

EXPONENTIAL TAILS OF COVID-19 CASES ARE MODULATED BY DAYLIGHT HOURS

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ABSTRACT

The environmental factors that affect Covid-19 are not apparent yet. There is an urgent need to elucidate them, especially if we want to anticipate a more than likely second hit. While some researchers speculate that heat indexed by the average temperature and humidity indexed by the average percentage of vapor water in the air may affect viral spreading, results are not conclusive. This work aims to shed light on this topic of substantial interest in everybody's life. Over the last weeks, we have taken publicly available data from Ireland and fitted a plethora of mathematical models. Strikingly, the independent variable that shows the most substantial influence on the number of cases since Ireland reached the maximum is daylight hours.

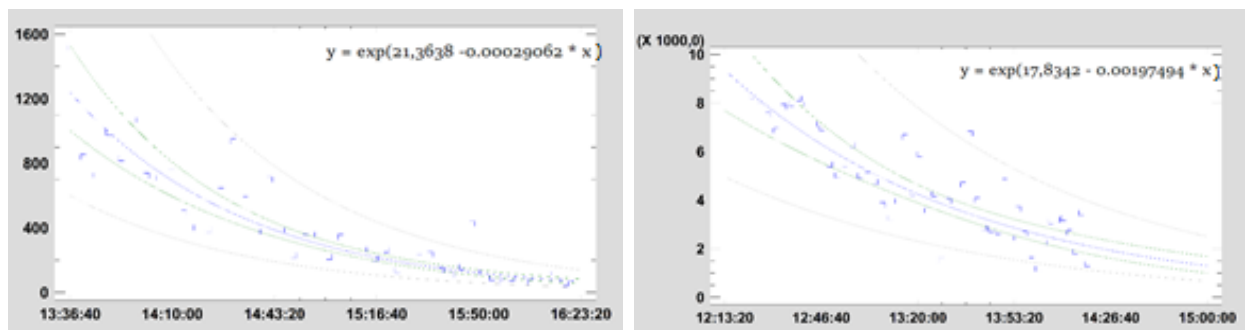


Figure 1: Case number versus daylight hours in Ireland Figure 2: Case number versus daylight hours in Spain

While findings are preliminary, the variance explained by daylight hours is humongous. The model itself explains about 90% of the variability in the number of cases. Interestingly, this statistical significance seems to be consistent in other European countries such as Spain, with the exponential coefficient converging to the same value as the one estimated in Ireland. Importantly, the fitted responses are independent of the number of inhabitants of each country but show a significant relation with daylight length. We stress that we should take these analyses with caution. Especially now that national governments for different reasons are updating the reported values on a day-by-day basis; however, the statistical significance is very high and seems to point out that daylight length has a substantial impact on viral spreading.

Keywords: COVID-19, environmental factor, daylight hours, Ireland, Spain