

Inserm Chair

Supporting institution/organization: Inserm

Name of the head of the institution/organization: Didier Samuel

Academic region : Ile de France (Paris Area)

Partner institutions/organizations: *Sorbonne University*

Research Unit: Institut Pierre Louis d'Epidémiologie et de Santé Publique (IPLESP) UMRS-1136.

Project title: Causal Inference in Public Health using large Observational health Databases (CIPHOD)

Keywords: Public health, causal inference, big data, statistical learning, epidemiology

Duration: 36 months

Scientific domain: Public health

CNU/CSS: 4604/CSS6

Institution strategy:

Inserm, the French National Institute of Health and Medical Research, has chosen to open an Inserm Chair position at the Pierre Louis Institute of Epidemiology and Public Health (IPLESP) - Sorbonne University and Inserm, as it is one of the major players in public health research in France. Sorbonne University, a world-class research university, covers the full range of disciplines in the arts, humanities, social sciences, natural sciences, engineering and medicine. It stands at the crossroads of diverse disciplines and is committed to meeting the intellectual and scientific challenges of the 21st century. Its strategic plan emphasises the internationalisation of the institution and the positioning of Sorbonne University as a strategic player where research, teaching and innovation are combined and structured to support each other. In this respect, in the public health-epidemiology and biostatistics discipline, causal inference appears to be an essential emerging scientific theme in which the university wishes to become a leading player by strengthening existing competences and setting up a dedicated group. Indeed, causal inference using observational data is expected to have a major impact in the field of medicine. The recruitment of a senior researcher in this promising field of public health is in line with the university's objectives in consolidating the university's role in a competitive and engaging scientific field, and in promoting the research, education and innovation activities that are central to the university's mission. It is also very much in line with Inserm's strategy in the field of public health, given the increasing role of causal inference in epidemiology and clinical research.

Host laboratory strategy:

The Pierre Louis Institute of Epidemiology and Public Health (IPLESP), co-accredited by Inserm and Sorbonne University, brings together all the research strengths in epidemiology and public health within Sorbonne University. The IPLESP's overall common objective is to produce original knowledge on the most pressing public health issues and on the effectiveness of related interventions, particularly in the field of emerging infectious diseases, chronic diseases, environmental and mental health. The Institute covers the main domains of epidemiology, whether clinical, populational or social, as well as pharmacoepidemiology, biostatistics, statistical and mathematical modelling, clinical research, social determinants of health. Our most prominent specificities are to use innovative design and analytical methods to ensure the highest level of evidence for our findings and our capacity to integrate and exploit a huge amount of data from various sources. In this respect, counterfactual methods of causal inference to analyze observational data (ad hoc studies or secondary use of healthcare database) is at the heart of our research activities. This emerging topic is the subject of very dynamic and active research at the international level. IPLESP aims at recruiting a high-level researcher in this field who can strengthen, coordinate and structure the research activities in causal inference in the different teams. This chair is fully in line with the strategy of the IPLESP, whose challenge is to set up a group capable of developing its own methodological research in this innovative scientific field while interacting with the other teams of the Institute to provide the necessary expertise.

Summary of the scientific project:

The project will mostly be centered on evaluating and developing innovative statistical approaches in causal inference for identifying exposure causal effect including treatment effect on health outcomes from observational data. The increasing availability of health data (i.e. medico-administrative data, electronic medical records, large cohort studies) opens up the possibility of evaluating treatments, strategies of care and biomarkers in real life for many pathologies, particularly in infectious diseases, chronic diseases and mental health. In this context, the development of causal inference methods makes it possible to evaluate the effect of exposure factors from observational data in a rigorous, robust and reproducible manner. Emulating target clinical trials from observational health data, integrating interventional research results with real-life data analysis to evaluate the effectiveness of treatments are research objectives made possible by causal inference. The Chairholder will use her/his expertise to develop causal methods and analyze data to identify the best strategies for the treatment and prevention of infectious and non-infectious diseases. Among others, the comparison of various alternative models to link drug exposure in terms of cumulative duration/dose to a beneficial or adverse effect, the emulation of a target trial from using data from the French national health insurance database (SNDS) or electronic medical records (Health data warehouse from Assistance Publique-Hôpitaux de Paris), the estimation of the causal effect of a biomarker on the prognosis of subjects in a large cohort study, are topics that could be studied.

Summary of the teaching project:

IPLESP is strongly committed to academic and professional training and coordinates the doctoral school of public health, the master's degree in public health and other training courses in epidemiology and biostatistics at Sorbonne University.

Thanks to her or his skills in causal inference methods, epidemiology, biostatistics, the Chairholder will be able to develop or coordinate teaching units or courses on causal methods, in particular in the "statistics, modelling and health data sciences (SMSDS)" and the "Clinical Epidemiology and Pharmacoepidemiology (ECLIPE)" courses of the Master of public health. She/he will animate and lead an annual workshop for PhD students affiliated to the Public Health doctoral school (ED 393) on the use and implementation of causal methods. She/he will be involved in other courses on causal inference at Sorbonne University. She/he will be supervising Master degrees and PhD students. The Chairholder will be encouraged to submit a proposal for a PhD to ED393, which will be open to application for a PhD contract at Sorbonne University

Budget summary:

Total funded on JPC (including ANR package)	200 000€
Co-financing	
Welcome package Faculty of Medicine – Sorbonne Université	10 000€
- Doctoral fellowship	
- Research Unit endowment	33 000
Total	243 000€

Scientific dissemination:

The Chairholder will publish her or his major results in the best peer-reviewed journals and through presentations at national and international scientific meetings.

Open science:

This project is fully in line with the open science approach promoted by Inserm and Sorbonne University. All accepted articles will be published on open archives (Hal), all computer codes of the developed methods will be accessible on a free software hosting and management service (github). The data will also be published where appropriate, in compliance with French regulations and the GDPR.

Science and society:

The ultimate products of IPLESP are not only peer-reviewed scientific papers, but also to produce relevant information to guide changes in clinical practice and healthcare organisations and to advise public health and policy makers, patient organisations and the general public. In this context and depending on the subject, the original results obtained thanks to the methods developed by the Chairholder may be communicated to the general public or to patient associations through the mainstream media.

Indicators:

- number of papers published in peer-reviewed journals

- number of research contracts obtained in national, European and international calls for tender
- number of students supervised in Master, thesis or other postgraduate courses