

# 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

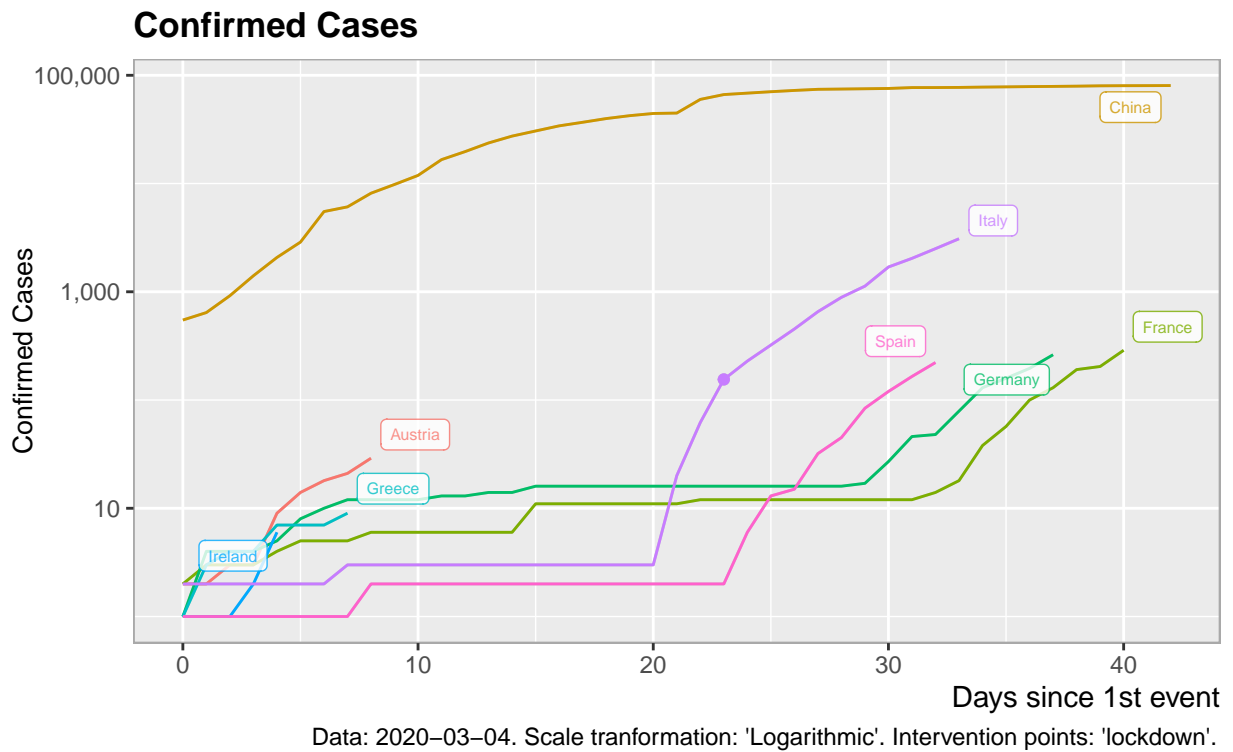


Figure 1: Confirmed Cases

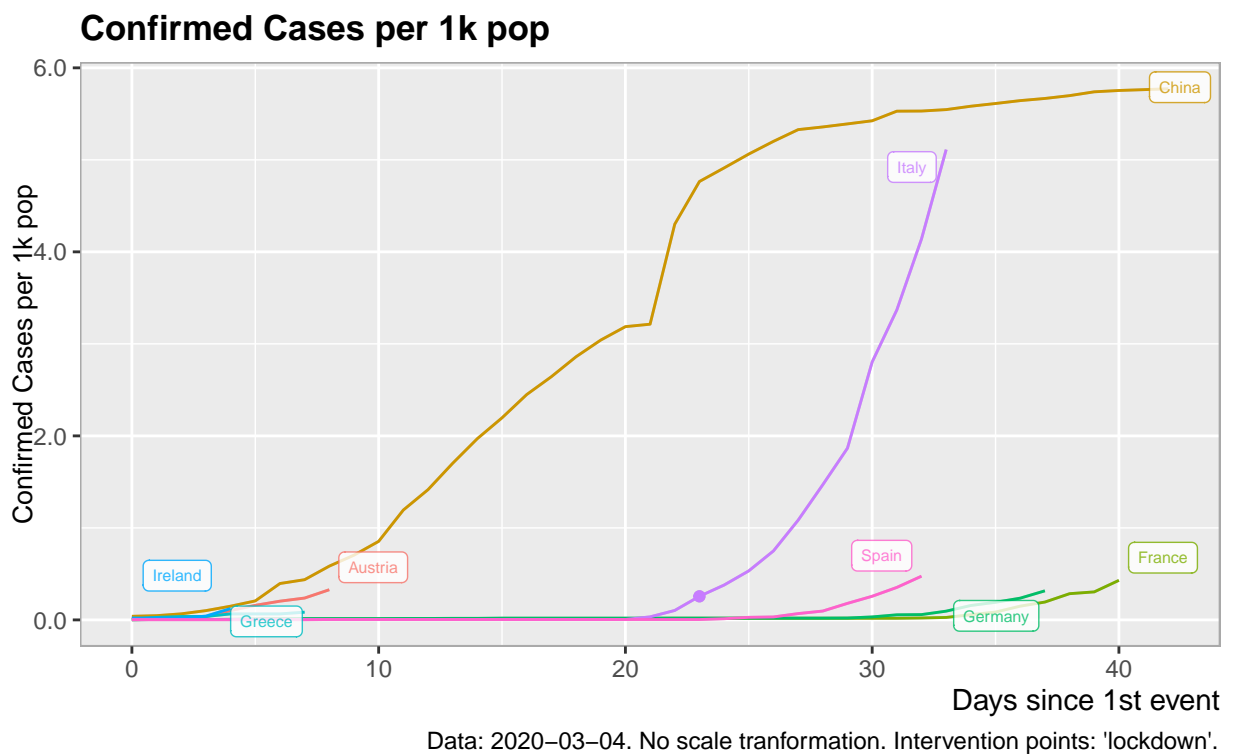


Figure 2: Confirmed Cases by 1000 population

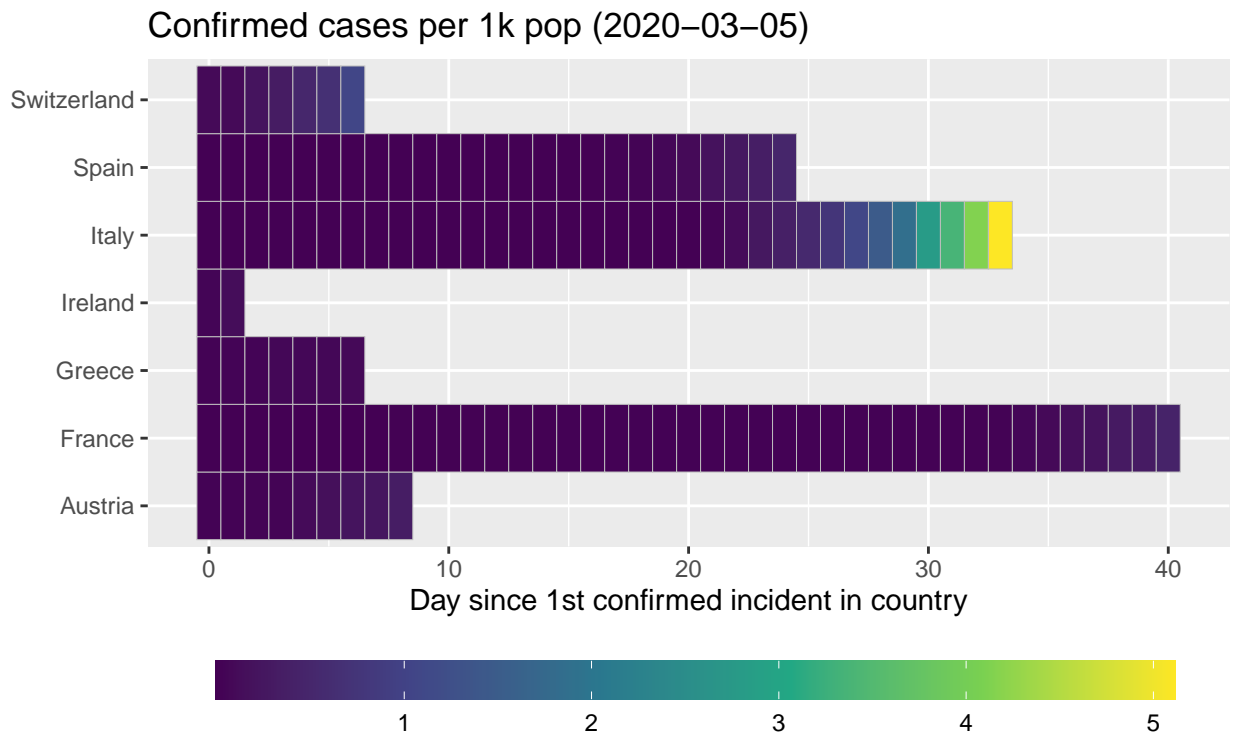
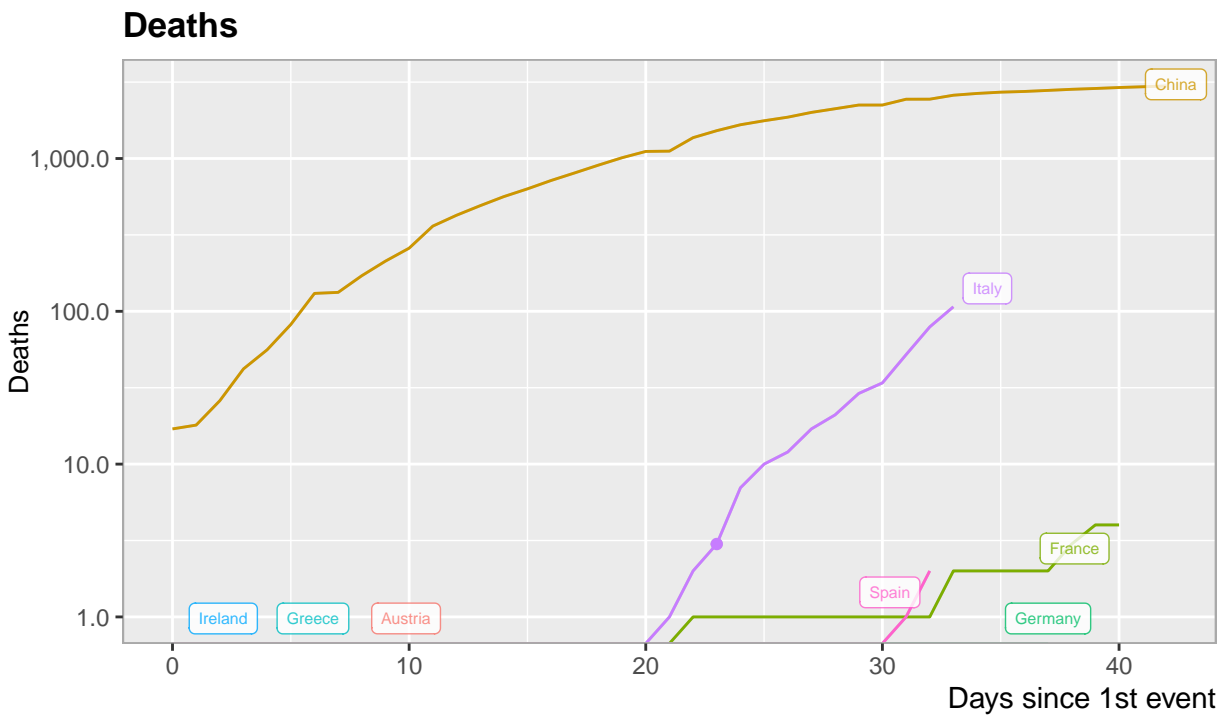


Figure 3: Confirmed Cases by 1000 population

## 2.2 Deaths



Data: 2020-03-04. Scale tranformation: 'Logarithmic'. Intervention points: 'lockdown'.

Figure 4: Number of deaths by country

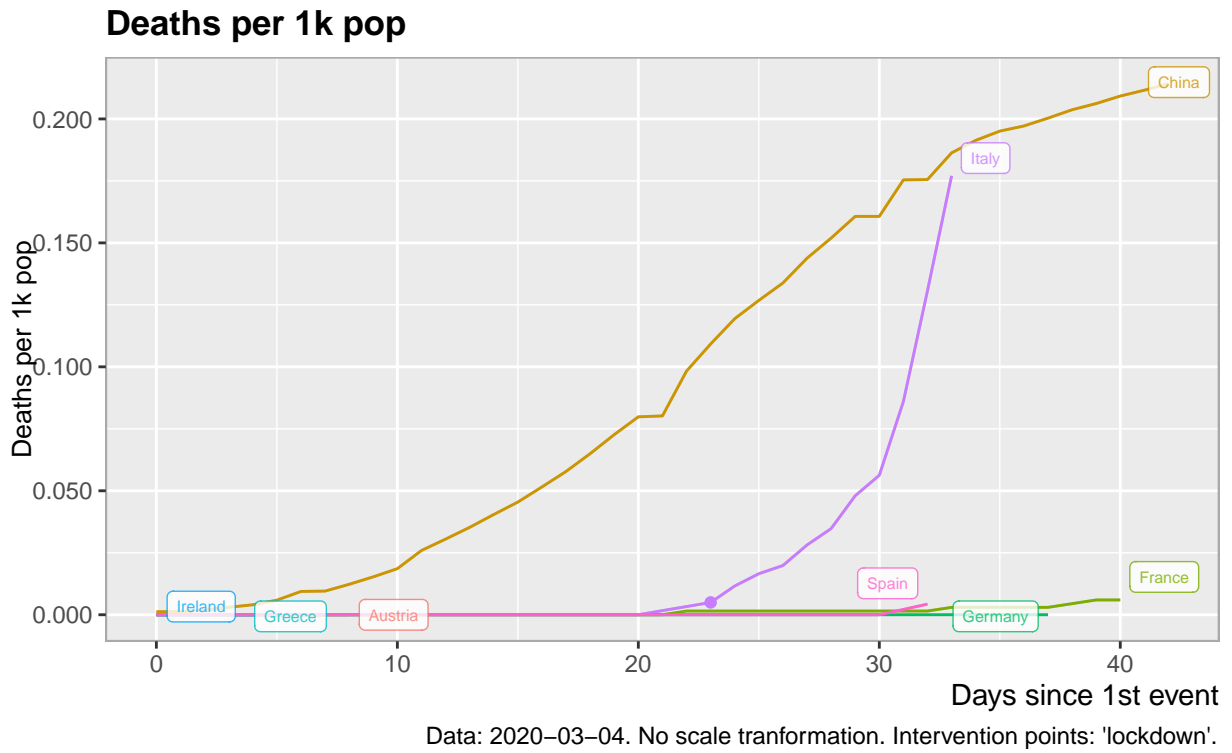


Figure 5: Deaths by 1000 population

### 3 Rate of change over time

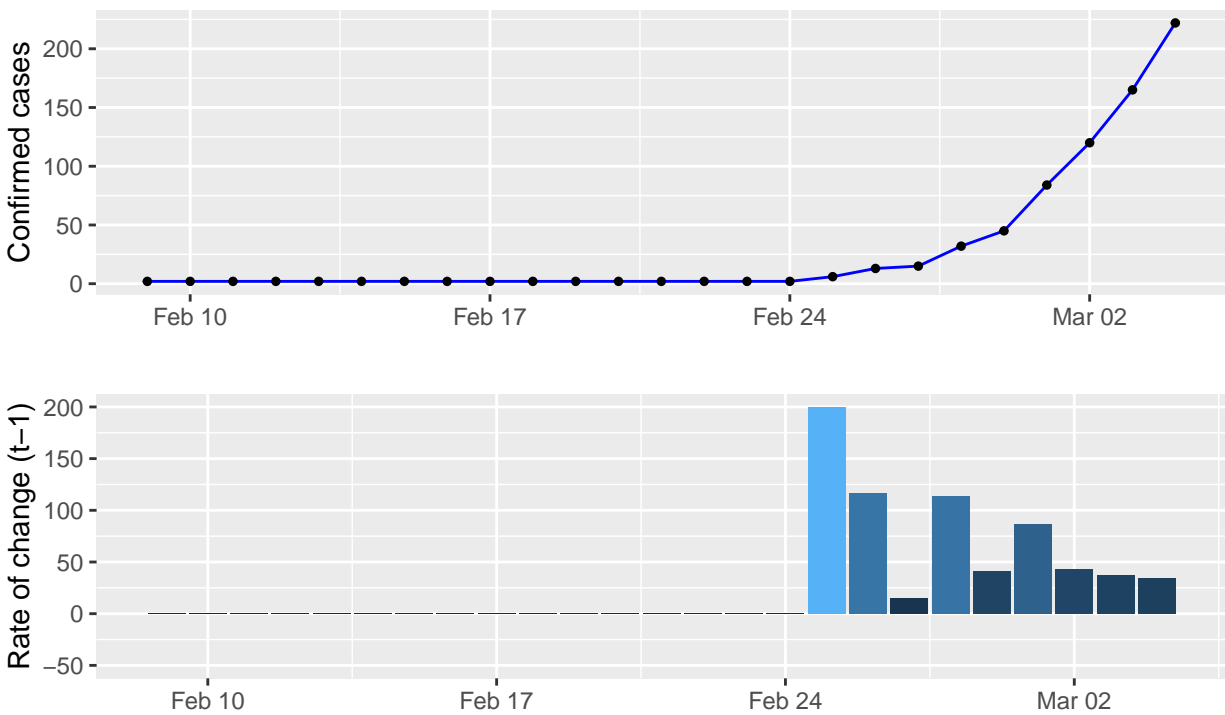


Figure 6: Rate of change of confirmed cases

## 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

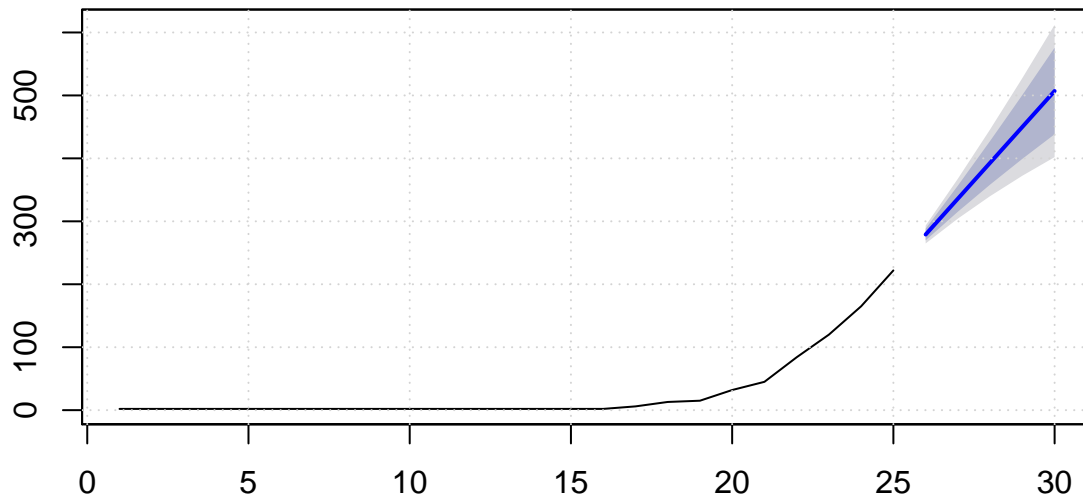


Figure 7: ARIMA projection

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

	Estimation	Confidence 95% (Low)	Confidence 95% (High)
<b>t+1 (2020-03-05)</b>	279	264.8	293.2
<b>t+2 (2020-03-06)</b>	336	304.3	367.7
<b>t+3 (2020-03-07)</b>	393	340	446
<b>t+4 (2020-03-08)</b>	450	372.4	527.6
<b>t+5 (2020-03-09)</b>	507	402	612

- We cannot estimate the detection percentage yet. We need more data.
- With data up to 2020-03-04 in Spain we have 222 confirmed cases and 2 deaths.
- Estimated doubling time (based on 5 days time window) is approximately 1.8 days

## 4.2 PROPHET projection

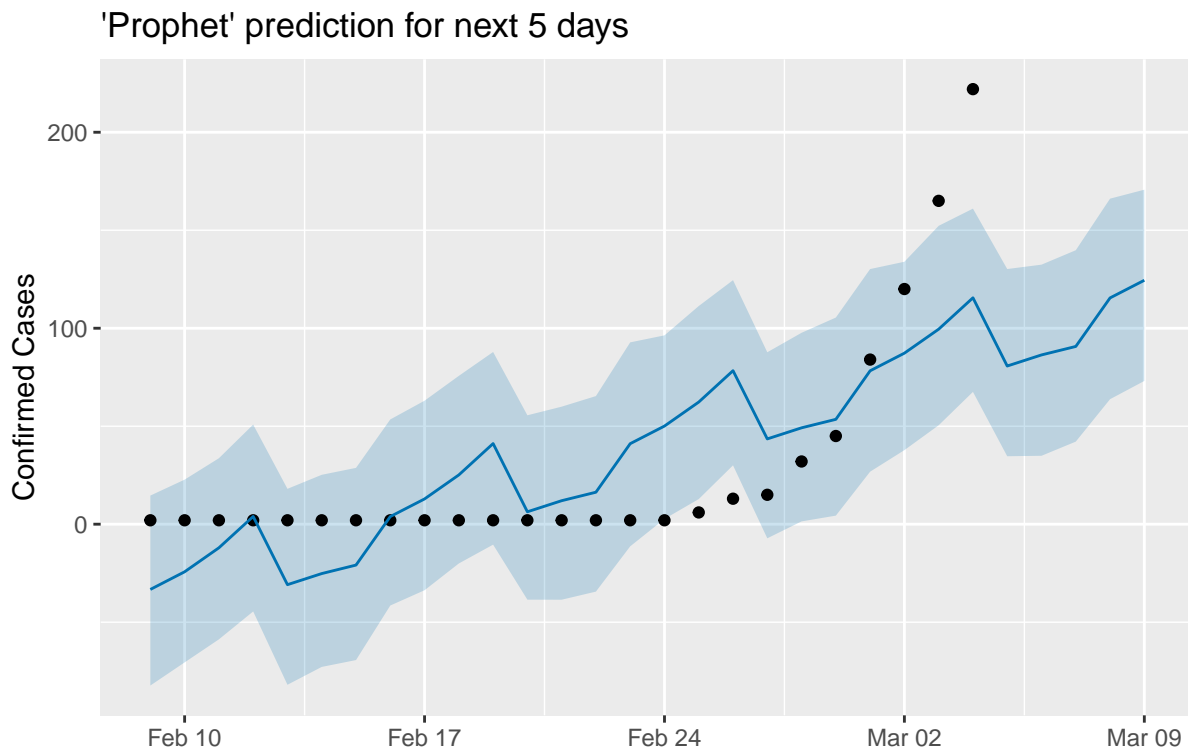


Figure 8: PROPHET Projection of confirmed cases over the next 5 days for Spain

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>	2020-03-05	80.71	34.68	130.2
<b>t+2</b>	2020-03-06	86.37	34.91	132.4
<b>t+3</b>	2020-03-07	90.7	42.14	139.8
<b>t+4</b>	2020-03-08	115.5	63.78	166.1
<b>t+5</b>	2020-03-09	124.5	73.09	170.7