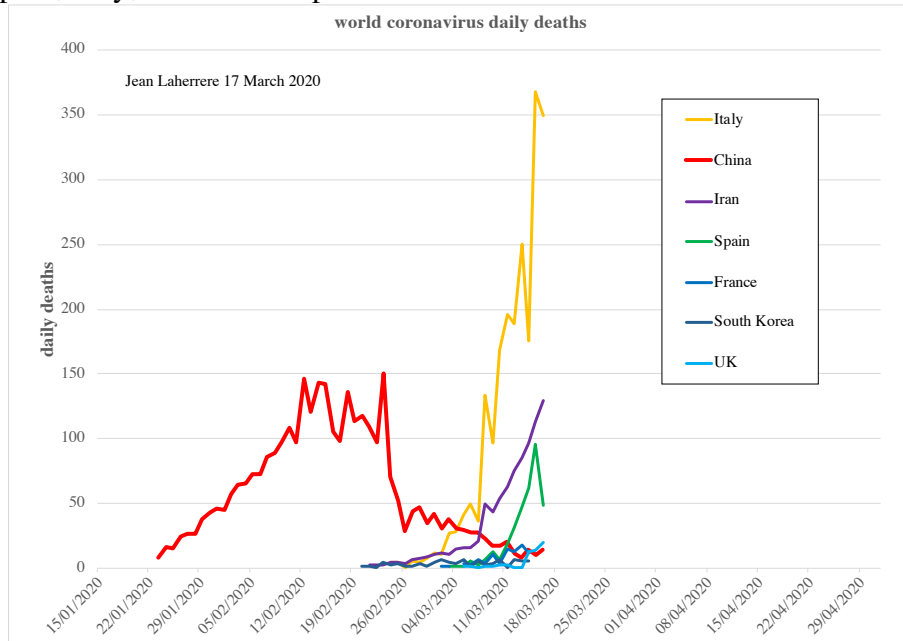


### Covid19 HL forecast update with data 16 March 2020

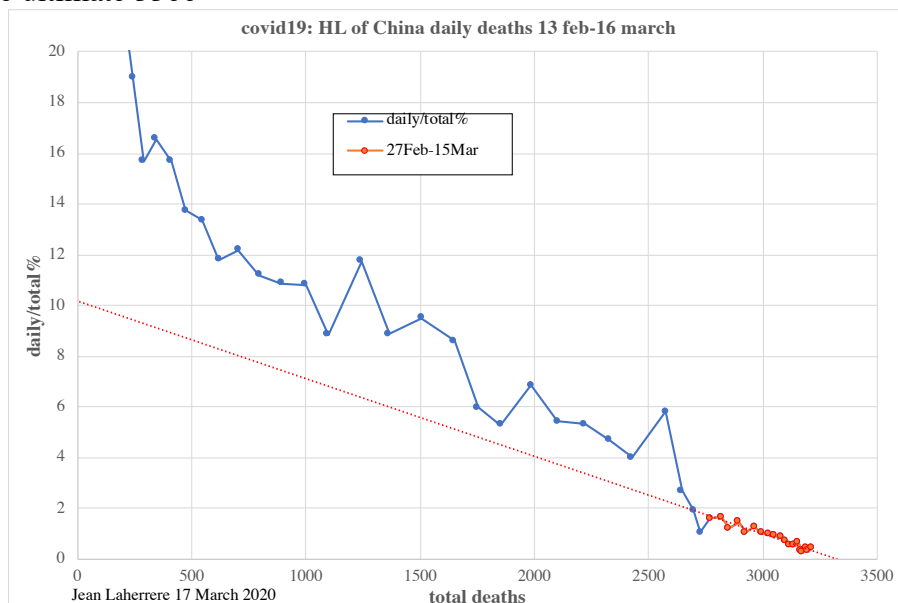
Yesterday forecast from 15 March data is found on <https://aspofrance.files.wordpress.com/2020/03/hlcovid19-16mars.pdf>  
<https://aspofrance.org/2020/03/16/using-hubbert-linearization-to-forecast-covid19-deaths>

Today, the update of the graphs with 16 March data brings big change in daily deaths, with decline in Spain, Italy, after the sharp increase of 15 March:

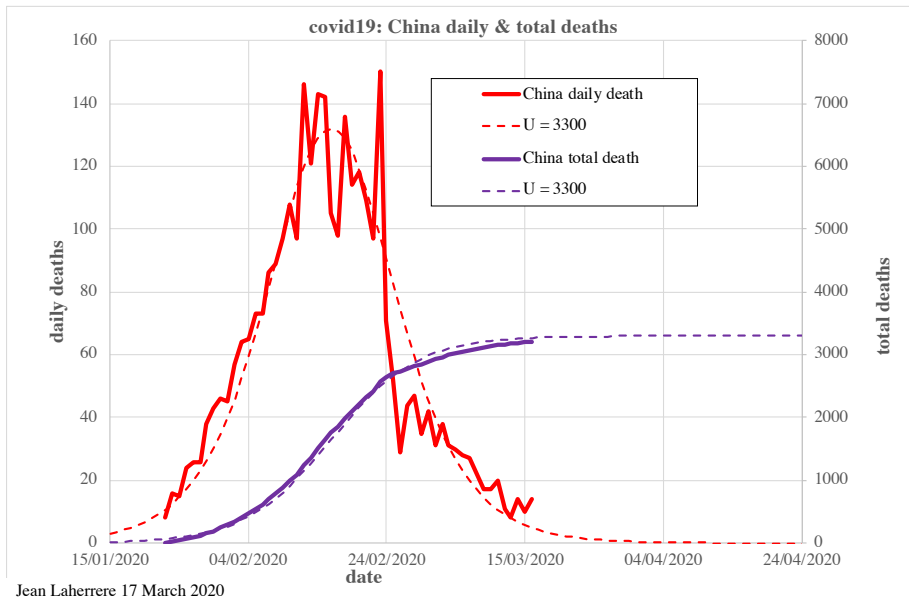


HL ultimate estimates are used to forecast the daily deaths peak and China is used as example

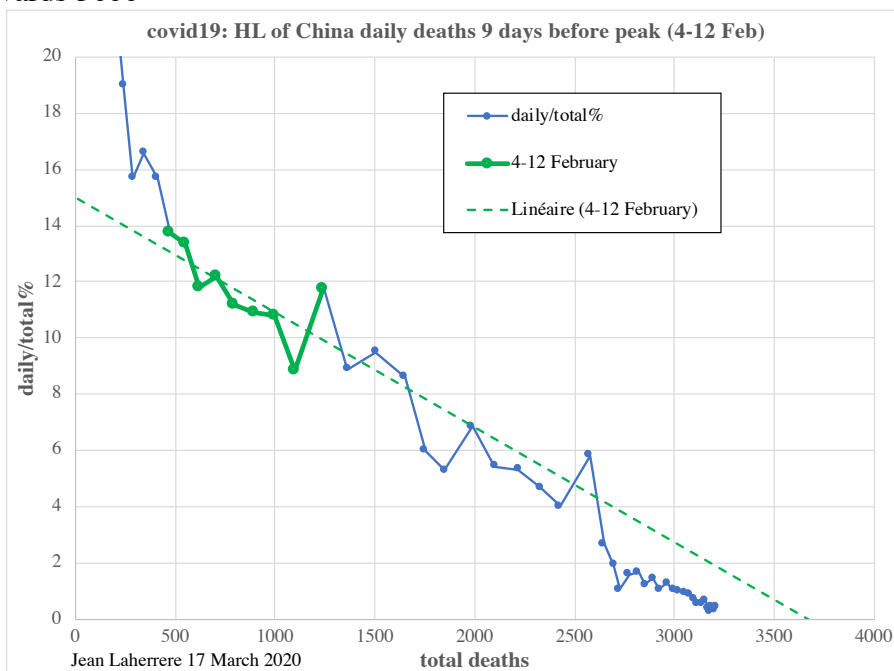
### China same ultimate 3300



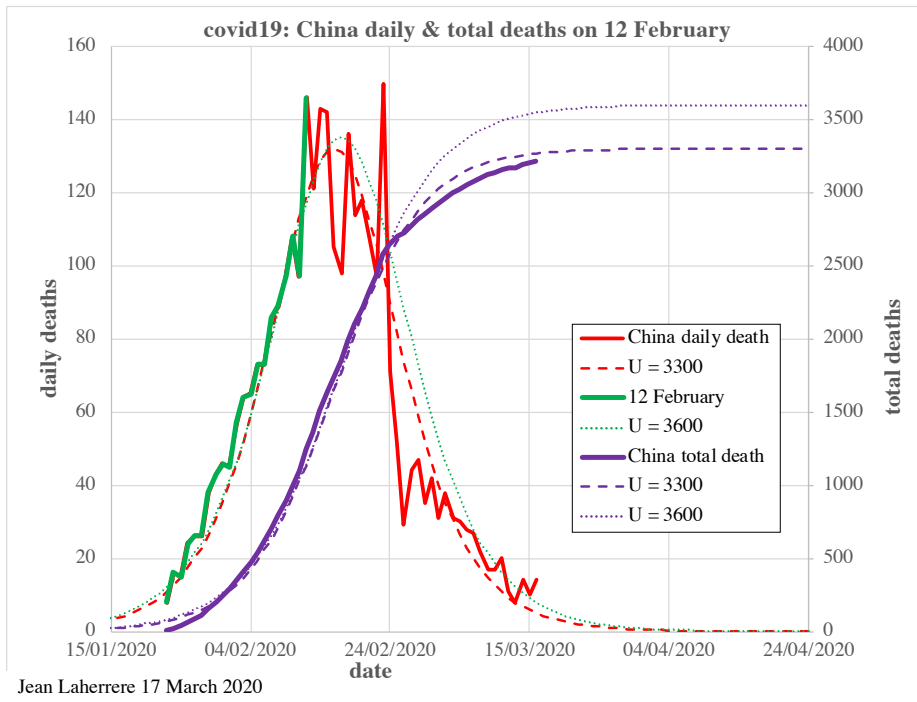
Peak was in fact a bumpy plateau around 15 February



The HL plot using only data for 9 days before peak = 4 to 12 February is shown in green and it trends towards 3600



With this 3600 ultimate, the daily forecast is close to the present forecast at 3300

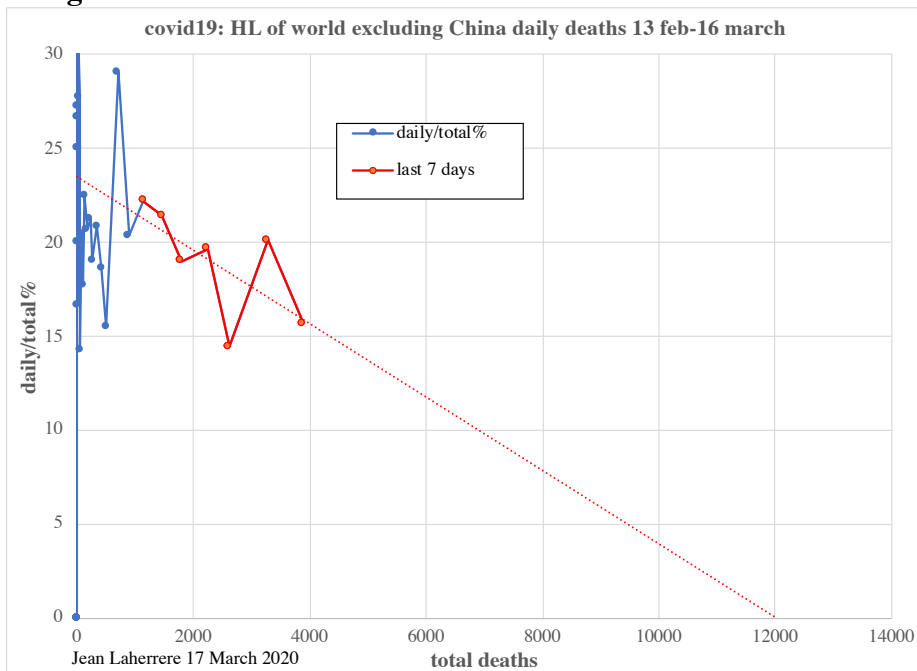


Jean Laherrere 17 March 2020

It means that HL can before peak give good forecast.

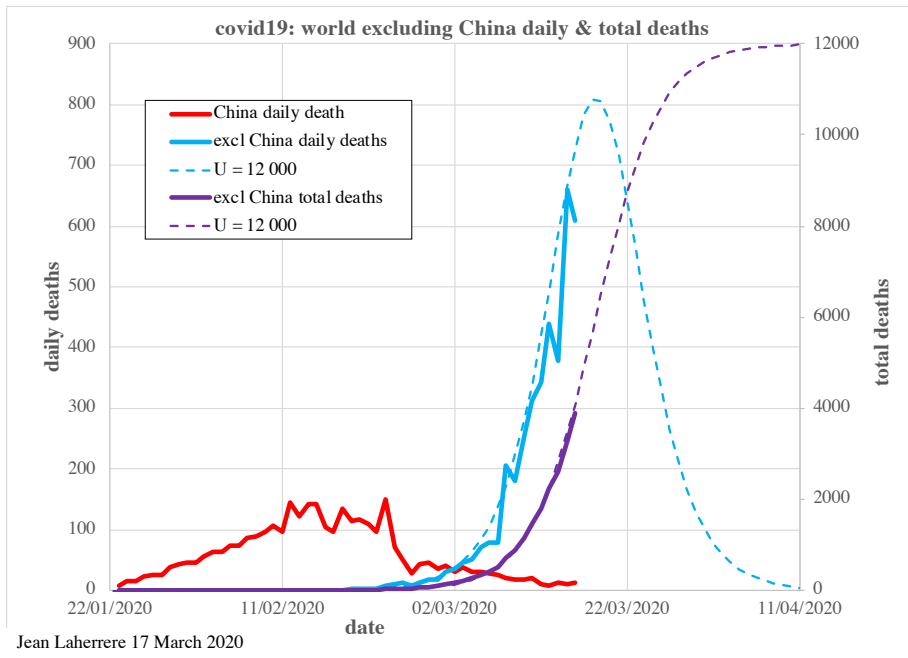
It shows also that real data are below after 24 February, meaning the Chinese restrictions of move save lifes

**World excluding China : same ultimate of 12 000**



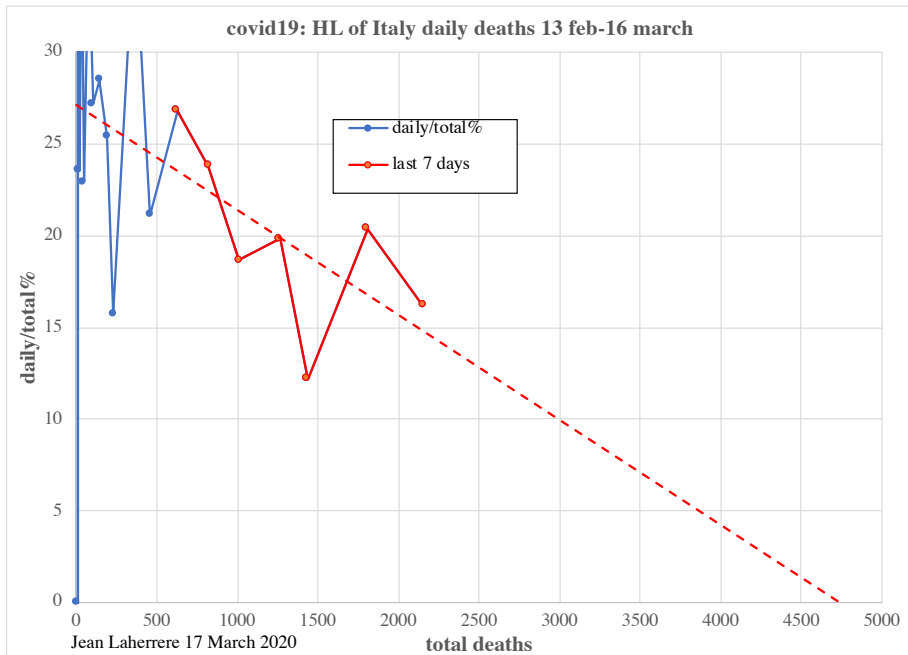
Jean Laherrere 17 March 2020

Peak around 20 March



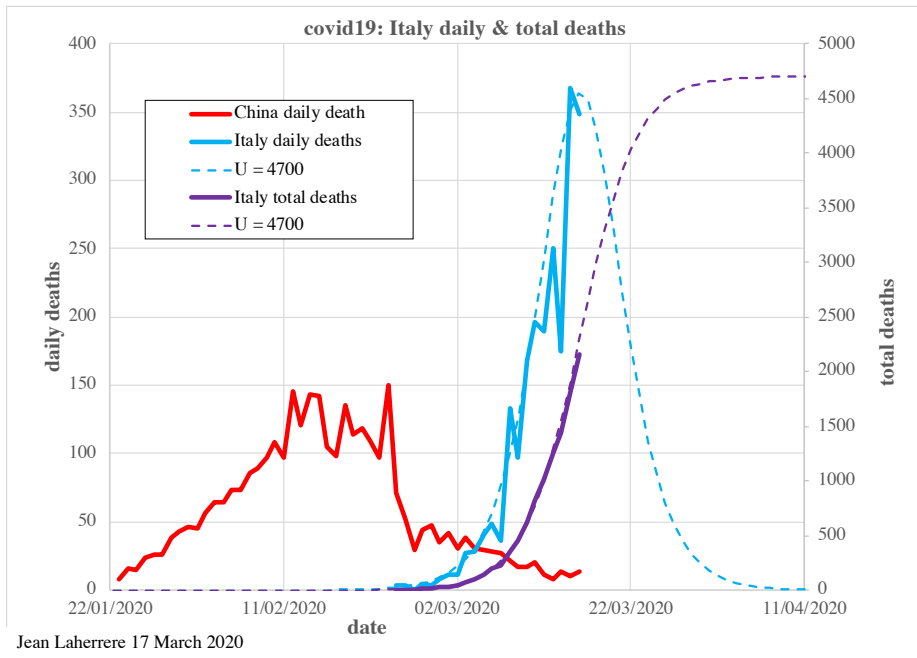
Jean Laherrere 17 March 2020

**Italy ultimate of 4700 instead of 4000**

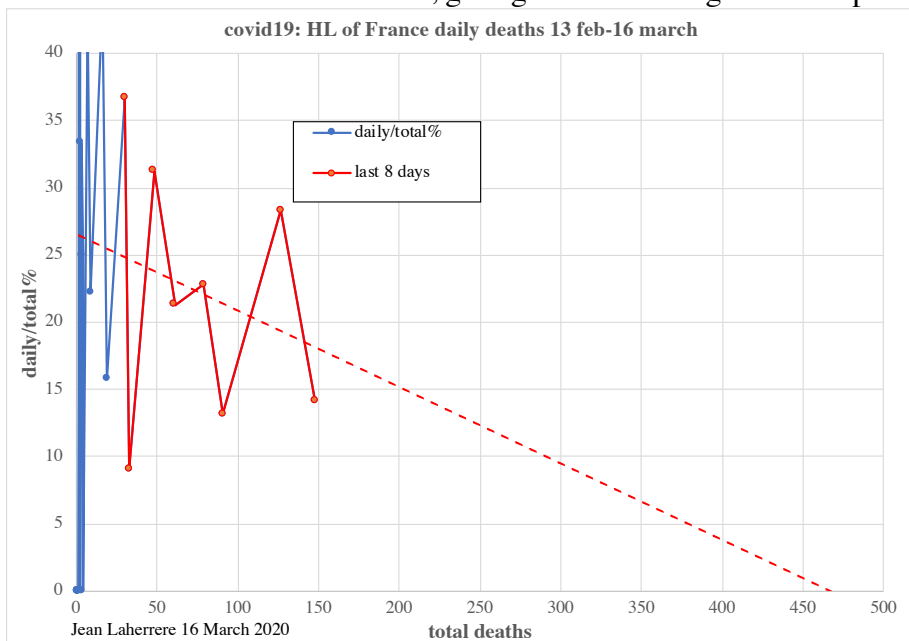


Jean Laherrere 17 March 2020

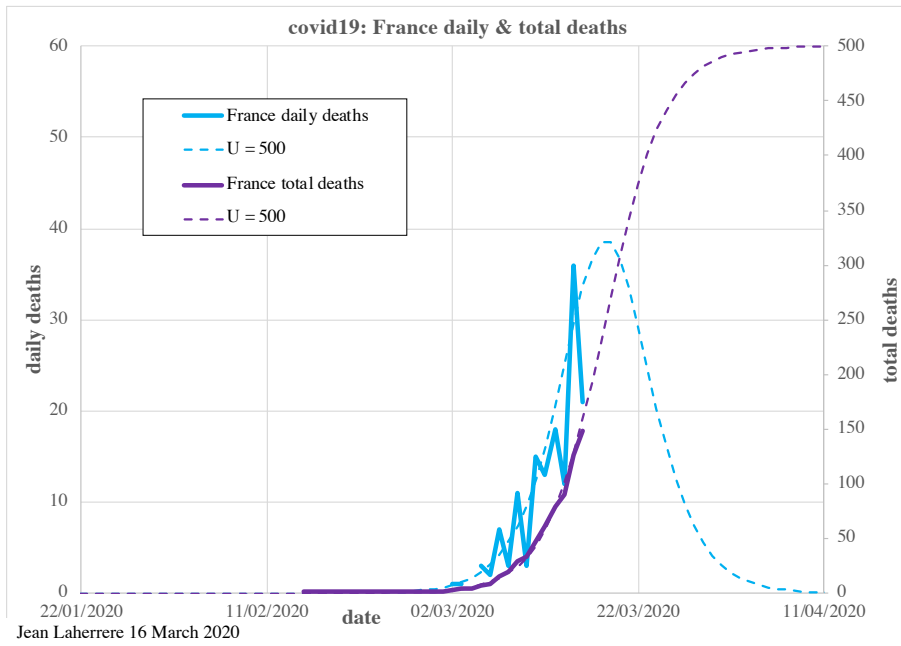
Peak with this 4700 ultimate will occur within few days, being much higher than in China which is 20 times more populated



**France:** new ultimate of 500 instead of 1800, giving however a slight shift to peak

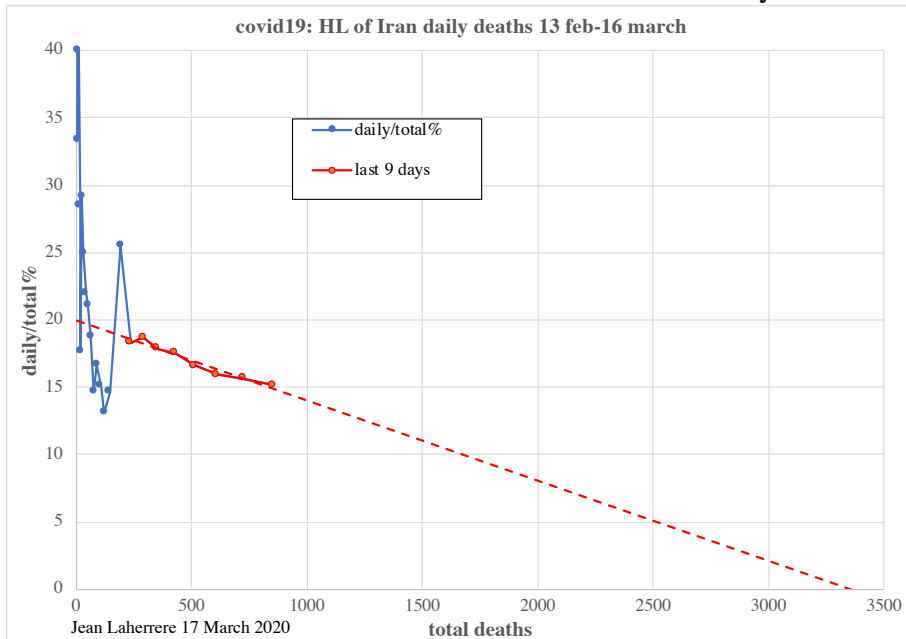


Peak with an ultimate of 500 will occur in a week

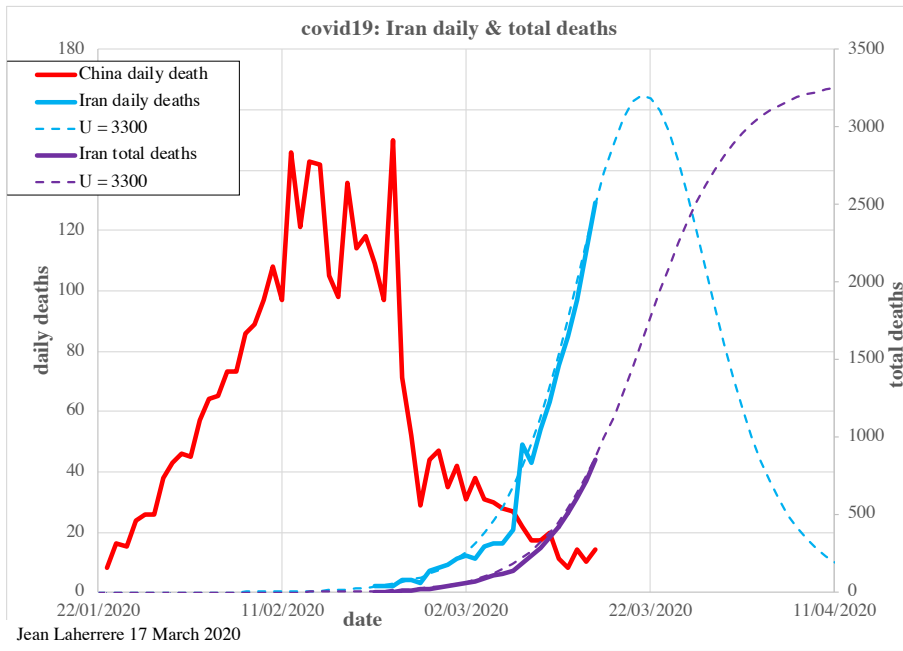


This 500 total deaths ultimate is very far from the worst scenario by Neil Ferguson Imperial College at London with 300 000 to 500 000 deaths in France!

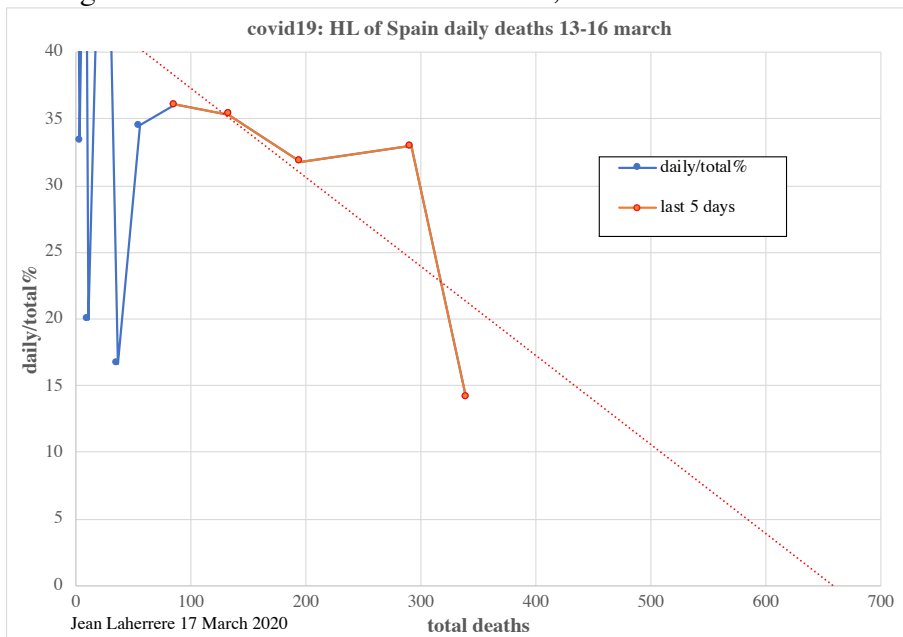
**Iran:** ultimate 3300 instead of 3000 but HL was linear for the last 9 days



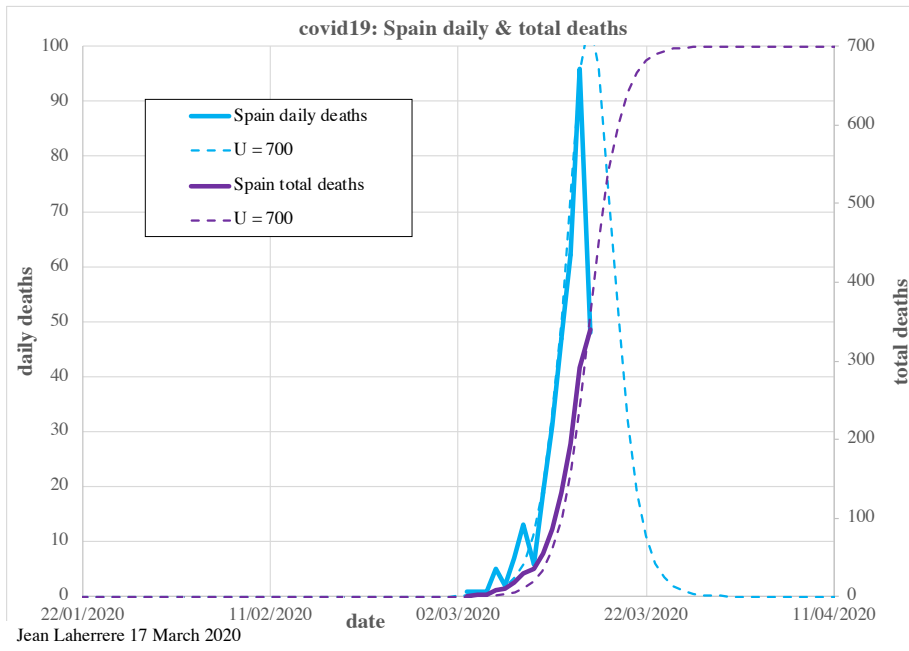
With an ultimate of 3300, peak will occur in a week



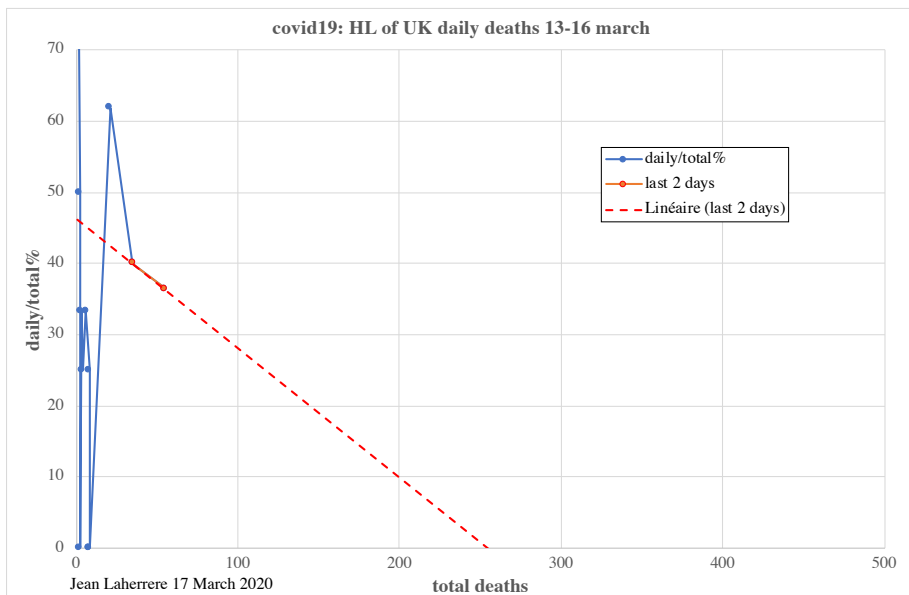
**Spain:** huge change on ultimate = 700 instead of 2200, but HL is far from linear



With an ultimate of 700, peak will occur within few days

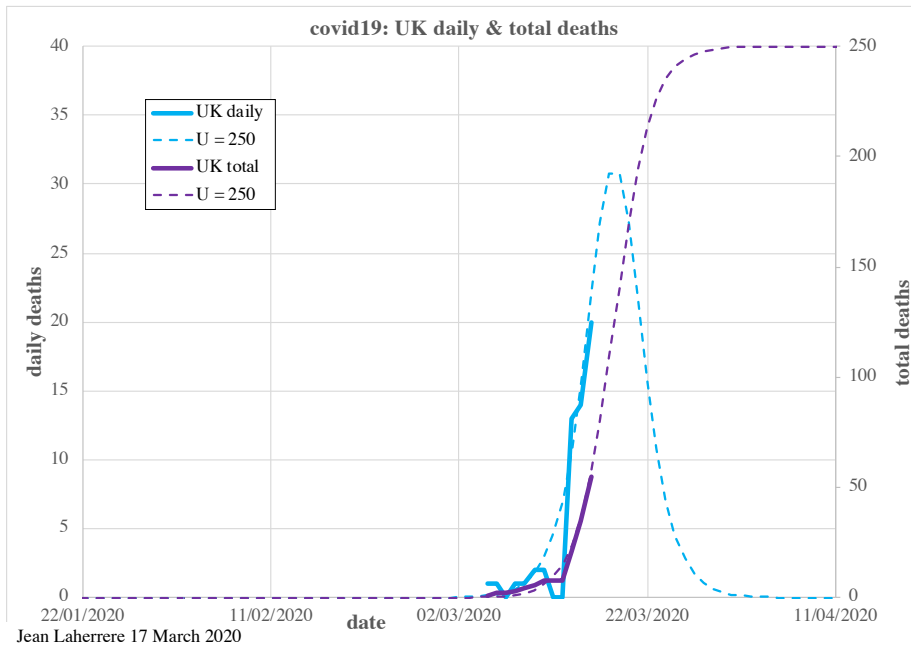


UK : HL could only be plotted on the last 2 days (16 March) and trends towards an ultimate of 250 deaths



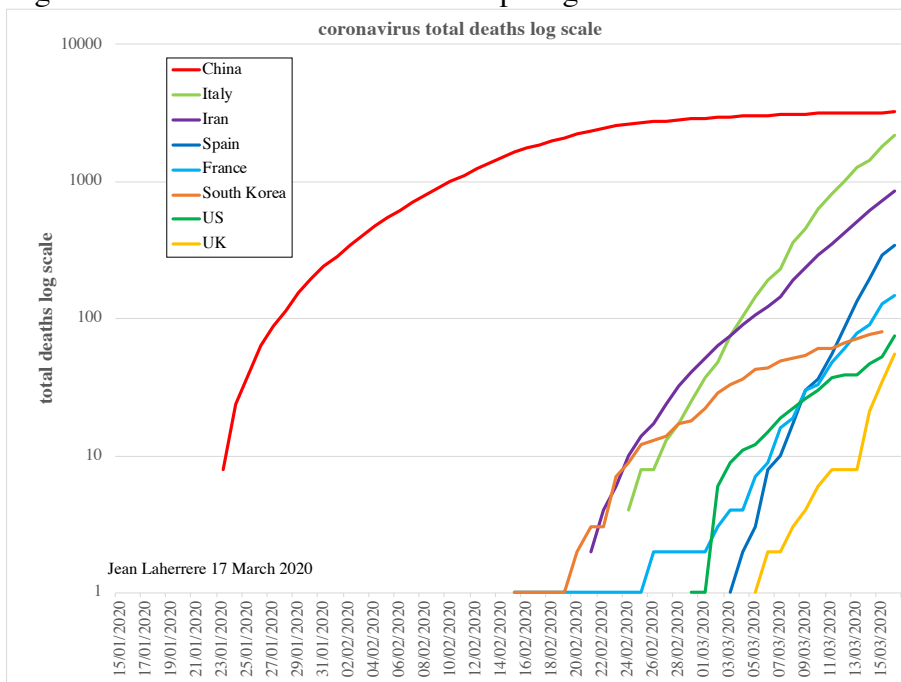
For an ultimate of 250 deaths the peak will be in few days at 30 : it seems unlikely: we need more data (at last 10 days)





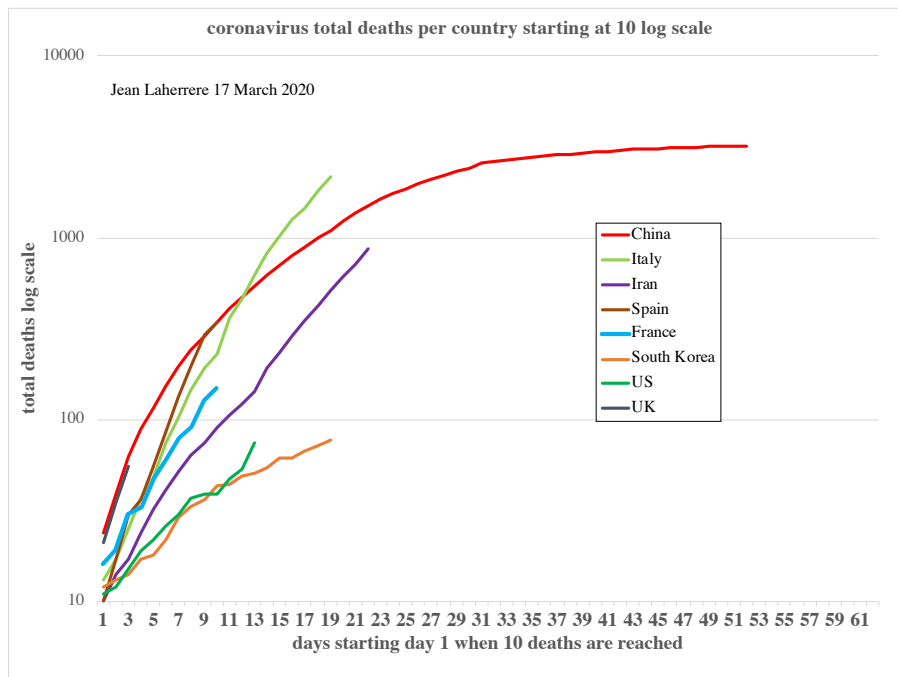
### Comparison total deaths by country log scale

The plot on log scale of total deaths allows to compare growth



Each country continues to show different patterns for total deaths, which depends mainly upon total population, restrictions on move, hospital conditions, and other criteria...

A better comparison is when each country is plotted using day 1 for the day when total deaths passes over 10



Spain and Italy are similar, US and South Korea are similar, UK starts as China, but the data is too short.

### Conclusion

China data shows that on 12 February, before the peak, HL could have forecasted an ultimate of 3600 deaths when present data give 3300: it was then possible to forecast the peak with a good accuracy when 10 days of good data.

After the sharp change with 15 March data, 16 March brings decline and large change for Italy, France and Spain

With present estimates, daily deaths peak will all occur before 22 March 2020 for all studied countries.

It is obvious that the estimates will improve within few days when HL plots will be more linear. Presently only Iran HL is reliable.