Post-doctoral position

Statistical analysis and modeling of the SARS-Cov2 patient care pathway

Period 12 months	**Location** Sorbonne Université Campus Jussieu
Gross Monthly Salary 2 589.68 €, if less than 2 years' experience, with bonus if more than 2 years' experience	**Contact** Olivier Lopez, Anna Bonnet, Charlotte Dion, Maud Thomas olivier.lopez@sorbonne-universite.fr anna.bonnet@sorbonne-universite.fr charlotte.dion@sorbonne-universite.fr maud.thomas@sorbonne-universite.fr

This post-doctoral position is part of a collaboration between the Laboratoire de Probabilités Statistique et Modélisation (LPSM, UMR CNRS 8001) and the Institut Pierre Louis d'Épidémiologie et de Santé Publique (iPLESP, UMR S 1136), Sorbonne Université. The recruited person will be assigned to the ``Statistique, Données, Algorithmes'' team of the LPSM, in regular liaison with the ``Maladies transmissibles : Surveillance et modélisation'' team of iPLESP.

Context

COVID-19 is an emerging disease due to the SARS-CoV-2 virus. Genomic analyses of suspected infected patients indicate that this virus probably emerged in the last months of 2019 in China. Models for the spread of the disease and its health impact were at the origin of the public health decisions that led, for example, to the lockdown on 17 March 2020 in France. One of the key arguments was the likely impact on the healthcare system, with a very high demand for intensive care beds. The decisions essential to the management of the pandemic are based on the ability to identify the signs of a decrease in the number of cases and to anticipate sufficient patient capacity, taking into account the likely evolution of their condition. The response strategy therefore requires accurate modeling of the evolution of the burden on the healthcare system.

The recruited person will have the task of studying and developing statistical methods in order to model individual patient follow-up data, particularly during hospital treatment. The aim is to model the temporal evolution of the patient within the care pathway, in order to improve the vision of flows and to plan the most appropriate pathology management. The data used comes from the AP-HP's Entrepôt Des Données de Santé (EDS). Currently, more than 4,000 hospitalized patients have been described individually, with a succession of entry and discharge dates in the functional treatment units. Demographic and additional clinical data are available through chaining in the EDS, potentially allowing the impact of patient characteristics on prognosis and length of hospitalization to be refined.

Objectives

- develop models to consider the pathway of COVID-19 patients through the care system (and their time spent in each state) by arriving at a robust estimation of their parameters;
- develop classification methods in order to group certain patient care pathways in a relevant way;
- investigate the joint impact of the chosen estimation methods and the modeling choices on the analyses and predictions produced by compartmentalized and individual-based models;
- study the correspondence between the assumptions implemented in individual-based models and mean-field approximations;
- construct indicators of the reliability of analyses and predictions taking into account the quality of the data and the accuracy of the statistical methods used.

Applications

Candidate profile

- PhD in Applied mathematics (statistics) or Epidemiology
- Strong knowledge of statistical methods in data analysis
- Good programming skills in R or Python
- Knowledge of epidemiology/biostatistics is not mandatory but will be appreciated.

Application procedure

Please send your CV with a list of publications and a short cover letter to the contact person.