1. Data from an article by Robert Rutledge in Annals of Surgery in 1993

|  |  |  |
| --- | --- | --- |
|  | Survived | Died |
| No seat belt | 1781 | 135 |
| Seat belt | 1443 | 47 |

Determine whether wearing a seatbelt has an effect on survival. Interpret your results – should you wear your seat belt?

**Answer:**

A hypothesis test with null hypothesis that the proportions of Death in both “no seat belt” and “seat belt” returns a p-value of 1.234e-07 and confidence interval is (0.02789984,0.05855832) which does not contain) so we can reject the null hypothesis. So, wearing seat belt does have an effect on the chances of survival. So, we should wear seat belt.

1. Compare the approximate and actual tests for difference in 2 proportions using

|  |  |  |  |
| --- | --- | --- | --- |
|  | Fatal attack | Nonfatal attack | No attack |
| Placebo | 18 | 171 | 10845 |
| Aspirin | 5 | 99 | 10933 |

1. Look at only those groups that had an attack
2. Look at attacks of any type versus no attack (approximate test only)

**Answer:**

1. If we look at those groups that had an attack

|  |  |  |
| --- | --- | --- |
|  | Fatal Attack | Total People in Attack Group |
| Placebo | 18 | 171+18 |
| Aspirin | 5 | 99+5 |

An approximate test on the difference of two proportions gives a p value of 0.1509 so we cannot reject the null hypothesis that the proportions on attack is same for both aspirin and placebo. It is consistent with the confidence interval (-0.01150587, 0.10582822) which contains 0.

Fisher’s Exact test on the same hypothesis that the proportions are same gives a p value of 0.1782 which means we cannot reject the null hypothesis.

1. If we look at the attack vs non-attack

|  |  |  |  |
| --- | --- | --- | --- |
|  | Attack | No Attack | Total |
| Placebo | 18+171 | 10845 | 18+171+10845 |
| Aspirin | 5+99 | 10993 | 5+99+10993 |

An approximate test on the difference of two proportions gives a p value of 4.464e-07 so we can reject the null hypothesis that the proportions on attack is same for both aspirin and placebo. It is consistent with the confidence interval (0.004744481 0.010769463) which does not contain 0.