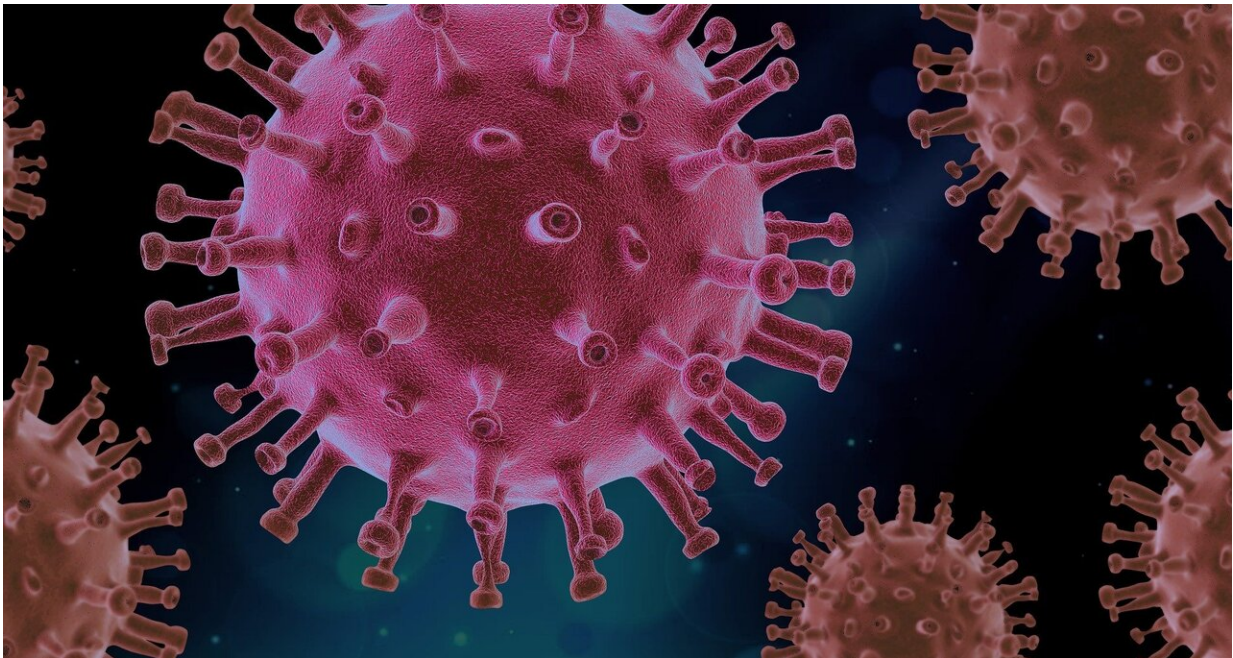


Covid-19 deaths in Italian hospitals are increasing at maximum rate: report

March 31 2020



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A new report on Covid-19 data up to March 30 from Italy, prepared by an Italian expert for the European Society of Anaesthesiology (ESA), says that the number of daily deaths in Italian hospitals is today still accelerating at the maximum rate, and significant numbers of deaths in hospital are likely to continue until at least mid-April and could go on until early June. The report is by Davide Manca, Professor of Process

Systems Engineering at Politecnico di Milano, Milan, Italy.

The data suggest that the increase in numbers of patients in [intensive care](#) (ICU) in both the Lombardy region and Italy as a whole are likely to have peaked, but that numbers of deaths in hospital will continue to increase at the maximum rate for several days to come.

March 31, 2020, is classed as day 39 of the pandemic in Italy, with day 1 classed as February 22. For deaths, it is important to note that patients dying now and during the days to come were mostly infected around two weeks ago. Models identify the maximum daily increase of deaths in hospital as being likely to occur during days 36-40 (that is March 28-April 1) in Lombardy and days 36-41 (March 28-April 2) in Italy.

Professor Manca has explored two different modelling techniques called logistic and Gompertz modelling to prepare his report. According to the more optimistic logistic model, 98% of total expected deaths in hospital would have occurred in both Lombardy and Italy by April 15. Conversely, the more pessimistic Gompertz model predicts 98% of deaths to occur by June 3 in Lombardy and by June 4 in Italy.

For the number of patients in ICU, the data show the day of maximum increase was reached at Day 22 (15 March) in Lombardy and Day 25 (18 March) in Italy. "The difference between Lombardy and Italy is due to the social-distancing measures adopted first in Lombardy and then all over the country. Every day counted," explains Professor Manca.

In the past few days, the number of patients in ICU has increased by less than 10 persons per day in Lombardy, due to its intensive care units being filled to capacity. Across Italy (including the South and Central regions), the number of patients in ICU has increased by 50-75 patients per day in recent days, compared with a much steeper increase of 180 to 240 patients per day across the period 13 to 23 March. It is important to

remember, says Prof Manca, that space in ICU becomes available as patients recover and are discharged, or sadly die from Covid-19. Also, more ICU capacity is being created in Italy as the pandemic progresses.

"We expect to reach the date on which there will be little or no further increase of Covid-19 patients in ICU to be around day 45 (April 6) in Lombardy and day 47 (April 8) in Italy. The data suggest that numbers of patients in intensive care should begin to fall across Lombardy and Italy after these dates, depending on the continued implementation and enforcement of Italy's strict quarantine measures," says Professor Manca.

The new report contains several additional observations from the data:

- Resuscitation and intensive care doctors are reporting extended periods of viral shedding. One infected ICU doctor is experiencing persistent virus shedding for more than 30 days (in quarantine since Feb 23) while doctors are also reporting longer periods of virus shedding (than average) by their patients
- About 15 days are necessary to achieve an effective weaning from respiratory care in ICU. Indeed, the experience shows that about one-third (33%) of patients worsen after the first extubation and call for further (but not invasive) respiratory treatment.
- The time spent in ICU by patients who tragically go on to die is in general rather high (about 10-12 days), which is longer than Chinese literature data (9-10 days).
- Resuscitation doctors should keep in mind that new ICU beds added during wartime cannot meet the same high-level standards as in peacetime. That is why, in case of saturation conditions of ICU beds, the proportion of successful treatment decreases, and consequently the number of deaths in hospital increases.
- Not all the patients that require intubation treatment can receive

it when required. Sometimes, that treatment must be postponed because of ICU beds saturation and this may cause deterioration in the patient's pulmonary status and prevent the patient's weaning and extend their time in ICU

- CPAP ([continuous positive airway pressure](#)) breathing devices may delay respiratory failure, and help medical staff (also non-ICU experts) to avoid ICU admission when intubation is not feasible.

More information: For the full report see:

[drive.google.com/file/d/1HQxL8 ... YQy/view?usp=sharing](https://drive.google.com/file/d/1HQxL8...YQy/view?usp=sharing)

For supplementary material see: [drive.google.com/file/d/123THH... h0L/view?usp=sharing](https://drive.google.com/file/d/123THH...h0L/view?usp=sharing)

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