

Italy's first wave of the COVID-19 pandemic has ended: no excess mortality in May, 2020

In response to the urgent need for data on the effect of the COVID-19 pandemic, the National Institute of Statistics, in collaboration with the Italian National Institute of Health, published preliminary data on the daily number of deaths in Italy from any cause occurring during the pandemic, up to May 31, 2020.¹ The total number of deaths was obtained through integration of the Population Registers and the Tax Register, and these data were released for 7357 municipalities, with validated data from 7904 municipalities, covering 95% of the Italian resident population. Total mortality is a key indicator of the real effect of COVID-19 since it is not subject to errors in the certification of the causes of death.

The total number of deaths recorded in all municipalities with validated data, and in the municipalities located in the Lombardy region only (the Italian region most severely hit by the pandemic) were compared with the mean number of deaths occurring in the period 2015–19 (appendix). Also shown in the appendix are the number of deceased patients registered in the surveillance system of the Ministry of Health and the Civil Protection Department as having had COVID-19 in the same period (in all Italian municipalities).²

In Italy, the first death due to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection was observed on Feb 21, 2020,³ and in mid-March, 2020, the number of deaths rapidly increased, resulting in almost 50% of excess deaths from any causes in March, 2020. In April, 2020, excess mortality was still 36%. In the first 2 weeks of May, 2020, excess mortality decreased to 3%, and in the last 2 weeks of May, 2020, the number of deaths was lower than that observed in the previous

years (–7%). Lombardy, the most widely hit region, lagged behind: in the first 2 weeks of May, 2020, the excess mortality was still 20%, corresponding to more than 700 excess deaths. In the last 2 weeks of May, 2020, mortality was also lower than that observed in the previous years in Lombardy.

In March and April, 2020, the excess observed in overall mortality noticeably exceeded the number of deaths registered by the Ministry of Health and the Civil Protection Department as COVID-19-related, indicating a substantial underestimation of the overall effect of the pandemic, owing to a large number of individuals who died untested and untreated. This was particularly evident in March, 2020, when the difference was almost 15 000 deaths, then in April, 2020, the gap narrowed to less than 2500 deaths, apparently owing to the increased diagnostic ability. However, in the last 2 weeks of May, 2020, the Ministry of Health and the Civil Protection Department attributed 1805 deaths to SARS-CoV-2 infection, and almost 5500 deaths were attributed to SARS-CoV-2 infection for the whole of May, 2020, although total mortality was less than expected in May.

The most plausible explanation for this discrepancy is a short-term decrease in mortality after the first phase of the pandemic, which affected mainly older adults and those with underlying chronic conditions,^{4,5} a phenomenon known as the harvesting effect. In fact, the median age at death of patients who died and tested positive for SARS-CoV-2 infection was 82 years; 95% of them had at least one comorbidity, and 60% had at least three comorbidities before being infected. This phenomenon was less evident in Lombardy, where the number of cases, although remarkably reduced in the second half of May, 2020, continued to be non-negligible. More importantly, a large number of patients who had tested positive for SARS-CoV-2 might have died in May of other causes, although their deaths were attributed to COVID-19.

In conclusion, total mortality in Italy showed that the COVID-19 pandemic had severely hit the country in the month of March, 2020, but there was a remarkable attenuation of the excess mortality in April and a lack of excess deaths in May. In the last 2 weeks of May, 2020, the excess mortality disappeared even in the highest epidemic area. Overall, about 44 000 excess deaths have been registered in the 3-month period considered, as compared with 33 386 officially registered by the Civil Protection Department as COVID-19-related.

The difference is largely due to undercertification of COVID-19, mainly in March, but some of these excess deaths are probably owing to inadequate management of other diseases during the COVID-19 pandemic, and hence to excess mortality from other causes.

In short, total mortality is a key indicator of the COVID-19 effect; the excess total mortality in March and April, 2020, in Italy was substantial (ie, a total of over 45 000 deaths), corresponding to an overall excess about 60% greater than the number of officially registered COVID-19 deaths; there was a substantial under-registration of COVID-19 deaths in March, 2020, and a smaller under-registration in April, 2020; there was no residual excess total mortality in May, 2020, when COVID-19 deaths were probably over-registered.

The authors declare no competing interests.

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1 National Institute of Statistics and Italian National Institute of Health. Report on impact of the COVID-19 epidemic on the total mortality. https://www.istat.it/it/files/2020/07/Rapp_Istat_Iss_9luglio.pdf (accessed July 9, 2020)



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See Online for appendix

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- 2 Ministero della Salute. Covid-19, situation in Italy. <http://www.salute.gov.it/portale/nuovocoronavirus/homeNuovoCoronavirus.jsp?lingua=english>. (accessed July 8, 2020).
- 3 Remuzzi A, Remuzzi G. COVID-19 and Italy: what next? *Lancet* 2020; **395**: 1225–28.
- 4 Boccia S, Ricciardi W, Ioannidis JPA. What other countries can learn from Italy during the COVID-19 pandemic. *JAMA Intern Med* 2020; **180**: 927–28.
- 5 Italian National Institute of Health. Characteristics of SARS-CoV-2 patients dying in Italy. Report based on available data on June 25th, 2020. https://www.epicentro.iss.it/en/coronavirus/bollettino/Report-COVID-2019_25_june_2020.pdf. (accessed July 8, 2020).