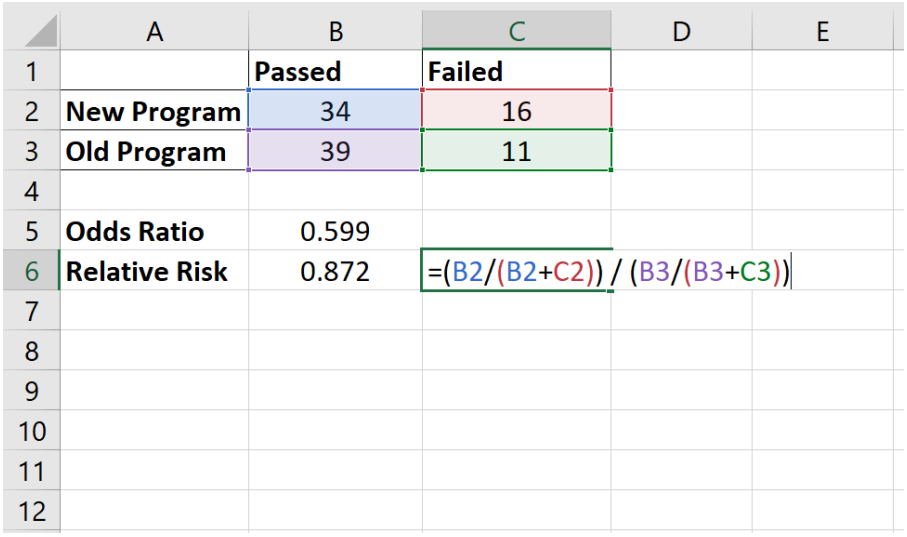


	A	B	C	D	E
1		Passed	Failed		
2	New Program	34	16		
3	Old Program	39	11		
4					
5	Odds Ratio	0.599	=(B2*C3)/(C2*B3)		
6					
7					
8					
9					
10					
11					
12					

We would interpret this to mean that the odds that a player passes the test by using the new program are just 0.599 times the odds that a player passes the test by using the old program.

In other words, the odds that a player passes the test are actually lowered by 40.1% by using the new program.

The relative risk is calculated as / = 0.872



	A	B	C	D	E
1		Passed	Failed		
2	New Program	34	16		
3	Old Program	39	11		
4					
5	Odds Ratio	0.599			
6	Relative Risk	0.872	=(B2/(B2+C2)) / (B3/(B3+C3))		
7					
8					
9					
10					
11					
12					

Because this value is less than 1, it indicates that the probability of passing is actually lower under the new program compared to the old program.

We could also see this by directly computing the probability that a player passes under each program:

Probability of passing under new program = 34 / 50 = 68%

Probability of passing under old program = 39 / 50 = 78%

How to Calculate Confidence Intervals

Once we calculate the odds ratio and relative risk, we may also be interested in computing confidence

intervals for these two metrics.

A 95% confidence interval for the odds ratio can be calculated using the following formula:

95% C.I. for odds ratio =

where SE(ln(OR)) =√1/A + 1/B + 1/C + 1/D

The 95% C.I. for the odds ratio turns out to be (.245, 1.467). The image below shows the formula we used to calculate this confidence interval:

	A	B	C	D	E
1		**Passed**	**Failed**		
2	**New Program**	34	16		
3	**Old Program**	39	11		
4					
5	**Odds Ratio**	0.599			
6	**Relative Risk**	0.872			
7					
8	**SE(ln(OR))**	0.457	=SQRT(1/B2+1/C2+1/B3+1/C3)		
9	**95% C.I. for Odds Ratio**	0.245	=EXP(LN(B5)-1.96*B8)		
10		1.467	=EXP(LN(B5)+1.96*B8)		
11					
12					
13					
14					
15					
16					

A 95% confidence interval for the relative risk can be calculated using the following formula:

95% C.I. for relative risk = exp(ln(RR) - 1.96*SE(ln(RR))) to exp(ln(RR) - 1.96*SE(ln(RR)))

where SE(ln(RR)) =√1/A + 1/C - 1/(A+B) - 1/(C+D)

The 95% C.I. for the relative risk turns out to be (.685, 1.109). The image below shows the formula we used to calculate this confidence interval:

	A	B	C	D	E	F
1		**Passed**	**Failed**			
2	**New Program**	34	16			
3	**Old Program**	39	11			
4						
5	**Odds Ratio**	0.599				
6	**Relative Risk**	0.872				
7						
8	**SE(ln(OR))**	0.457				
9	**95% C.I. for Odds Ratio**	0.245				
10		1.467				
11						
12	**SE(ln(RR))**	0.123	=SQRT(1/B2+1/B3-1/(B2+C2)-1/(B3+C3))			
13	**95% C.I. for Relative Risk**	0.685	=EXP(LN(B6)-1.96*B12)			
14		1.109	=EXP(LN(B6)+1.96*B12)			
15						
16						
17						
18						

The following tutorials offer additional information on how to interpret odds ratios and relative risk: