Class 1: Basics and experimental design

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Learning outcomes

- Know how to create an interpret a two-sample t-test
- Understand what a p-value means
- Be able to perform a simple sample size calculation
- Understand the basics of experimental design

Intro slide

Syllabus/timetable for the day

General goal: be able to create a statistical model of a biomarker panel and check that it is robust

Basics of data: continuous vs discrete, ordinal vs interval vs nominal

Two examples: prostate cancer (regression)

South African Heart Rate data (classification)

Testing differences between groups; the two-sample t-test

Sampling distributions of data

Null and alternative hypotheses

Drawing pictures

Getting and understanding the p-value

What the p-value is not

Introduction to sample size calculations

Type 1 and Type 2 error

Drawing pictures

The magic formula

Getting the values to put in to the formula

Possible extensions

Design of Experiments

The golden rule of designing an experiment

Blocking

Randomisation

Replication

More complicated experiments