

**Institute of Systems Science
National University of Singapore**

**GRADUATE CERTIFICATE
BUSINESS ANALYTICS PRACTICE**

Supplementary Workshop Guide

Subject: *NICF- Statistics Bootcamp (SF)*

Workshop for Day 2

Background

Dry eye is a common disease with great health burden and no satisfactory treatment. There was a clinical study that looked into the use of Traditional Chinese Medicine (TCM) as one of the possible ways to control and manage dry eye. The study had recruited 50 dry eye subjects. Before the start of the treatment, they were assessed on their conjunctival redness. Four weeks later, they were asked to visit the clinic and did another evaluation on their conjunctival redness.

Table 1: Conjunctival redness of the 100 subjects

No treatment (before)		Herb (after)	
2.372	1.264	1.477	0.875
1.957	0.330	1.323	1.322
1.997	2.074	0.967	0.909
2.087	1.618	1.349	0.985
1.815	0.905	1.270	0.789
1.403	1.951	1.076	1.014
0.847	1.395	0.712	0.954
1.632	0.882	0.858	0.871
0.514	0.501	0.919	0.569
1.501	1.351	0.866	1.242
1.782	0.835	1.274	0.861
0.989	0.856	1.140	1.190
1.358	0.463	1.138	1.720
1.392	0.970	1.091	1.106
1.520	1.671	0.599	0.858
1.282	1.261	1.210	0.826
1.431	2.029	0.948	1.208
1.379	0.801	0.934	0.954
0.672	1.028	1.020	0.123
1.565	1.396	1.633	1.520
1.438	1.576	0.737	0.816
1.043	1.300	0.750	0.608
0.932	0.245	0.996	0.768
2.216	0.836	0.962	1.256
1.192	1.303	1.107	1.092

Task

The purpose of the study was to evaluate the effectiveness of the TCM herb treatment.

- a. Read in the data from the csv file.
- b. Use ggplot to draw boxplot on the conjunctival redness before herb treatment.
- c. Use ggplot to draw boxplot on the conjunctival redness after herb treatment.
- d. Check the normality of the notreat sample.
- e. Check the normality of the herb sample.
- f. Check the normality of the difference between notreat and herb sample.
- g. [Optional] Perform the correct t -test to determine if there was a significant change in conjunctival redness after herb treatment