

# Efficient treatment allocation in 2x2 cluster randomized and multicentre trials

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Propositions belonging to the thesis

## **Efficient treatment allocation in 2x2 Cluster Randomized and Multicentre Trials**

Francesca Lemme, November 2015

1. A balanced design is highly efficient for a range of research questions under homogeneity of outcome variance and costs (this thesis).
2. For Cluster Randomized Trials with a balanced  $2 \times 2$  design, the loss of efficiency due to heterogeneity of variance is compensated by adding one or two clusters per treatment condition (this thesis).
3. Balanced designs are commonly planned, but are generally suboptimal under heterogeneous variance and/or heterogeneous costs (this thesis).
4. If costs per cluster or per individual are heterogeneous across treatments, then a design optimal for heterogeneous costs and homogeneous outcome variances is generally more efficient than a balanced design (this thesis).
5. Being a statistician means never to say you are certain.
6. If you can't refer, then infer!
7. Statistics is the science of decision-making in the presence of uncertainty (Kapur and Saxena, *Mathematical Statistics*, 1960, page 690).
8. In light of the ever-rising costs of scientific studies, optimal designs which take into account both power and research costs, are beneficial both to society and to science.
9. "*Even kijken*" is the most popular expression in the Netherlands.
10. The design of a PhD project is a two-level design, where the upper level (supervisors) to the lower level (student) cost and variance ratio are both much higher than 1.
11. You can't stop the waves, but you can learn to surf (Jon Kabat-Zinn, *Wherever you go, there you are*; Hachette Books, 1994).