

UNIVERSITY OF STRATHCLYDE
DEPARTMENT OF MATHEMATICS & STATISTICS

MM104: Statistics and Data Presentation Semester 2
MM107: Statistics and Data Presentation

PROJECT 3: HYPOTHESIS TESTS - T TESTS

Overview

In this project you will

1. Formulate a simple hypothesis.
2. Use Minitab to perform an appropriate two sample test.
3. Use your results to make conclusions regarding your hypothesis.
4. Use Word and PowerPoint for reports and presentations.
5. Further develop your presentation skills.

In particular, your group will concentrate on two variables, both of which are continuous and represent the results of a clinical trial. You will formulate a simple hypothesis concerning the relationship between your variables and undertake a two-sample t-test. You will then formulate conclusions from the output of this test.

The Data Set

The data-set consists of the results of 8 clinical trials. Each trial focuses on a disease or condition and the trial involves the comparison of two drugs, one of which is the drug of interest for which we want to investigate its performance. These are synthetic data based upon real studies.

Trial	Description	Variables
Sleep	Investigation into the performance of the drug Diazepam for insomnia.	Sleep_Other: Extra minutes sleep for patients given another sleeping pill Sleep_Diaz: Extra minutes sleep for patients given Diazepam.
Breast Cancer	Investigation into the performance of the drug Herceptin for breast cancer.	Breast_Cancer_Other: Survival time (months) for patients receiving another drug. Breast_Cancer_Hercep: Survival time (months) for patients receiving Herceptin.
Pain	Investigation into the performance of the drug Paracetamol for treatment of pain.	Pain_Herbal: Time in minutes until pain relief for patients receiving a herbal remedy Pain_Para: Time in minutes until pain relief for patients receiving Paracetamol.
Prostate Cancer	Investigation into the performance of the drug Enzalutamide for treatment of prostate cancer.	Prostate_Cancer_Placebo: Survival time (months) for patients receiving a placebo Prostate_Cancer_Enzal: Survival time (months) for patients receiving Enzalutamide
Melanoma	Investigation into the performance of the drug Vemurafenib for treatment of melanoma.	Melanoma_Placebo: Survival time (months) for patients receiving a placebo Melanoma_Vemur: Survival time (months) for patients receiving Vemurafenib

Each group will work with one of the treatment group data sets as shown below:

Group Number	Topics
1	Insomnia
2	Breast Cancer
3	Pain
4	Prostate Cancer
5	Melanoma

Tasks

For each clinical trial you are expected to at least:

- Conduct background research on the disease and treatments you have been assigned.
- Formulate a hypothesis. The aim is to determine whether or not the drug of interest performs better than the other drug, which may be a placebo. Think about how you would judge whether or not it performs better, in the context of the scenario and what you would expect the outcome to be. You should then write down your hypothesis about the relationship you would like to consider/investigate. You should state the null hypothesis (H_0) and the alternative hypothesis (H_1).

- Produce the appropriate graphs and descriptive statistics.
- Undertake the appropriate two sample test at the 5% significance level.
- Provide an estimate of the estimated treatment effect i.e. the difference of the means.
- If appropriate calculate the effect size and interpret the findings.
- Interpret your results in the context of the scenario.
- Test your assumptions of your test.

Report and Presentation

Your Word report should be at least 3 to 4 pages, and at least 750 words (excluding title page and references). Your report should have sections which correspond to the sections in your PowerPoint presentation as well as a references section. Your PowerPoint presentation should be 5-6 minutes.

Remember: the first or second page should contain a declaration section. This should list the names of all group members and sentence outlining each person's contribution to the project. Each person should sign this sheet electronically.

Tips

- Remember the importance of a group strategy for the week and allocate tasks.
- Everyone in your group will have different strengths and weaknesses; think about these when allocating tasks within your group.
- Make sure the content of your presentation is correct and make sure that everyone in your group reviews the presentation and report to check for typos.
- Make sure you save regularly and upload it to Myplace before the deadline.
- Start to experiment with PowerPoint a bit more so that your presentation and report look professional.
- Make sure you practise your presentation before recording it via Zoom.