Multiple Endpoints in Neurological Studies

Eric A. Macklin, PhD
MGH Biostatistics Center
19 Nov 2014
The Problem

- Often more than one feature or outcome of a disease is of interest
  - Motor function and cognitive capacity in PD
  - ALSFRS-R progression and death in ALS
- How do we combine information on the effect of treatment on all of them?
- What if observing one outcome prevents observation of another outcome?
The Problem

• Combining information across outcomes is a dimension reduction problem: reducing n dimensions to one

• With non-censoring outcomes, the issue is to choose a summary measure that weights each outcome appropriately
  - F-statistics for comparing two active arms vs. placebo
  - Strength mega-scores summed over muscle groups in ALS

• With censoring outcomes, we need to weight outcomes appropriately plus we need to overcome the loss of information from censoring
  - Easier when there is a hierarchy of outcomes
  - More difficult when all outcomes are equally important
Solutions

• Ritesh Ramchandri
  Biostatistics PhD student at HSPH
  *Combining Endpoints Using a Global Rank Test*

• Rebecca Betensky, PhD
  Prof. of Biostatistics, HSPH
  *Power and Sample Size Calculations for the Wilcoxon-Mann-Whitney Test in the Presence of Missing Observations due to Death*