# Development of Bayesian and Formal Demography approaches to unveil historical fertility patterns using online genealogical data

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## Short Abstract

The proliferation of non-traditional data sources for population studies has paved the way for the development of advanced methods rooted in Formal Demography and Statistics. This study proposes a Bayesian hierarchical model and a new series of indicators to investigate fertility trends in Europe and the United States of America (1751-1900) leveraging data from a big genealogical database. These methods allow the estimation of period total fertility rates (TFR) using minimal data (women aged 15-49 and children under age 5), while incorporating information about child mortality and sample under-enumeration. To access the accuracy, we compare the genealogy-based TFR estimates with ground-truth rates from reliable sources such as the Human Fertility Collection. Preliminary findings highlight that the inclusion of prior information on child mortality and sample under-reporting significantly enhances the accuracy of the proposed estimates, enabling the investigation of fertility patterns in regions and historical periods lacking ground-truth demographic data.