

# A Report in Fifteen Tweets. 14 April 2020

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## TWEET 1 14Apr2020

Today 14Apr20, a month after we released our report dated 14Mar20

[https://www.dropbox.com/s/r4gxdvlnrxet1i/1.The Corona Chronologies.%20Part%20I%20-%20China.%20Part%20II.%20Rest of World Michael Levitt%2CStanford r.pdf?dl=0](https://www.dropbox.com/s/r4gxdvlnrxet1i/1.The_Corona_Chronologies.%20Part%20I%20-%20China.%20Part%20II.%20Rest_of_World_Michael_Levitt%2CStanford_r.pdf?dl=0), we see optimistic signs that COVID-19 is contained in the Western World where it wreaked such havoc in deaths, panic, economic loss & political turmoil. Details to follow...

## TWEET 2 14Apr2020

It is also three weeks since my optimistic interviews in the Calcalist

<https://www.calcalistech.com/ctech/articles/0,7340,L-3800632,00.html> and LA Times  
<https://www.latimes.com/science/story/2020-03-22/coronavirus-outbreak-nobel-laureate>

## TWEET 3 14Apr2020

This is a team effort involving Francesco Zonta (Shanghaitech), Frédéric Poitevin, João Rodrigues, Fatima Pardo-Avila and Andrea Scaiewicz (all Stanford).

## TWEET 4 14Apr2020

We also had discussions and shared ideas with Eran Bendavid (Stanford), Cathrine Bergh (Royal Institute of Technology, Sweden) and Siri Camee van Keulen (Utrecht University, The Netherlands).

## TWEET 5 14Apr2020

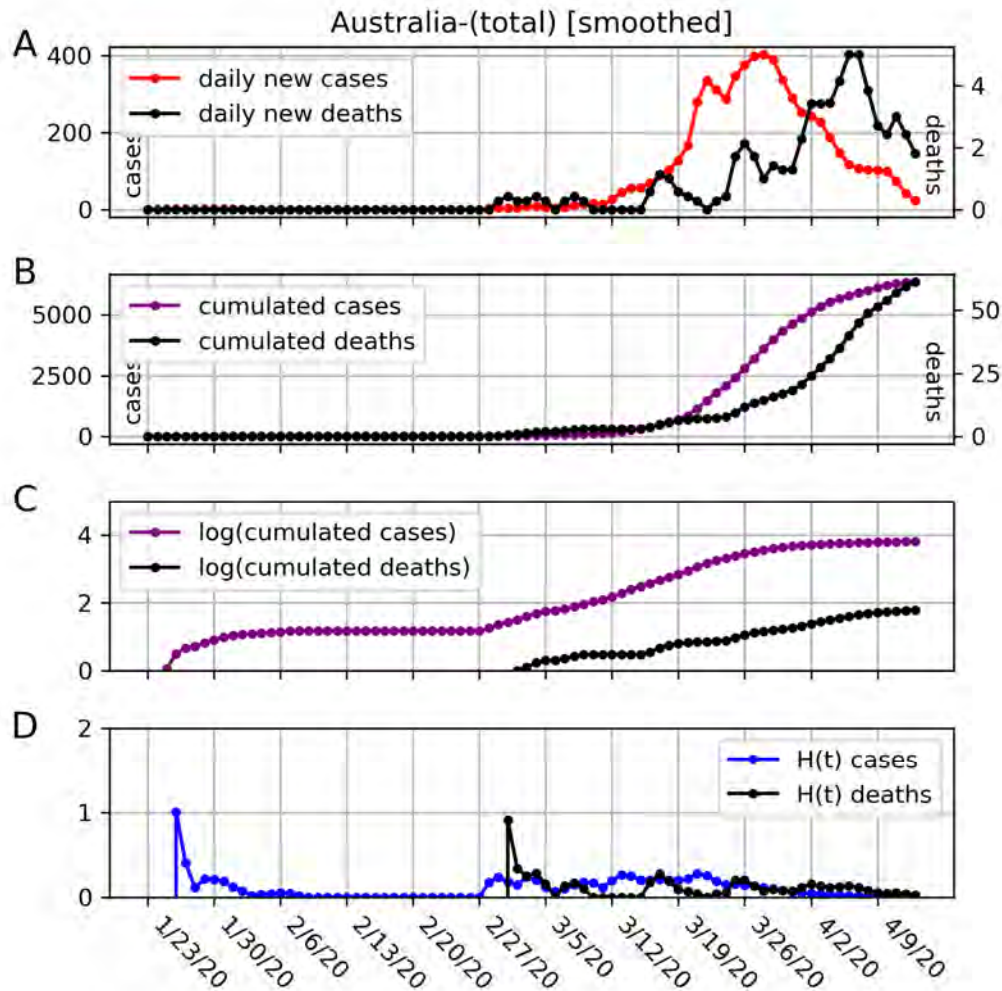
All the countries discussed here seem to be past the two critical milestones, the peak in new cases and the peak in new deaths. We like to wait five days before being certain that this is a not a peak of a one of many outbreaks. Still,

### TWEET 6 14Apr2020

Before I release the results, we worry that due to the long Easter weekend there may be massive under-reporting of deaths in western countries. If true, it makes all the study of numbers futile so I am prepared to take the numbers at face value.

### TWEET 7 14Apr2020

An clear situation in Australia with new deaths following new cases, with the same 9 Day delay between a new case and a new death seen in China (14Mar20 report p6, p7).

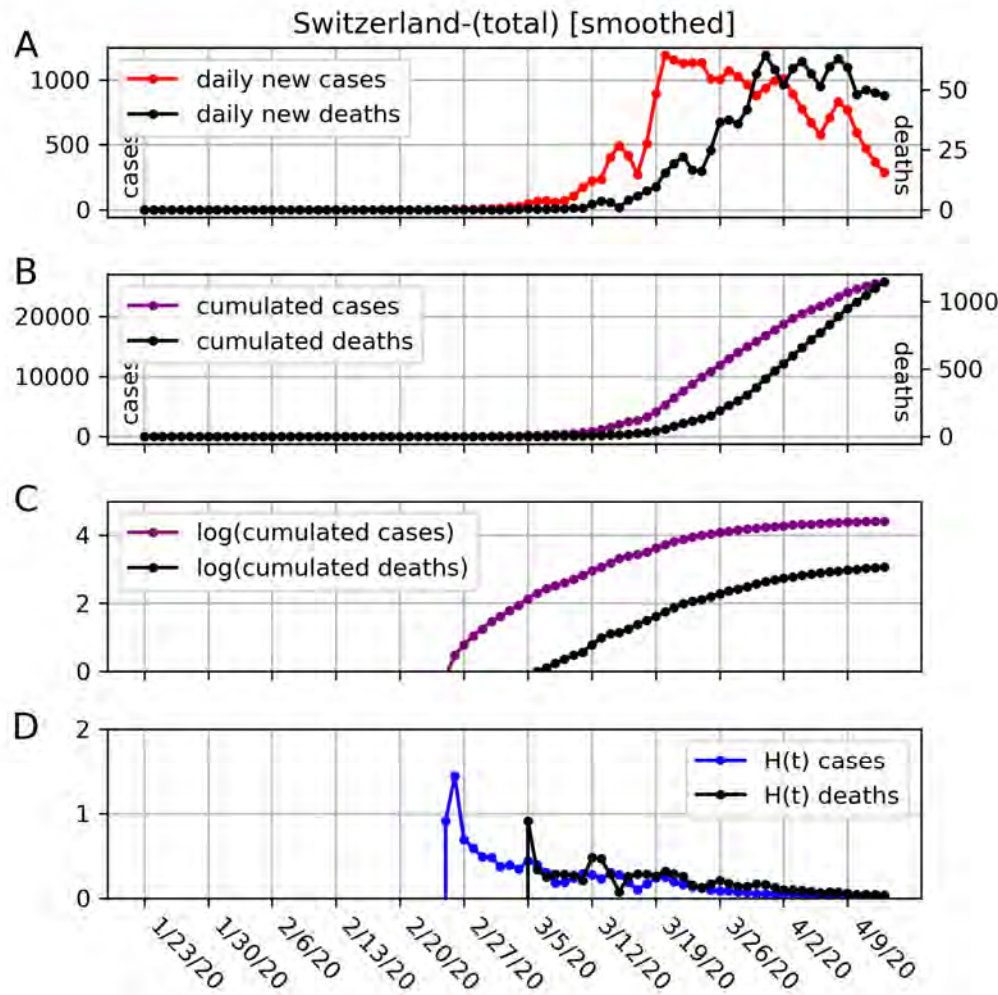


### TWEET 8 14Apr2020

I forgot to add that  $H(t)$  is the log of the Fraction Change or Change Ratio. The Change Ratio is the total number today divided by the total number yesterday.  $H(t)$  is also the change in  $\log(\text{number})$  from yesterday to today or the slope of the  $\log(\text{number})$  curve.

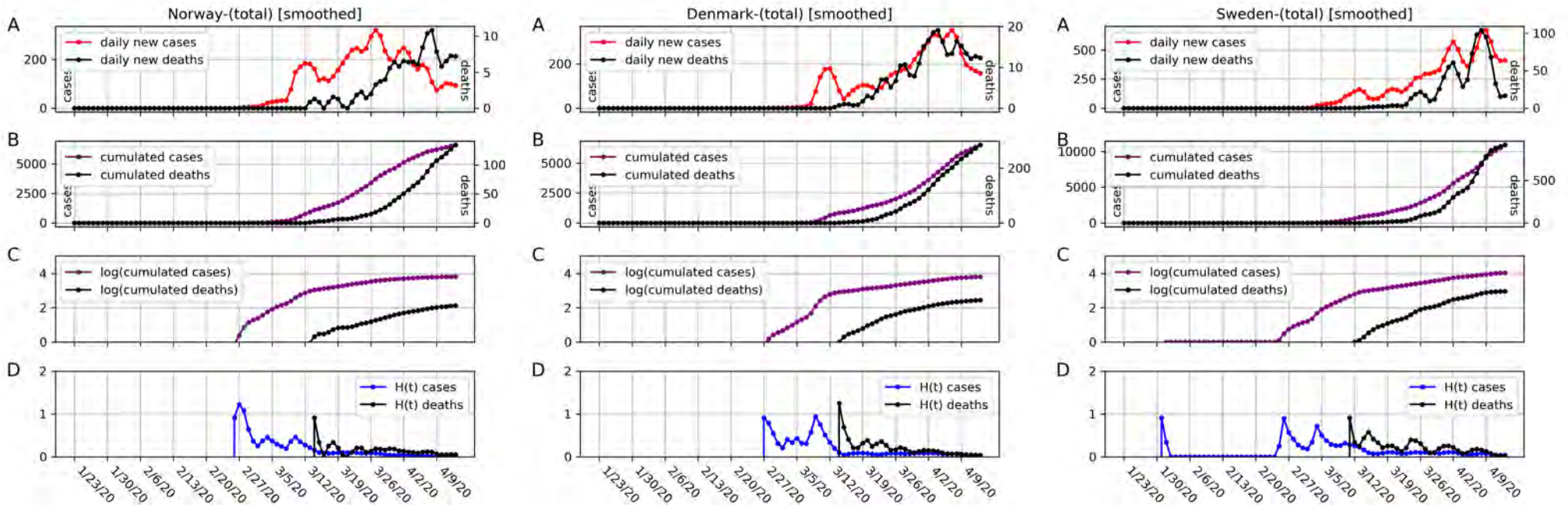
### TWEET 9 14Apr2020

Now Switzerland, a difficult case with many independent outbreaks that lead to a broad peak of new cases. As a result, there is broad peak in new deaths 10 days later but new deaths are on the way down.



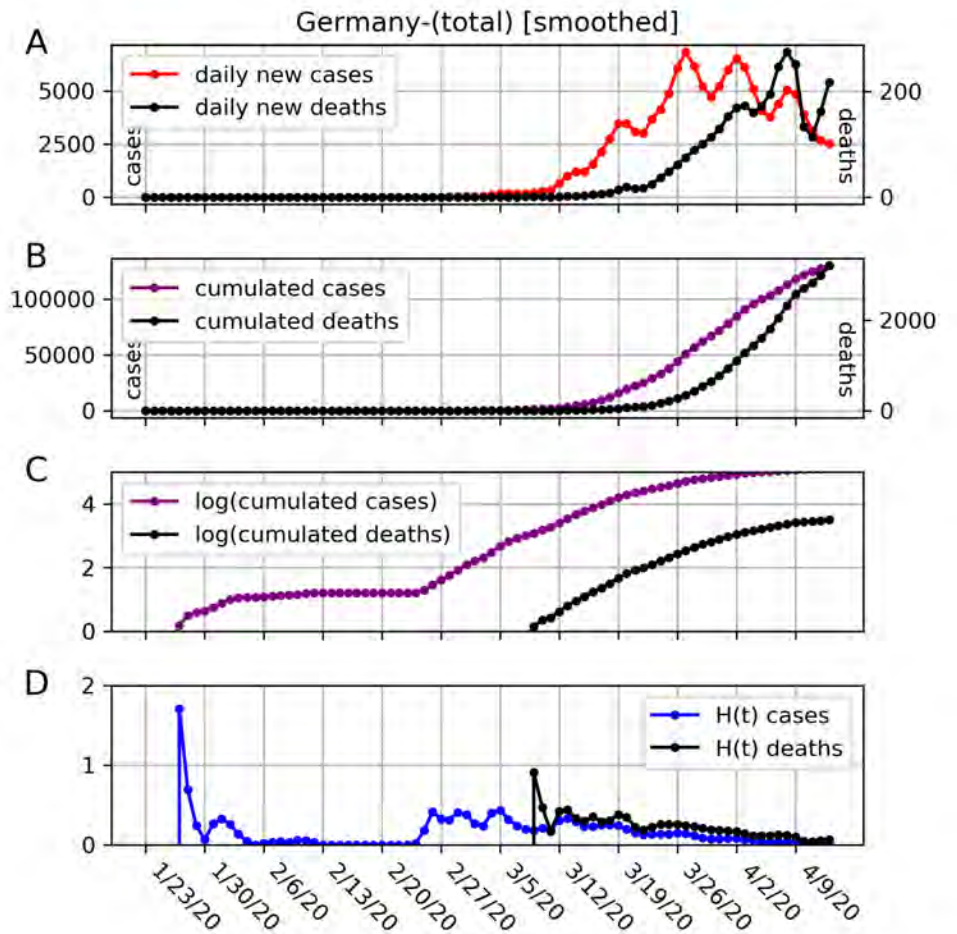
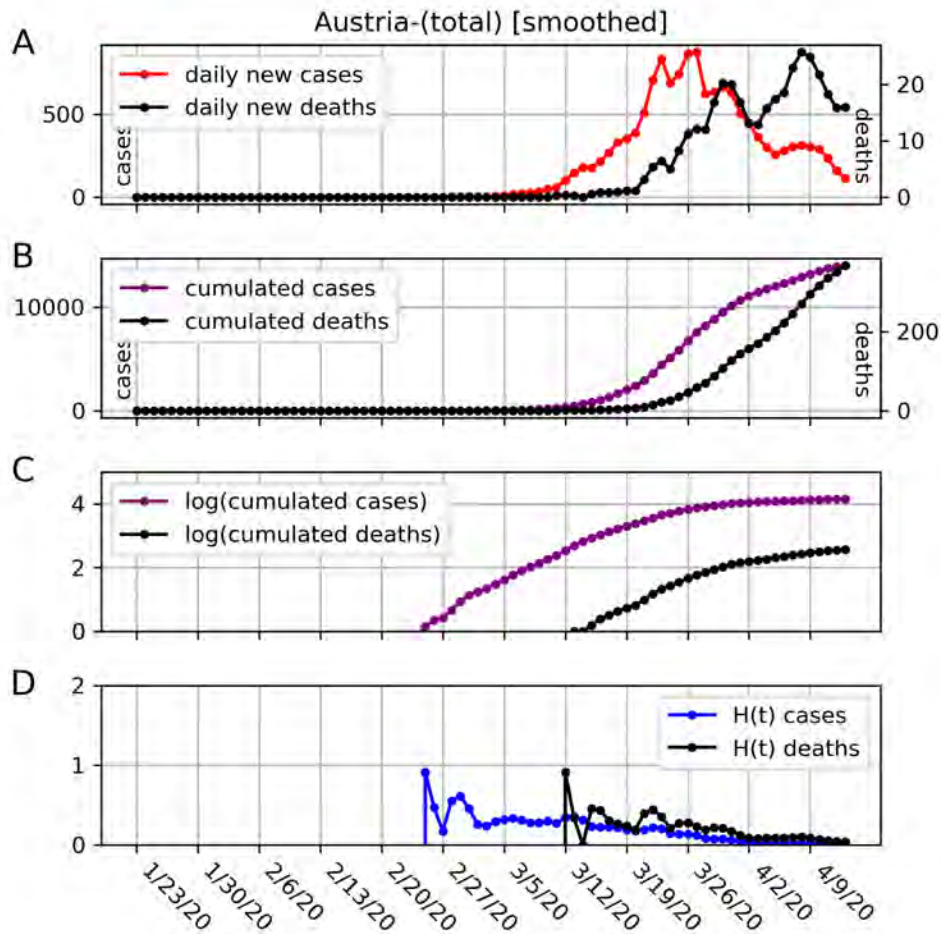
## TWEET 10 14Apr2020

Three Scandinavian countries are doing well. In Norway, there is the expected 9 day gap between cases and deaths, In Denmark and Sweden, new deaths follow new cases with very little delay suggesting that cases are defined differently.



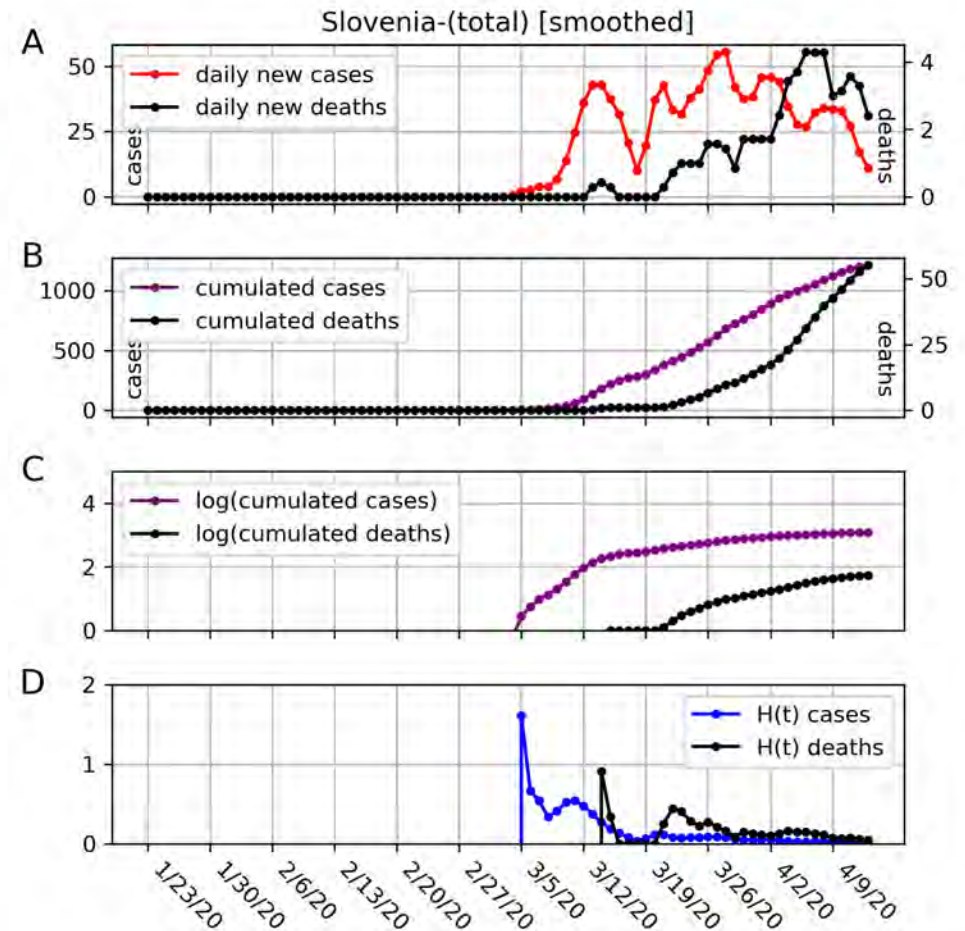
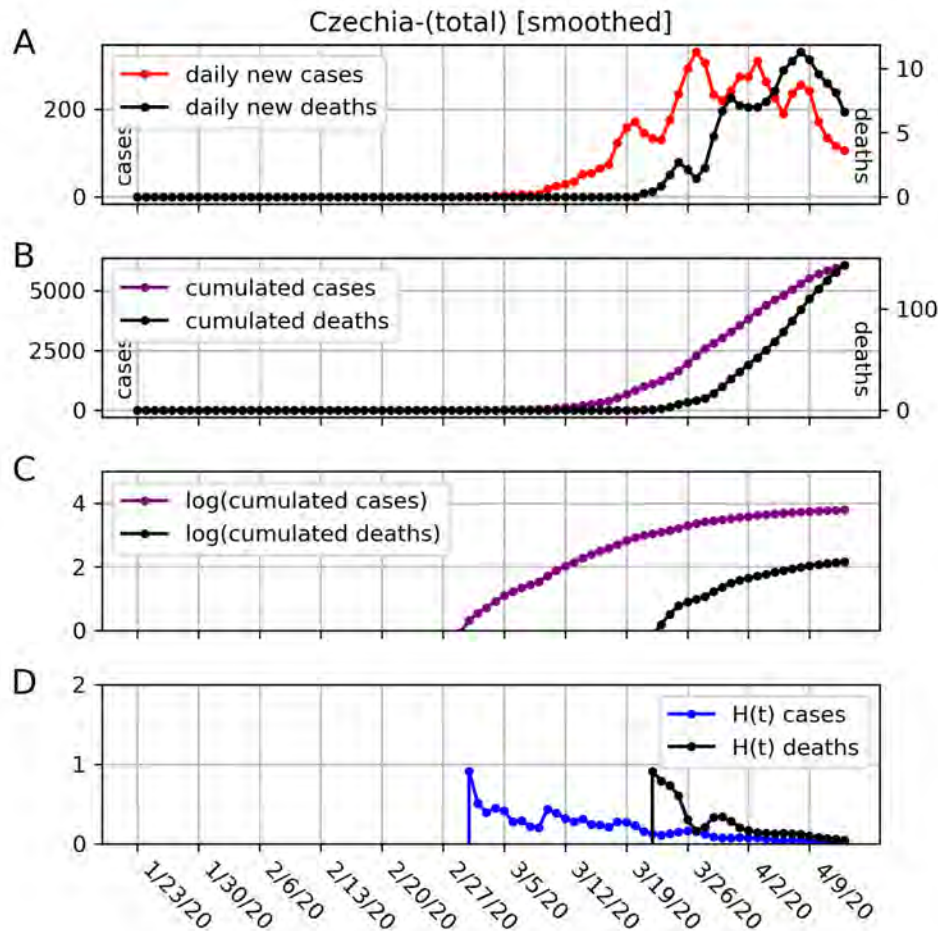
TWEET 11 14Apr2020

Austria and Germany also seem to have controlled their COVID-19 epidemics. The gap between new cases and new deaths is about 12 days, slightly longer than that seen in China. We need to broadly apply the analysis from p7 of 14Mar20 Report.



TWEET 12 14Apr2020

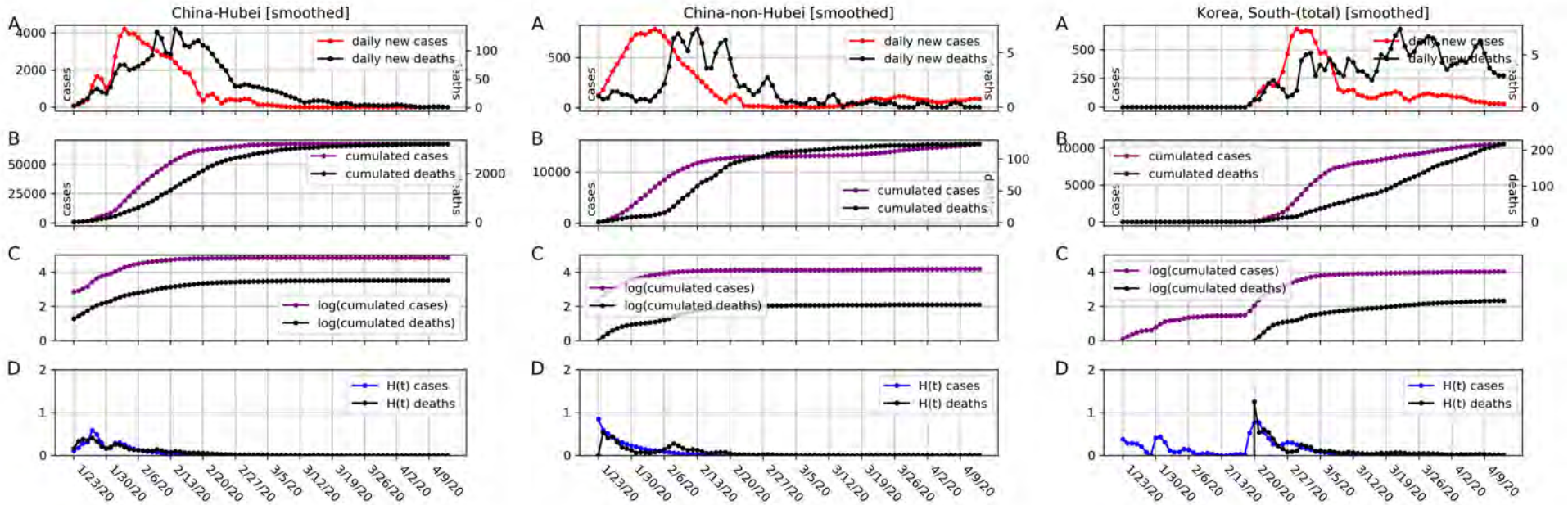
Finally for today here are Czechia and Slovenia showing patterns that you should all be familiar with by now. There are more countries in our boundary zone that may be ready to call in a day or two. We also hope to have all graphs online. See <http://med.stanford.edu/levitt.html>



On further reflection, we add three additional Tweets to provide historical perspective.

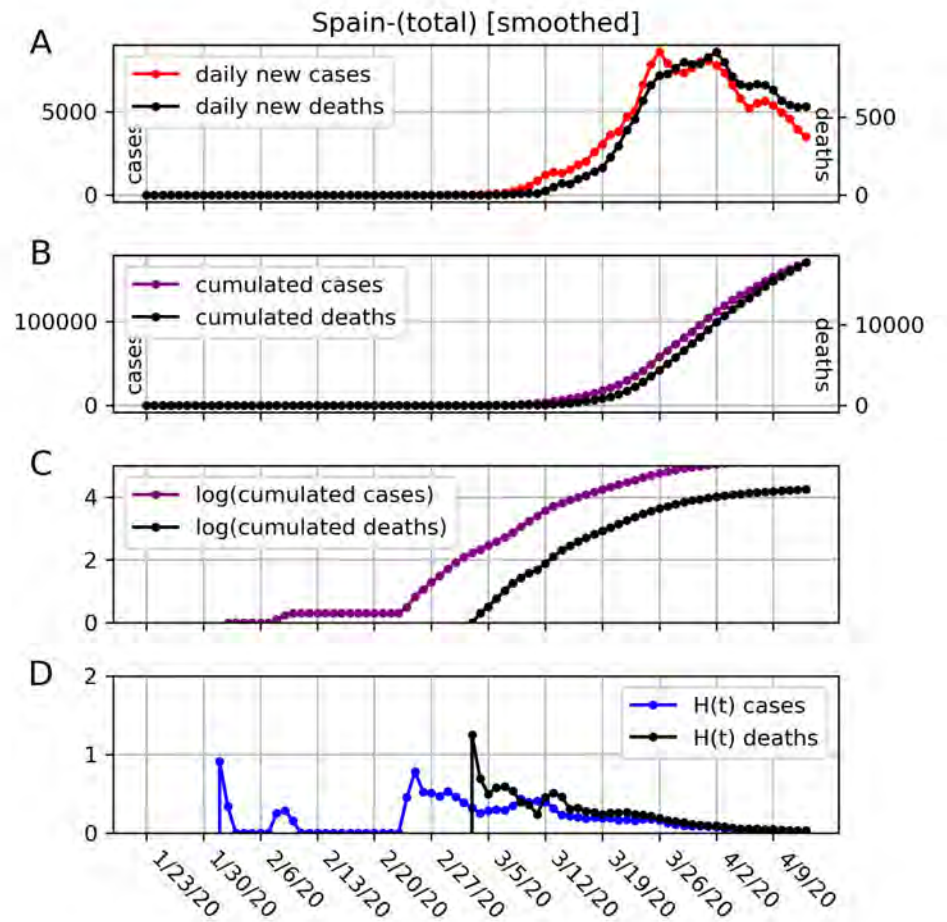
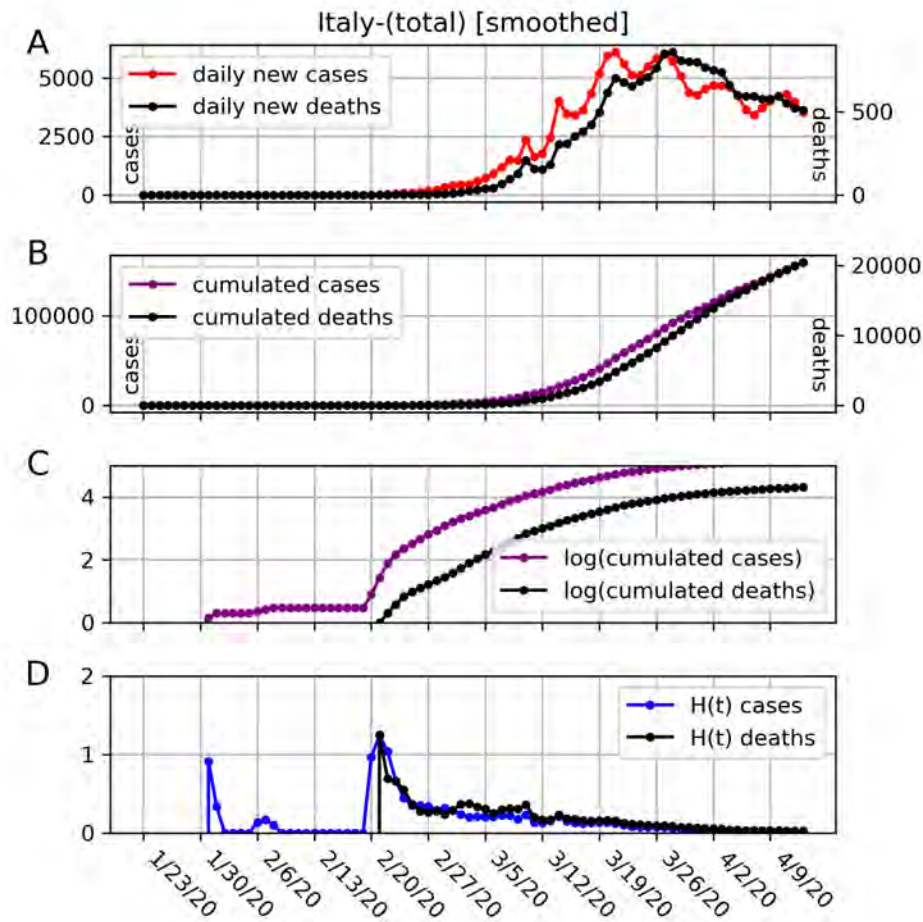
**TWEET 13 14Apr2020**

The same Levitt Lab plots for the 'classic' completely controlled epidemics in China distinguishing between Hubei and non-Hubei and in South Korea. Many distinct outbreaks are seen for South Korea (blue peaks in (D)). The number of total deaths keeps climbing in South Korea. Perhaps this is a controlled attempt to slowly achieve herd immunity. Does anyone know?



TWEET 14 14Apr2020

Levitt Lab plots for Italy and Spain. With their multiple outbreaks, gap between new cases & deaths of 2 to 4 days, and broad peaks, these curves look similar to one another but not the 'classics' of China and South Korea perhaps because of different population age profiles.





TWEET 15 14Apr2020

Levitt Lab plots for Iran, Iraq and Brazil. In Iran and Iraq, the apparent occurrence of new deaths before new cases is impossible and points to new cases being under reported. In Brazil there is no delay between new cases and new deaths.

