Theme 4: Best practice in the design, analysis and reporting of trials

Randomised controlled trials (RCTs) are the gold standard for comparing healthcare interventions, however they require sound design, analysis, and reporting to ensure their results are accurate and robust. The PCTU is involved in a variety of research projects focussing on improving the design, analysis, and reporting of RCTs.

Specific topics of our work include:

Adjustment for covariates
Adjusting for prognostic covariates in the analysis of RCTs can be beneficial, as it can increase statistical power and precision. Our work has focussed on determining when and how to do this. We have examined whether we need to adjust for stratification or minimisation factors (i.e. variables used to balance treatment groups during randomisation) in the analysis. We have also looked at the best way of adjusting for covariates in the analysis, focussing primarily on how to adjust for centre or site in multicentre trials, and how to adjust for continuous covariates.

Outcome measures
Choosing an appropriate outcome measure and ensuring it is measured or assessed in a valid way is an essential part of designing RCTs. An inappropriate outcome measure (e.g. something that is not relevant to patients) may mean RCT results are not useful. Poor measurement or assessment of outcomes may introduce bias to the trial results. Our work has focussed on choosing appropriate primary outcome measures, as well as how to reduce bias in the assessment of the outcome in open-label (unblinded) trials where blinded outcome assessment is not feasible.

Reporting
Accurate reporting is essential in RCTs so that others are able understand the trial’s design, conduct, analysis, which allows them to assess the validity of the trial results. Incomplete or inaccurate reporting can hinder this process. We have developed reporting standards and guidelines for embedded recruitment trials (studies within a trial which compare different methods of patient recruitment) and for implementation studies of complex interventions. We have also assessed the reporting quality surrounding outcome assessment, method of randomisation, the analysis of RCTs using stratified randomisation, and the analysis of multicentre RCTs.
References to our published papers include:


Kahan BC, Harhay MO. Many multicenter trials had few events per center, requiring analysis via random-effects models or GEEs. Journal of clinical epidemiology. 2015.


