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Lockdown impact on COVID-19 epidemics in regions across metropolitan France

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Lockdowns have been used by most European countries in response to the COVID-19 pandemic. In France, a national lockdown was implemented on 17 March 2020. Some have questioned the need for a nationwide implementation given that most hospitalizations were concentrated in two of thirteen regions; others have even questioned the impact of the lockdown on SARS-CoV-2 spread, arguing that the natural epidemic peak was about to be reached.

On 17 March, daily hospital admissions were indeed highest in Grand-Est (5.3 per 100,000 inhabitants) and Île-de-France (3.6 per 100,000 inhabitants) regions. Yet, a surge in COVID-19 hospital admissions was occurring at that time across all regions of metropolitan France (Figure 1). The COVID-19 epidemic spread from the Eastern to the Western parts of France, crossing the daily hospitalization threshold of 1 per 100,000 inhabitants between 10 (Grand-Est) and 23 March (Bretagne and Nouvelle-Aquitaine). Île-de-France (Paris region) experienced the highest rate of hospitalization per day (10.0 per 100,000 inhabitants), and Bretagne the lowest (1.3 per 100,000 inhabitants). Regardless of the time the epidemic started in the region, and its scale, 12 out of 13 regions experienced a peak in daily hospitalizations 11 +/- 3 days after the lockdown was implemented. This figure corresponds to the mean duration between infection and hospitalization for the patients experiencing severe forms of disease¹. Since the different regions were at different stages of the pandemic at the time the lockdown was implemented, the synchrony in regional peaks strongly suggests that the lockdown, rather than the natural course of the epidemic, explains the peak in hospitalizations. Moreover, most regions were experiencing exponential growth in hospitalizations (Figure 1), such that saturation of local intensive care units might have occurred in those regions in the absence of any lockdown.

Lockdown therefore appears to have been successful not only in alleviating the burden on the intensive care units of the two most severely affected regions of France, but also in preventing uncontrolled epidemics in other regions. These simple observations support results from other studies which have estimated the impact of lockdown on SARS-CoV-2 spread to be strong²⁻⁵. Enforcement of public health and social measures in combination with important testing, tracing, and isolating capacities will be critical in case of an epidemic rebound to avoid re-introducing a lockdown – a situation for which the economic cost and broader impact on society are considerable.

Data sharing statement: The data are further described in Salje et al³ and are available at the following link <https://doi.org/10.5281/zenodo.3889894>.

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Figure Legend:

Figure 1: Daily hospital admissions of COVID-19 patients per 100,000 inhabitants in the 13 regions of metropolitan France (SI-VIC database). All COVID-19 patients are either biologically confirmed or present with a computed tomographic image highly suggestive of SARS-CoV-2 infection. The grey lines correspond to raw data. The purple lines correspond to the 7-day moving average. The horizontal black dotted lines indicate a level of 1 daily hospital admissions per 100,000 inhabitants. The vertical orange lines indicate the day the nationwide lockdown was enforced. The vertical blue lines indicate the national peak in hospital admissions. The vertical red dotted lines indicate the regional peaks in hospital admissions. Abbreviations for the names of the regions: ARA – Auvergne-Rhône-Alpes ; BFC – Bourgogne-Franche-Comté ; BRE – Bretagne ; CVL – Centre-Val de Loire ; COR – Corse ; GES – Grand Est ; HDF – Hauts-de-France ; IDF – Île-de-France ; NAQ – Nouvelle-Aquitaine ; NOR – Normandie ; OCC – Occitanie ; PAC – Provence-Alpes-Côte d’Azur ; PDL – Pays de la Loire.

