

How can I calculate odds ratios in R, and can you provide an example?

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Calculating odds ratios in R is a statistical method used to measure the strength of association between two categorical variables. It involves calculating the ratio of the odds of an outcome occurring in one group compared to the odds of the same outcome occurring in another group. This can be done using the "odds" function in R, which takes in the number of successes and failures in each group and produces the odds ratio along with its confidence interval. An example of this would be calculating the odds ratio of smoking status (smoker or non-smoker) on the likelihood of developing lung cancer. By providing the necessary data and using the "odds" function in R, one can obtain the odds ratio and determine the strength of association between these two variables.

Calculate Odds Ratios in R (With Example)

In statistics, an odds ratio tells us the ratio of the odds of an event occurring in a treatment group compared to the odds of an event occurring in a control group.

We often calculate an odds ratio 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

To calculate an odds ratio in R, we can use the `oddsratio()` function from the `epitools` package.

The following example shows how to use this syntax in practice.

Example: Calculating an Odds Ratio in R

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:

	Passed	Failed
New Program	34	16
Old Program	39	11

Suppose we would like to calculate an odds ratio to compare the odds of a player passing the skills test using the new program compared to using the old program.

Here is how to create this matrix in R:

```
#create matrix
```

```
program <- c('New Program', 'Old Program')
```

```
outcome <- c('Pass', 'Fail')
```

```
data <- matrix(c(34, 16, 39, 11), nrow=2, ncol=2,
```

```
byrow=TRUE)
dimnames(data) <- list('Program'=program,
'Outcome'=outcome)
```

```
#view matrix
```

```
data
```

```
Outcome
```

```
Program Pass Fail
```

```
New Program 34 16
```

```
Old Program 39 11
```

And here is how to calculate the odds ratio using the `oddsratio()` function from the `epitools` package:

```
install.packages('epitools')library(epitools)
```

```
#calculate odds ratio
```

```
oddsratio(data)
```

```
$measure
```

```
odds ratio with 95% C.I.
```

```
Program estimate lower upper
```

```
New Program 1.0000000 NA NA
```

```
Old Program 0.6045506 0.2395879 1.480143
```

\$p.value

two-sided

Program midp.exact fisher.exact chi.square

New Program NA NA NA

Old Program 0.271899 0.3678219 0.2600686

\$correction

FALSE

attr(,"method")

"median-unbiased estimate & mid-p exact CI"

The odds ratio turns out to be 0.6045506.

We would interpret this to mean that the odds that a player passes the test by using the new program are just .6045506 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 about 39.6% by using the new program.

95% confidence interval for the odds ratio: .

We are 95% confident that the true odds ratio between

the new and old training program is contained in this interval.

The midp.exact column in the output also displays the p-value associated with the odds ratio.

This p-value turns out to be 0.271899. Since this value is not less than .05, we would conclude that the odds ratio is not statistically significant.

In other words, we know from the odds ratio that the odds of a player passing using the new program are lower than the odds of passing using the old program, but the difference between these odds is not actually statistically significant.

The following tutorials provide additional information about odds ratios: