

## Unit 11 – Chi Square Tests Homework

### SOLUTIONS

1. This exercise gives you practice doing a Fisher Exact Test. See course notes Unit 11, page 18.

Source: Fisher LD and Van Belle G. *Biostatistics: A Methodology for the Health Sciences*. New York: Wiley, 1993. Chapter 6 problem 5, page 232.

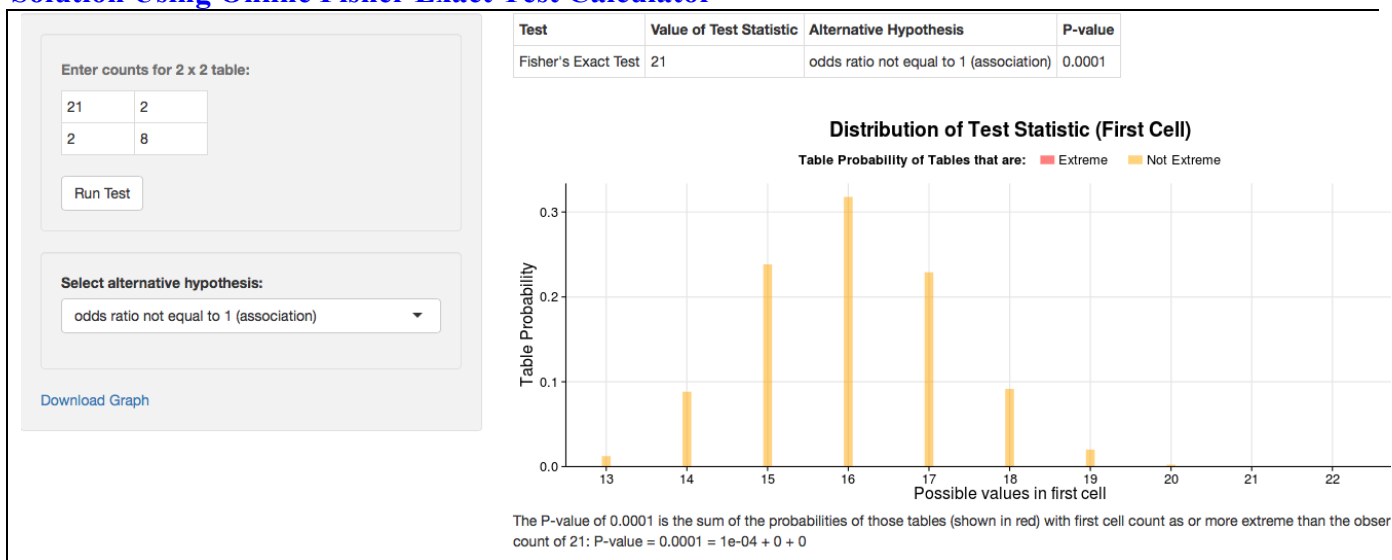
Smith, Delgado and Rutledge (1976) report data on ovarian carcinoma. Individuals had different numbers of courses of chemotherapy. The 5-year survival data for those with 1-4 and 10 or more courses of chemotherapy are:

Courses	Five Year Status	
	Dead	Alive
1-4	21	2
$\geq 10$	2	8

Using Fisher's Exact test, is there a statistically significant association ( $p < .05$ ) in this table?

**Assumption of the null hypothesis model (Null: No Association) has led to an unlikely result. The p-value  $< .0001$ . Reject the null hypothesis. Conclude that these data provide statistically significant evidence that, relative to  $\geq 10$  courses, fewer (1-4) courses of chemotherapy are associated with greater odds of death at 5 years.**

### Solution Using Online Fisher Exact Test Calculator



<https://istats.shinyapps.io/FisherExact/>

### Solution Using R

```
# Fisher Exact Test for a 2x2 table
table2x2 <- data.frame(dead=c(21,2), alive=c(2,8))
table2x2

##   dead alive
## 1   21     2
## 2    2     8

fisher.test(table2x2, or=1, alternative="two.sided")

##
## Fisher's Exact Test for Count Data
##
## data:  table2x2
## p-value = 0.0001255
## alternative hypothesis: true odds ratio is not equal to 1
## 95 percent confidence interval:
##   3.819676 571.245711
## sample estimates:
## odds ratio
##   34.05494
```

### Solution Using Stata

```
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```

row		col		Total
		1	2	
1		21	2	23
2		2	8	10
Total		23	10	33

```
Fisher's exact = 0.000
1-sided Fisher's exact = 0.000
```