

Use the following to answer questions 1 through 8

We collect data on subjects who did and did not receive a flu vaccine, and record whether or not they contracted the flu in the same year, obtaining the data below.

	Received vaccine	Did not receive vaccine	Total
Contracted flu	9	23	32
Did not contract flu	78	53	131
Total	87	76	163

1. What is the risk of contracting the flu?
2. What are the odds of contracting the flu?
3. For subjects who received a vaccine, what is the risk of the flu?
4. Find and interpret the risk ratio of contracting the flu for those who did vs. those who did not receive a vaccine.
5. Find and interpret the odds ratio of contracting the flu for those who did vs. those who did not receive a vaccine.
6. Create a 90% confidence interval for the odds ratio
7. Based on your confidence interval, is there enough evidence to conclude the odds of contracting the flu for those who received the flu vaccine are different than the odds of contracting the flu for those who did not receive the flu vaccine?

8. Conduct a hypotheses test using $\alpha = 0.10$

I. State the null and alternative hypotheses

II. Calculate the test statistic, $\sum \frac{(O-E)^2}{E}$

III. Find the p-value

IV. Make and justify a decision

V. Interpret your decision in the context of the problem

Use the following to answer questions 9 through 15

Subjects were enrolled in a study to determine whether vitamin C supplementation had any effect on the likelihood of developing cancer. Subjects were divided into 2 groups, 1 group who took daily vitamin C supplementation, the other who did not. They were followed for 25 years, and we recorded whether or not they developed any form of cancer during that time, resulting in the data below.

Took vitamin C supplement	Developed Cancer		Total
	No	Yes	
No	92	45	137
Yes	78	59	137
Total	170	104	274

9. What is the risk of cancer?

10. What are the odds of cancer?

11. For subjects who did not take a vitamin C supplement, what are the odds of cancer?

12. Find and interpret the risk ratio of cancer for those who did vs. those who did not take a vitamin C supplement.

13. Find and interpret the odds ratio of cancer for those who did vs. those who did not take a vitamin C supplement.

14. Create a 95% confidence interval for the odds ratio of cancer for those who did vs. those who did not take a vitamin C supplement.

15. Based on your confidence interval, is there enough evidence to conclude the odds of contracting cancer are different for those who did receive a vitamin C supplement vs those who did not?

Use the following for questions 16 through 18

We are interested in whether different variants of the HLA gene have an effect on the probability of developing melanoma. At-risk subjects were recruited into a study, their gene variant recorded, and followed for 5 years. At the end of 5 years we recorded whether or not they developed melanoma, resulting in the data below.

HLA variant	Developed melanoma		Total
	Yes	No	
A2	8	35	43
B12	1	28	29
B45	8	29	37
C3	5	58	63
Total	22	150	172

16. Find the risk ratio of melanoma for those with the B12 variant vs those with the C3 variant.

17. Find the odds ratio of melanoma for those with the C3 variant vs those with the A2 variant.

18. Conduct a hypotheses test using $\alpha = 0.01$

I. State the null and alternative hypotheses

II. Calculate the test statistic, $\sum \frac{(O-E)^2}{E}$

III. Find the p-value

IV. Make and justify a decision

V. Interpret your decision in the context of the problem