

# Covid19 Report

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## 1 The *CRISTINA* project

This report is part of a research project “**Co**Rona vIrus **Spa**Tial **a**NAlysis” (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

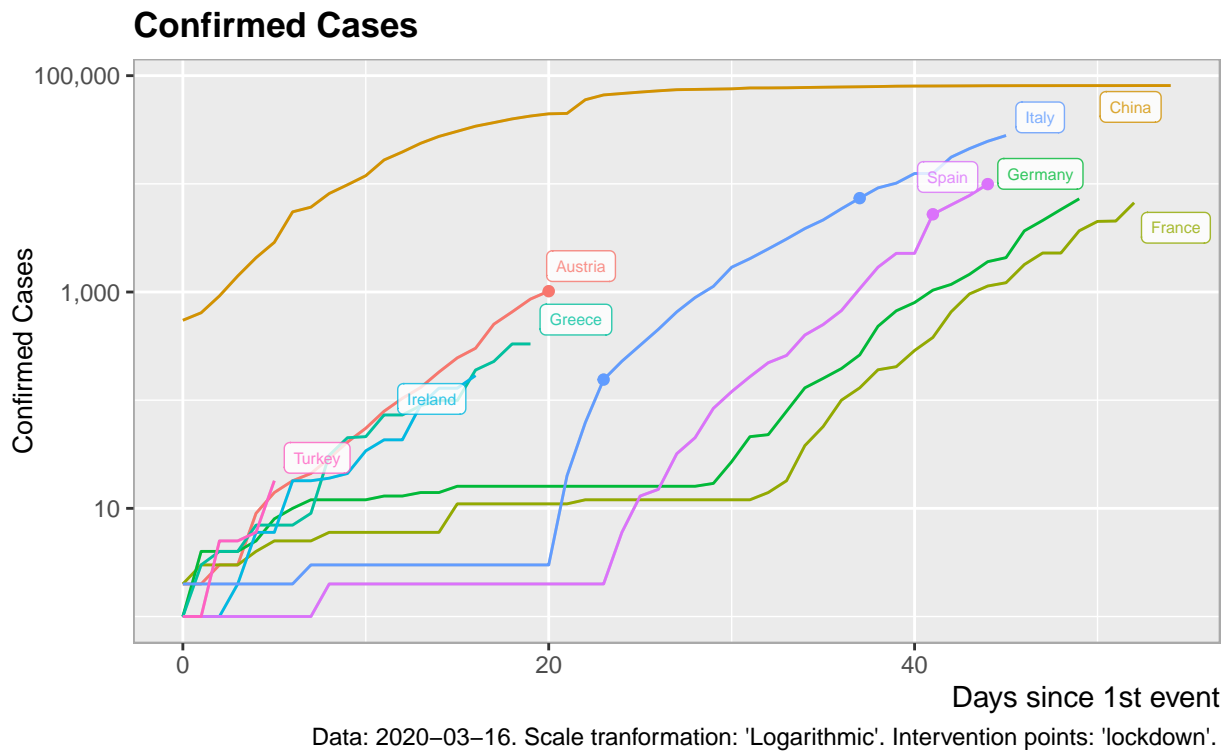


Figure 1: Confirmed Cases

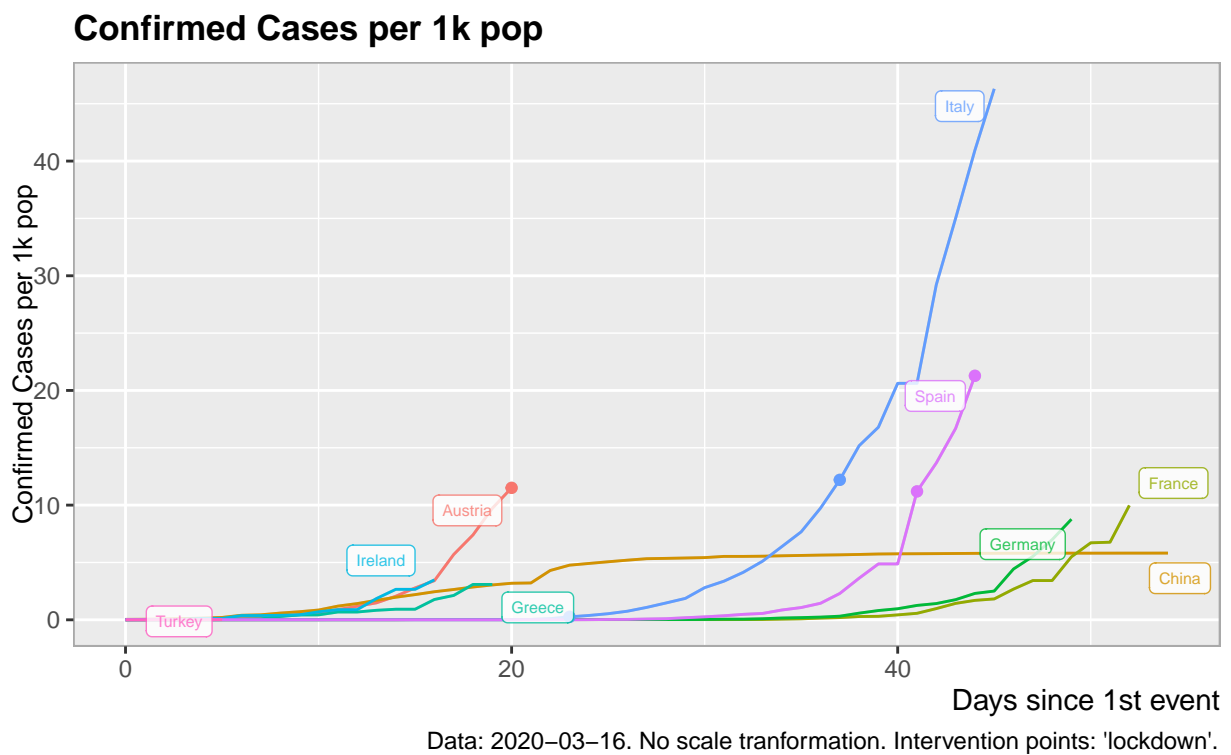


Figure 2: Confirmed Cases by 1000 population

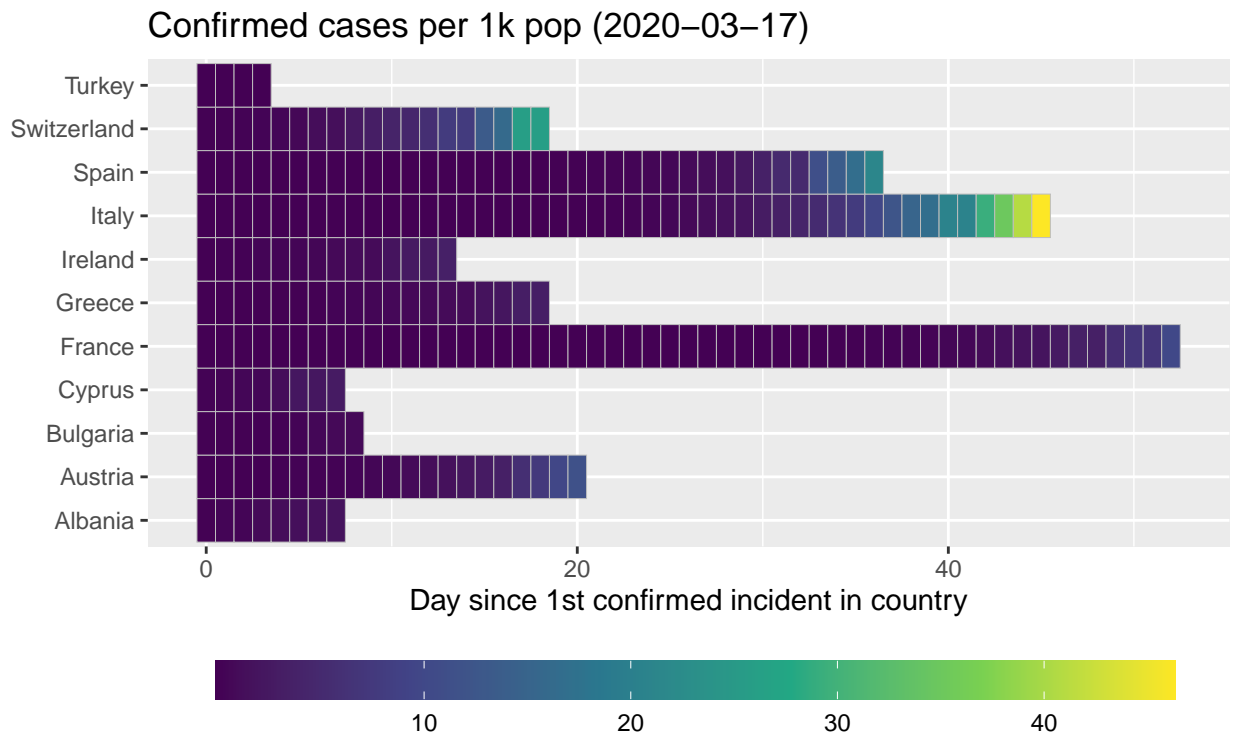


Figure 3: Confirmed Cases by 1000 population

## 2.2 Deaths

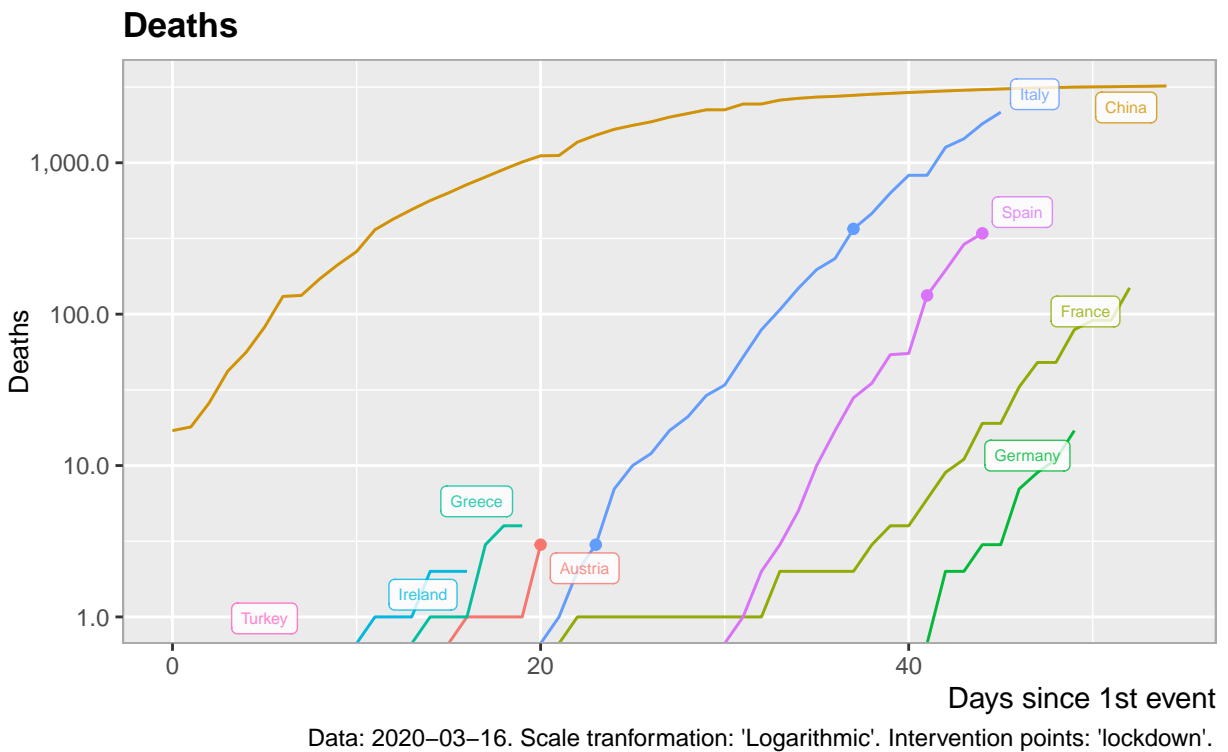


Figure 4: Number of deaths by country

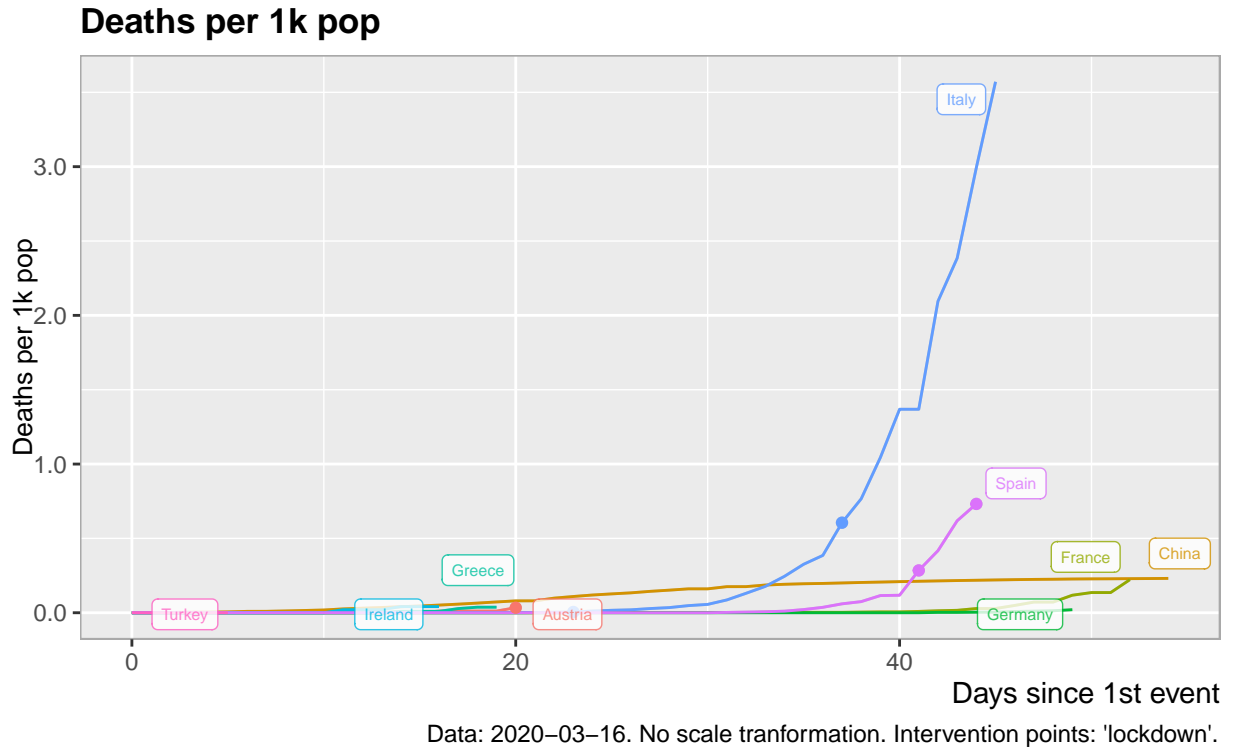


Figure 5: Deaths by 1000 population

### 3 Rate of change over time

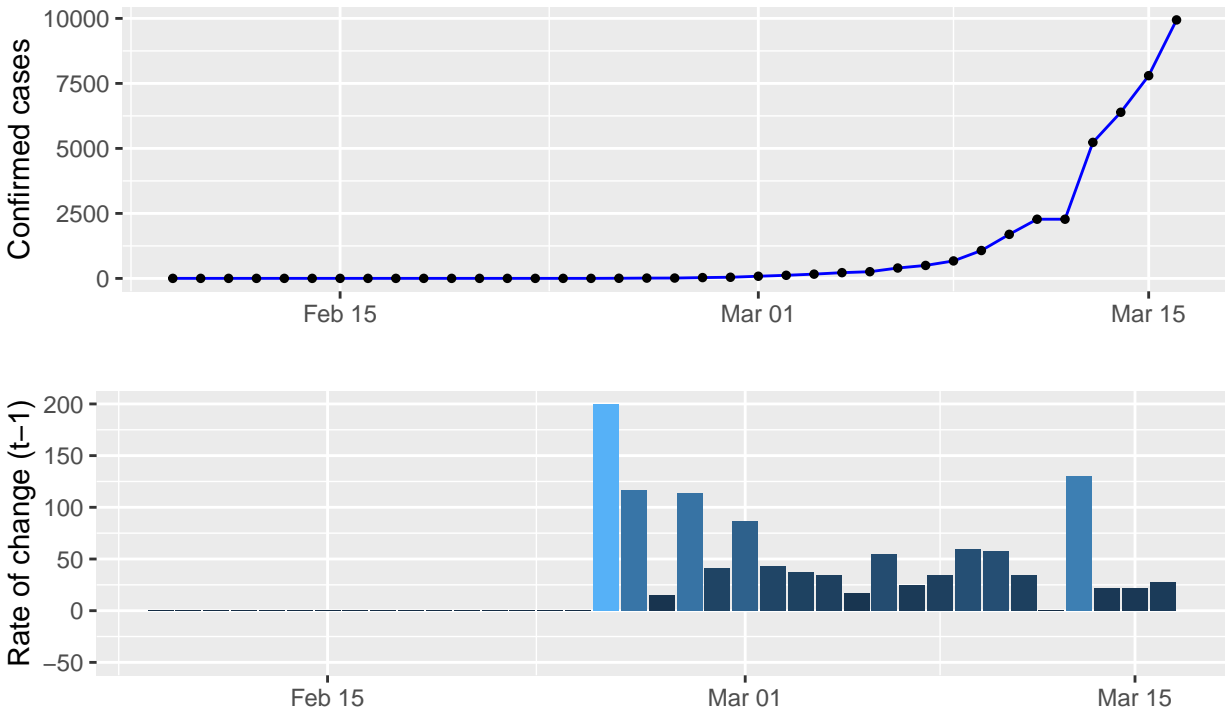


Figure 6: Rate of change of confirmed cases

## 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

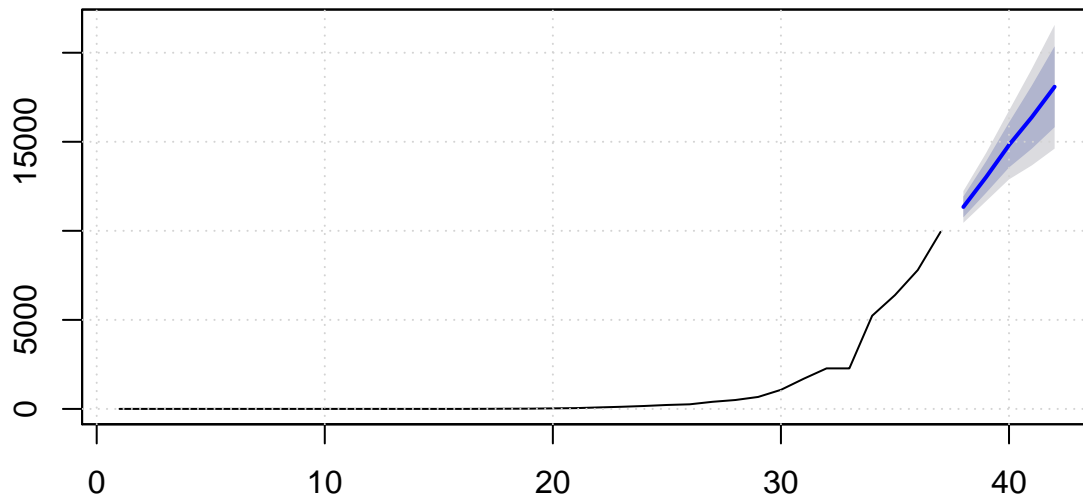


Figure 7: ARIMA projection

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

	Estimation	Confidence 95% (Low)	Confidence 95% (High)
<b>t+1 (2020-03-17)</b>	11340	10451	12230
<b>t+2 (2020-03-18)</b>	13023	11668	14377
<b>t+3 (2020-03-19)</b>	14818	12888	16748
<b>t+4 (2020-03-20)</b>	16382	13673	19091
<b>t+5 (2020-03-21)</b>	18089	14616	21562

- The estimated proportion of cases detected is 0.21%.
- With data up to 2020-03-16 in Spain we have 9942 confirmed cases and 342 deaths.
- Estimated doubling time (based on 5 days time window) is approximately 2.1 days

## 4.2 PROPHET projection

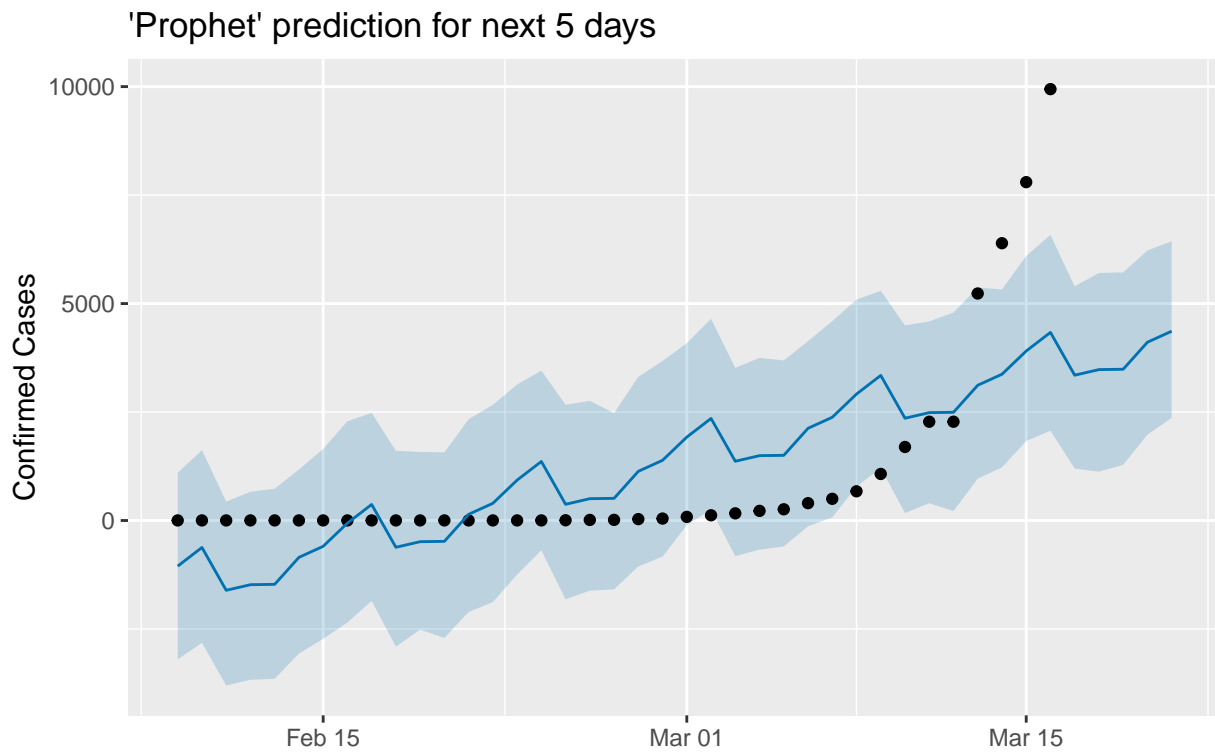


Figure 8: PROPHET Projection of confirmed cases over the next 5 days for Spain

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>	2020-03-17	3349	1197	5398
<b>t+2</b>	2020-03-18	3478	1126	5706
<b>t+3</b>	2020-03-19	3486	1283	5719
<b>t+4</b>	2020-03-20	4109	1978	6224
<b>t+5</b>	2020-03-21	4363	2365	6435