First month of the epidemic caused by COVID-19 in Italy: current status and real-time outbreak development forecast

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Research

Keywords: COVID-19, SARS-CoV-2, outbreak, forecast model, forecast in real-time, epidemiology

Posted Date: July 10th, 2020

DOI: https://doi.org/10.21203/rs.3.rs-20456/v4

Version of Record: A version of this preprint was published at Global Health Research and Policy on October 9th, 2020. See the published version at https://doi.org/10.1186/s41256-020-00170-3.

Abstract

Background: The first outbreak of COVID-19 in Italy occurred during the second half of February 2020 in some areas in the North of the country. Due to the high contagiousness of the infection, further spread by asymptomatic people, Italy has become in a few weeks the country with the greatest number of infected people in the world. The large number of severe cases among infected people in Italy led to the hospitalization of thousands of patients, with a heavy burden on the National Health Service.

Methods: We analyzed data provided daily by Italian Authorities for the period from 24 February 2020 to 30 March 2020. Considering such information, we developed a forecast model in real-time, based on the cumulative log-logistic distribution.

Results: A total of 101,739 infected individuals were confirmed until 30 March 2020, of which 14,620 recovered or discharged, and 11,591 deaths. Until the same date patients quarantined at home were 43,752, whereas hospitalized patients were 31,776, of which 3,981 in intensive care. The active cases (i.e. the number of patients not yet recovered until that date) were 75,528. The forecast model estimated a number of infected persons for Italy of 234,000 about, and a duration of the epidemic of approximately 4 months.

Conclusions: One month after the first outbreaks there seemed to be the first signs of a decrease in the number of infections, showing that we could be now facing the descending phase of the epidemic. The forecast obtained thanks to our model could be used by decision-makers to implement coordinative and collaborative efforts in order to control the epidemic. The pandemic due to novel Coronavirus must be a warning for all countries worldwide, regarding a rapid and complete dissemination of information, surveillance, health organization, and cooperation among the states.

Full Text

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Figures

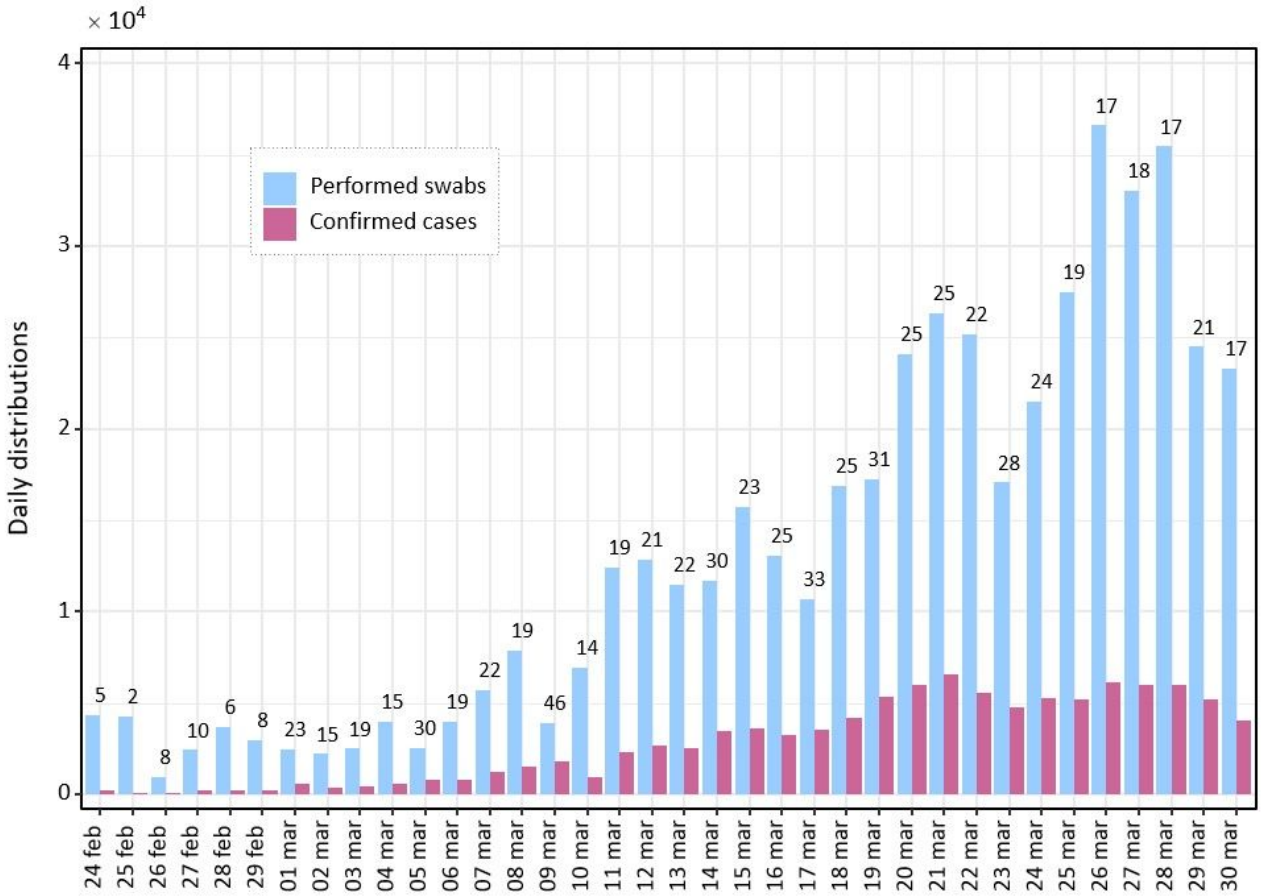

Figure 1

Daily distribution of the performed swabs and confirmed cases. The numbers are related to the ratio, in percentage, between confirmed cases and performed swabs

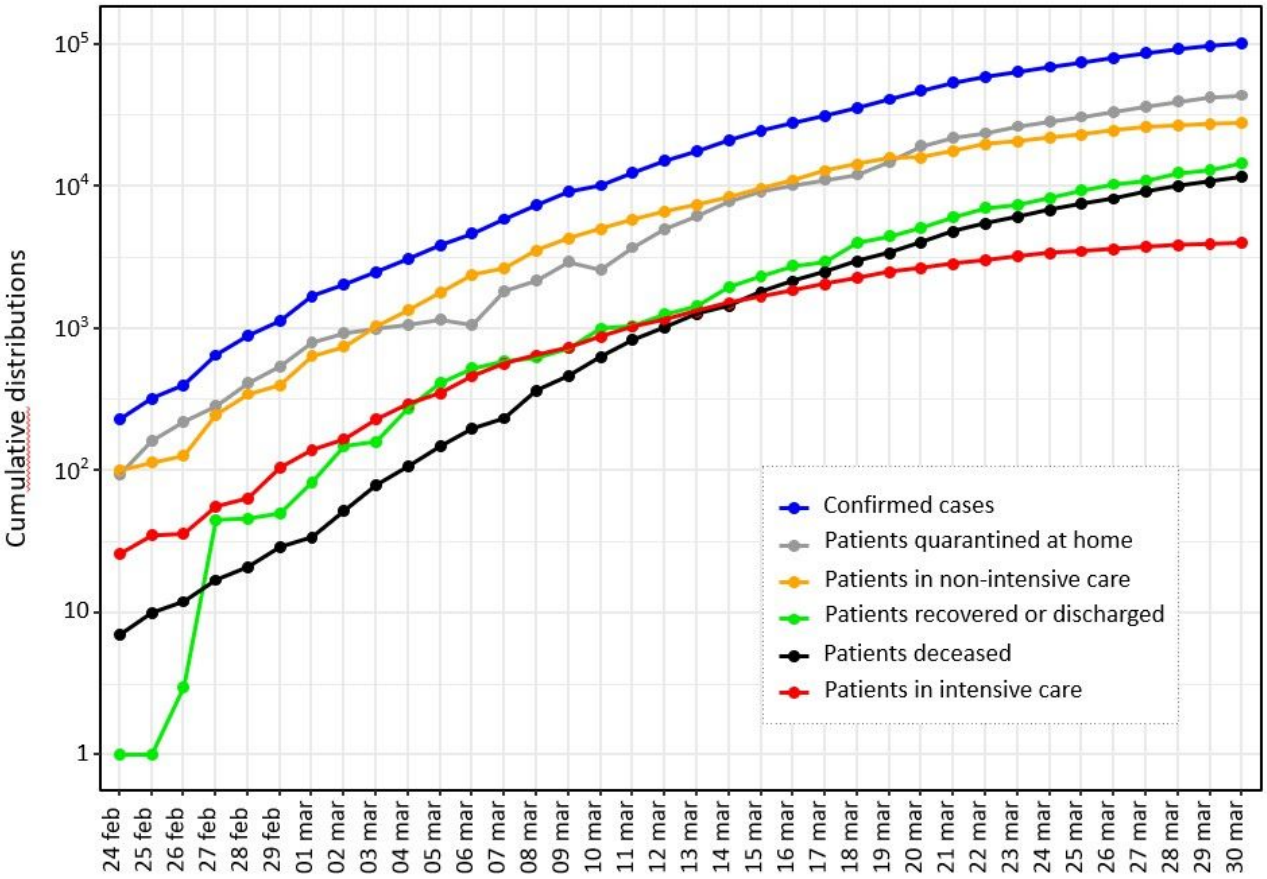

Figure 2

Cumulative distribution of the confirmed cases and patient categories

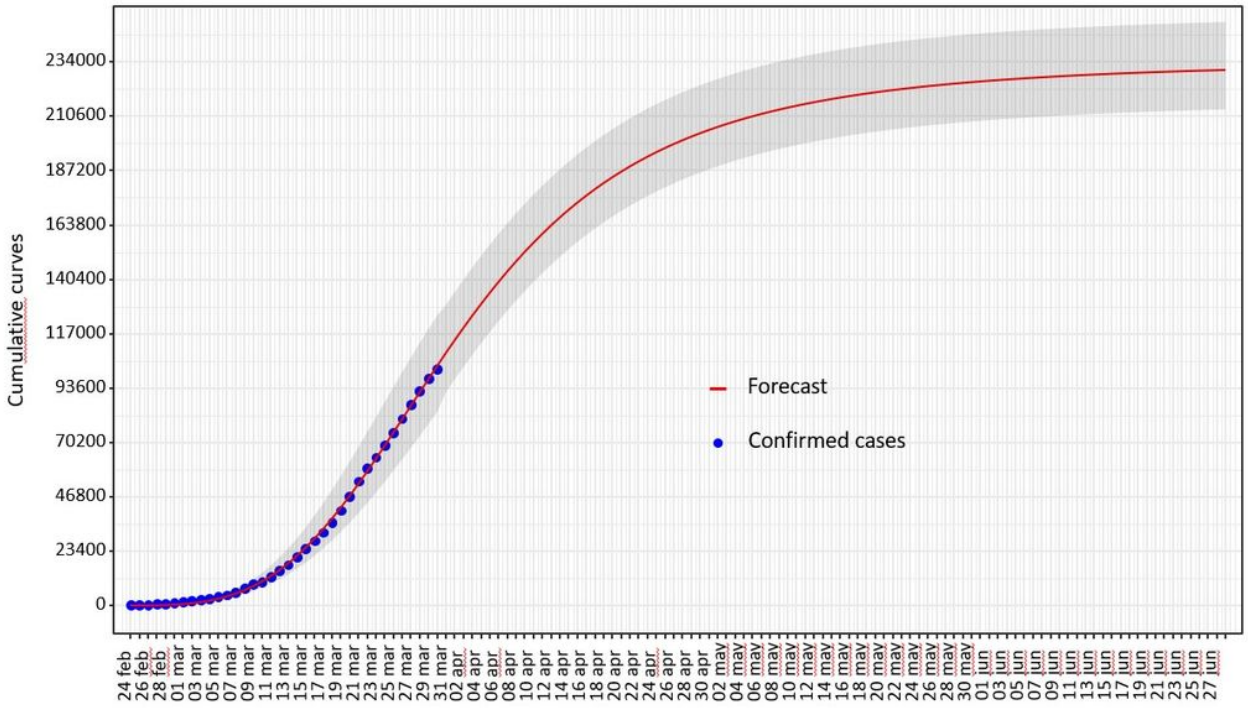

Figure 3

Cumulative curve obtained by the forecasted model of the epidemic in Italy in real-time. Predictions are represented by the red line, with the gray area to indicate 95% CI. The blue points represent the confirmed cases

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- SupplementaryMaterials2.docx
- data.csv