

# Covid19 Report

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## 1 The *CRISTINA* project

This report is part of a research project “**CoRona vIrus SpaTial aNAlysis**” (*CRISTINA*) which examines the time series progress of COVID-19 events in 177 countries of the world.

## 2 Spain

A series of visualizations for the progress of COVID-19 for **Spain**. We use absolute numbering scale and logarithmic scale to visualize the progress of “*confirmed cases*”, “*deaths*” and “*recovered cases*”. We also indicate the goverment interventions as dots on top of each line.

2.1 Confirmed Cases

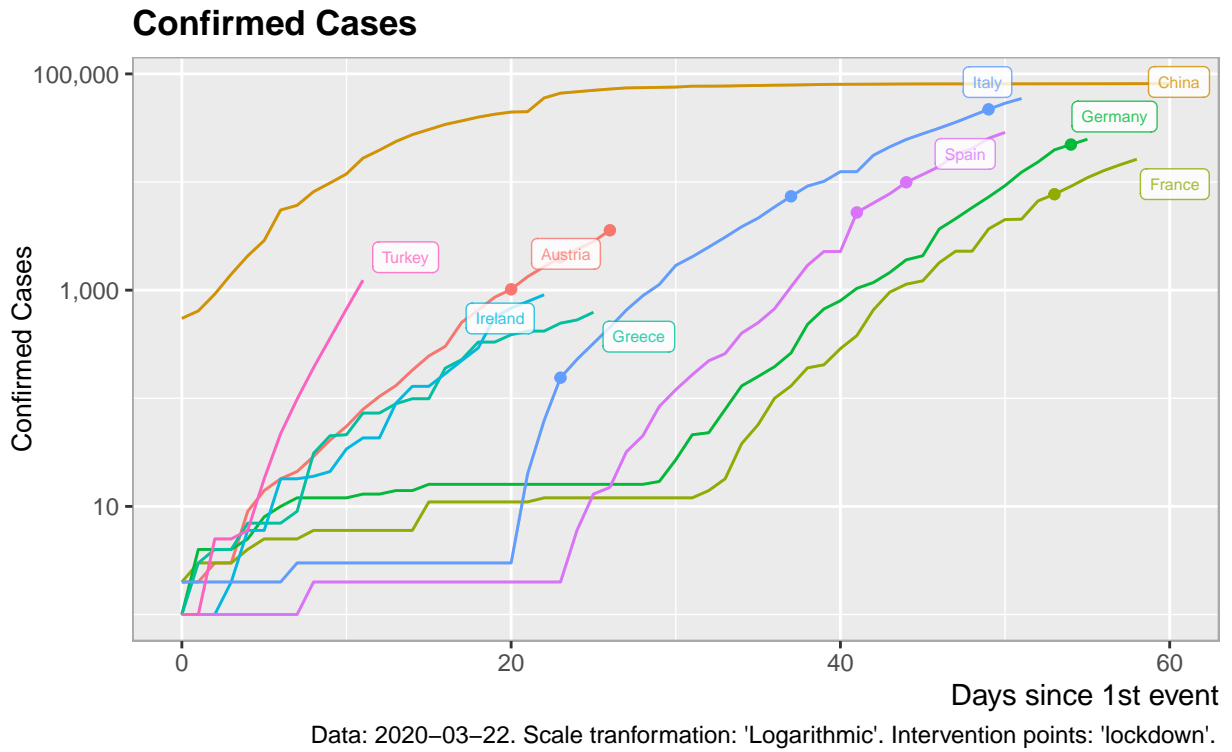


Figure 1: Confirmed Cases

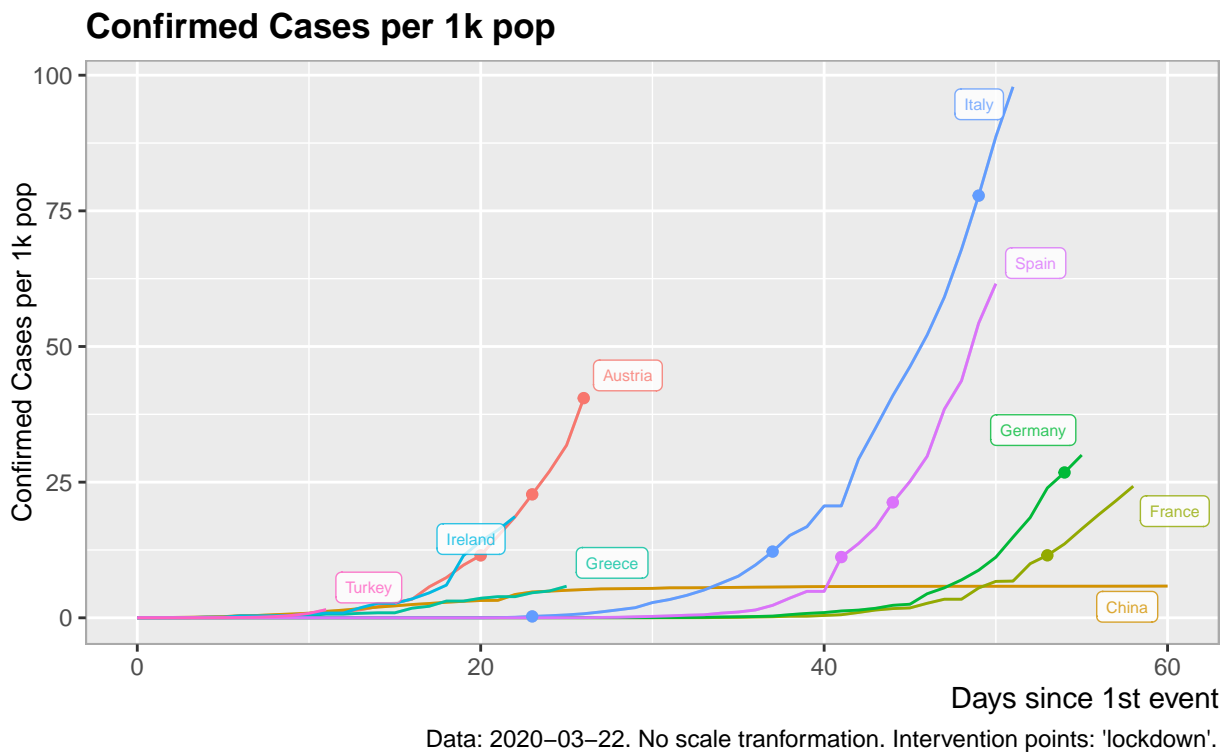


Figure 2: Confirmed Cases by 1000 population

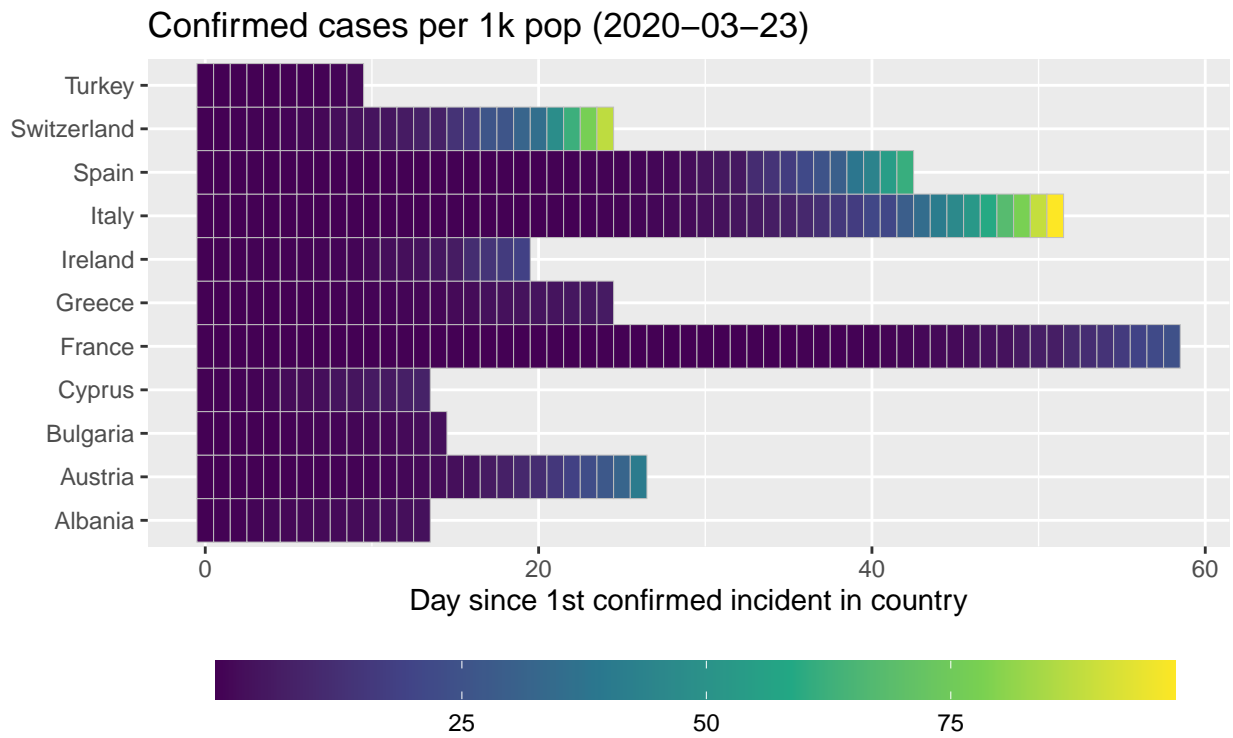


Figure 3: Confirmed Cases by 1000 population

## 2.2 Deaths

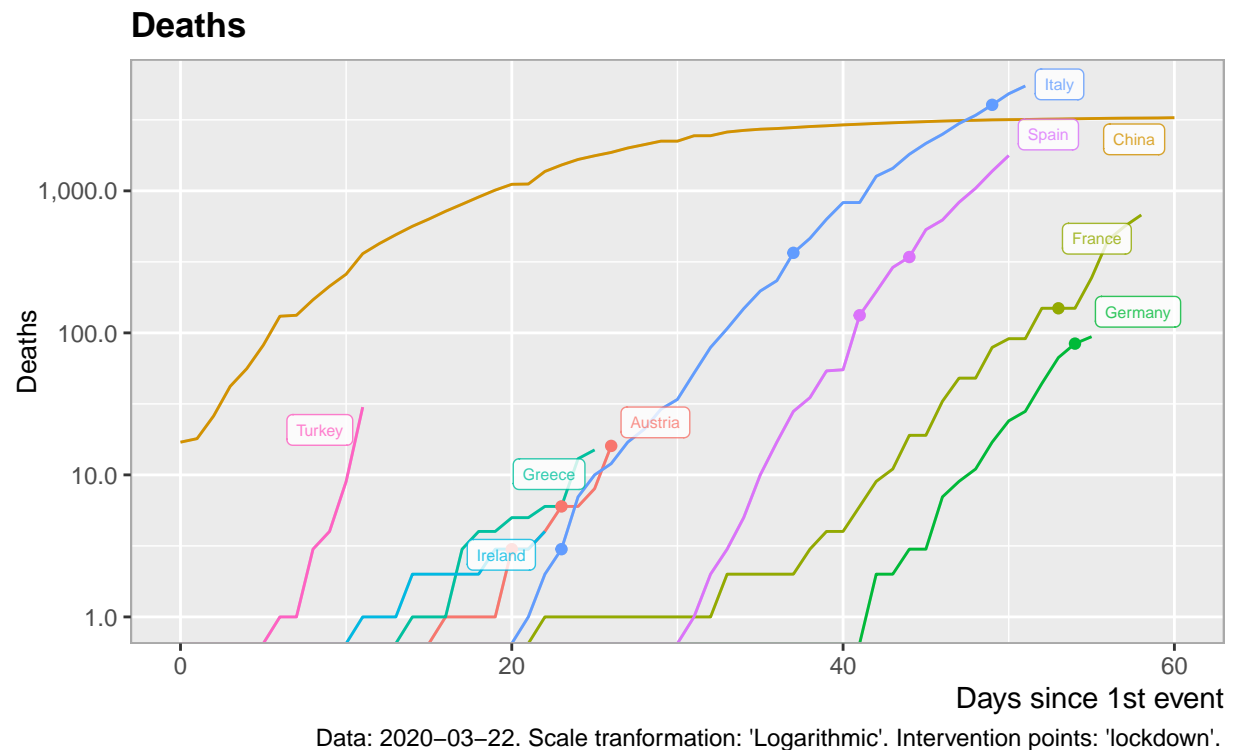


Figure 4: Number of deaths by country

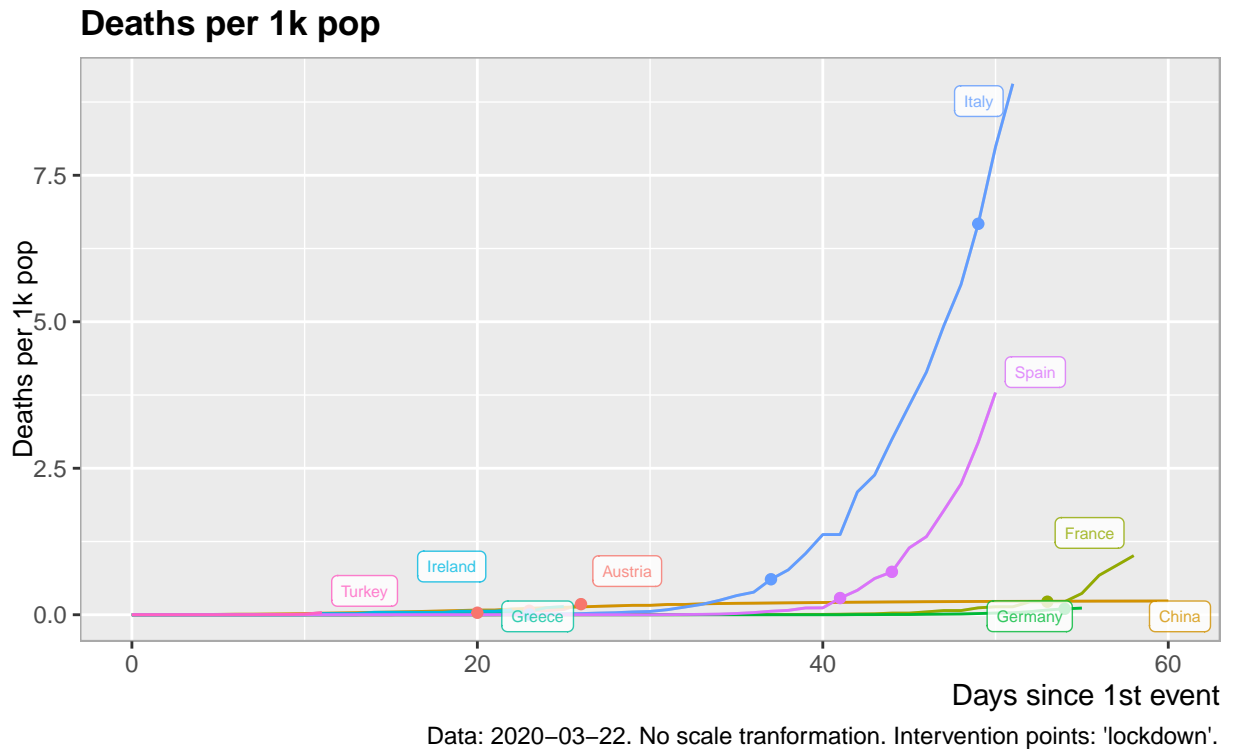


Figure 5: Deaths by 1000 population

### 3 Rate of change over time

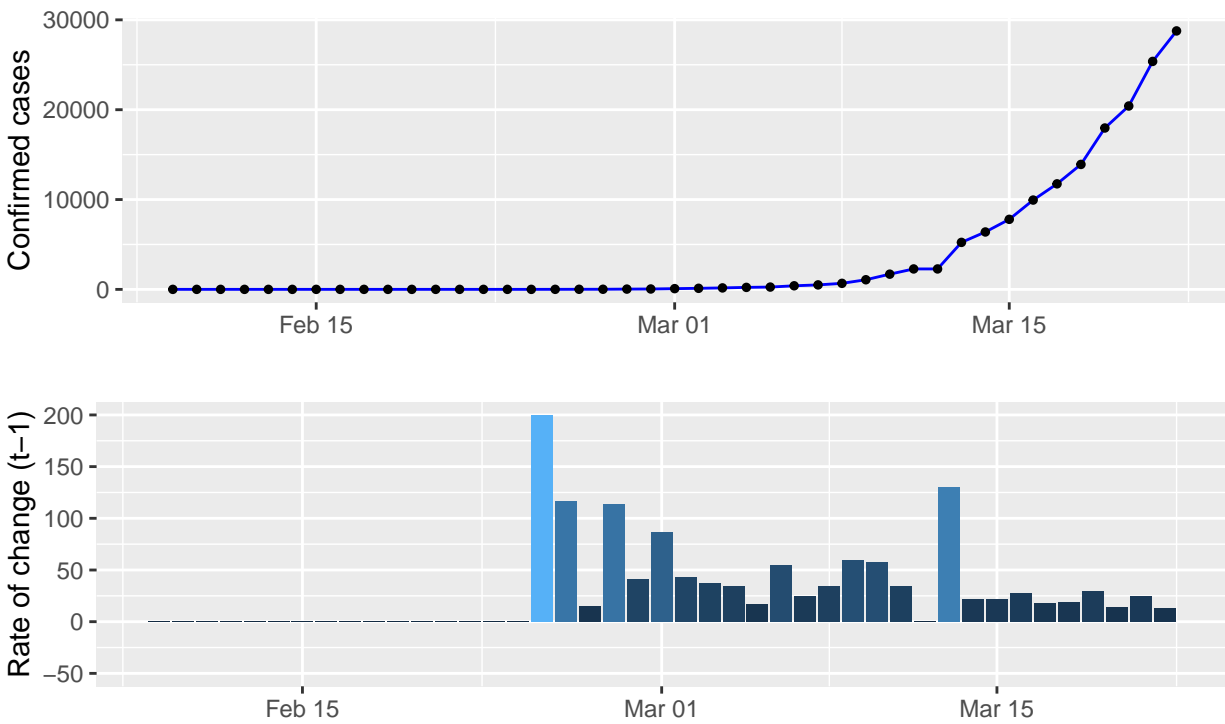


Figure 6: Rate of change of confirmed cases

## 4 Estimations

We estimate the future projection of *confirmed cases* for the next 5 days in Spain with two methods.

### 4.1 ARIMA projection

#### Projection of 'confirmed' cases for 5 ahead

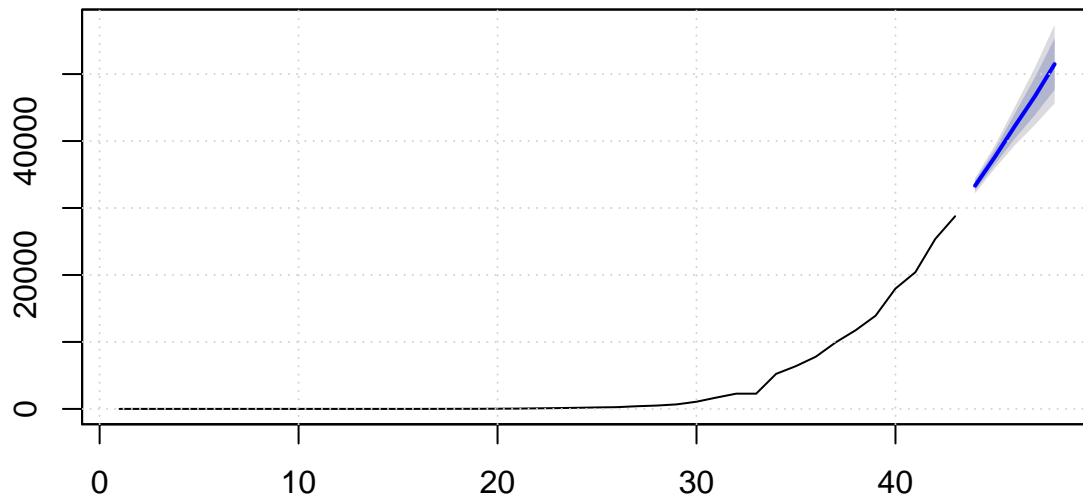


Figure 7: ARIMA projection

Table 1: ARIMA of 'confirmed cases' for 5 days ahead

	Estimation	Confidence 95% (Low)	Confidence 95% (High)
<b>t+1 (2020-03-23)</b>	33327	32198	34455
<b>t+2 (2020-03-24)</b>	37640	35921	39359
<b>t+3 (2020-03-25)</b>	42228	39370	45086
<b>t+4 (2020-03-26)</b>	46638	42378	50898
<b>t+5 (2020-03-27)</b>	51480	45619	57341

- The estimated proportion of cases detected is 0.41%.
- With data up to 2020-03-22 in Spain we have 28768 confirmed cases and 1772 deaths.
- Estimated doubling time (based on 5 days time window) is approximately 3.9 days

## 4.2 PROPHET projection

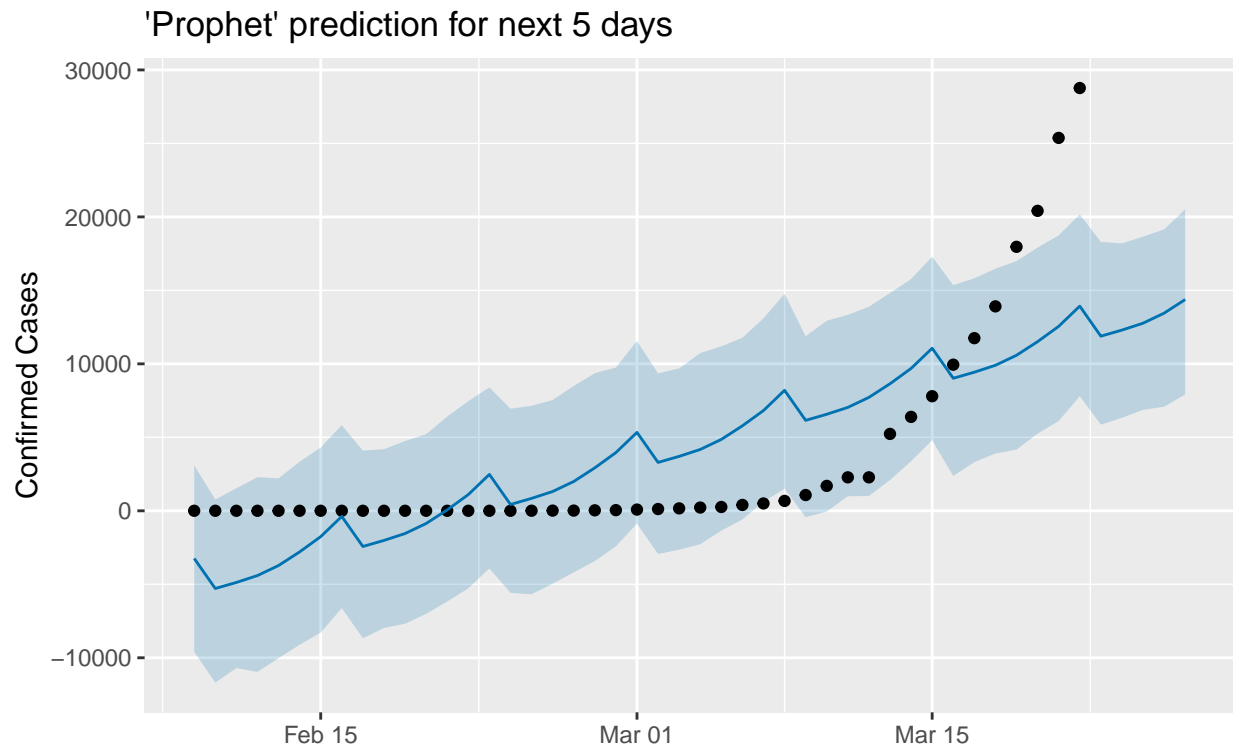


Figure 8: PROPHET Projection of confirmed cases over the next 5 days for Spain

Table 2: PROPHET of 'confirmed cases' for 5 days ahead for Spain

	Future_Date	Estimation	Confidence 95% (Low)	Confidence 95% (High)
<b>t+1</b>	2020-03-23	11882	5862	18299
<b>t+2</b>	2020-03-24	12296	6327	18196
<b>t+3</b>	2020-03-25	12765	6871	18657
<b>t+4</b>	2020-03-26	13448	7080	19142
<b>t+5</b>	2020-03-27	14375	7915	20517