The starting date of COVID-19 in Portugal

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The new coronavirus SARS-CoV-2 has been a threat to global public health. The apparent rapid spread of the virus has led to a pandemic, and countries around the world have grappled with an increase in infected cases. With this in mind, this article is part of an effort to better understand the initial dynamics of COVID-19 in Portugal, in particular, aiming to estimate a likely date for the onset of the epidemic outbreak. Using information provided by health authorities and the classic logistic model, a modeling of the early stages of the disease in the country is presented, with an awareness of its respective uncertainty. This model allows for inferring a range for the occurrence of the first case of COVID-19 in Portugal prior to official notification.

The first outbreaks of COVID-19 in Europe were in Italy, where the first official case was detected on 20 February 2020. A study carried out in Lombardy region, Italy, on 20 March 2020 suggested that COVID-19 had arrived much earlier than 20 February 2020, because they found a case with symptoms beginning on 1 January 2020 [1]. In France, the SARS-CoV-2 virus was detected in a patient at the end of December 2019 [2]. There is, therefore, a body of evidence that the virus that causes COVID-19 was already in Europe long before the first official positive cases. So where is the true start date of the COVID-19 epidemic in Portugal? Looking for a possible answer, this work uses a parametric statistical approach, based on a logistic regressor, which adjusts official data on the registration of positive cases [3]. Three indicators are used to determine when the stationary epidemic curve was found in Portugal, without, however, taking into account delays or underreporting. They are the ratio between positive tests and negative tests, the stabilization of symptoms of registered positive cases and the Rt transmission index. An average of the three logistic regressors allows us to project backwards in time, with an uncertainty of 95%, the date of 27 January 2020 as the probable date of the first contagion in Portugal, see Figure 1.

Other authors have arrived at similar dates. Using the number of deaths in other European countries, they estimated the first contagions for the last 15 days of January 2020 [4]. And a genomic analysis of the virus in March 2020 in Portugal predicted that the first contagion was before 2 February 2020 [5].

A sequence of logistic regressions was used to model the winter of 21/22 and the model made it possible to predict the incidence in the month of February 2022 with great accuracy.
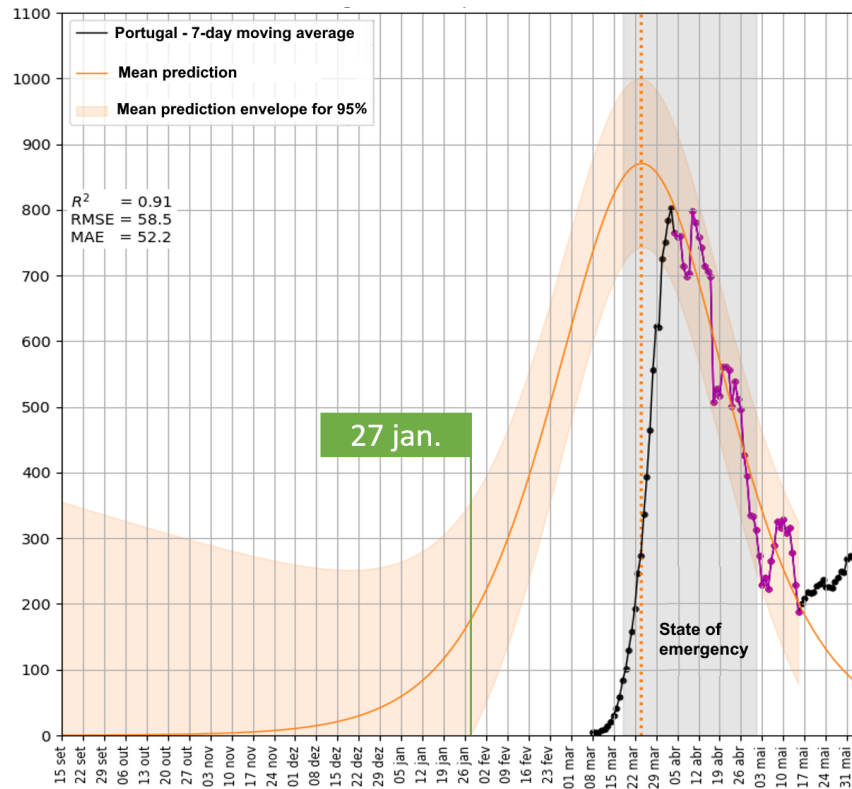

Figure 1: Predictive epidemic curve for Portugal - January to May 2020

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