Selecting the Appropriate Trial Design

Nikki Totton[1], Prof Steven Julious[1], Prof Dyfrig Hughes[2], Associate Prof Jonathan Cook[3], Katie Biggs[1], Dr Lizzie Coates[1], Dr Andrew Cook[4], Prof Catherine Hewitt[5] and Dr Simon Day[6]

Background

Randomised Controlled Trials (RCTs) can be designed on a Superiority, Equivalence or Non-Inferiority basis

- Superiority: new treatment better than comparator
- Equivalence: new treatment the same as the comparator
- Non-inferiority: new treatment is no worse than the comparator

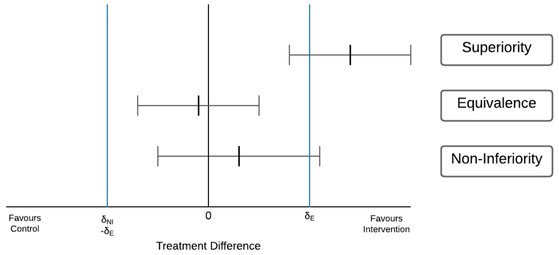


Figure 1: Graphical demonstration of superiority, equivalence and non-inferiority results

Aim

Define when each of the trial designs (superiority, equivalence and non-inferiority) are appropriate to use in practice

Methods

A workshop was completed with fifteen experts using the Nominal Group Technique to gain consensus

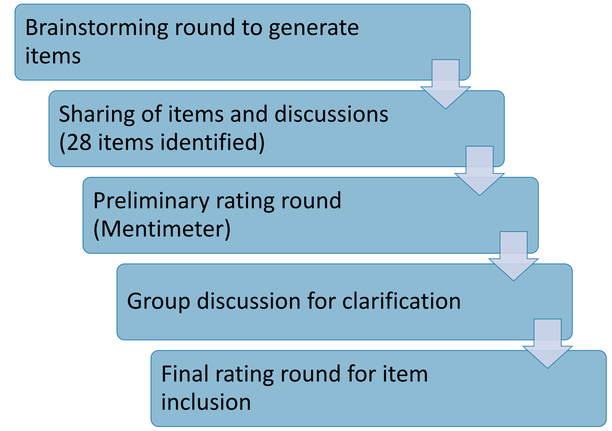
1. ScHARR, University of Sheffield, 2. CHEME, Bangor University, 3. NDORMS, University of Oxford, 4. University of Southampton, 5. University of York, 6. Clinical Trials Consulting & Training Limited

Superiority, Equivalence or Non-Inferiority?

Trial Design Consideration	Superiority	Equivalence / Non-inferiority
1 POPULATION		
High disease burden		✓
All sub-populations of interest on a superiority basis	✓	
2 INTERVENTION		
Intervention similar to comparator		✓
3 COMPARATOR		
Comparator is placebo or no treatment	✓	
Comparator less effective than current practice	✓	
Good quality evidence of comparator over placebo		✓
4 OUTCOMES		
Highest priority outcome is not expected to be improved		✓
Multiple outcomes key to treatment decision making		✓
Superiority outcomes are secondary outcomes		✓
Higher costs expected for the intervention	✓	
Intervention similar to the comparator		✓
Positive incremental net benefits expected	✓	
5 FEASIBILITY		
Larger sample sizes are feasible		✓
Value of additional information is good value for money		✓
6 PERSPECTIVES		
Ethical to observe a reduction on the primary outcome		✓
Improvement on primary outcome required to make the treatment attractive	✓	
Potential negative impact on another sector	✓	

Methods

Nominal group technique methodology



Results

A 19-item checklist was created (see table left) which was grouped into six areas. This builds on the widely used PICO framework within clinical trial design.

Further elaboration for each of the considerations as well as examples for each trial design were created to support the applicability of the checklist.

Conclusion

This checklist hopes to assist researchers to select the most appropriate trial design when they are designing their research.

Full publication out soon
Scan to follow updates on the project

The University Of Sheffield.

MRC Medical Research Council