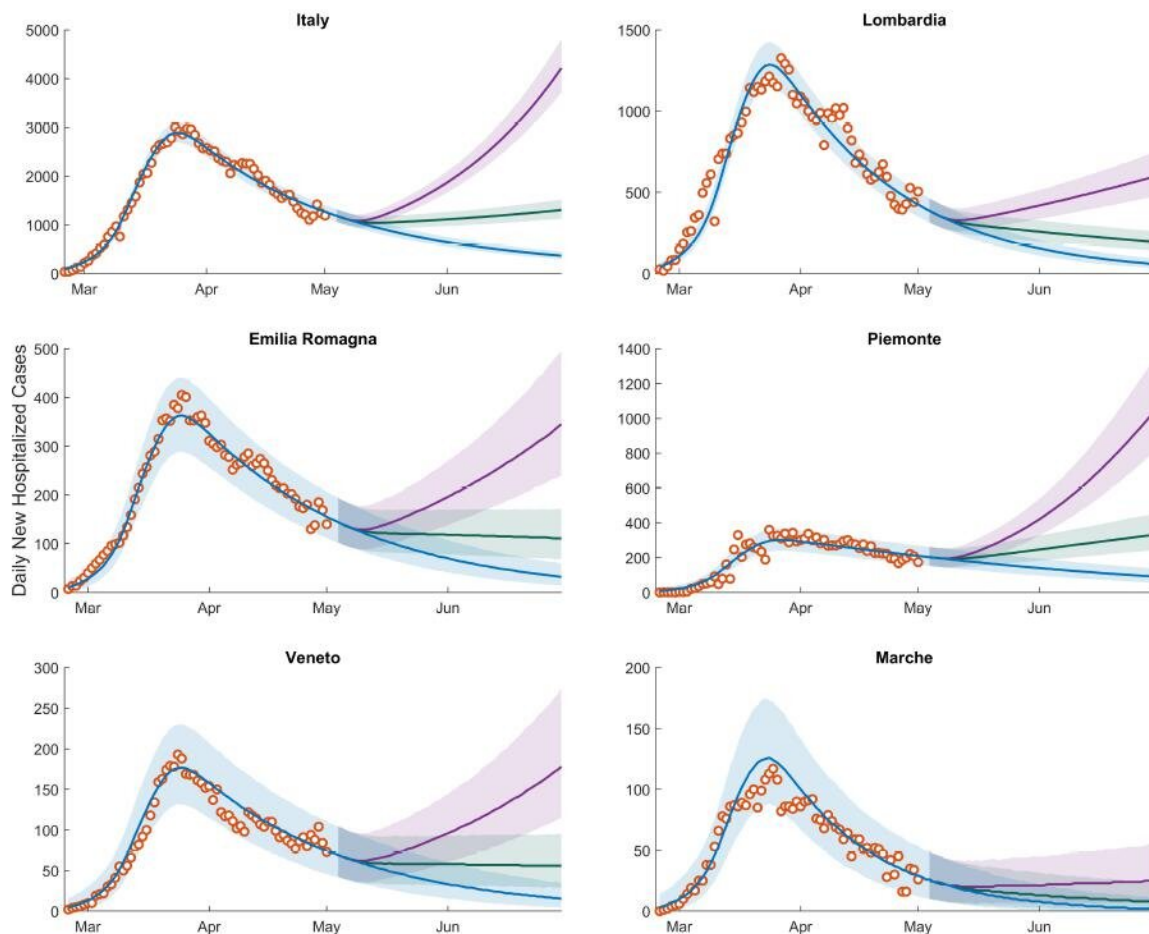


A model for keeping the pandemic in check in Italy

August 26 2020, by Nathalie Jollien



These charts illustrate the daily number of new COVID-19 hospitalizations in Italy's hardest-hit regions. Collected data is represented by circles, and lines indicate values generated by the model. The baseline scenario, if lockdown had been maintained, is shown in blue. The green and purple scenarios correspond to an easing of lockdown measures, resulting in an increase in the transmission rate

of 20% or 40% when compared with the baseline scenario. Credit: E. Bertuzzo et al., *Nature Communications*, 2020

A team of researchers has been modeling the potential spread of the coronavirus pandemic in Italy. Using their model, they can calculate the number of exposed and highly infectious individuals and the daily isolation efforts required to bring down the epidemic curve.

In April, a team led by Professor Andrea Rinaldo, the head of EPFL's Laboratory of Ecohydrology (ECHO), published a paper that presented a [model](#) for the spread of COVID-19 in Italy. Since then, the model has been used to investigate different potential outcomes of the pandemic's progression depending on the measures put in place. The researchers, from the Politecnico di Milano, Ca' Foscari University of Venice, the University of Padua and EPFL, published these latest results today in *Nature Communications*.

The [mathematical model](#) uses a range of data, including the [number](#) of hospitalizations and reported deaths attributable to coronavirus and their distribution among Italy's 107 provinces—the most granular level of detail available—as well as a mobility factor provided by cellphone tracking. From this information, the model generates the pandemic's theoretical progression. By adjusting the underlying parameters (mobility, [transmission rate](#), etc.), the team can predict potential scenarios for the virus's spread.

The impact of easing lockdown measures

"Since we created the model, we have been constantly recalibrating it, for example by factoring in the effects of easing lockdown measures on 4 May," says Rinaldo. "We also ascertained that the values previously

estimated by the model concerning the pandemic's progression were a reflection of reality." Confident of their model's high degree of accuracy, the researchers then generated data that was, in practice, unattainable on the ground.

Currently, our knowledge of the total number of people infected with coronavirus is limited by the number of tests performed. As such, it does not correspond to real conditions. By using the model, however, this critical figure can be estimated. Using the total number of infections, the model can then calculate the daily isolation efforts required to keep the pandemic in check—and, as it turns out, isolating only a small percentage of the population would be sufficient.

With the end of lockdown, the virus's transmission rate will undoubtedly be higher than that observed when the lockdown was in place. The team looked at various scenarios based on the percentage of this rise. They found that a 40% increase in the transmission rate would result in the epidemic returning to most of Italy's regions. To stay below this 40% threshold, they posited that 5.5% of exposed and highly infectious individuals would need to be isolated, regardless of whether they were symptomatic. Such measures would bring down the epidemic curve. Moreover, the researchers stress that isolation is most effective when people are in the incubation stage, based on findings that viral shedding peaks just before the onset of symptoms.

The team also examined the impact of relaxing lockdown measures. According to the model, extending the [lockdown](#) by one month would have cut the number of infected individuals by around two-thirds.

Continued vigilance

In Italy, cases of COVID-19 are currently on the rise. The [state of emergency](#) has been extended until 15 October and masks must be worn

in all enclosed spaces such as public transport and shops. "We are quite concerned by the upturn in the number of confirmed infections and by the victims' considerably lower average age," says Rinaldo. "When the weather turns cold, indoor activities will make airborne infections much more aggressive unless strict personal protection is maintained. In my view, masks should remain mandatory until a vaccine is widely available."

More information: Enrico Bertuzzo et al. The geography of COVID-19 spread in Italy and implications for the relaxation of confinement measures, *Nature Communications* (2020). [DOI: 10.1038/s41467-020-18050-2](https://doi.org/10.1038/s41467-020-18050-2)

Marino Gatto et al. Spread and dynamics of the COVID-19 epidemic in Italy: Effects of emergency containment measures, *Proceedings of the National Academy of Sciences* (2020). [DOI: 10.1073/pnas.2004978117](https://doi.org/10.1073/pnas.2004978117)

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