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PIANO NAZIONALE DI RIPRESA E RESILIENZA (PNRR)

Missione 4 "Istruzione e Ricerca" - Componente C2

Investimento 1.1, "Fondo per il Programma Nazionale di Ricerca e Progetti di Rilevante Interesse Nazionale (PRIN)"

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Titolo del progetto

Do air pollution, social, environmental, and comorbidity variables, jointly affect the risk of SARS-CoV-2 infection and of severity of COVID-19 clinical manifestation? Collecting and processing multiple heterogeneous data over a distributed "data lake" platform for advanced modelling

ID progetto: 2022NAA7R3

Codice CUP

Master CUP: **J53C24003360006**

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Soggetti attuatori

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Obiettivo principale dell'operazione

COVID-19 pandemic is a public health emergency worldwide, yet among different geographical areas it shows remarkable differences in incidence rate of infection, and of morbidity and death. In Italy the highest rate of SARS-COV-2 infection and of severe COVID-19 disease and deaths were observed in those regions with highest level of industrialization, and where transportation is higher. Since in those regions degree of industrialization and traffic is largely mirrored by level of air pollution, it has been hypothesized that pollution may contribute to the spread and/or the severity of COVID-19.

Recent studies have investigated this issue. However, they were mostly based on analyses simply comparing pollution data and COVID metrics. This approach is not satisfactory, as it ignores a variety of components that may influence rates of SARS-COV-2 diffusion and infection at the same time, severity of COVID-19 disease and deaths are also influenced by many variables.

To be accurate this approach requires a high spatial resolution that only can be achieved through advanced geolocalization techniques. Putting together solid information about these various issues could provide substantial information about the epidemiology of the pandemic. It might also inform potentially relevant choices of public health and social organization.

The ambitious task of putting together large sets of diverse data from multiple sources (pollutant concentrations, COVID-related metrics, social, demographics, health-related parameters), to be investigated at a very detailed geographical level, requires a strong, concerted effort that leverages different skills and requires high-power computer capability.

To this end, our project is designed to provide strong synergy between solid epidemiological and medical knowledge and powerful computational skills to deal with heterogeneous and complex data sets, and to model them accordingly. The research Units of this proposal have a proven track record in these various items.