Epidemiology: risks and contingency tables

 # Enter the contingency table of counts data. The data from Rosner, page 373, Example 10.2.

```
> counts = c(683,2573,1498,8747)
> Table = matrix(counts,2,2)
> Table
     [,1] [,2]
[1,]  683 1498
[2,] 2573 8747
```

 # Calculate the absolute, relative, and attributable risks and the odds ratio

```
> R = 683/(683+1498)
> R
[1] 0.3131591
> RR = (683/(683+1498)) / (2573/(2573+8747))
> RR
[1] 1.377754
> AR = (683/(683+1498)) - (2573/(2573+8747))
> AR
[1] 0.08586228
> OR = (683/1498) / (2573/8747)
> OR
[1] 1.549988
```

 # We estimate the probability of developing a disease at 0.210, for people exposed to the risk factor.
 # This probability is 37.8% higher than for people who are not exposed. The attributable risk of
 # 0.086 represents the additional probability of developing the disease that can be attributed solely
 # to the risk factor. The odds ratio of developing the disease is 55.0% higher for people exposed to
 # the risk factor.

 # Chi-square test of association

```
> TestResults = chisq.test(Table, correct=0)
> TestResults

        Pearson's Chi-squared test
X-squared = 73.668, df = 1, p-value < 2.2e-16
```

 # The association between the disease and the factor is statistically significant. Next, we can see the
 # observed and expected counts that were used in the calculation of the chi-square statistic.

```
> TestResults$observed
     [,1] [,2]
[1,]  683 1498
```

```
[2,] 2573 8747
> TestResults$expected
         [,1]     [,2]
[1,]  525.9859 1655.014
[2,] 2730.0141 8589.986
```

 # The chi-square statistic measured how far the observed counts are from the expected counts. The # difference appeared statistically significant.