Fisher's Exact Test Report

Fisher's Exact Test Analysis Report

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Introduction

This report presents the results of a Fisher's Exact Test comparing two independent groups. The test is a non-parametric statistical test used to determine if there is a significant association between two categorical variables in a 2x2 contingency table. It is particularly useful when sample sizes are small or when expected cell counts are less than 5.
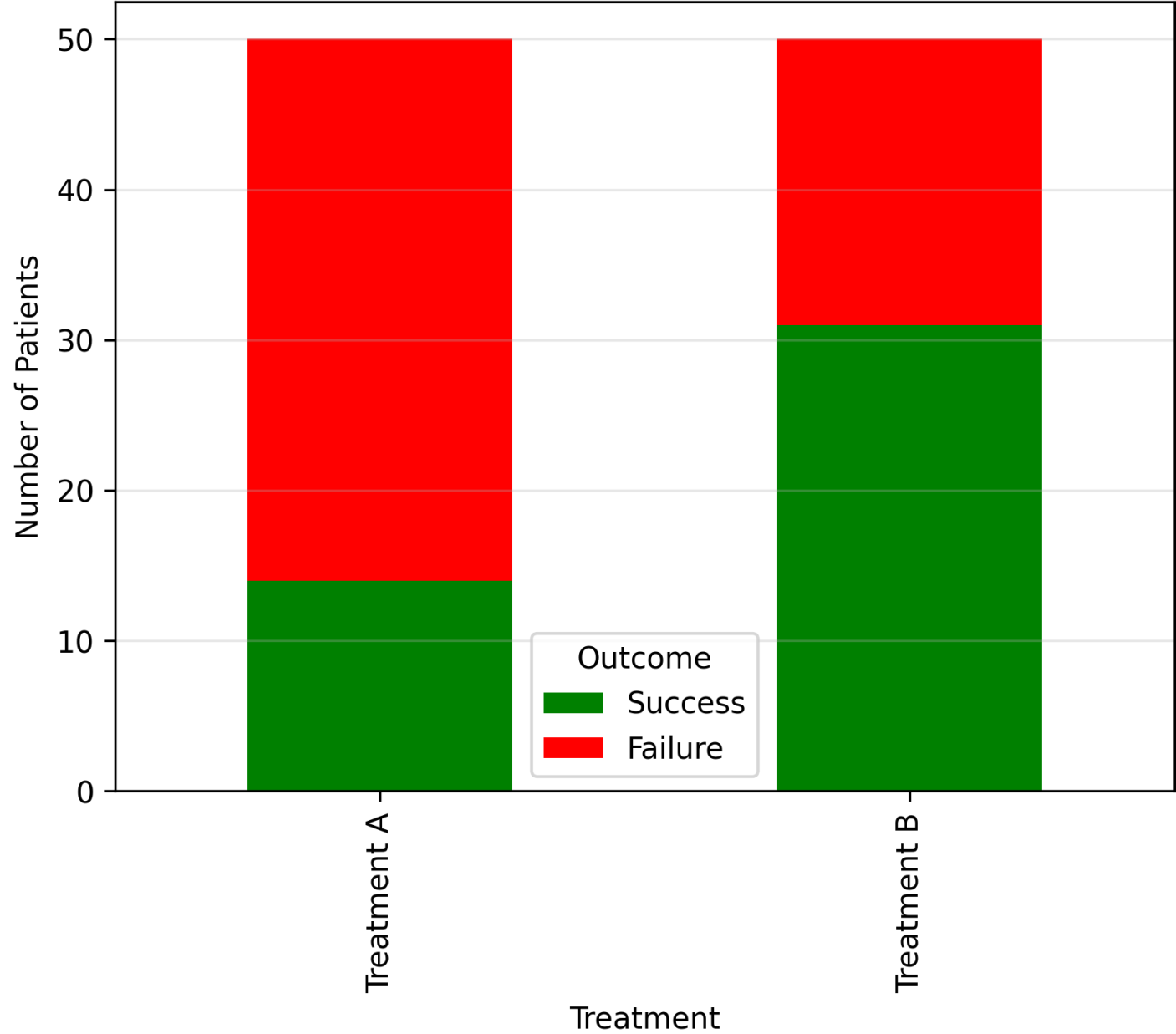
Data Description

The analysis includes data from 100 participants, divided into two groups: Treatment A (n=50) and Treatment B (n=50). The data represents success or failure outcomes after receiving different treatments.

	Success	Failure
Treatment A	14	36
Treatment B	31	19

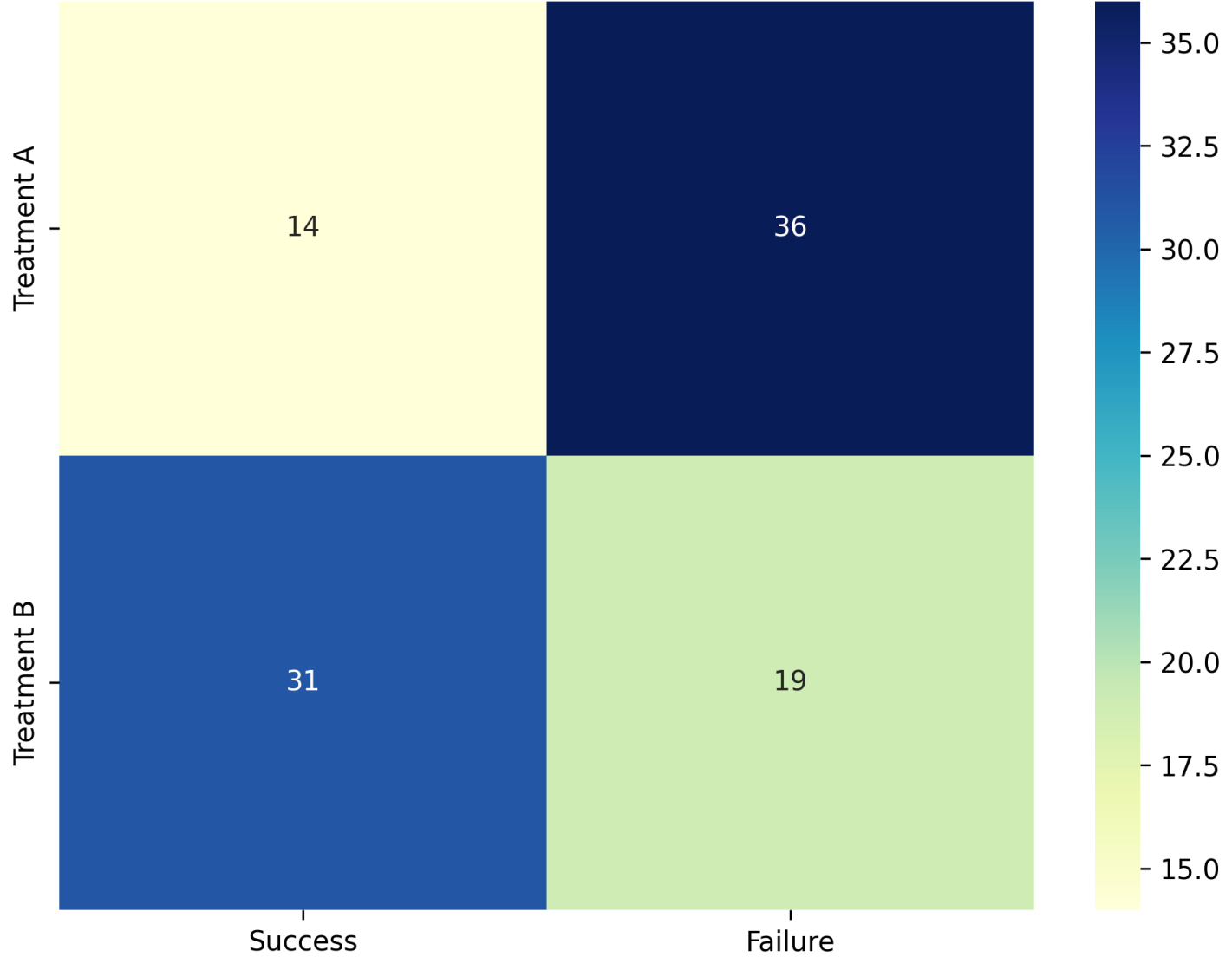## Treatment Outcomes

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Contingency Table Heatmap

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Test Results

Fisher's Exact Test was performed to compare the success rates between Treatment A and Treatment B. The results indicate a statistically significant association between treatment and outcome (p = 0.0012).
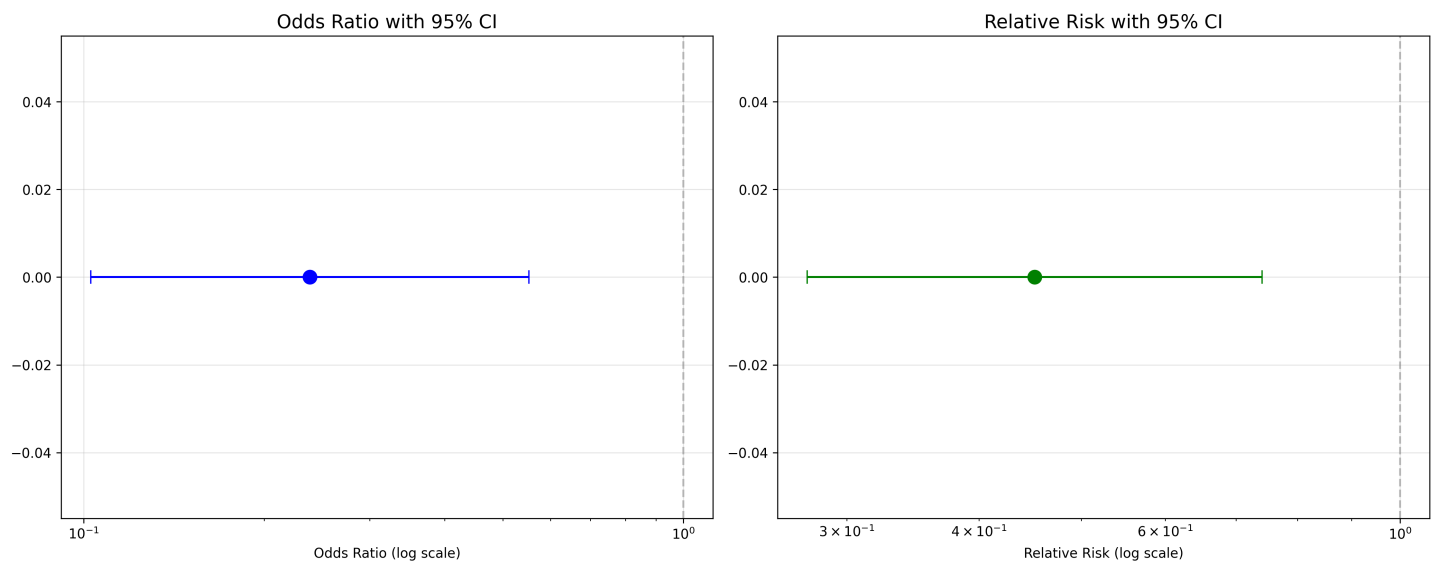
Effect Size

The effect size was calculated using the Phi coefficient, which is appropriate for 2x2 contingency tables. The effect size is medium (Phi = -0.3417). This indicates the strength of the association between treatment and outcome.

Odds Ratio and Relative Risk

The odds ratio (OR = 0.2384, 95% CI: [0.0896, 0.5221]) indicates the odds of success in Treatment A compared to Treatment B. A value greater than 1 suggests that Treatment A is associated with higher odds of success.

The relative risk (RR = 0.4516, 95% CI: [0.2754, 0.7406]) indicates the risk of success in Treatment A compared to Treatment B. A value greater than 1 suggests that Treatment A is associated with a higher risk of success.
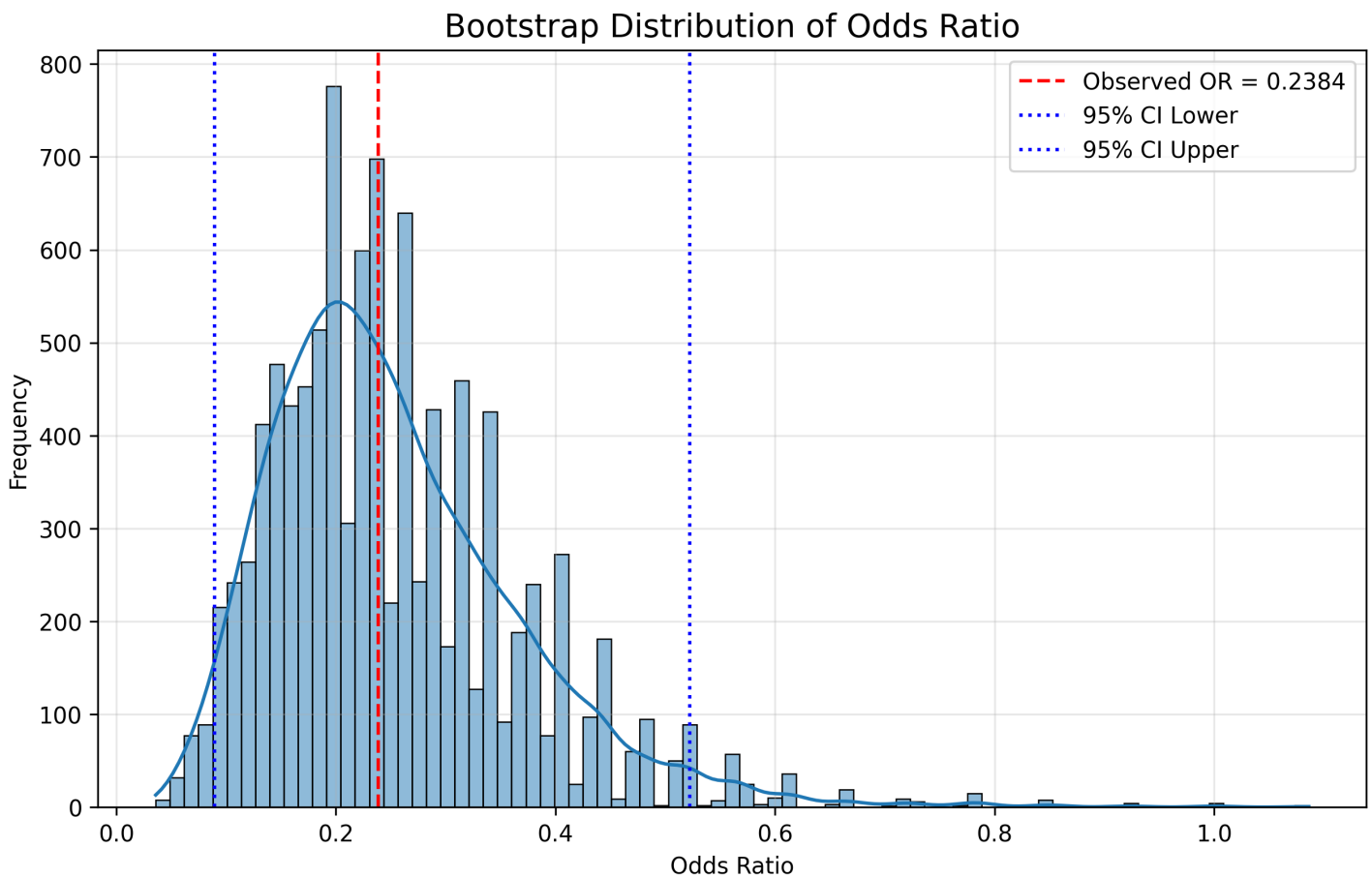
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Power Analysis

A power analysis was conducted to determine the sample size required to achieve 80% power with the observed effect size. The results indicate that 190 participants per group would be needed to achieve this level of power. With the current sample size (n=50 per group), the power is 0.2933.

Power Curve for Fisher's Exact Test
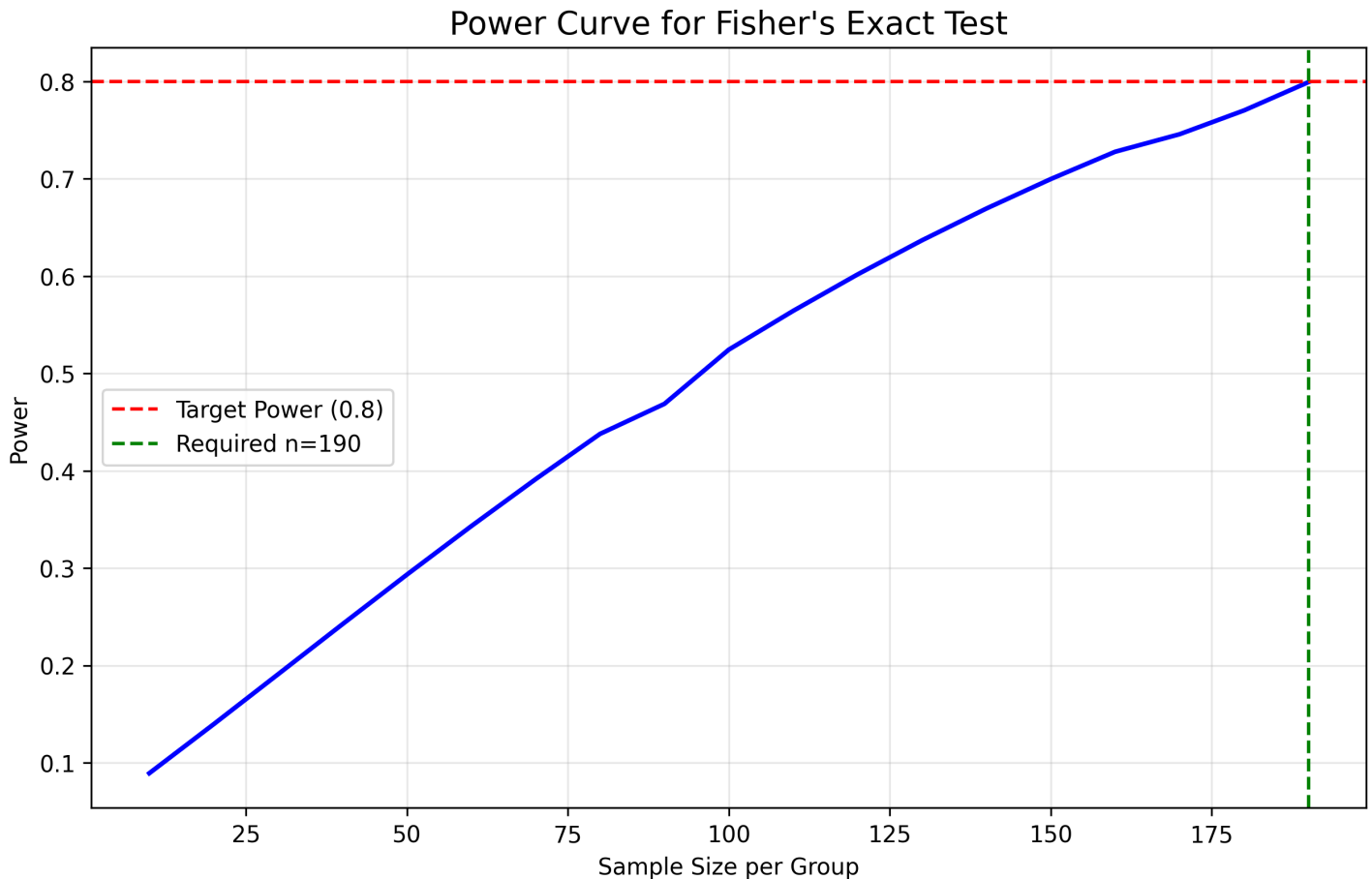
Bootstrap Analysis

A bootstrap analysis was conducted to estimate the confidence interval for the odds ratio. The results indicate that the 95% confidence interval for the odds ratio is [0.0896, 0.5221]. This provides a more robust estimate of the uncertainty in the odds ratio compared to the asymptotic confidence interval.

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Bootstrap Distribution of Odds Ratio

Conclusion

Based on Fisher's Exact Test, there is a statistically significant association between treatment and outcome (p = 0.0012).

The effect size is medium (Phi = -0.3417), indicating the strength of this association. The odds ratio (OR = 0.2384, 95% CI: [0.0896, 0.5221]) and relative risk (RR = 0.4516, 95% CI: [0.2754, 0.7406]) provide additional measures of the treatment effect.

To achieve 80% power with the observed effect size, 190 participants per group would be needed. The current study has 0.2933 power to detect the observed effect size.