

# Statistics 305/605: Introduction to Biostatistical Methods for Health Sciences

R Demo for Chapter 14 : Inference for Proportions

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# Test and CI

- Can use `prop.test()` function to get  $p$ -value and CI.

```
prop.test(c(166,122),c(8506,8102),conf.level=0.95,correct=FALSE)
```

```
##  
## 2-sample test for equality of proportions without continuity  
## correction  
##  
## data:  c(166, 122) out of c(8506, 8102)  
## X-squared = 4.8387, df = 1, p-value = 0.02783  
## alternative hypothesis: two.sided  
## 95 percent confidence interval:  
##  0.000498629 0.008416622  
## sample estimates:  
##      prop 1      prop 2  
## 0.01951564 0.01505801
```

# Arguments

```
prop.test(c(166,122),c(8506,8102),conf.level=0.95,correct=FALSE)
```

In the call above to `prop.test()`:

- ▶ The first argument contains the numbers of “successes” (cancers) in the EP and placebo groups, respectively.
- ▶ The 2nd argument contains the numbers of “trials” (women) in the EP and placebo groups, respectively.
- ▶ `conf.level` is the level or coverage probability  $C$  of the interval (default = 0.95).
- ▶ `correct` specifies whether to apply a “continuity correction” that improves the statistical inference when the total size of the sample is small. The default is `correct=TRUE`, but I set `correct=FALSE` to re-create the results from using the formulas in the text.

# Output

```
##
## 2-sample test for equality of proportions without continuity
## correction
##
## data:  c(166, 122) out of c(8506, 8102)
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```

- ▶ Mostly like the output of `t.test()`
- ▶ X-squared is the square of the test statistic  $Z$  that we have discussed. This has a chi-squared ( $\chi^2$ ) distribution with one df.
- ▶ When the alternative hypothesis is two-sided, the p-value from the  $\chi^2$  test is equivalent to the p-value from the  $Z$ -test.