QIMR Berghofer
Medical Research Institute

Choosing the right statistical method

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- **What is the purpose of the statistical analysis?**
  - Research question
  - Reference population
  - Variables and their type
  - Study design
- **Which statistical methods are you competent to handle?**
  - Understand enough of the statistical theory
  - Able to access and use a statistical package to do the analysis
  - Able to interpret and use the findings
  - Understand the limitations or restrictions of the analysis
- **Alternatively have good communication with a statistician**

Statistical analyses

- **Can I believe these numbers**?
  - Data checking and validation
  - Summary and univariate analyses
  - Does interpretation make sense

- Is your data independent or matched?

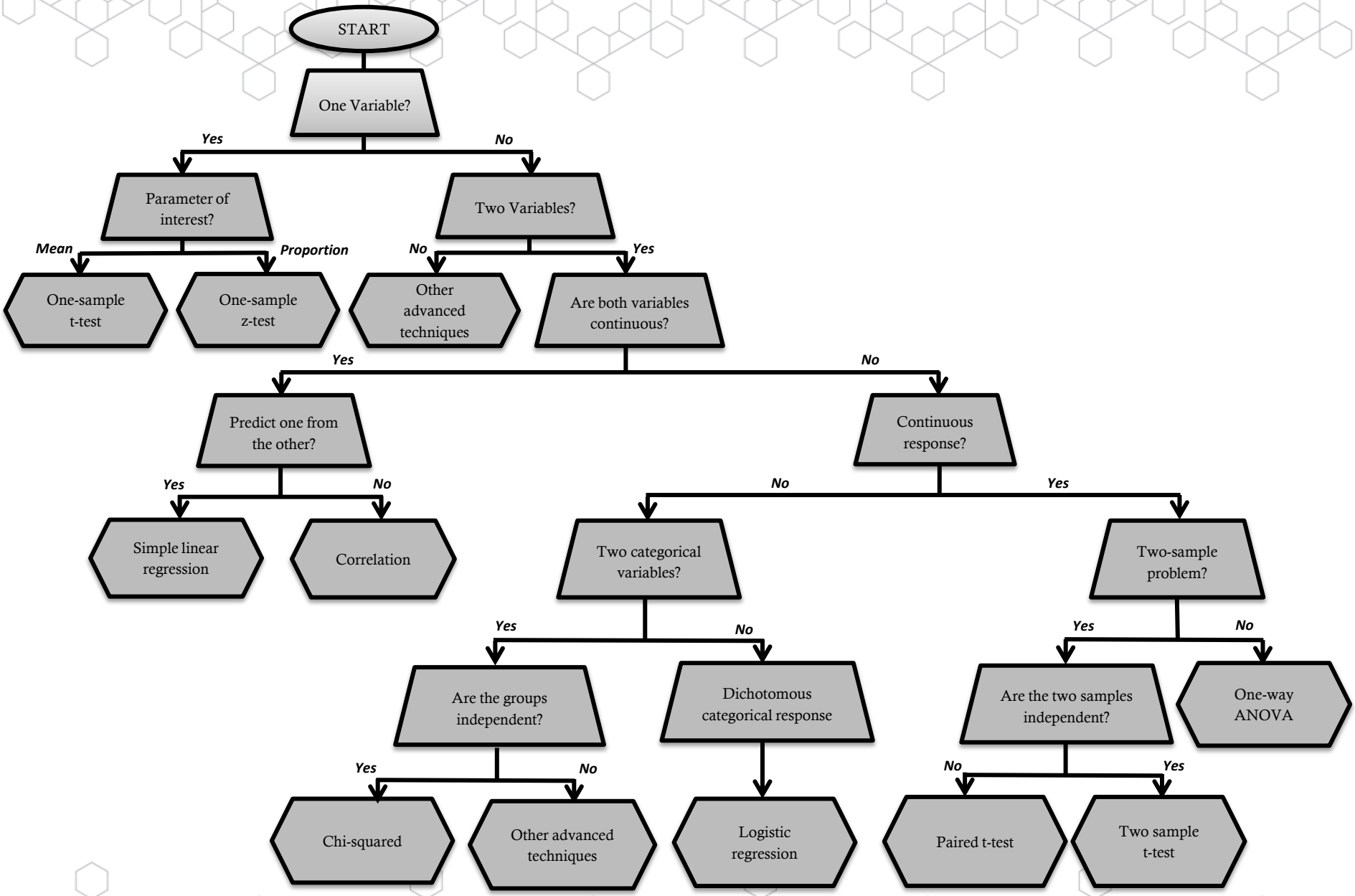
- **Appropriate analysis** is specific for the study purpose, design, experimental unit and outcome variable

Statistical analysis

- **If outcome is continuous e.g.**
  - t-test
  - Multiple regression
  - Analysis of variance (GLM)
  - Non-parametric equivalents
- **If outcome is binary (special case of categorical) e.g.**
  - Chi-squared tests of association
  - Logistic regression
- **If outcome is time to event e.g.**
  - Survival analysis

Parametric Tests

- **Assume data is drawn from a normally distributed population**
  - NB: this is different to saying that the observed *sample* has a normal distribution
- **Sometimes make the assumption of homogeneity of variance**
- **More powerful**



Parametric vs. Non-parametric Test Examples

Parametric Test	Equivalent Non Parametric Test
One-sample t-test	Sign Test
Two-sample t-test (assuming equal or unequal variance)	Mann-Whitney U test*/Wilcoxon two-sample test* Median test Kolmogorov-Smirnov test
Paired t-test	Wilcoxon signed-rank test
One-way ANOVA	Kruskal-Wallis
Two-way ANOVA	Friedman's test
Cox proportional hazards model	Log rank test (using Kaplan Meier Statistic)
Pearson's correlation	Spearman's correlation
Linear regression	Spline models

*** semi-parametric test as it assumes equal variance between groups**

How to contact the Statistics Unit

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