# COVID-19 deaths in Lombardy, Italy: data in context

Italy has one of the highest 2019 coronavirus disease (COVID-19) clinical burdens in the world. Although national-level data have been published,[1] such data allow weaker interpretation of the COVID-19 outbreak in Italy compared with regional-level data. The regional structure of the Italian national health service caused diverse regional responses to the emergency. The Lombardy region is home to a sixth of the Italian population (10·08 million inhabitants) and accounts for 37% of cases and 53% of deaths of the country, as of April 15, 2020. The COVID-19 outbreak started in Italy with two outbreaks; one in Codogno, Lombardy,[2] and one in Vo Euganeo, Veneto. On Feb 25, 2020, 240 cases had been confirmed in Lombardy and 43 in Veneto, and on March 3, 1520 had been confirmed in Lombardy versus 307 in Veneto, the difference progressively increasing up to a difference of more than 47 500 cases.[3] Two different epidemic control strategies were implemented: Veneto opted for strict containment of the outbreak and piloted mass testing in selected areas (ie, 4·4% of the population were tested, compared with 1·8% in the rest of Italy), whereas Lombardy reported high transmission and disease rates and strengthened hospital services to meet a massively increased demand for hospitalisation and intensive care unit beds. Although given the different regional polices, comparing the numbers of cases and deaths by region makes little sense, how do we explain the crude case fatality rate in Lombardy (18·3%) being approximately three times higher than that in Veneto (6·4%), and almost two times higher than that of the rest of Italy (10·6%, as of April 15)? We argue that these data have little epidemiological value to show excess mortality in Lombardy.

| | Population (million) | Cases | Deaths | Case fatality rate | Mortality (per 100 000) |
|---|---|---|---|---|---|
| Lombardy | 10·08 | 62 153 | 11 377 | 18·3% | 112·9 |
| Veneto | 4·90 | 14 624 | 940 | 6·4% | 19·2 |
| Rest of Italy | 45·39 | 88 378 | 9328 | 10·6% | 20·6 |

Data are n or %. Data are from the Civil Protection Department of the Italian Government, updated April 15, 2020.

***Table*: COVID-19 surveillance data in the Lombardy and Veneto regions and the rest of Italy**

Data-associated factors that are related to varying case fatality rates across regions are to be investigated in various regional testing strategies and capacities. Mortality rates provide more reliable data and truly quantify how deadly COVID-19 is with respect to the population. As of April 15, Lombardy had 112·9 deaths per 100 000 population, almost six times higher than in the rest of Italy (table). Lombardy was hit by the COVID-19 outbreak much earlier than other regions were, with a possibly delayed public health response and uncontrolled transmission between asymptomatic individuals at the community level.[3,4] Additionally, the emergence of many cases concentrated within a short period of time stretched hospitals to capacity. High pressure on hospital services might have negatively affected the health services' preparedness. Also, hospital services might not have been sufficiently supported and integrated with community and primary care services. Regional-level data from outside of Italy might help to put Lombardy's data into context. We compared Lombardy data with those from other international settings that were similar in terms of urbanisation and sociodemographic characteristics. Cumulative mortality rates at 30 days since the epidemic onset were highest in New York, NY, USA, (81·2 per 100 000) and the Madrid Comunidad, Spain (77·1 per 100 000), almost twice as high as that in Lombardy (41·4 per 100 000), Île-de-France, France (26·9 per 100 000), and Greater London, UK (23·0 per 100 000; appendix).

Although Italy is counting deaths and infected patients, what is missing in Italy and in many other countries affected by the pandemic is a robust system of epidemic intelligence that can provide much needed, solid, epidemiological data at the regional level to inform modelling of disease transmission at the population level and ultimately be used to offer effective guidance on public health action.

We declare no competing interests.



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1 Onder G, Rezza G, Brusaferro S. Case-Fatality rate and characteristics of patients dying in relation to COVID-19 in Italy. *JAMA* 2020; published online March 23. DOI:10.1001/jama.2020.4683.

2 Grasselli G, Pesenti A, Cecconi M. Critical care utilization for the COVID-19 Outbreak in Lombardy, Italy: early experience and forecast during an emergency response. *JAMA* 2020; published online March 13. DOI:10.1001/jama.2020.4031.

3 Signorelli C, Scognamiglio T, Odone A. COVID-19 in Italy: impact of containment measures and prevalence estimates of infection in the general population. *Acta Biomed* 2020; **91(3-s):** 175–59.

4 Boccia S, Ricciardi W, Ioannidis JPA. What other countries can learn from Italy during the COVID-19 pandemic. *JAMA Intern Med* 2020; published online April 7. DOI:10.1001/jamainternmed.2020.1447.

Published **Online** April 24, 2020 https://doi.org/10.1016/S2468-2667(20)30099-2

**This online publication has been corrected. The corrected version first appeared at thelancet.com/public-health on April 29, 2020**

For **Italy's case fatality rates** see http://www.protezionecivile.gov.it

See **Online** for appendix