Post-doctoral researcher position (18 months)

Description of the position:

The INSERM SPHERE Unit U1246 is part of both the Universities of Tours and Nantes and aims to contribute to high-quality research in methods on patient-centered outcomes and health research. We are looking for a motivated scientific staff member to join our team and engage in our research project QUARTET.

Summary of the project:

Cluster randomised trials are trials in which intact social units, such as hospitals, medical practices or communities, are randomized to intervention or control conditions while outcomes are then assessed on individuals within such clusters. The use of cluster randomised trials to evaluate clinical and public health interventions has been rising in recent years.

In cluster randomised trials, outcomes assessed on individuals from a given cluster are correlated. This clustering has to be taken into account at the planning stage, leading to an increased sample size (number of individuals included in the trial) to reach the same power as a comparable individually randomized trial. Analysis methods of a cluster randomised trial must also account for the correlated nature of the outcomes within clusters. This can be done by using either mixed-effects models, in which clusters are treated as random effects, or marginal models estimated with generalized estimating equations (GEEs). When reporting the results of a cluster randomised trial, a measure of intracluster correlation should be reported, usually the intracluster correlation coefficient.

Most of the developments to quantify and account for clustering in the analysis of cluster randomised trials have considered continuous or binary outcomes. Conversely, limited methods and recommendations are available for time-to-event (TTE) outcomes, which measure the time from the beginning of an observation period to an event of interest. In practice, TTE outcomes in cluster randomised trials are often inappropriately analysed, by treating them either as clustered binary outcomes or as TTE outcomes but ignoring correlation. The performance of existing analysis methods for correlated TTE outcomes has not been compared in the context of cluster randomised trials and the intracluster correlation coefficient (or any other measure of intracluster correlation) for TTE outcomes has not been clearly defined.

The main objective of the present project is to identify appropriate methods of estimating the degree of clustering for TTE outcomes in cluster randomised trials.

First, a review of existing clustering measures for TTE outcomes will be completed.

Second, where gaps are identified, we will develop or extend methods appropriate for cluster randomised trials. Existing and novel methods will be compared by simulation. This part of the project will consist of both theoretical work to develop/extend new methods as well as computer simulation to evaluate methods.

Finally, real data from three cluster randomised trials (for which we already have the agreement from the scientific coordinators) will be used to illustrate our findings.

Ease of use and interpretation of the selected measures are important. Recommended methods will be implemented in user-friendly R packages to be available to the wider scientific community.

At the end, this project will provide practical guidelines for measure of clustering for TTE outcomes in cluster randomised trials.

Related references:

1. Kalia S, Klar N, Donner A. On the estimation of intracluster correlation for time-to-event outcomes in cluster randomized trials. Stat Med. 30 déc 2016;35(30):5551-60.
2. Romdhani H, Lakhal-Chaieb L, Rivest LP. An exchangeable Kendall's tau for clustered data. Can J Stat Rev Can Stat. 2014;42(3):384-403.
3. Xie T, Waksman J. Design and sample size estimation in clinical trials with clustered survival times as the primary endpoint. Stat Med. 30 sept 2003;22(18):2835-46.
4. Li J, Jung SH. Sample size calculation for cluster randomization trials with a time-to-event endpoint. Stat Med. 2020;39(25):3608-23.

Your tasks:

The post-doctoral researcher will work specifically on measures of clustering for time-to-event outcomes in cluster randomised trials. This will include analytical developments and simulations.

The position can also include teaching activity and a master's thesis supervision, according to the applicant profile and wish.

The position will be based in the office space of the SPHERE unit in the teaching hospital of Tours. The applicant will have his/her own office with an adequately powered computer.

The position will be open until filled. In order to receive full consideration, applications should be submitted by **January 1st, 2023**. The starting date is flexible, but no later than early 2023.

The team will be composed by the two biostatisticians from the INSERM SPHERE Unit (Dr Agnès Caille and Dr Elsa Tavernier) and a mathematician from Institut Denis Poisson, University of Tours (Pr Hermine Biermé)

Requirements:

Please be sure to highlight your strengths pertaining to the following elements to help us in accurately evaluating your application.

Searched project-specific elements:

- Completion of a PhD in a relevant discipline (e.g. biostatistics, medical statistics, mathematics, bioinformatics).
- Knowledge in the methodology and the statistical analysis of randomised controlled trials.
- Advanced programming skills in the statistical software program R/RStudio.
- Strong knowledge in written and spoken English.
- Demonstrated experience in statistical methods for cluster randomised trials or any other situation with correlated data.
- Demonstrated experience in survival analysis.

Further desirable elements:

- Scientific writing skills as demonstrated by prior research publication.
- Experience in simulation studies.

How to apply:

Please send all application documents (cover letter, curriculum vitae, etc.) to agnes.caille@univ-tours.fr

Do not hesitate to ask content related questions to
Dr Agnès Caille agnes.caille@univ-tours.fr