

Impact of Mitigation Policies and socioeconomic deprivation on SARS-CoV-2 incidence in Italian provinces.

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Introduction

It is well known that socioeconomic position is positively associated with health outcomes ¹⁻⁴. Since the beginning of the COVID-19 pandemic, media claimed about the egalitarian spread of the virus but, despite the optimistic views, it has been shown how the pandemic exacerbated pre-existent socioeconomic inequalities regarding finances and basic needs⁵, as well as the spread of the virus itself^{6,7}. Some evidence from the Italian context is present, but analyses are restricted to the first outbreak^{8,9}. Since November 2020, when facing the second outbreak, Italy implemented a three-tier restriction system based on different levels of risk at the regional level (NUTS-2). This system differentiates the restrictions among regions and has been shown to systematically reduce mobility when higher tiers are implemented¹⁰.

Our main goal is to estimate the impact of mitigation policies on SARS-CoV-2 weekly incidence in Italian provinces (NUTS-3) characterized by different levels of socioeconomic position, analyzing data from 24th February 2020 to 19th September 2021. This work could bring further knowledge on health inequalities and how heterogeneity in area-level socioeconomic position could affect the evolution of present and future pandemics.

Data and methods

This study uses data from different sources. The weekly incidence of SARS-CoV-2 positive cases by Italian provinces is calculated from the daily cumulative number of positive cases supplied by the Italian Civil Protection Department (<https://github.com/pcm-dpc/COVID-19>). Socioeconomic position at the province level is measured using the percentage of individuals whose income from 2019 was less than 10,000€. This data comes at the municipality level from the Ministry of Economy and Finance and is grouped at the province level (<https://www.finanze.gov.it/opencms/it/>). The data on mobility are gathered from Google (<https://www.google.com/covid19/mobility/>), while population density and rural/non-rural classification are obtained from the Italian National Institute of Statistics (<https://www.istat.it/it/archivio/156224>).

We will run two different sets of analyses depending on time. The first analysis will focus on the first outbreak while the second analysis will estimate the effects of the three-tier restriction system. Interrupted time series model will be implemented for the first analysis and Negative Binomial regressions with random effects (cluster = province) will be implemented for the second. In both analyses the weekly incidence of SARS-CoV-2 positive cases will be considered as the dependent variable, the socioeconomic position as the independent variable and the others will be treated as covariates.

Preliminary Results and Expected Findings

Figure 1 shows the weekly trend of SARS-CoV-2 positive cases by geographical area in absolute values and percentages. As could be seen, during the first outbreak and until July 2020 more than 75% of positive cases were observed in the North-West and North-East. Following this evidence, the analysis of the first outbreak will be restricted to the provinces of North Italy (North-West + North-East = 47 provinces).

We expect different impacts of implemented mitigation policies on the spread of SARS-CoV-2 in provinces with different socioeconomic deprivation, with more deprived provinces having milder restrictions' effects on the incidence of SARS-CoV-2, other variables being equal. Expectations come from the assumption that lower socioeconomic provinces, and mainly rural provinces, will be more prone to essential works, and hence, with fewer opportunities to respect restrictive measures. Moreover, expectations are supported by previous findings⁶⁻⁹.

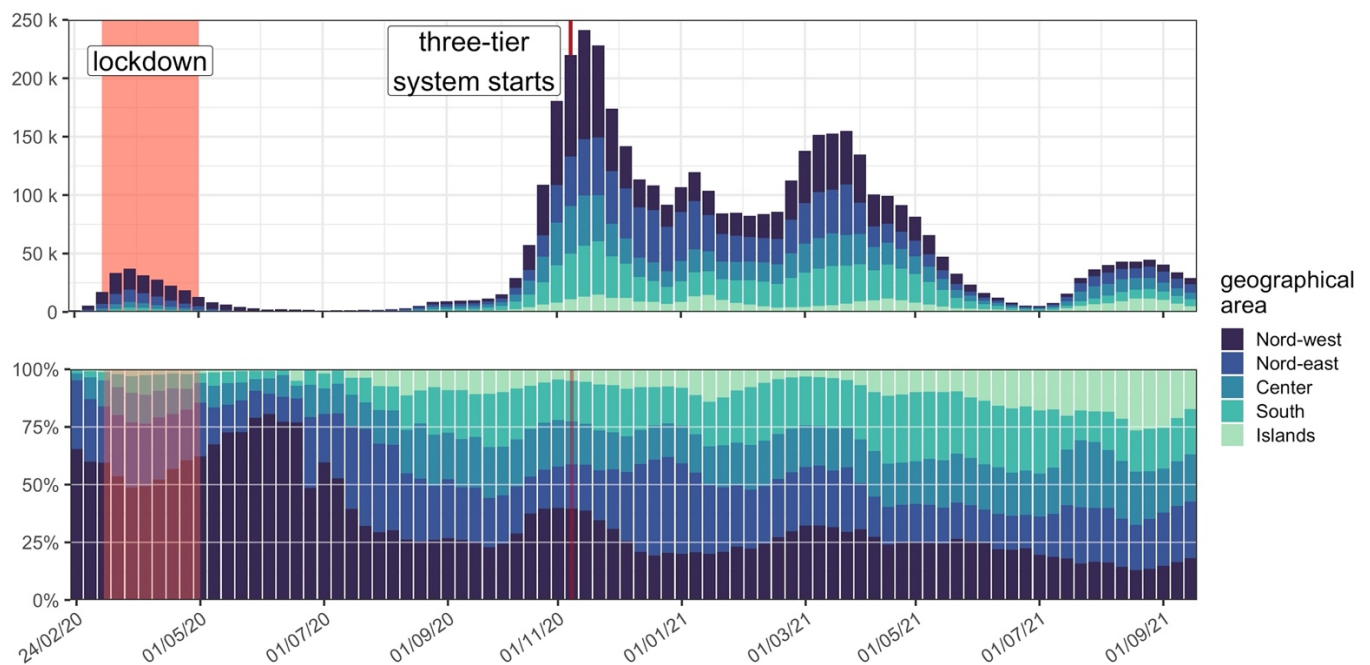


Figure 1 Weekly trend of SARS-CoV-2 positive cases in Italy by geographical area. Absolute values and percentages.

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