

DATA SCIENCE GROUP RESEARCH

COVID 19

Cristina Segura
Jalex Yestera
Jose M^a González

As part of our bootcamp training, we have done some investigation about the actual pandemic happening all around the planet. Countries were previously selected and assigned to groups, so we have focused in *India, Perú, France, Spain* and *USA*.

1. Data sources:

All used data is taken from <https://ourworldindata.org/>.

Most countries data is daily updated except Spanish data which usually takes a one day delay in updating. Due to this circumstances, this research is updated to the day before the current one, so today we'd get yesterday's values and so.

2. Data cleaning:

In order to avoid NaN values and focus on useful data, we have taken out from our countries dataset every '0' before the first infection was registered. This way we avoid plotting a time period where nothing happens (or the virus was not detected).

We haven't removed any outlier values as we could explain them, adding some relevant information which was also required by this investigation task.

3. Data plotting:

We have plotted the pandemic status in our selected countries so we can research trends and get a more accurate view of how the problem is being carried in these nations.

4. Plotted Trends:

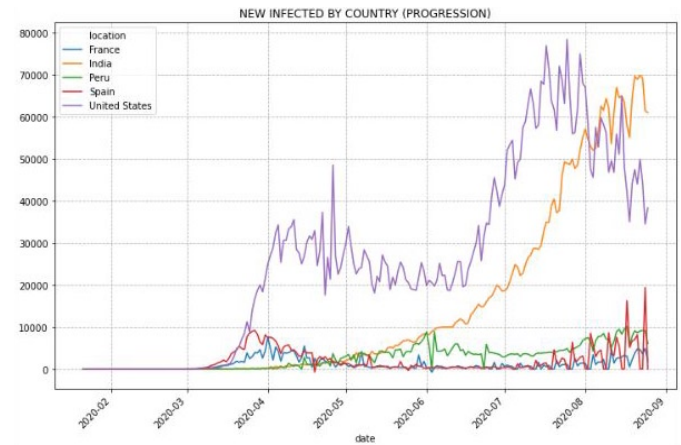
- New daily registered infections by country.
- Total number of infected people by country.
- Proportion of infected who died.
- Percentage of infected and recovered from disease.
- Infections registered during quarantine in each country (start to end of quarantine).
- Outliers.
- Amount of daily new deaths caused by covid.
- Total number of death people caused by covid19 since the beginning of the pandemic.
- Total number of deaths by covid19 registered in quarantine period in each country.

COVID 19 - A WORLDWIDE PANDEMIC

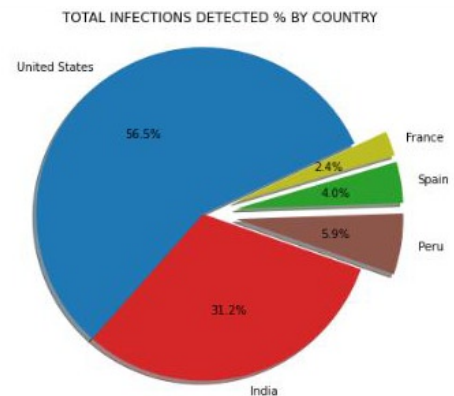
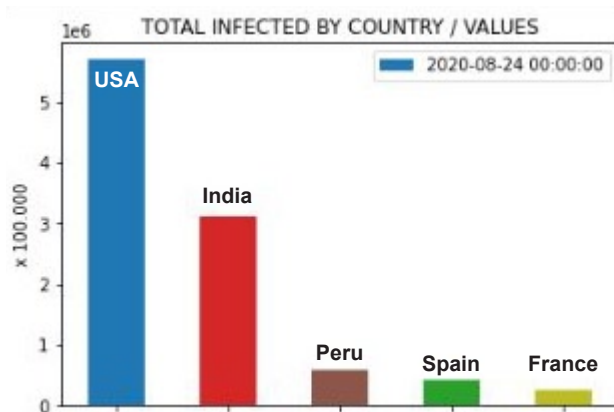
The pandemic data register started growing on March 2020.

Infections are still increasing in some countries where the infection trend hasn't changed.

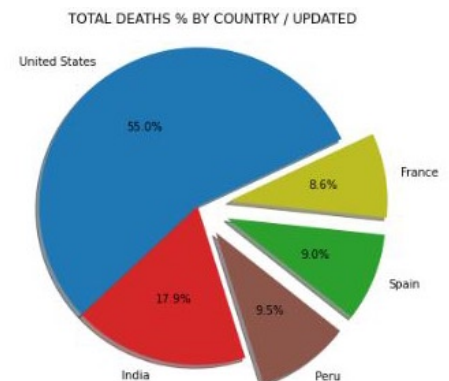
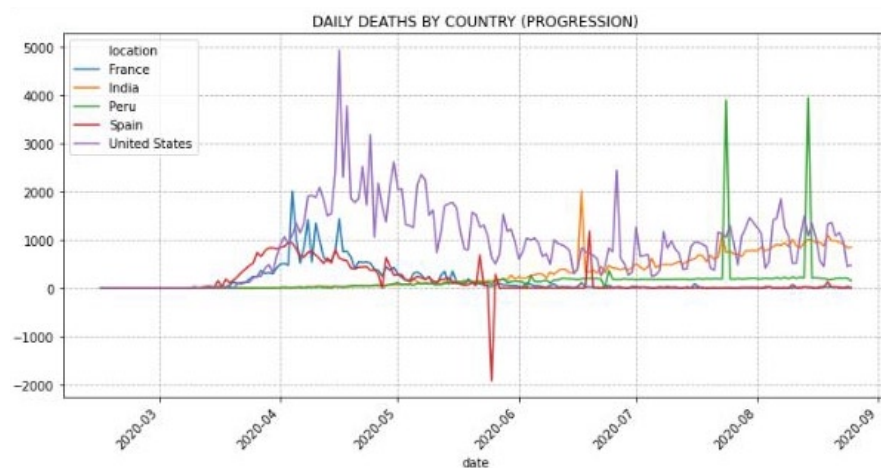
Evolution of infections is being different in each country due to several remarkable factors, such as population size, emergency measures taken by governments and national health system presence.



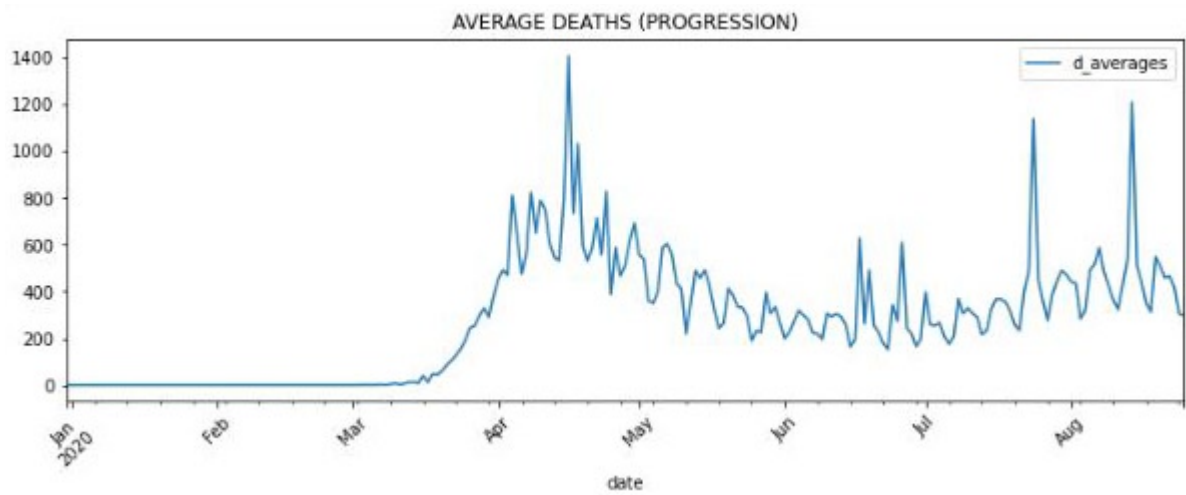
Total amount of infected people is related to country's population size



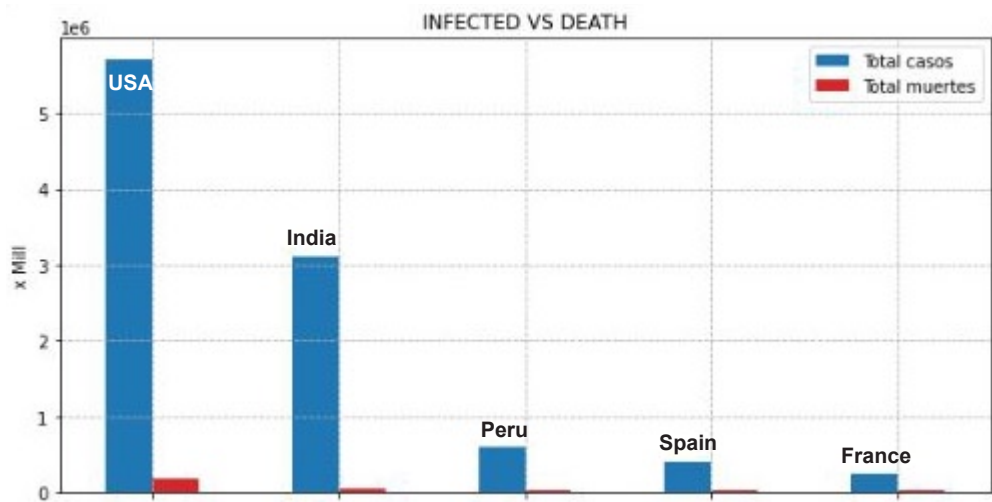
Amount of death people is related to all mentioned factors and population's mean age.



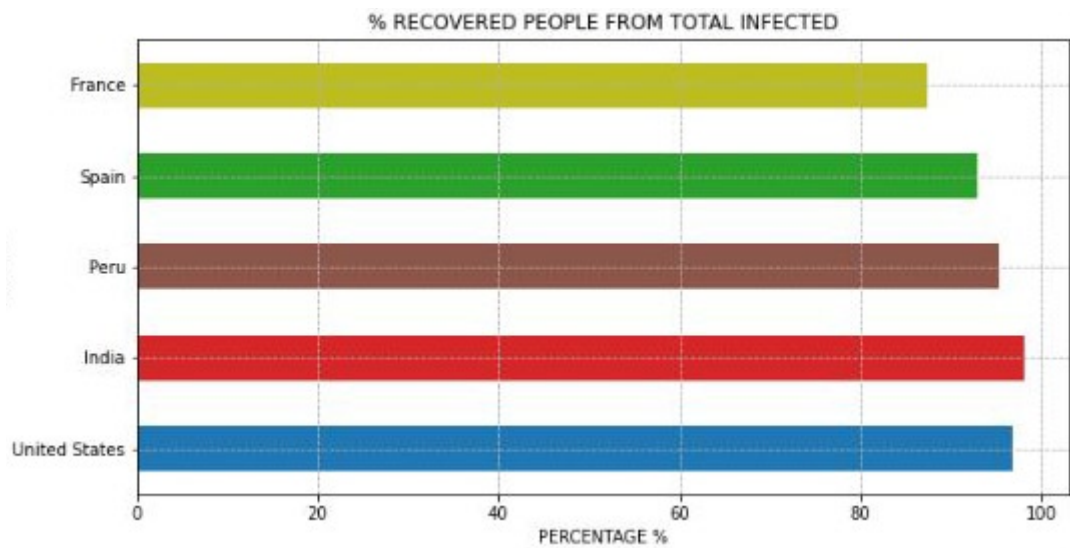
After the first wave, frequency of deaths remains stable and far from being stopped.



Death ratio among infected is low.



Percentage of infected people that recovers from disease is high.



FRANCE

Disease evolution.

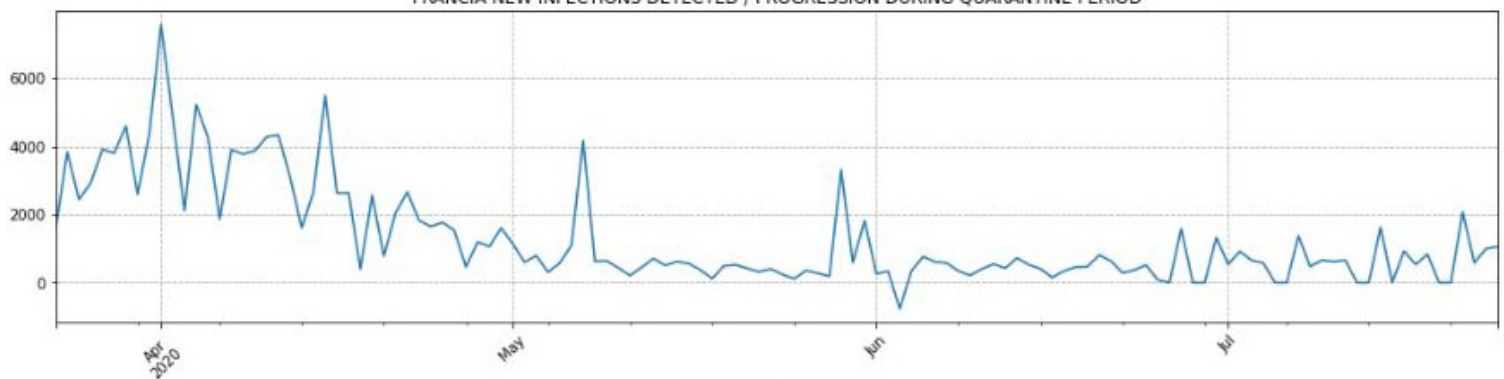
Emergency state declared:
March 23rd to July 10th

Quarantine measures taken during emergency state slowed down the growing number of deaths.

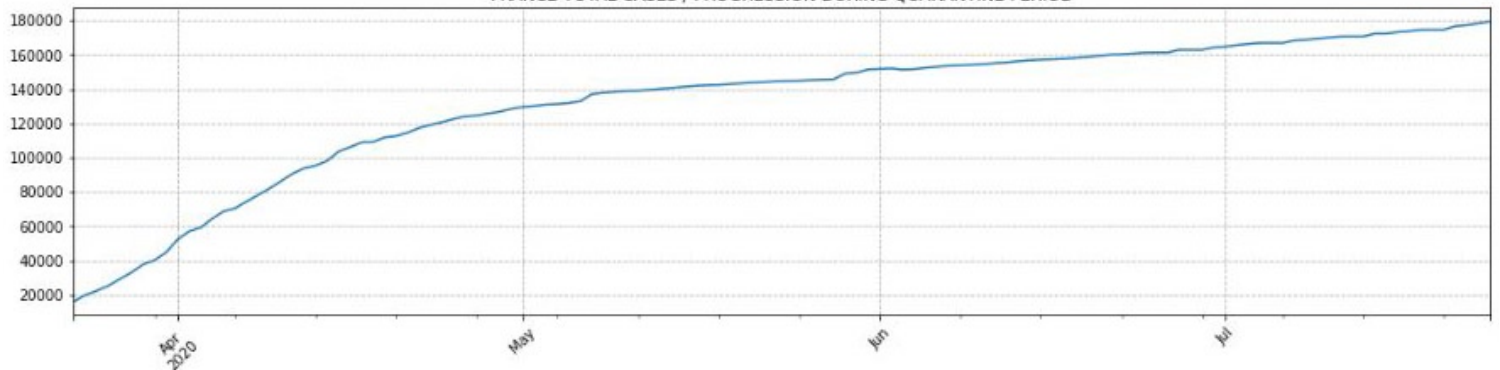
Emergency state finished after a long term without trend changes.



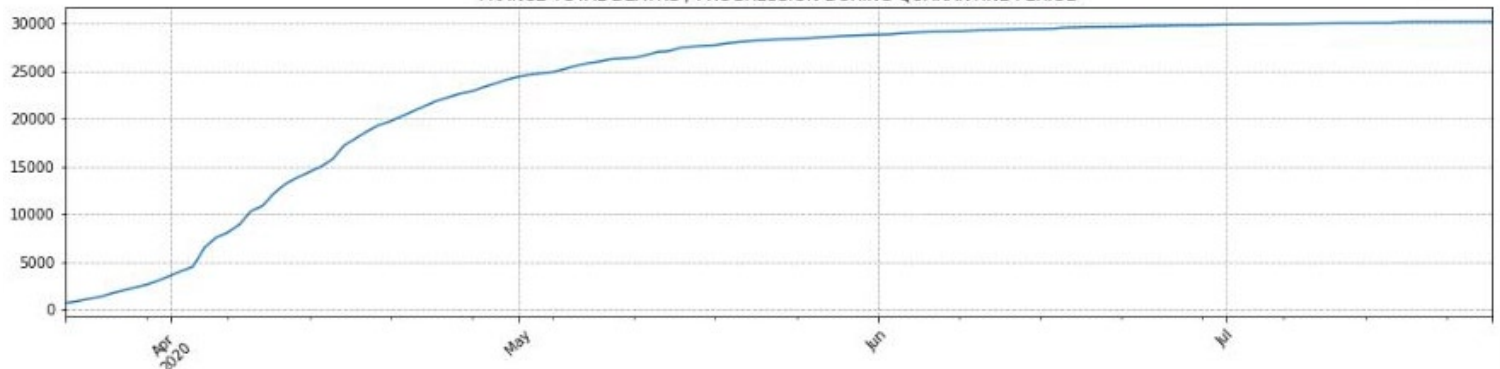
FRANCIA NEW INFECTIONS DETECTED / PROGRESSION DURING QUARANTINE PERIOD



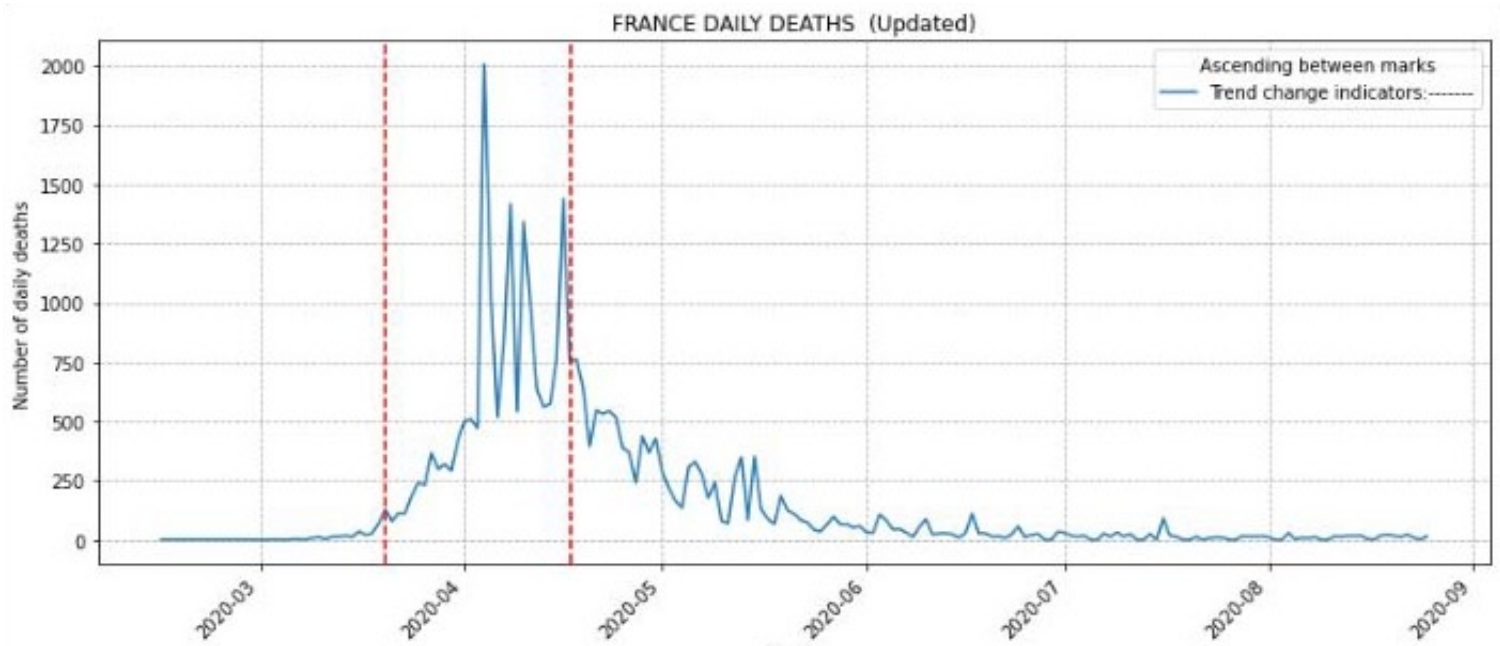
FRANCE TOTAL CASES / PROGRESSION DURING QUARANTINE PERIOD



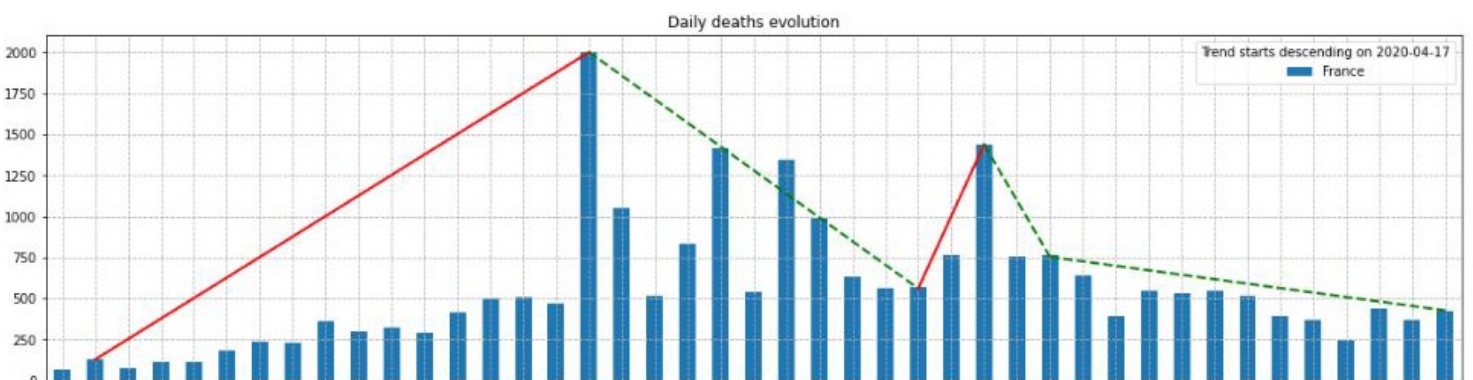
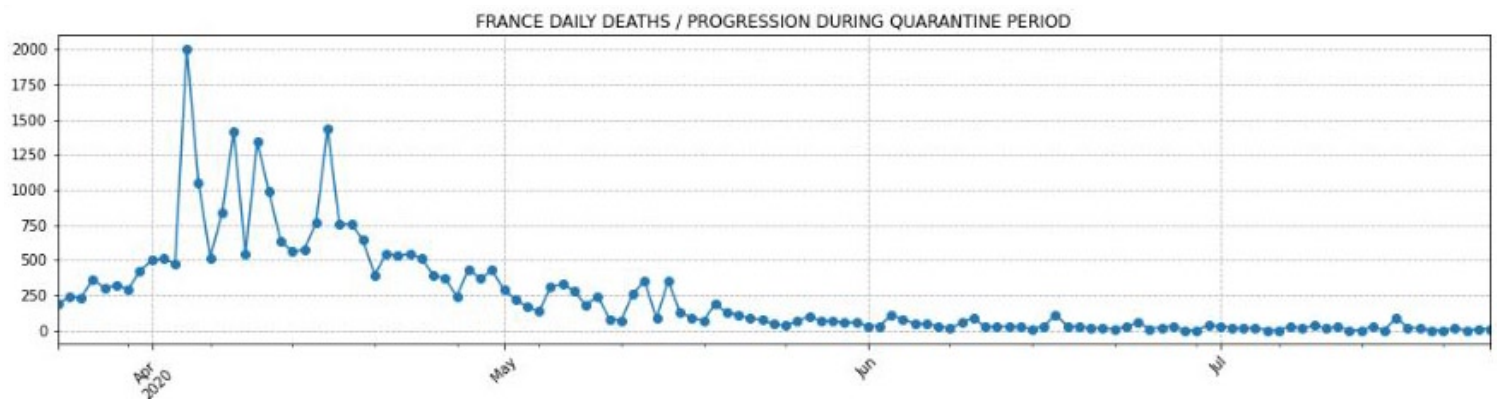
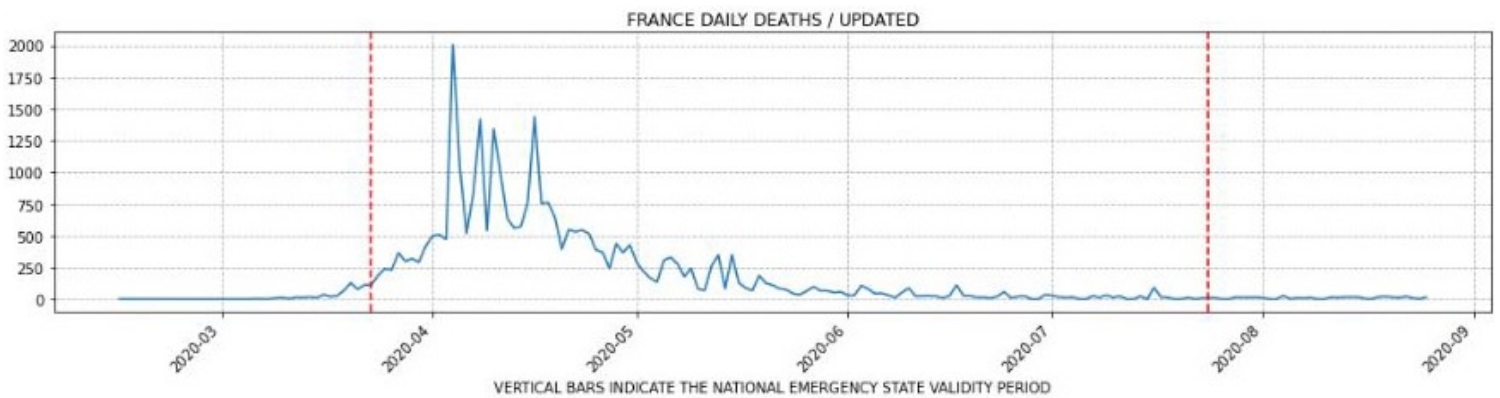
FRANCE TOTAL DEATHS / PROGRESSION DURING QUARANTINE PERIOD



FRANCE: Death by covid evolution.



Evolution with emergency state measures.

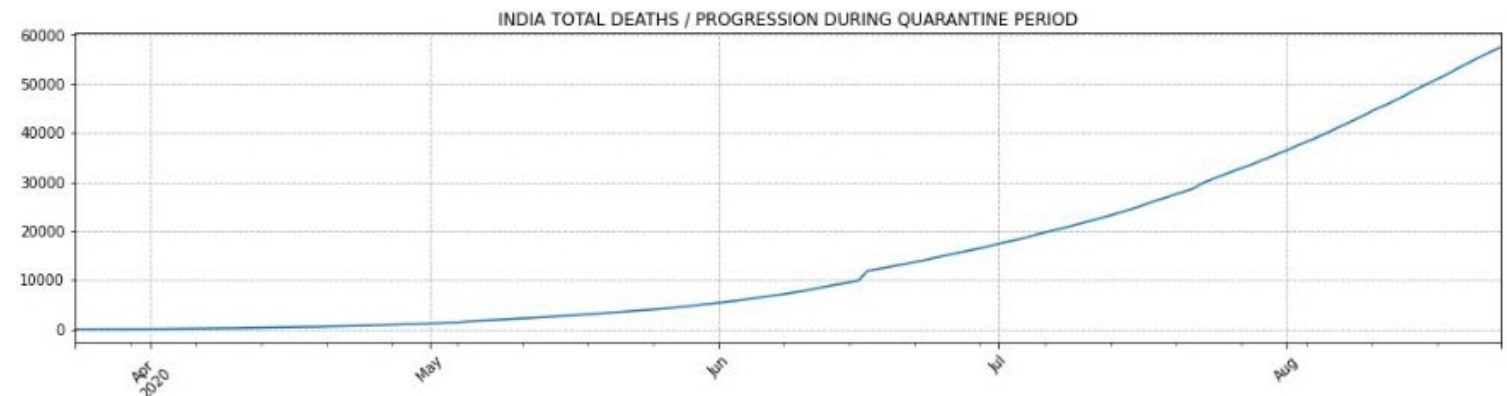
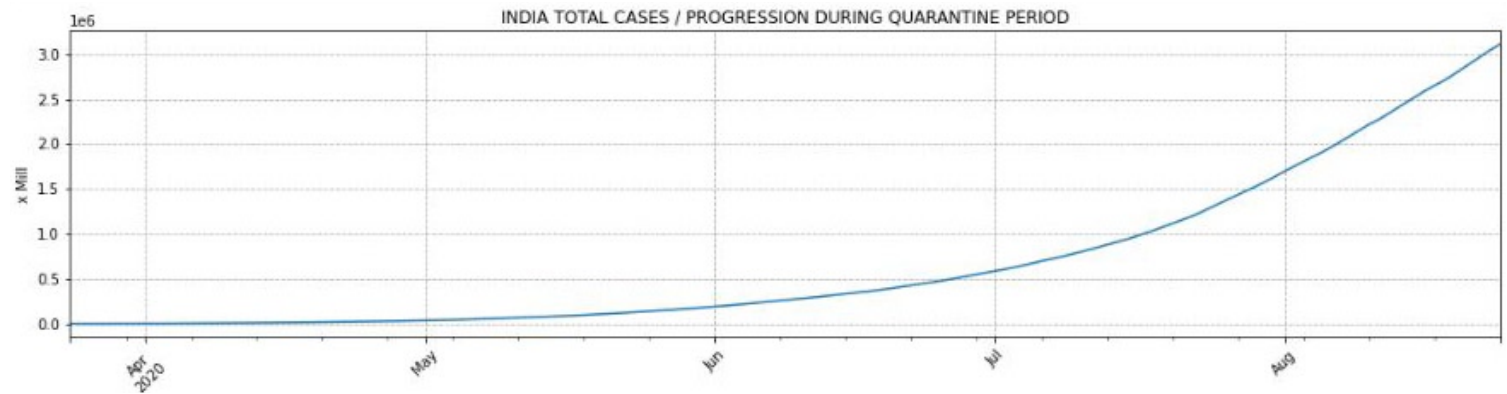
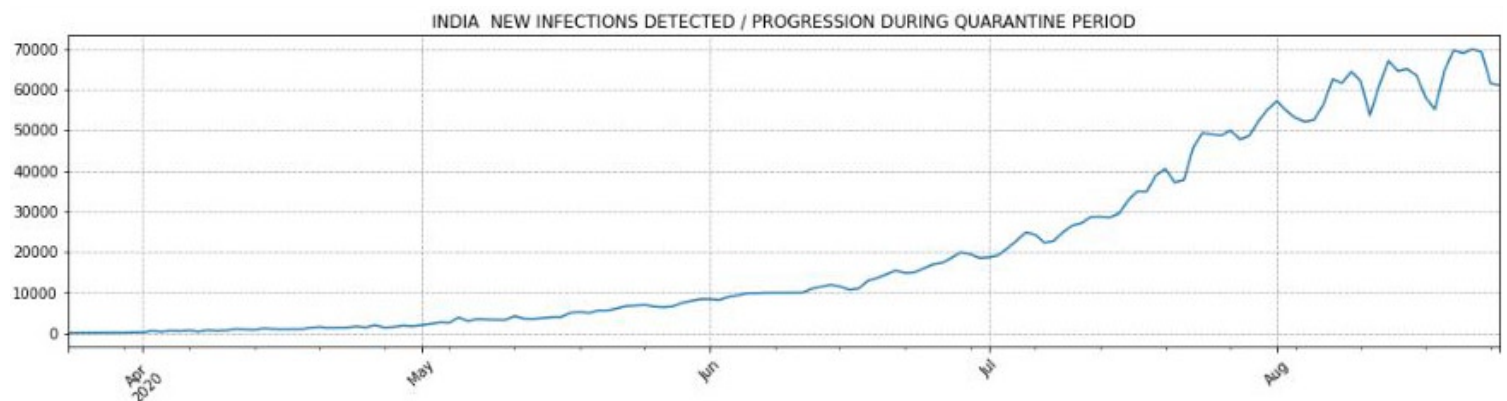
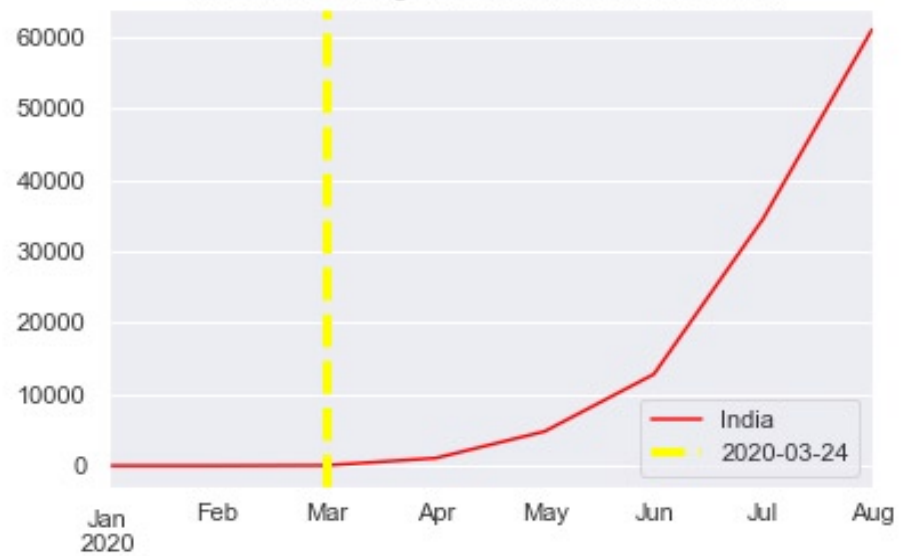


INDIA

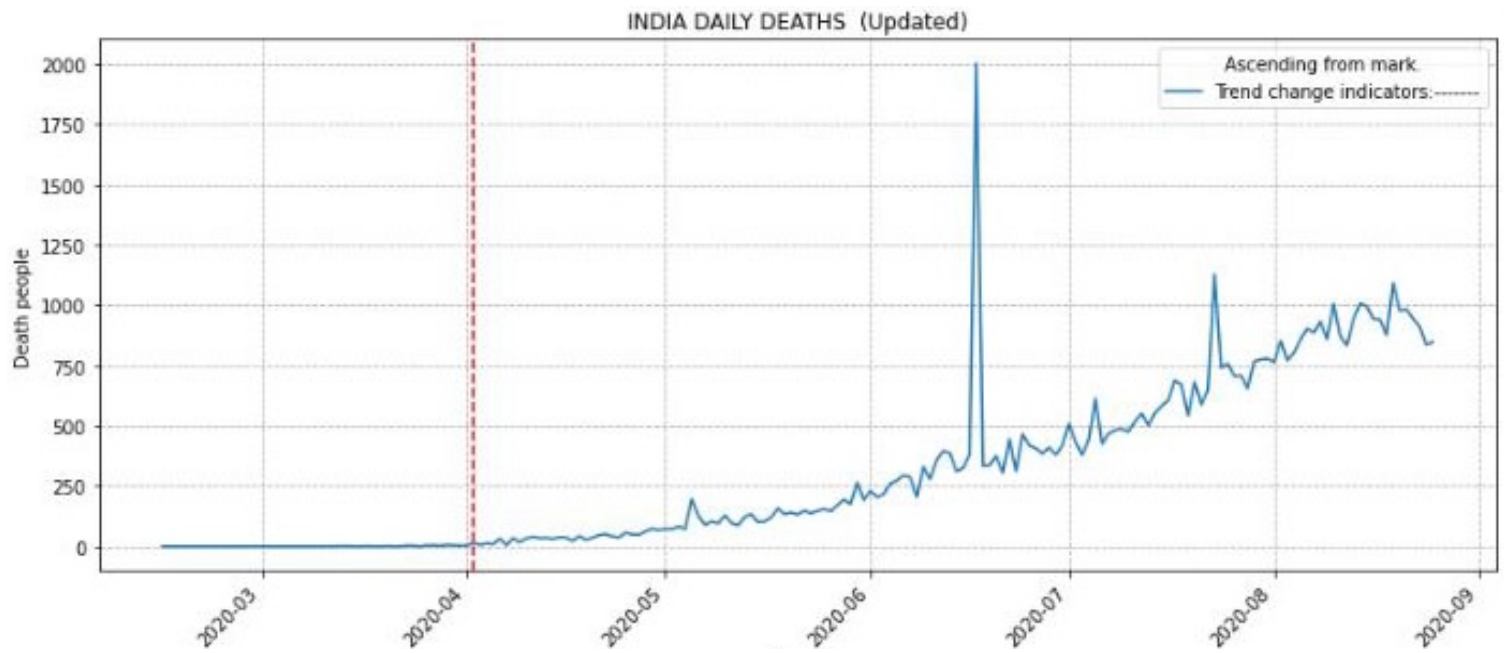
Disease evolution.
Emergency state declared:
March 24th - actually on

Emergency measures taken are not being useful. All numbers are growing and no changes in trends have been detected.

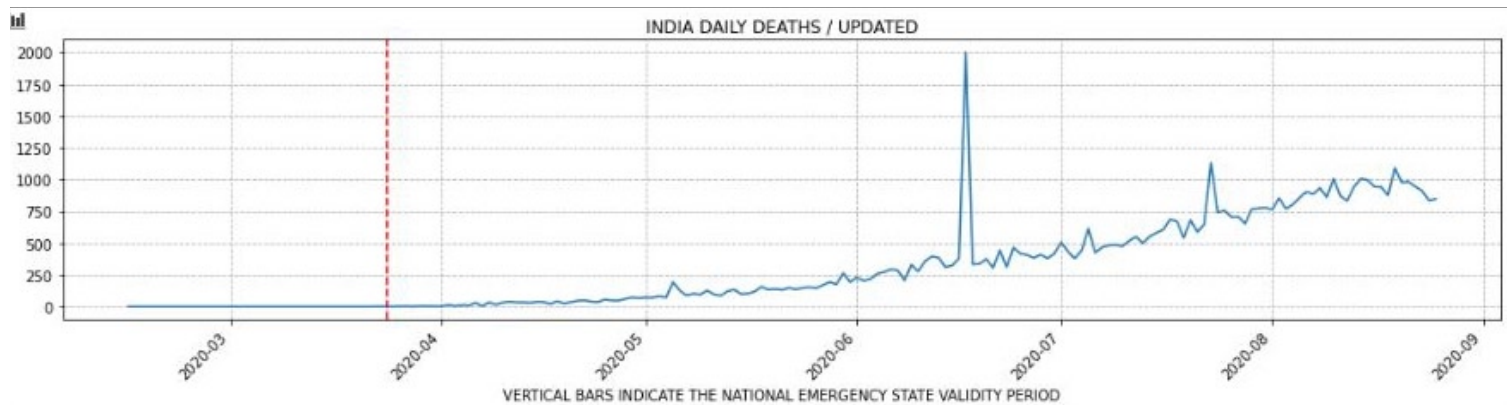
Emergency state is still valid.



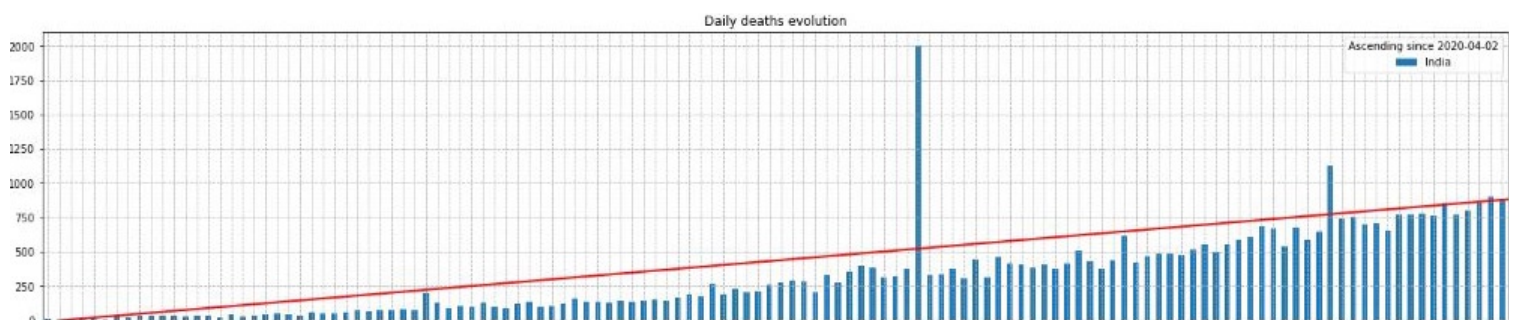
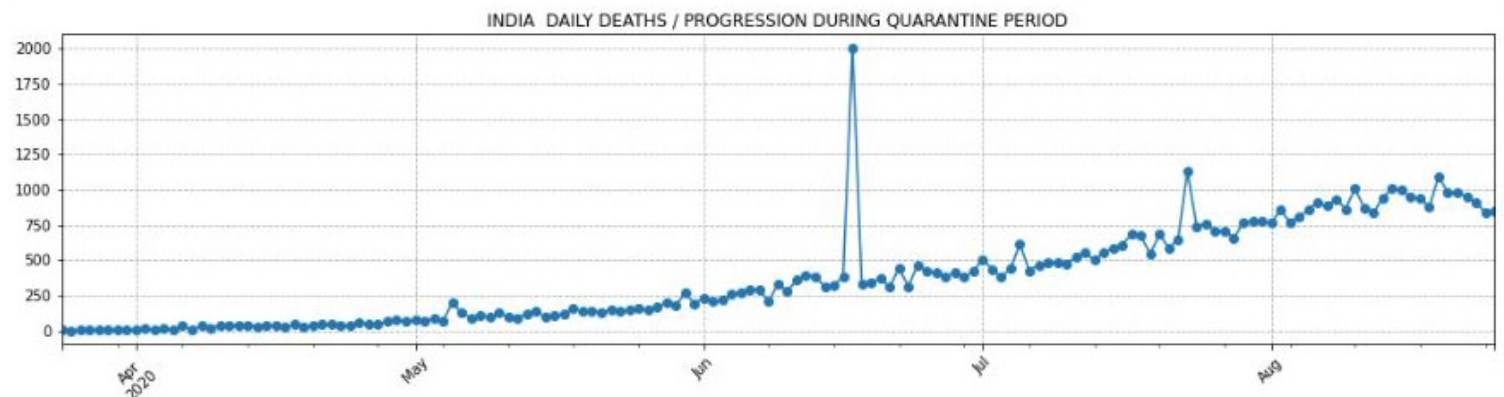
INDIA : Death by covid evolution.



Evolution with emergency state measures.



VERTICAL BARS INDICATE THE NATIONAL EMERGENCY STATE VALIDITY PERIOD



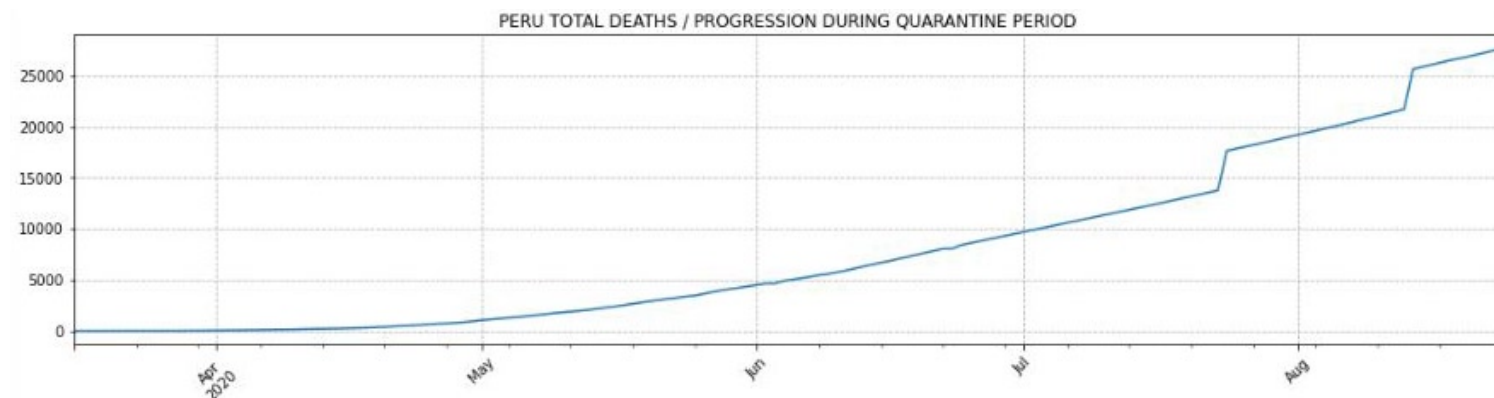
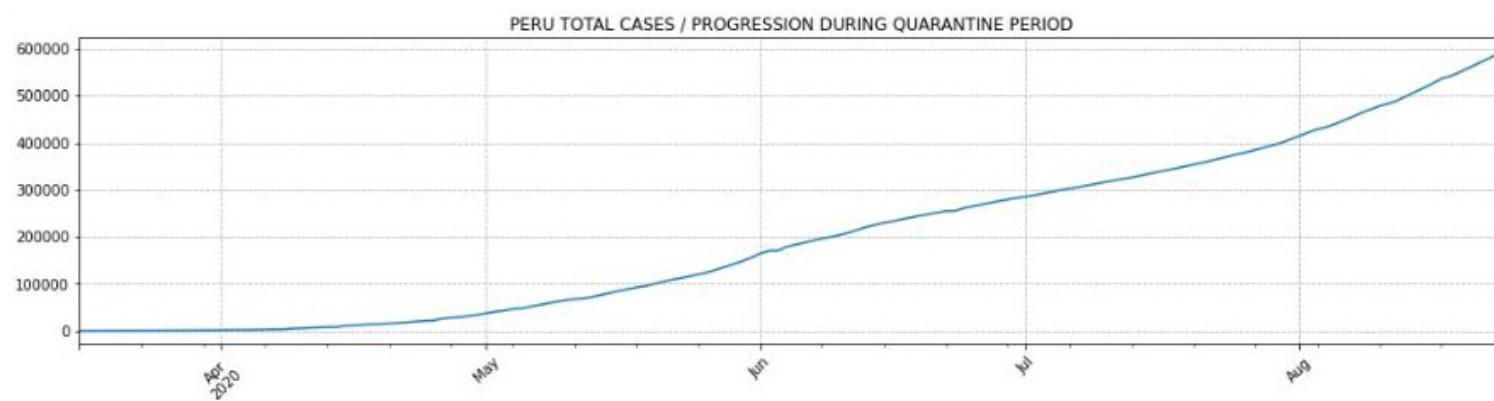
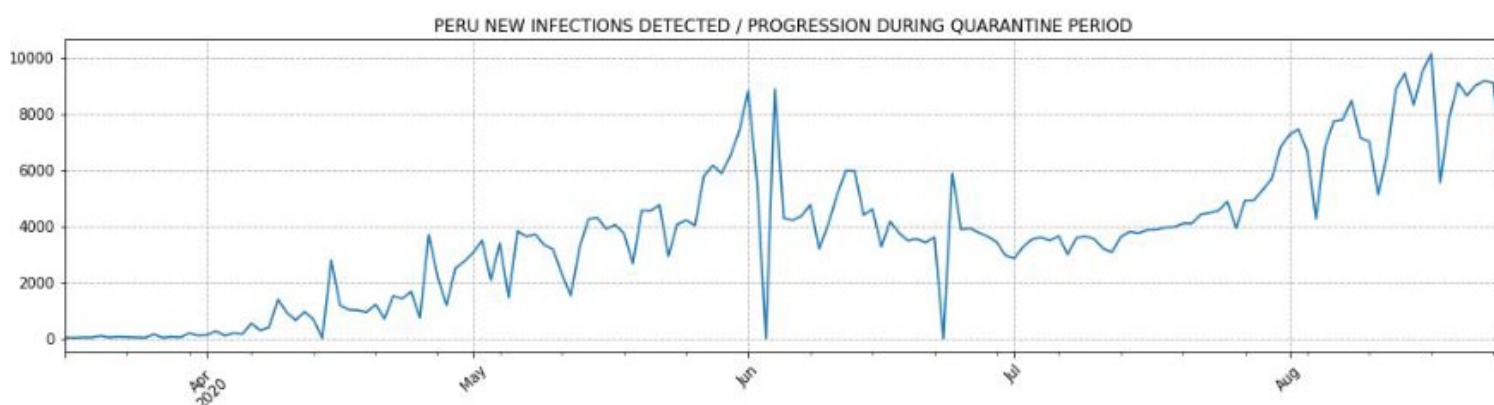
PERU

Disease evolution.

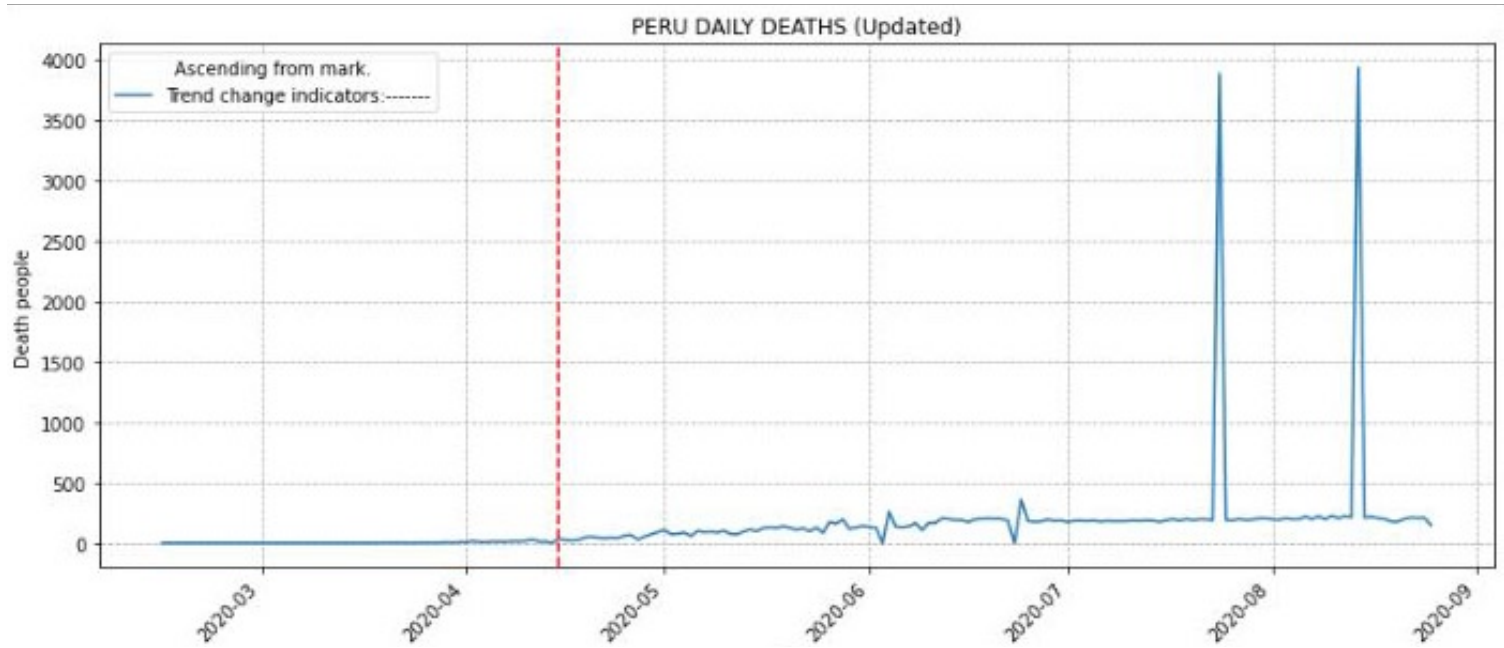
Emergency state declared:
March 15th to August 31st

Emergency measures taken are not being useful. All numbers are growing. Growth slowed from May to July.

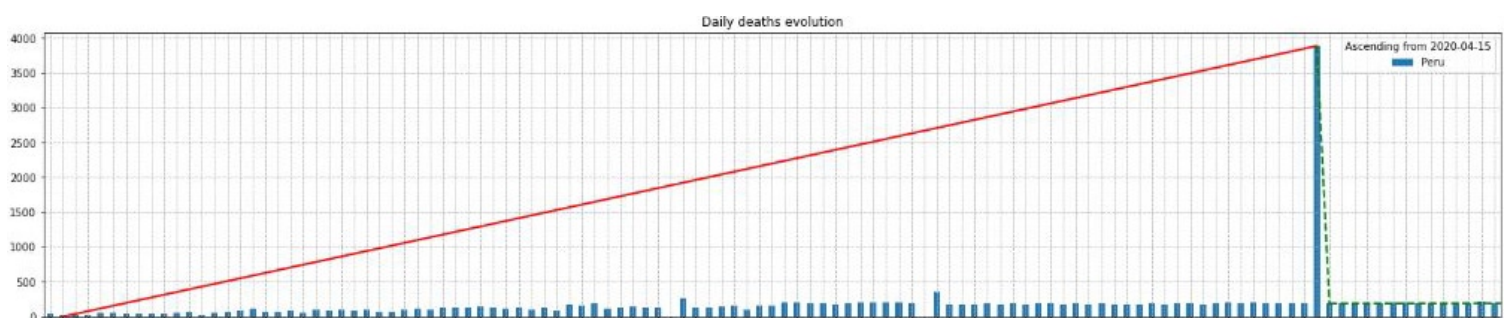
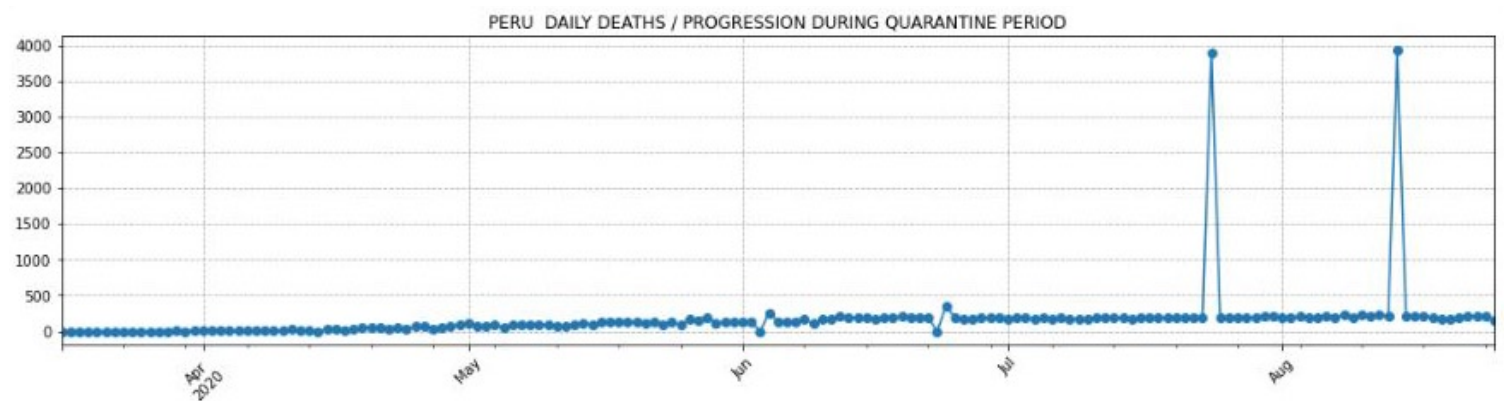
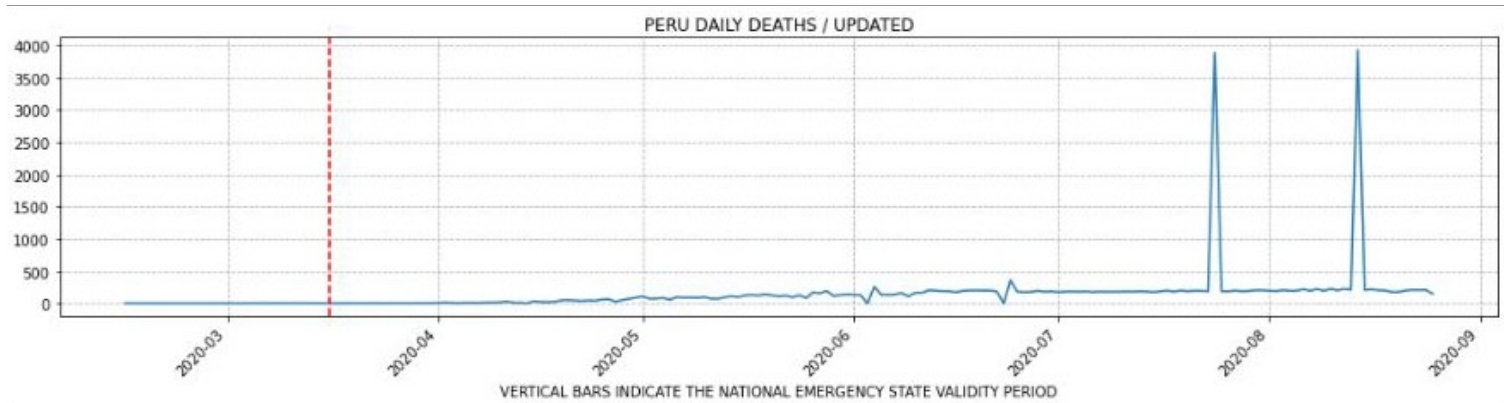
Emergency state is still valid.



PERU : Death by covid evolution.



Evolution with emergency state measures.



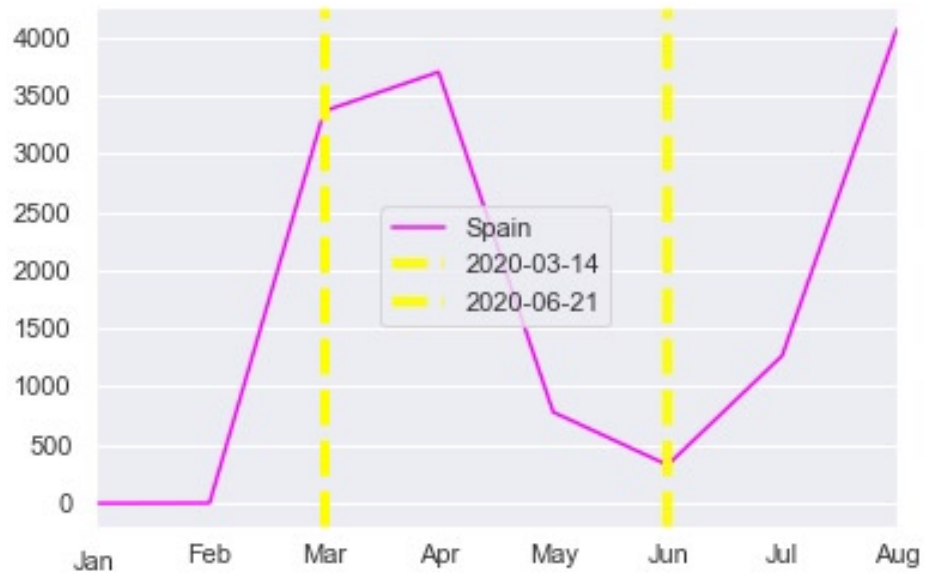
SPAIN

Disease evolution.

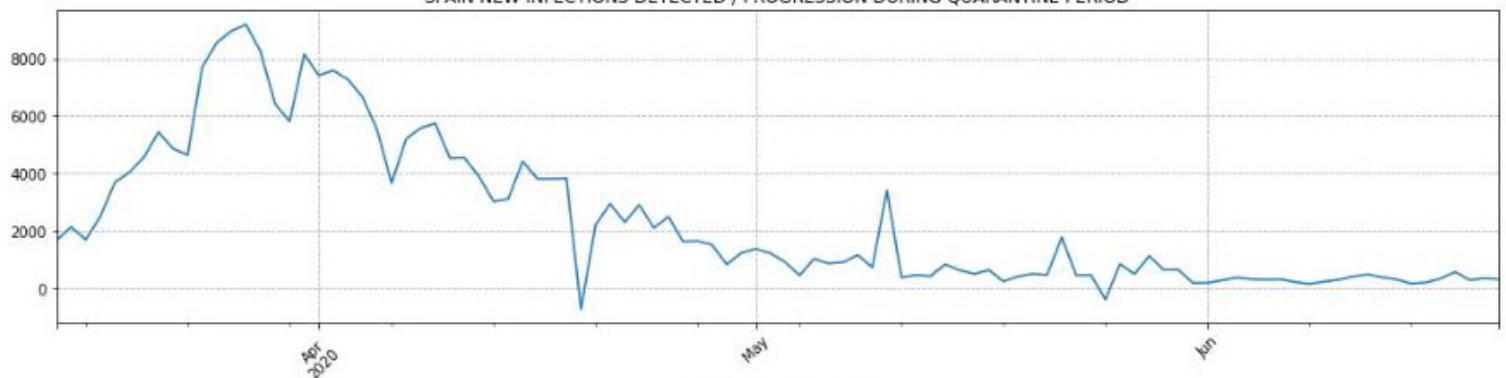
**Emergency state declared:
March 14th to June 21st**

Quarantine measures taken during emergency state slowed down the growing number of infections.

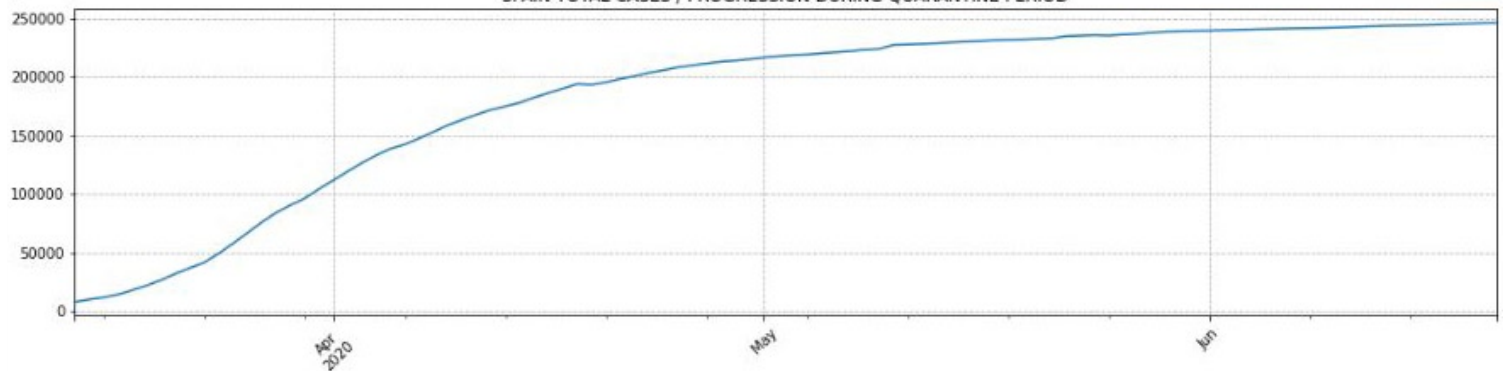
After emergency state was finished number of infections started growing. Possible new emergency declaration.



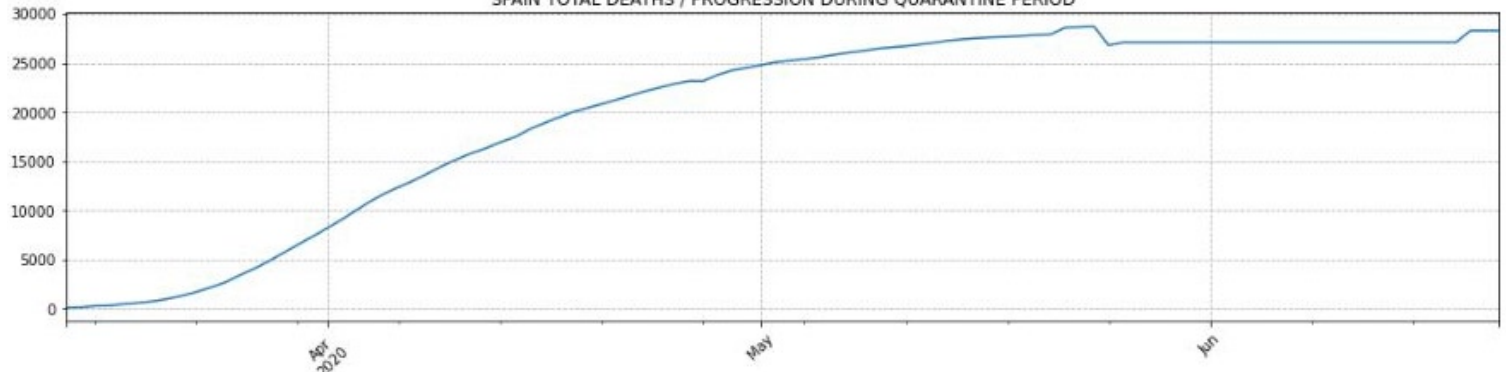
SPAIN NEW INFECTIONS DETECTED / PROGRESSION DURING QUARANTINE PERIOD



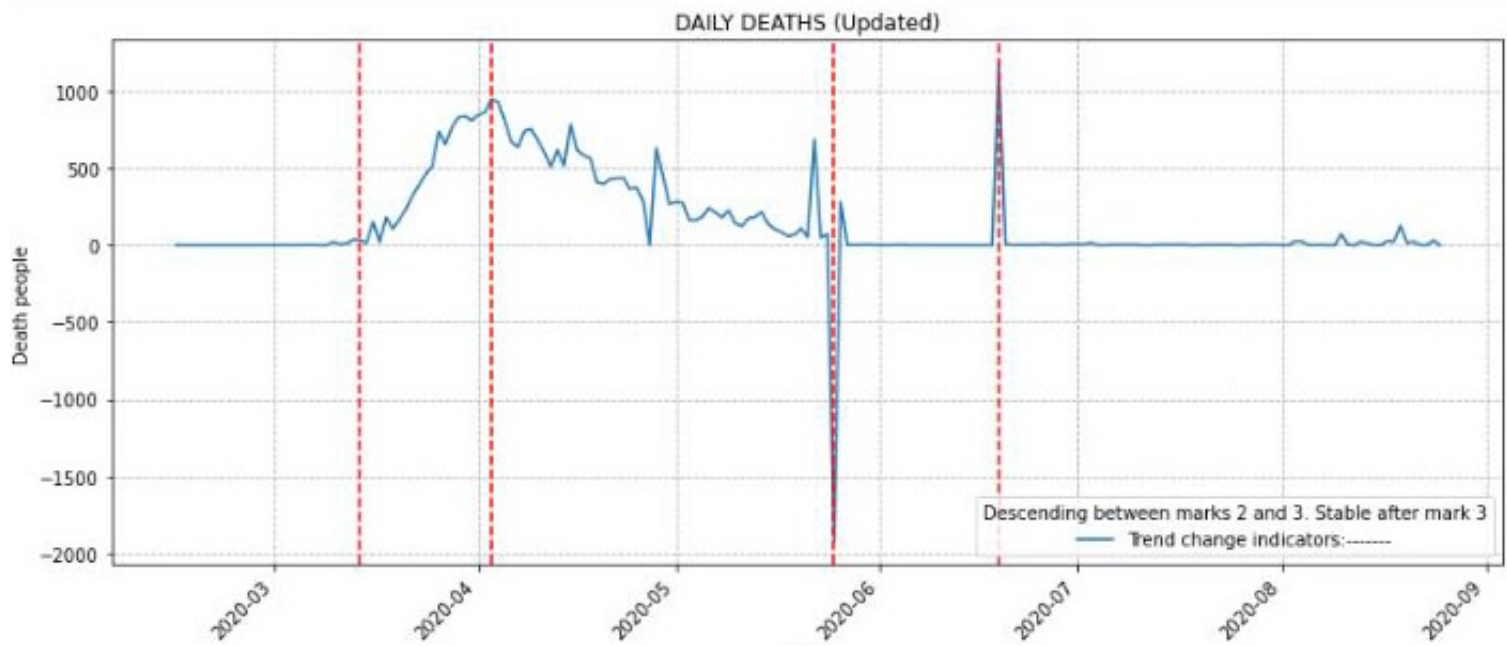
SPAIN TOTAL CASES / PROGRESSION DURING QUARANTINE PERIOD



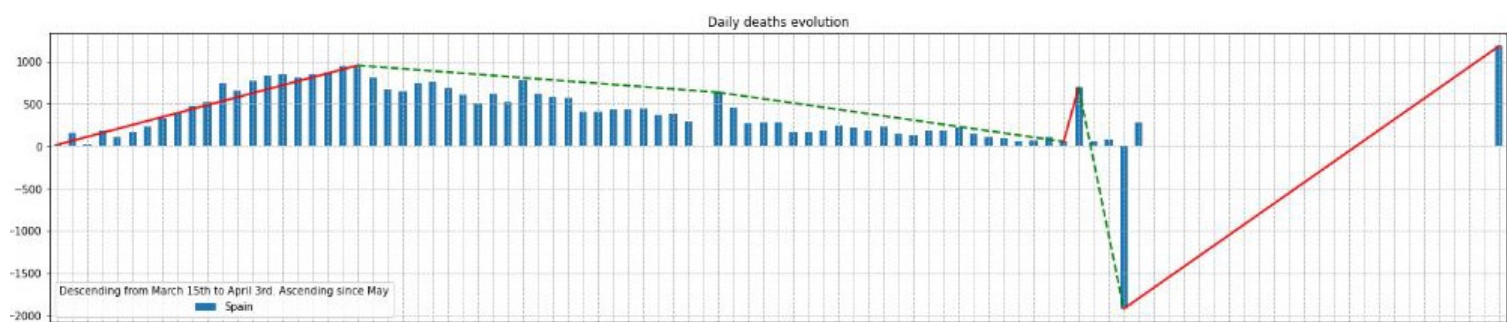
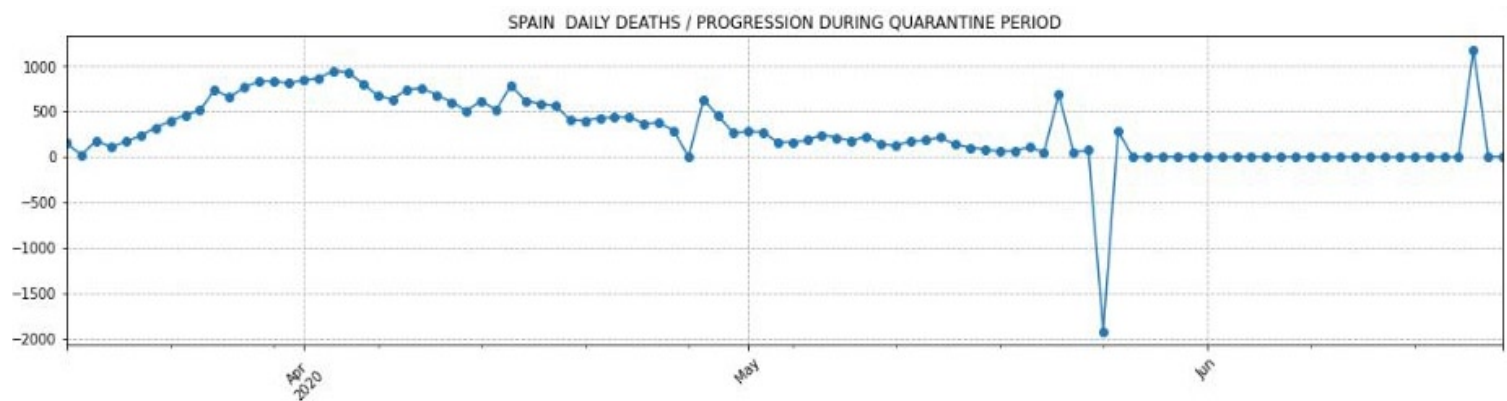
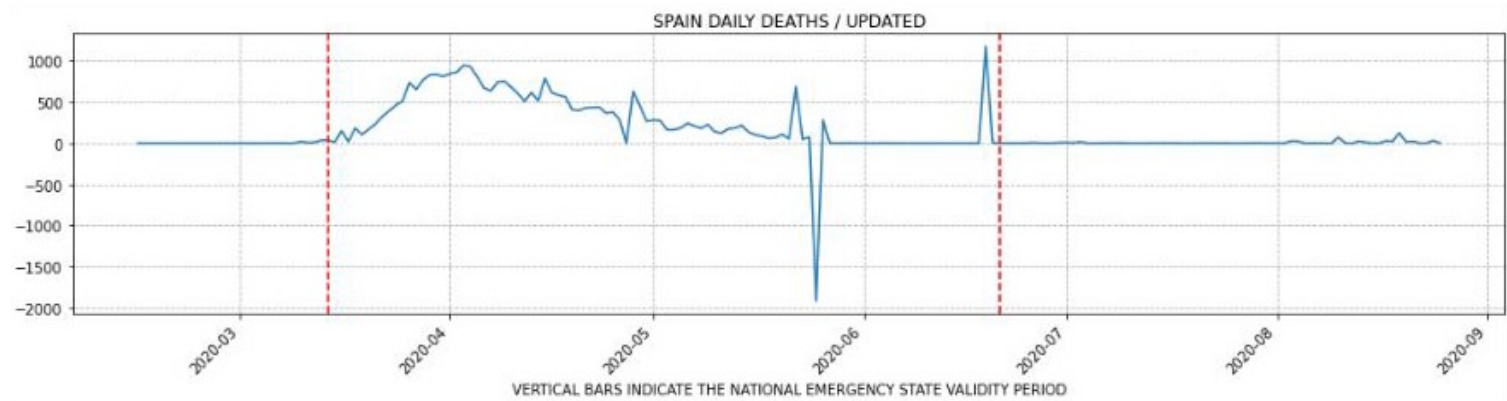
SPAIN TOTAL DEATHS / PROGRESSION DURING QUARANTINE PERIOD



SPAIN: Death by covid evolution.



Evolution with emergency state measures.

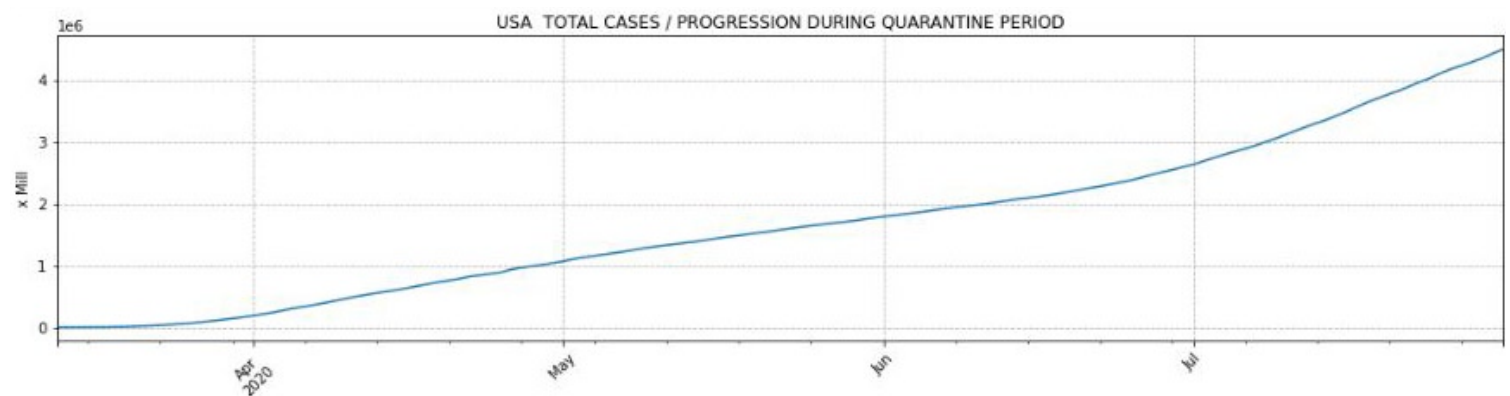
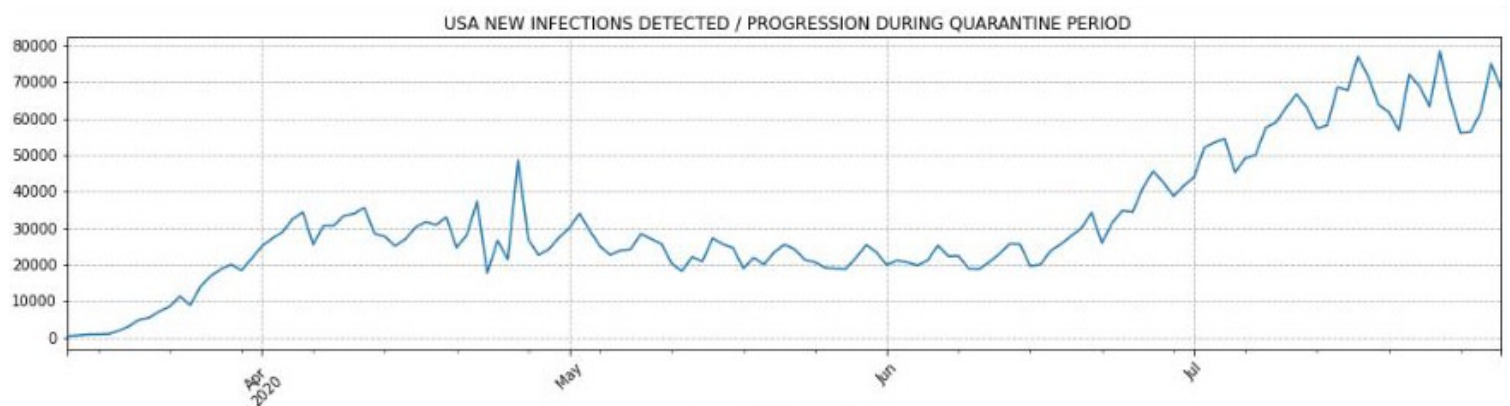
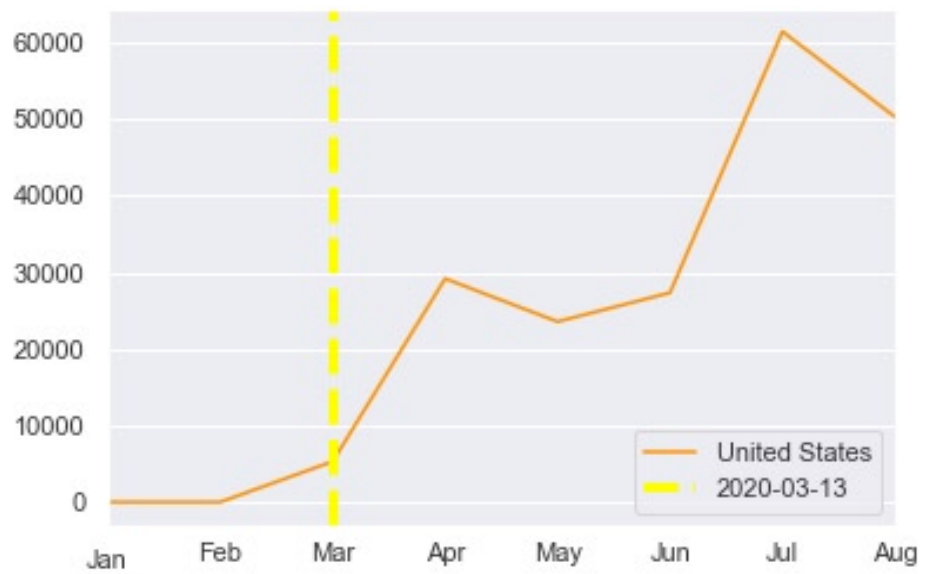


USA Disease evolution.

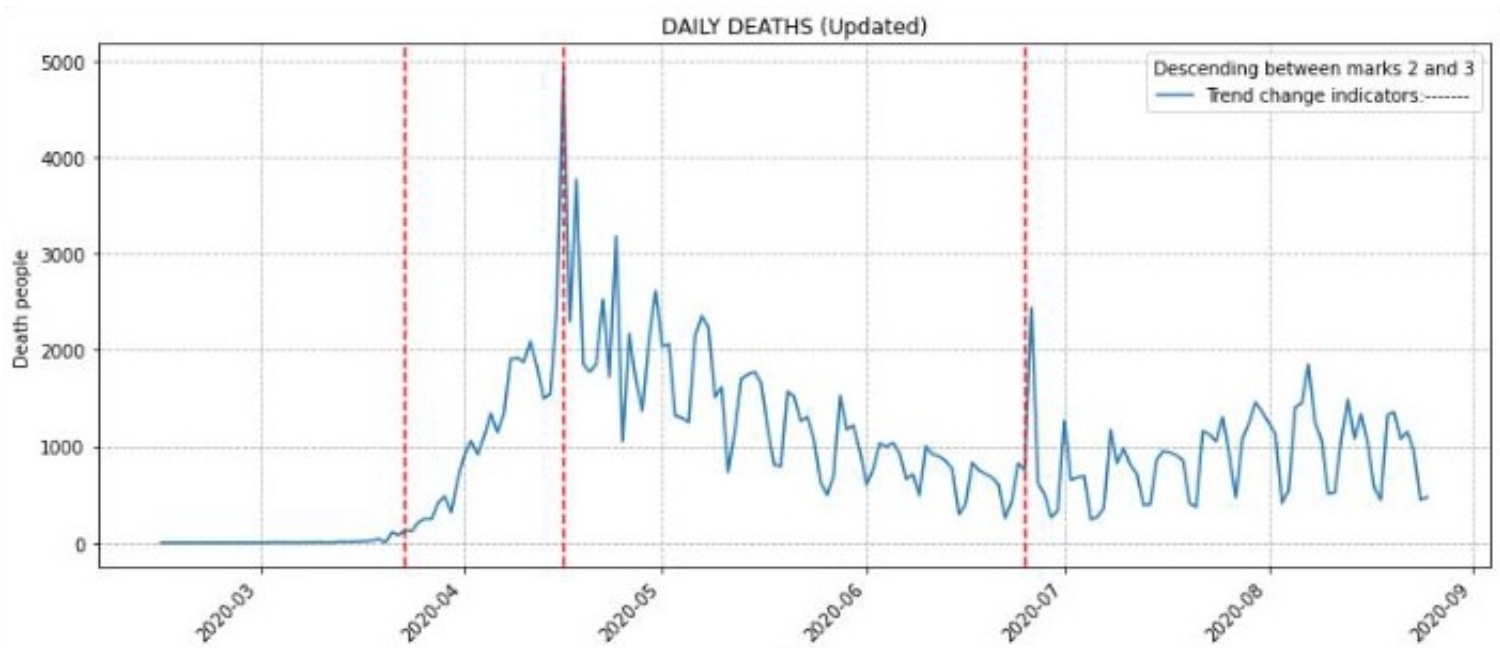
**Emergency state declared:
March 13rd - Actually on**

Emergency measures taken are not being useful. All numbers are growing. Growth trends changed in April, May and July.

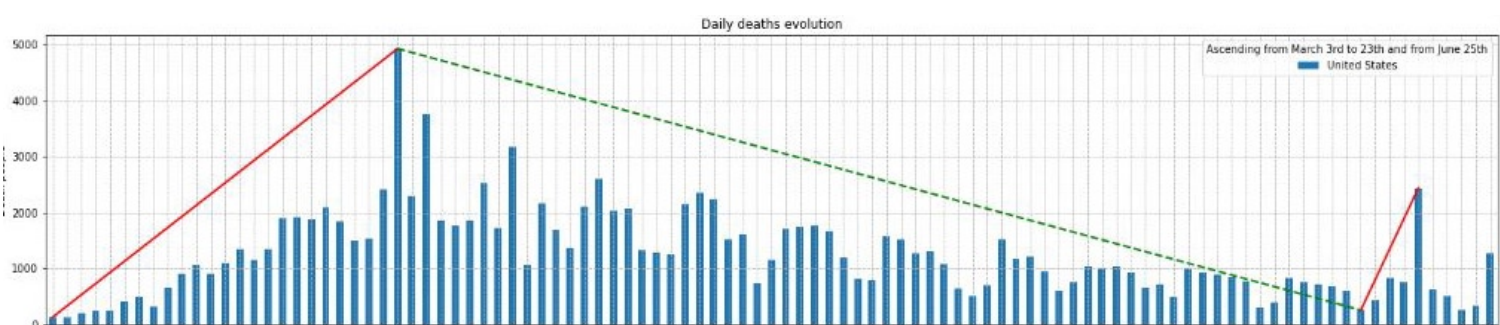
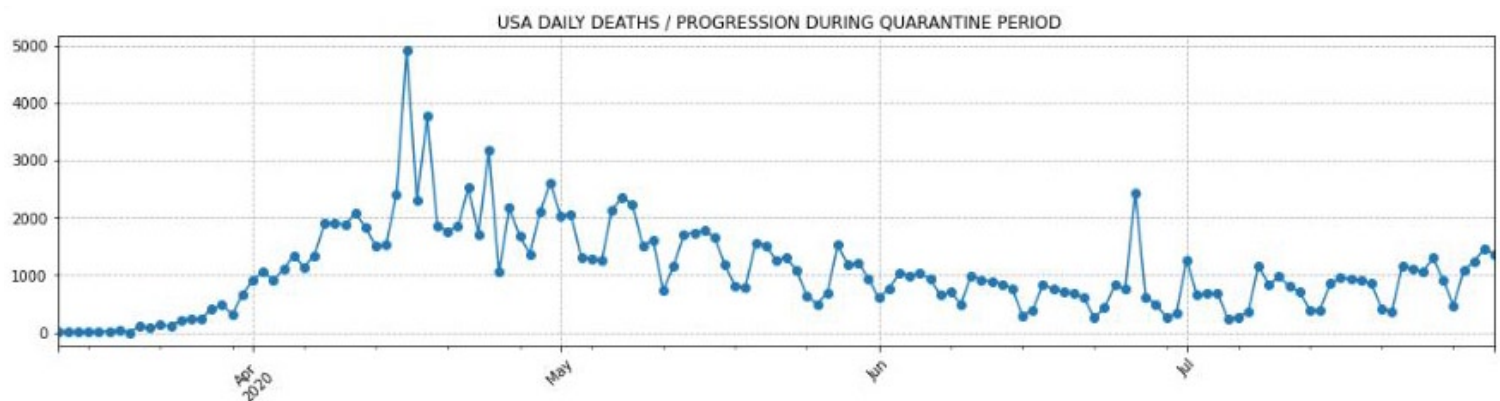
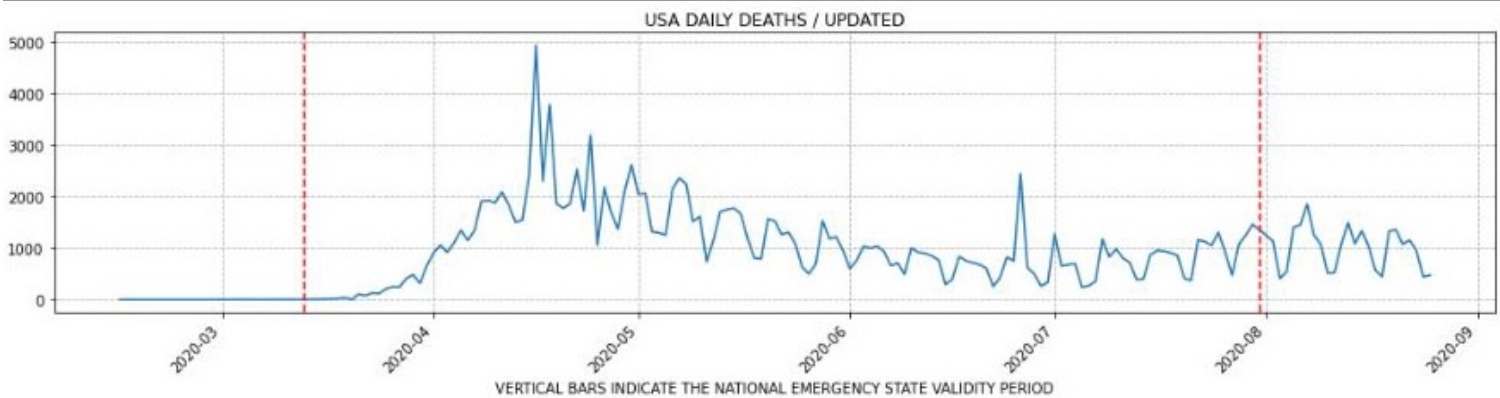
Emergency state is still valid.



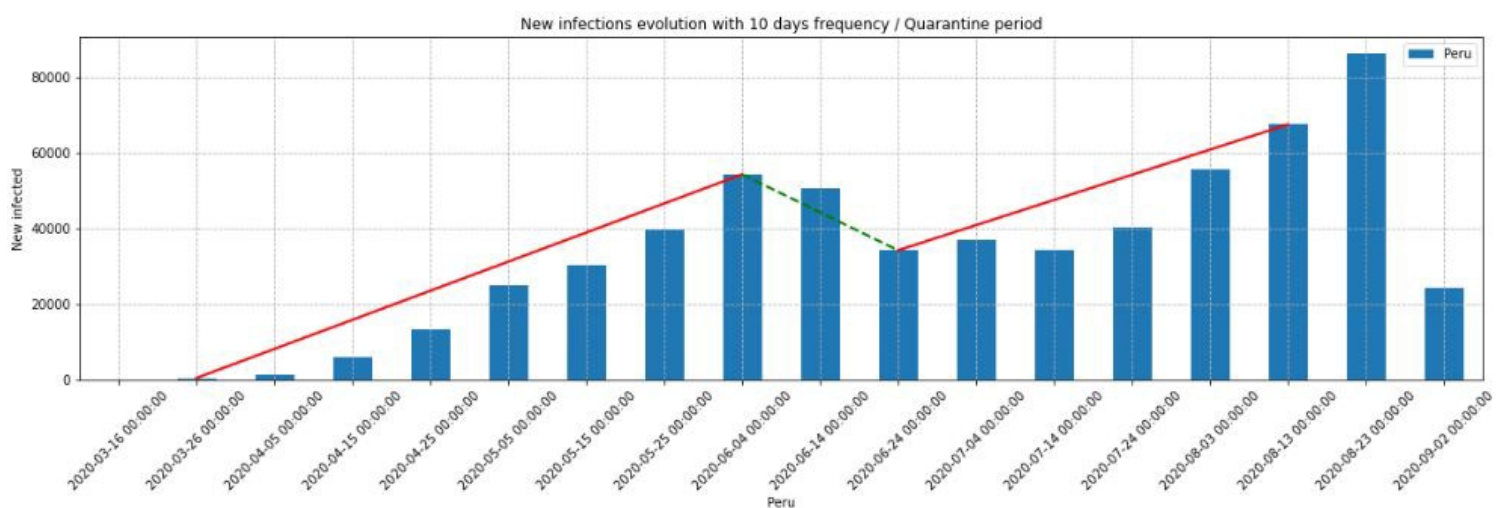
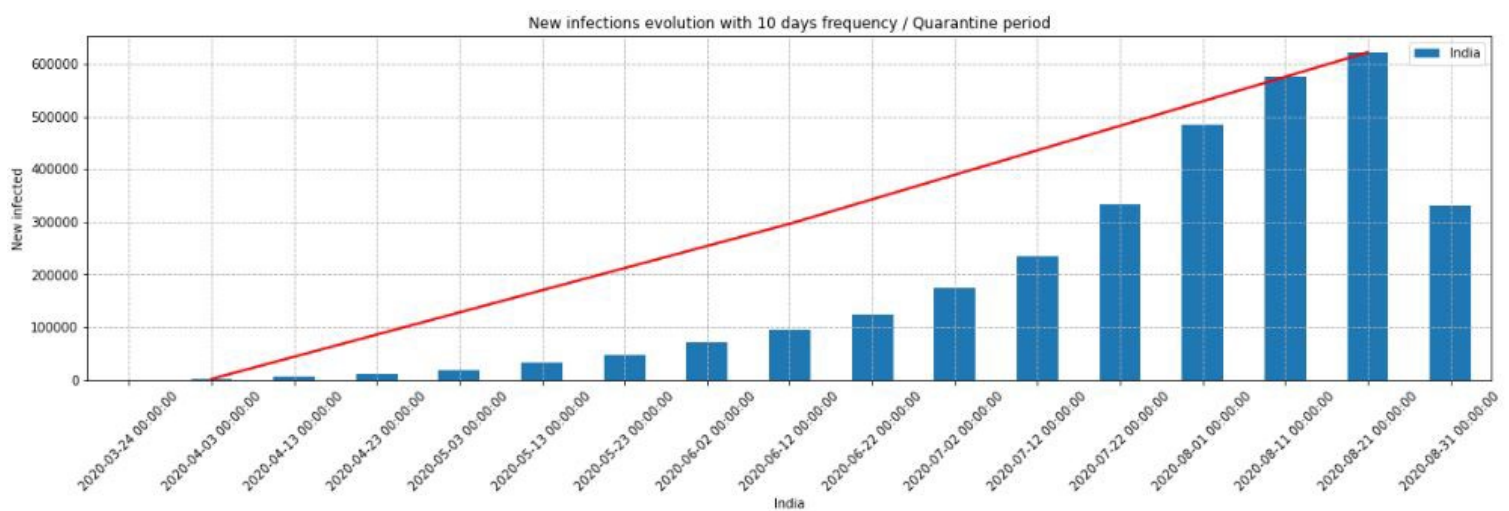
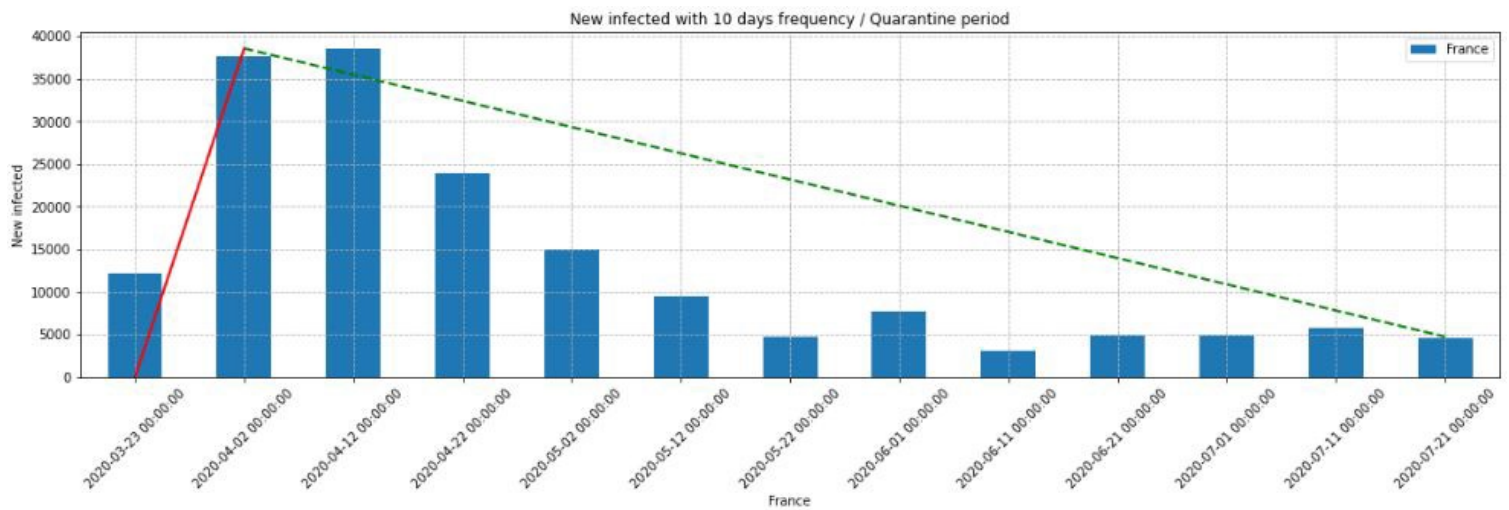
USA: Death by covid evolution.



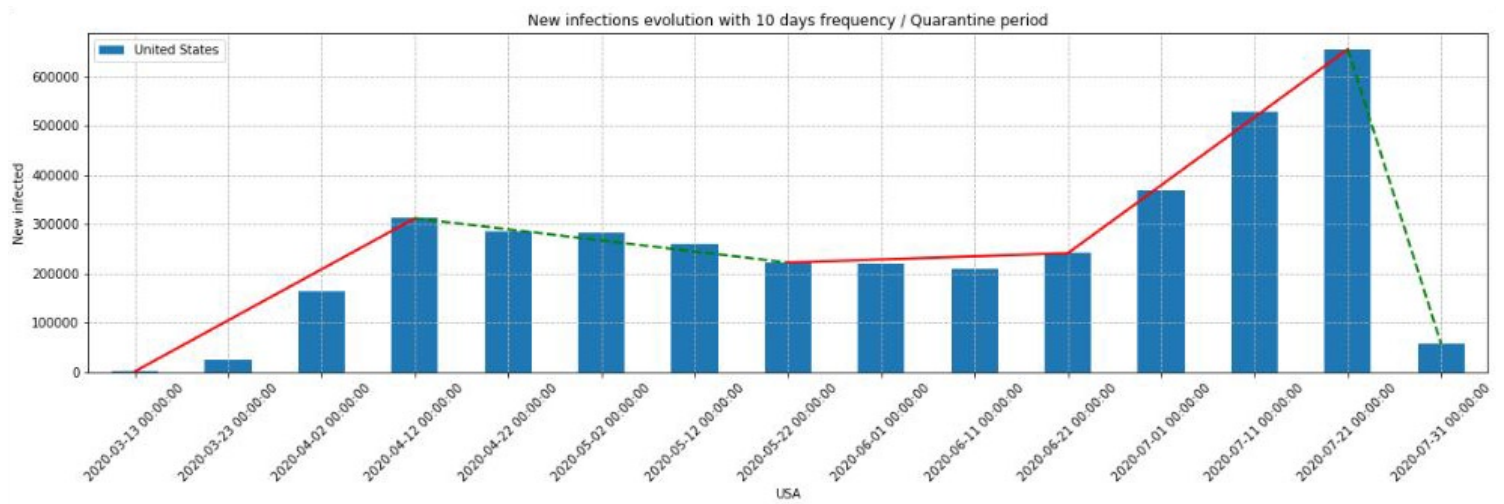
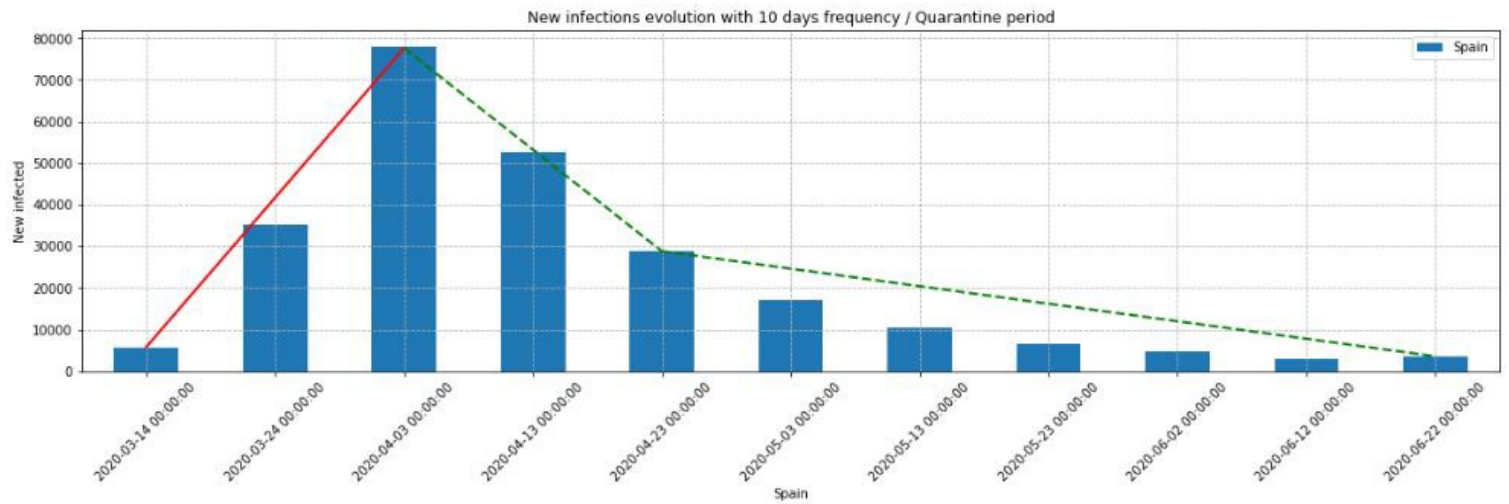
Evolution with emergency state measures.



BONUS: PLOTTED TENDENCES WITH 10 DAYS FRECUENCIES

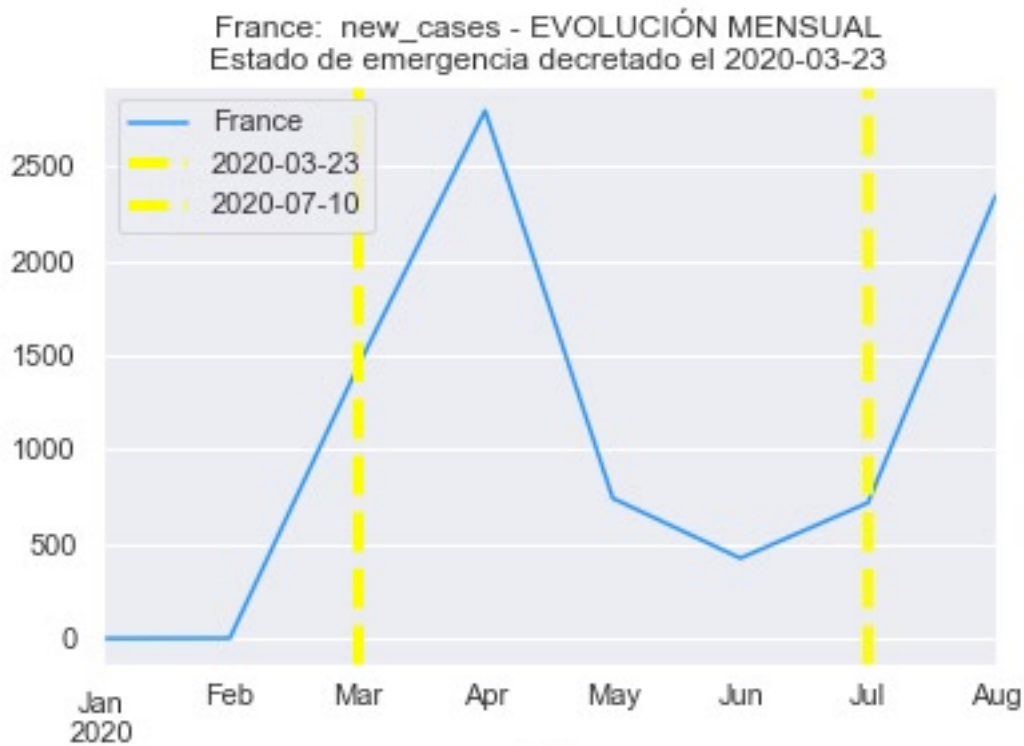


BONUS: PLOTTED TENDENCES WITH 10 DAYS FRECUENCIES



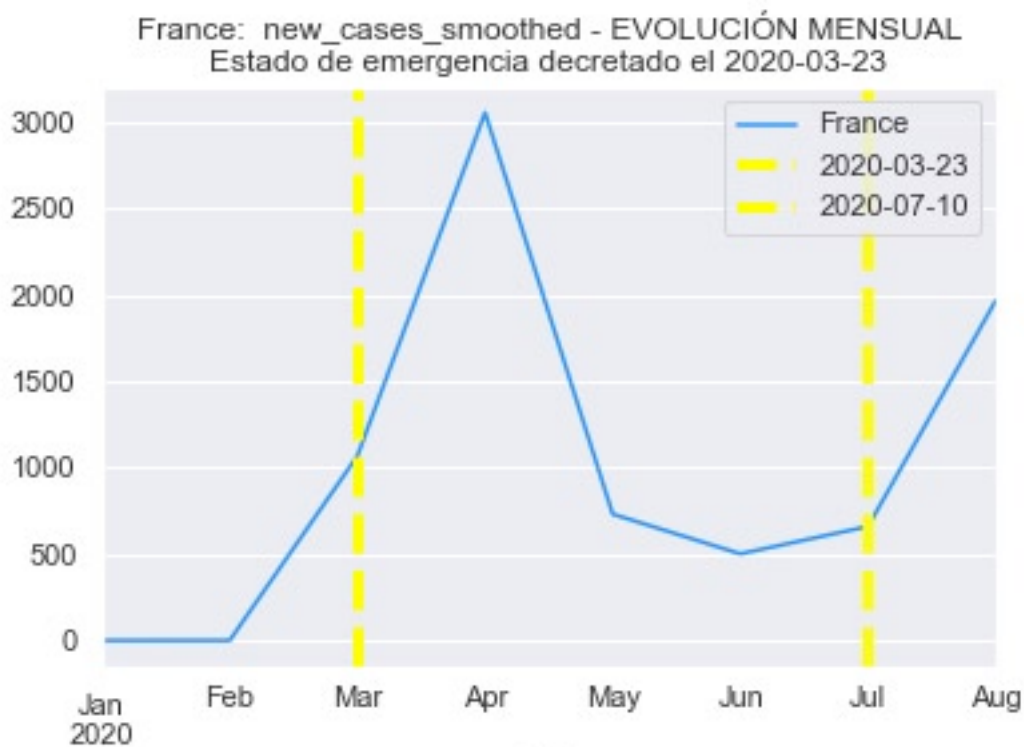
COLLECTION OF SAVED PLOTS

NEW DAILY INFECTIONS REGISTERED IN FRANCE (Updated 2020-08-23)



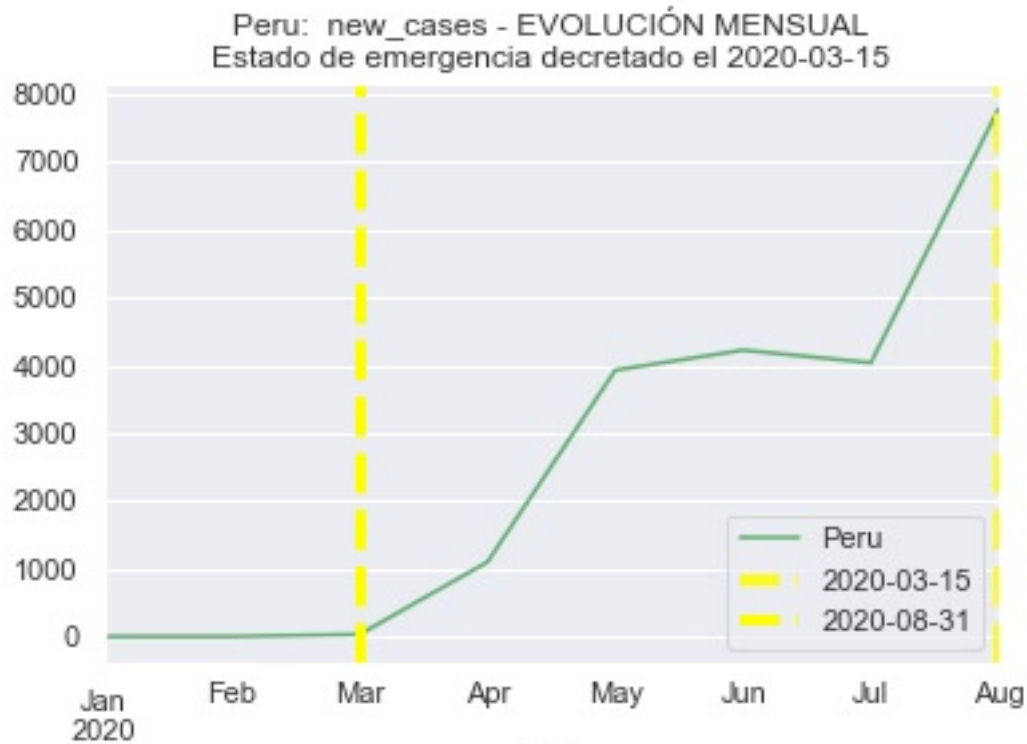
Amount of new cases reaches 2.600

SMOOTHED NEW DAILY INFECTIONS REGISTERED IN FRANCE



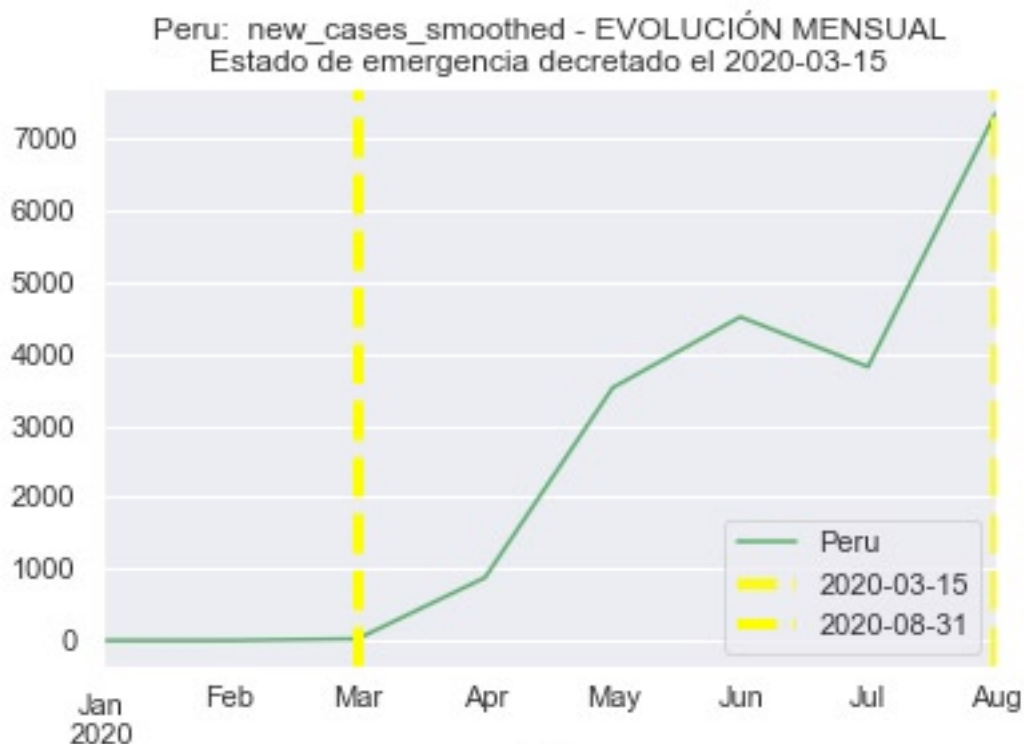
COLLECTION OF SAVED PLOTS

NEW DAILY INFECTIONS REGISTERED IN PERÚ (Updated 2020-08-23)



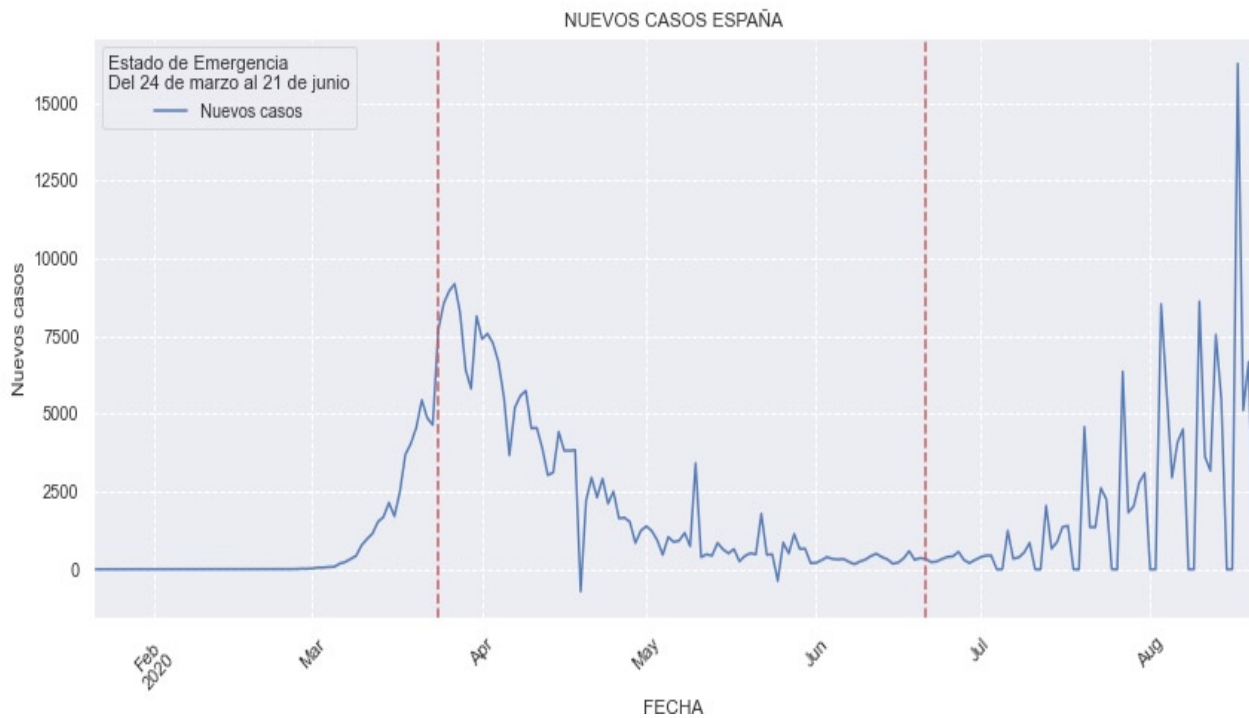
Amount of new cases reaches 8.000

SMOOTHED NEW DAILY INFECTIONS REGISTERED IN PERÚ



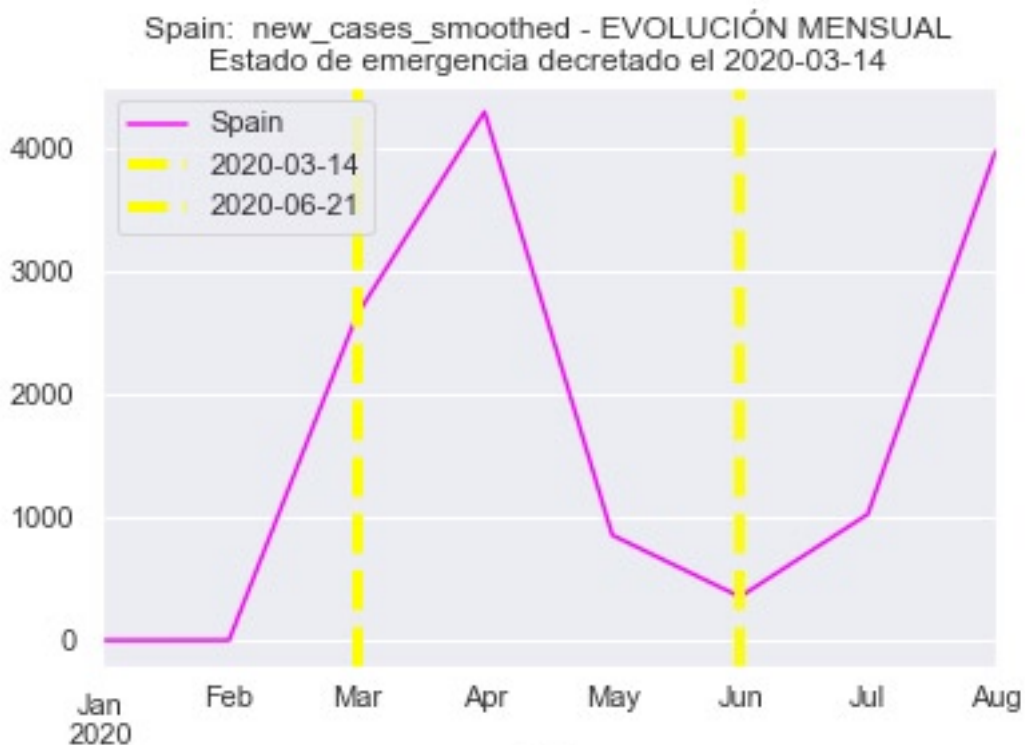
COLLECTION OF SAVED PLOTS

NEW DAILY INFECTIONS REGISTERED IN SPAIN (Updated 2020-08-23)



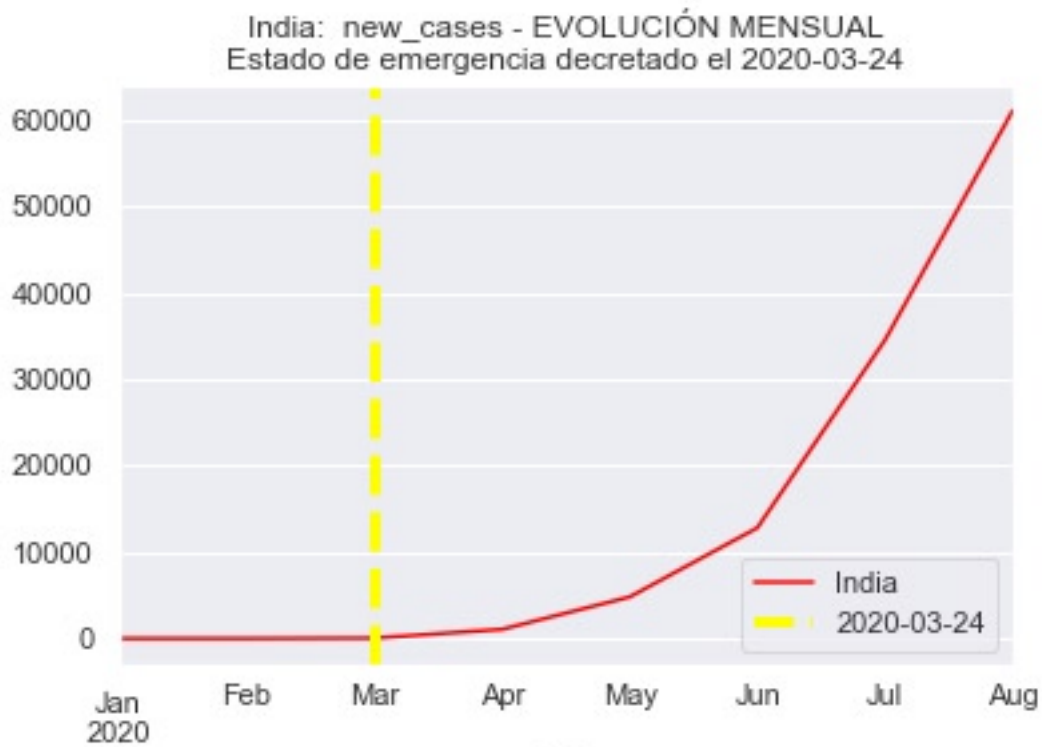
Amount of new cases reaches 15.000

SMOOTHED NEW DAILY INFECTIONS REGISTERED IN SPAIN



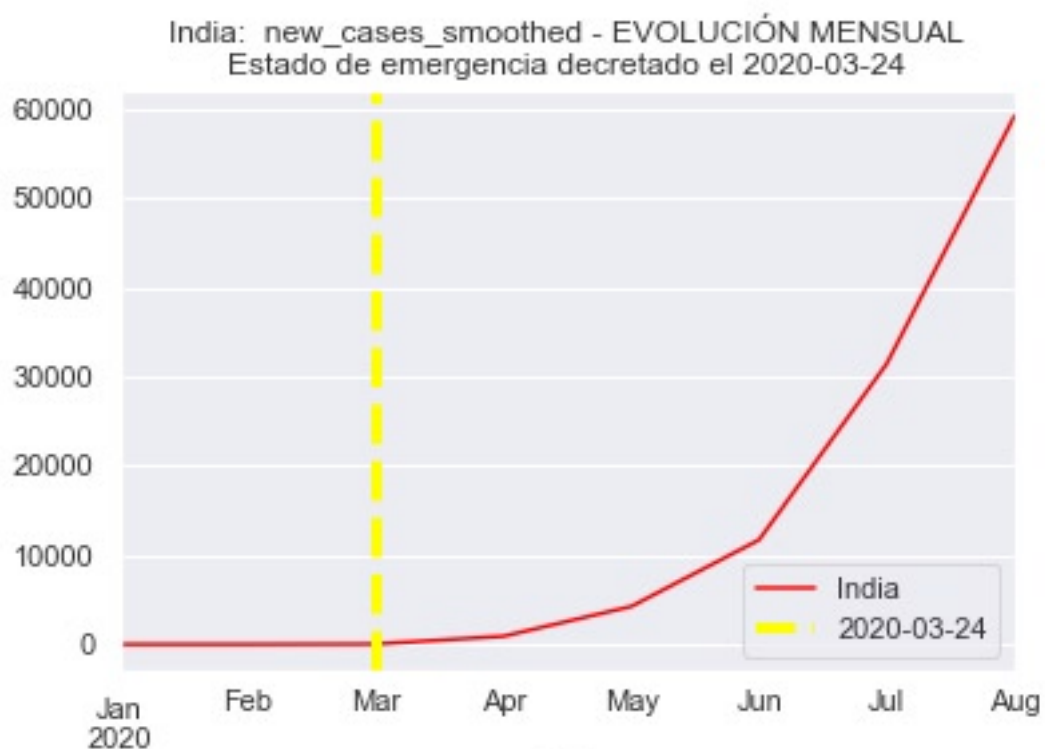
COLLECTION OF SAVED PLOTS

NEW DAILY INFECTIONS REGISTERED IN INDIA (Updated 2020-08-23)



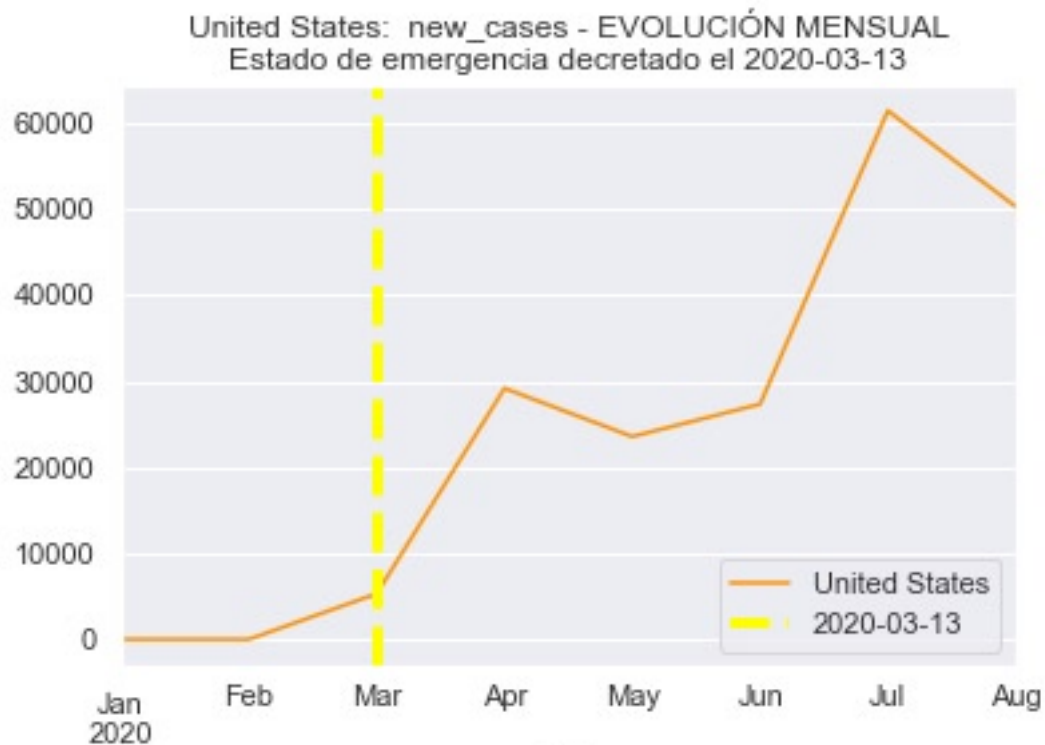
Amount of new cases reaches 60.000

SMOOTHED NEW DAILY INFECTIONS REGISTERED IN INDIA



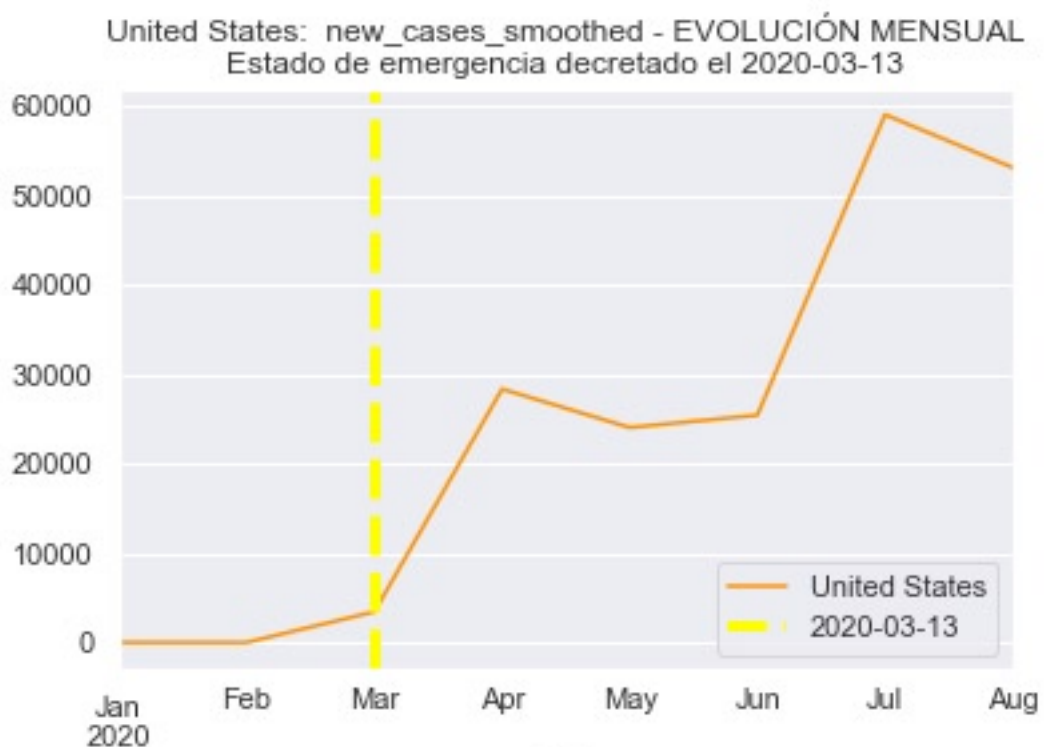
COLLECTION OF SAVED PLOTS

NEW DAILY INFECTIONS REGISTERED IN USA (Updated 2020-08-23)



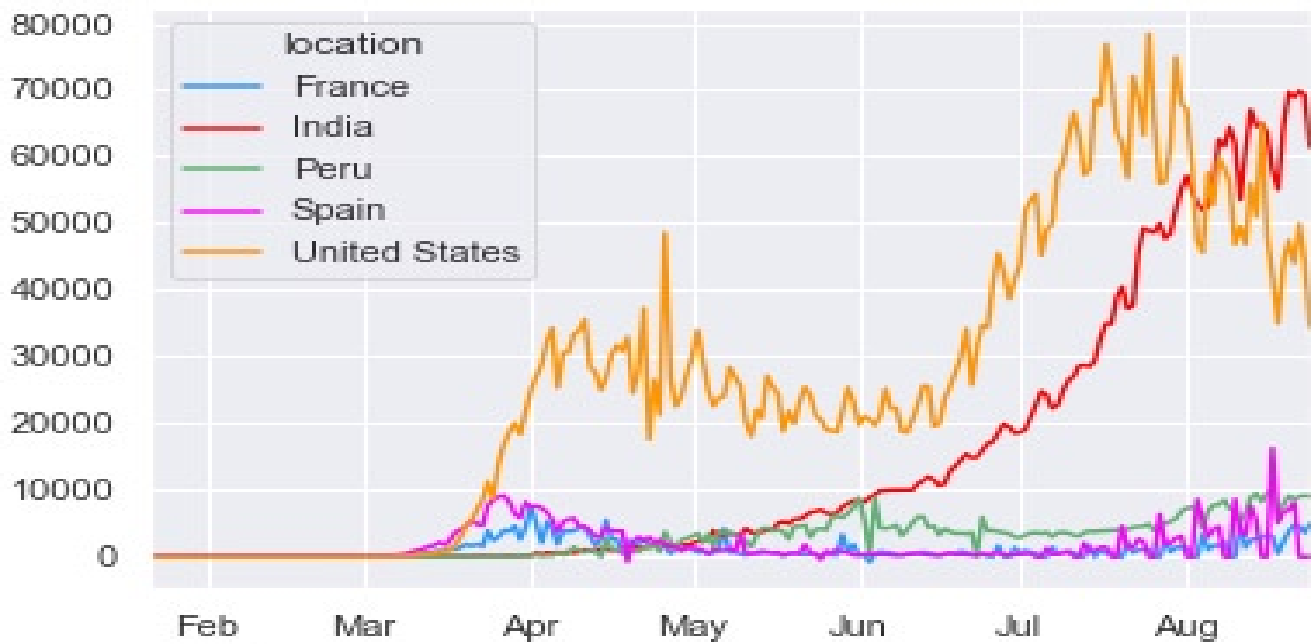
Amount of new cases (y axis) reaches 15.000

SMOOTHED NEW DAILY INFECTIONS REGISTERED IN USA

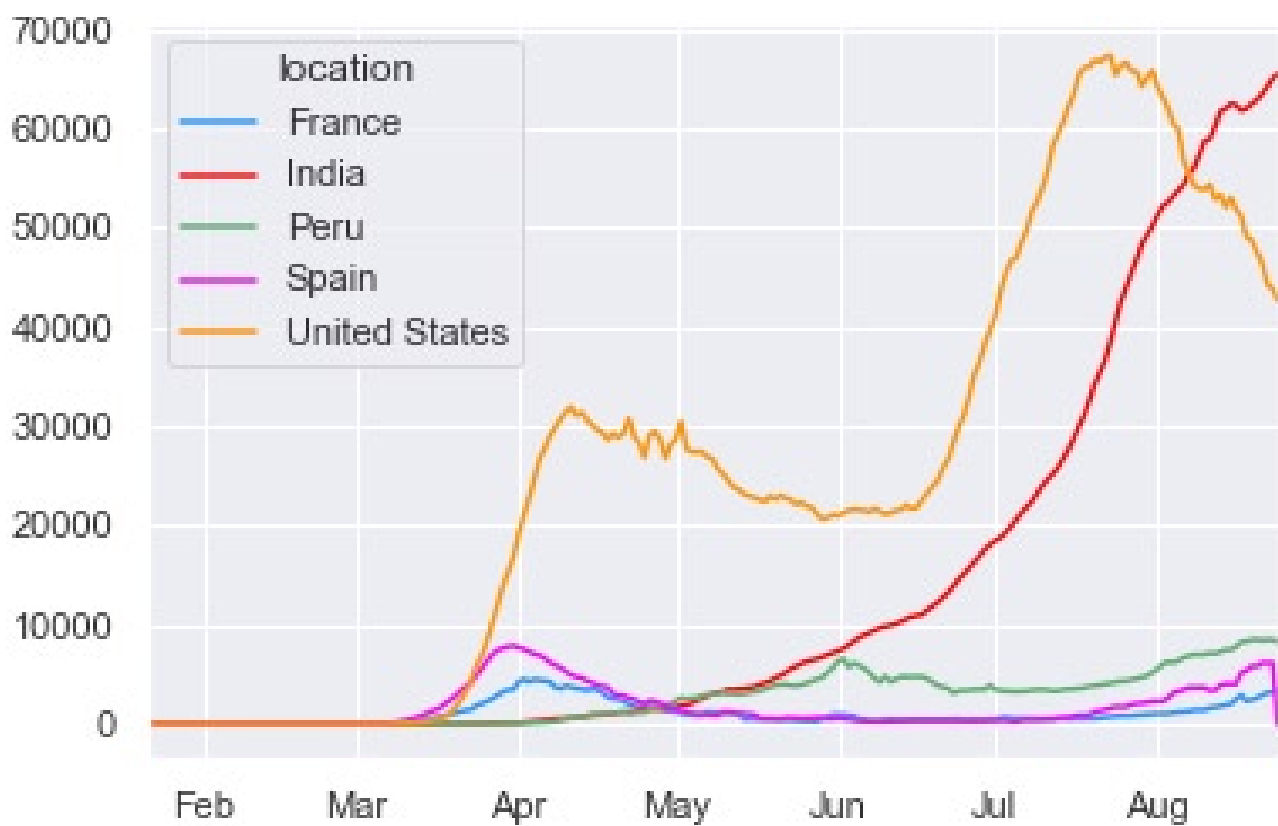


COLLECTION OF SAVED PLOTS

ALL COUNTRIES REGISTERED DAILY INFECTIONS (Updated 2020-08-23)

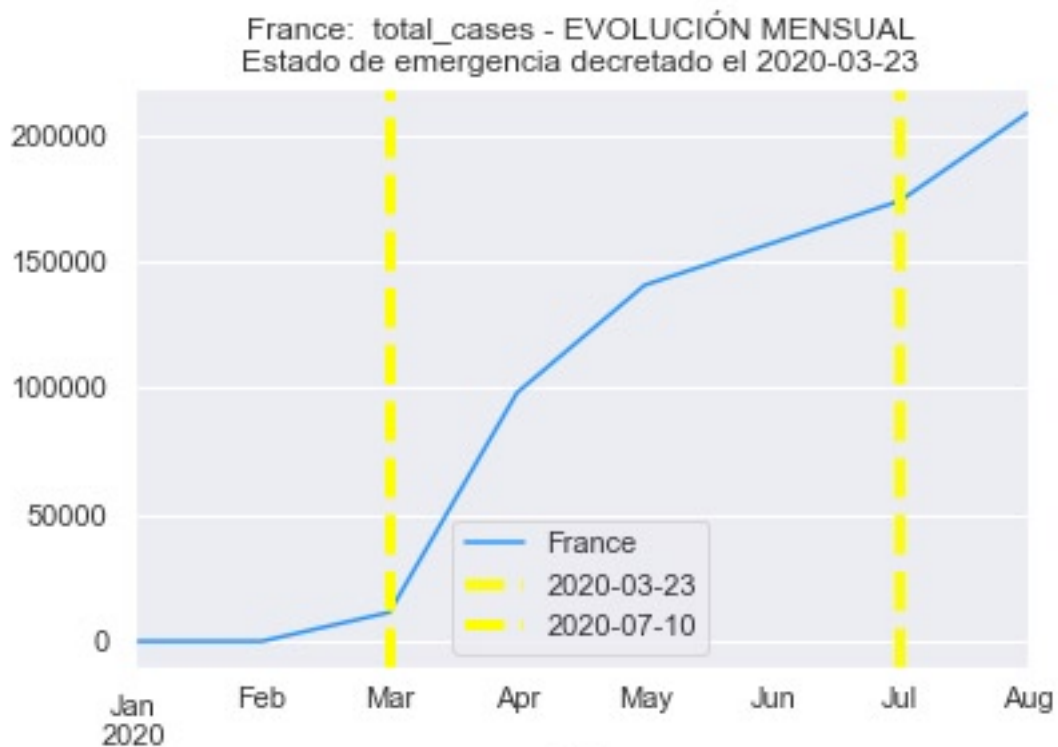


SMOOTHED - ALL COUNTRIES REGISTERED DAILY INFECTIONS



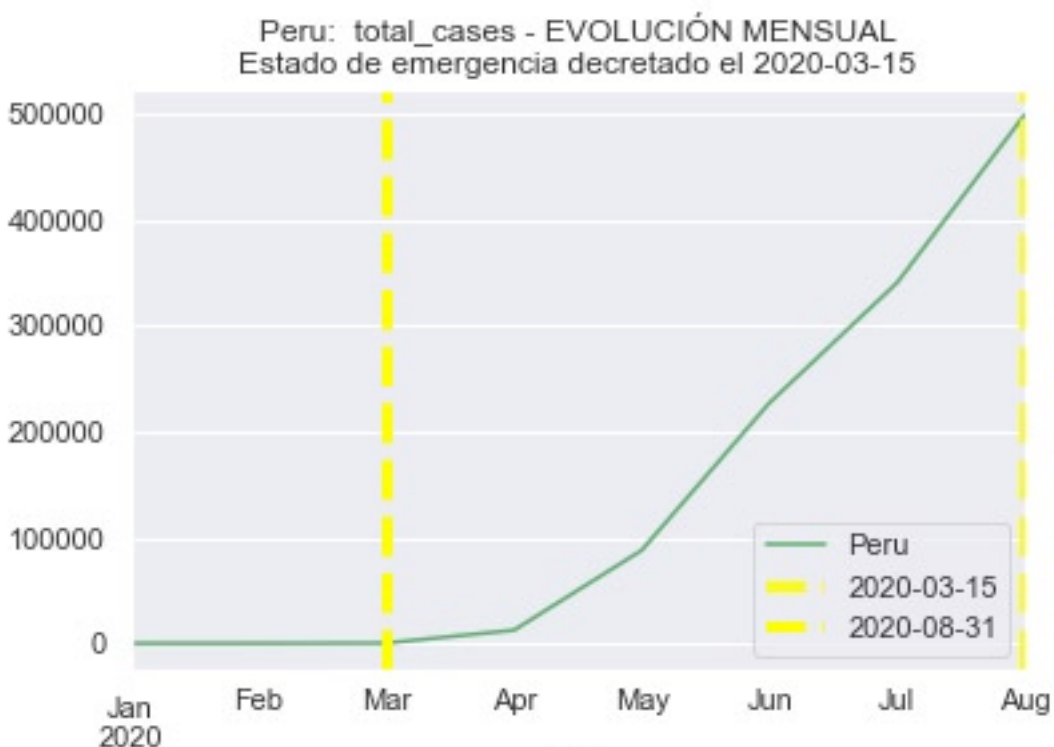
COLLECTION OF SAVED PLOTS

TOTAL INFECTED PEOPLE REGISTERED IN FRANCE (Updated 2020-08-23)



Amount of new cases reaches 250.000

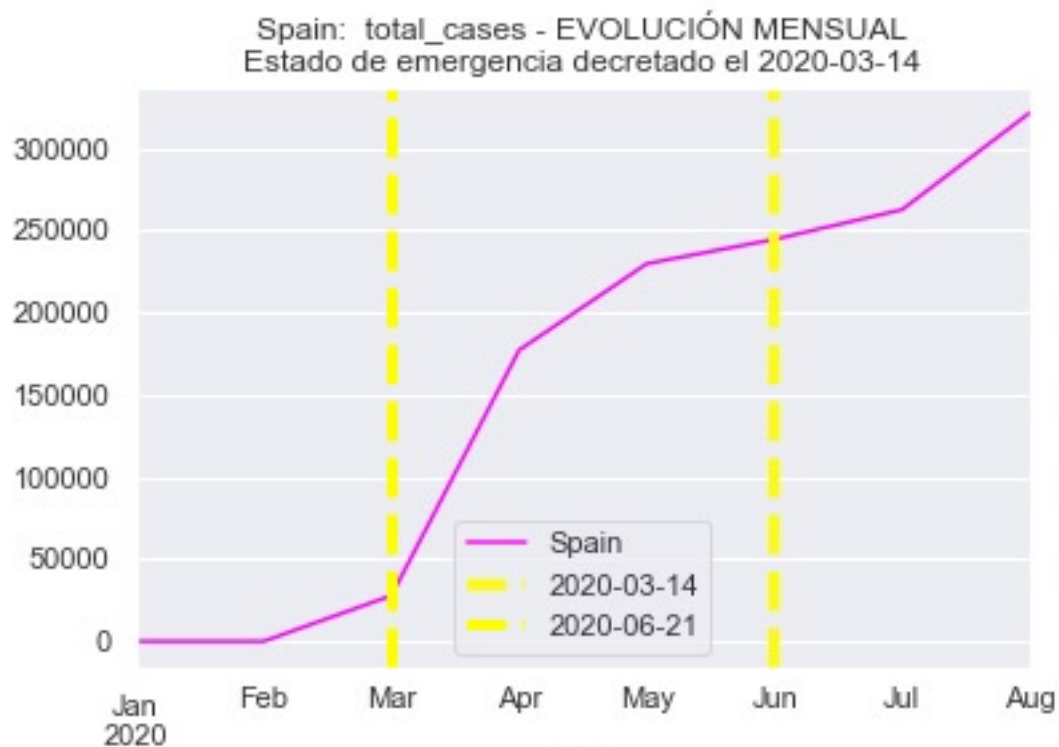
TOTAL INFECTED PEOPLE REGISTERED IN PERÚ (Updated 2020-08-23)



Amount of new cases reaches 500.000

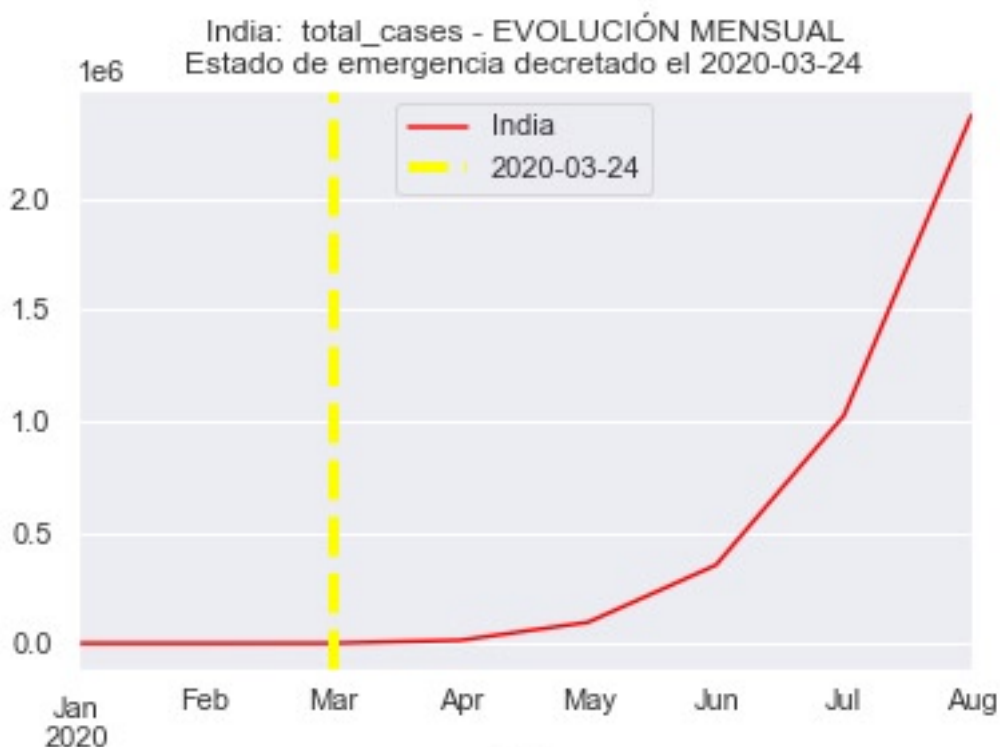
COLLECTION OF SAVED PLOTS

TOTAL INFECTED PEOPLE REGISTERED IN SPAIN (Updated 2020-08-23)



Amount of new cases reaches 300.000

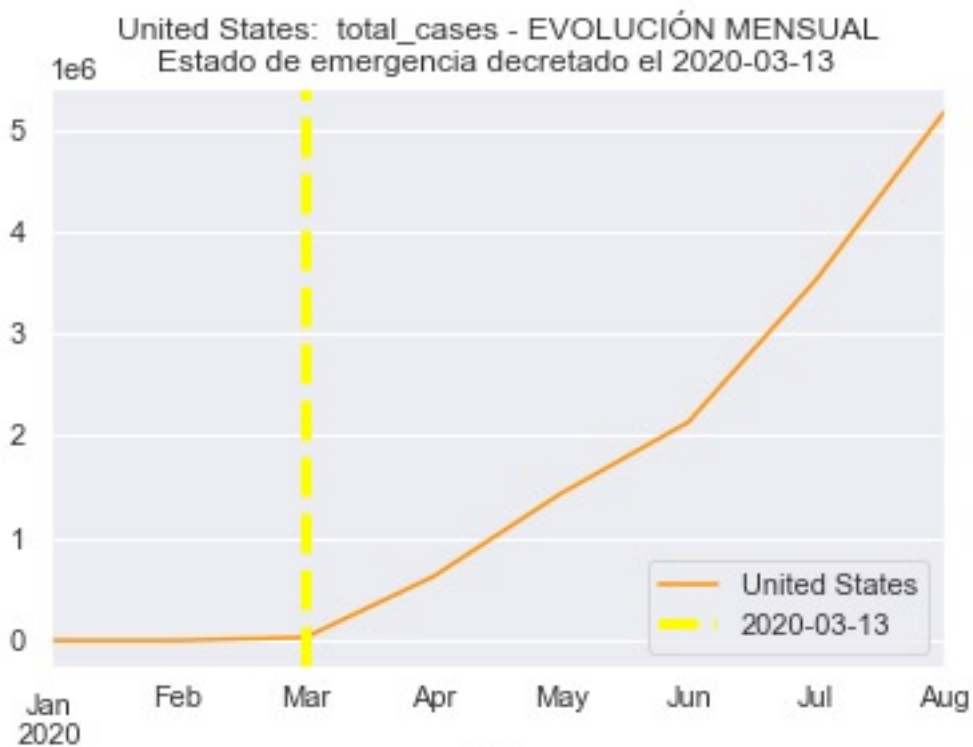
TOTAL INFECTED PEOPLE REGISTERED IN INDIA (Updated 2020-08-23)



Amount of new cases reaches 3.0 x100K

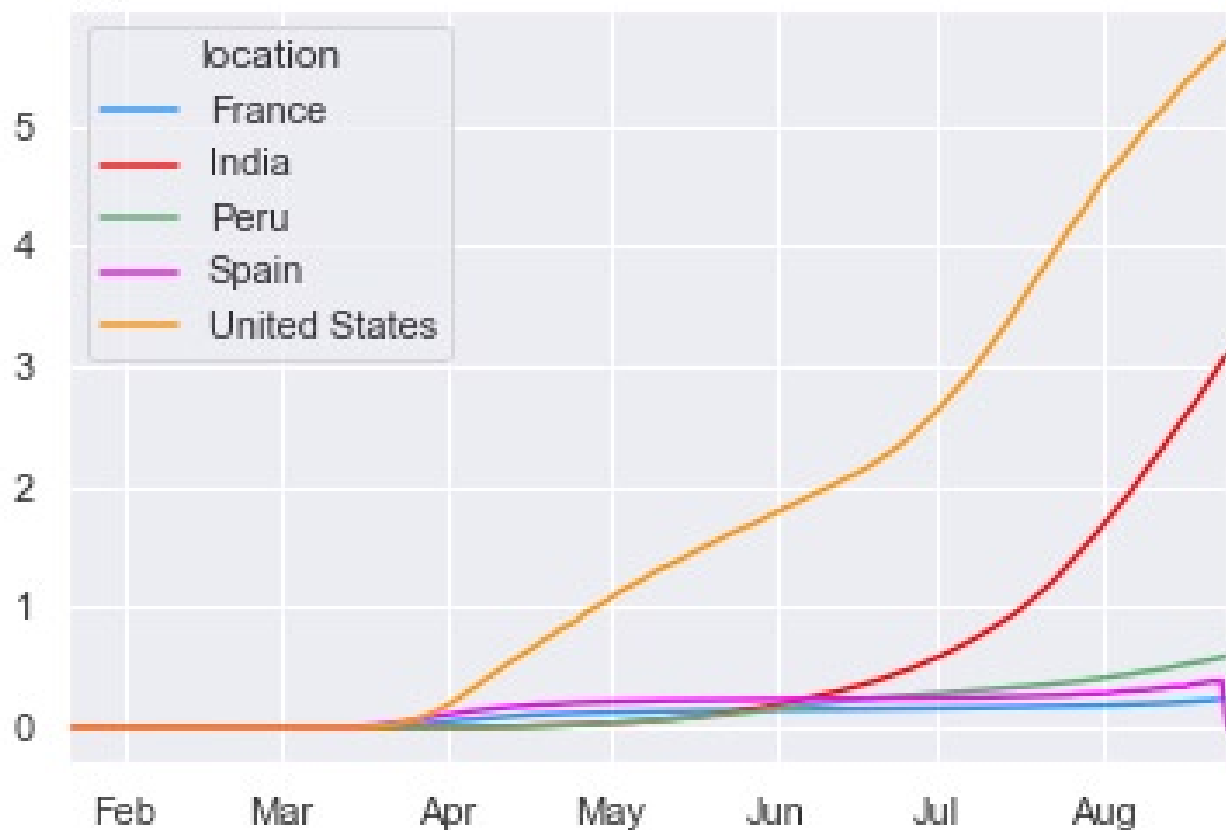
COLLECTION OF SAVED PLOTS

TOTAL INFECTED PEOPLE REGISTERED IN USA (Updated 2020-08-23)



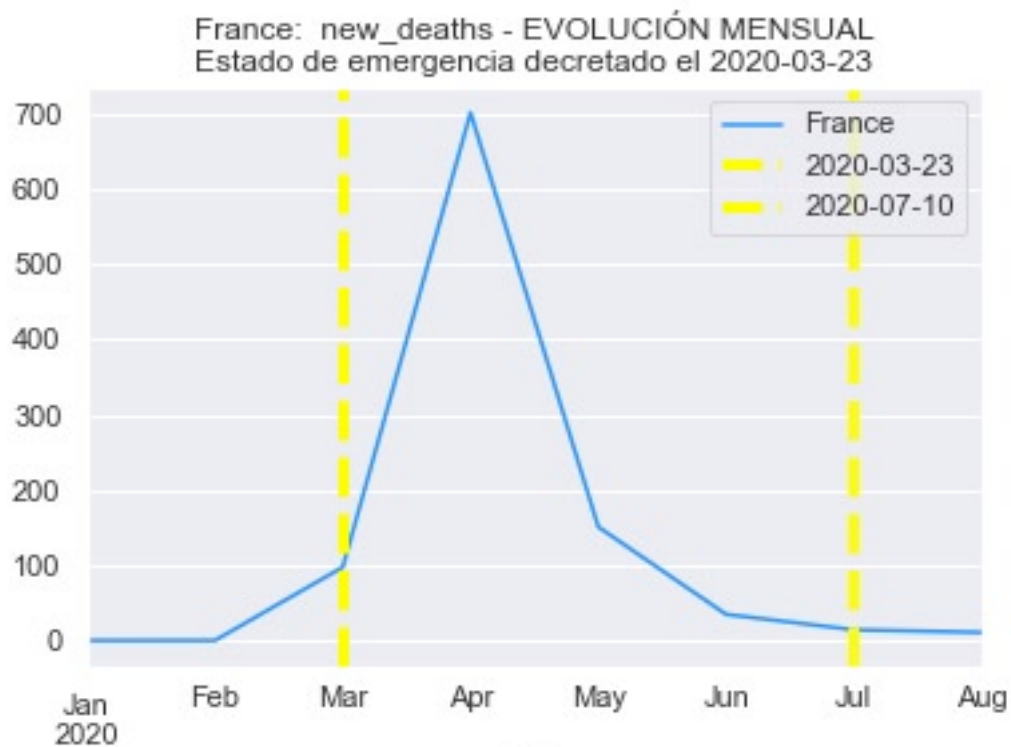
Amount of new cases reaches 5.0 X 100K

SMOOTHED - ALL COUNTRIES TOTAL REGISTERED INFECTIONS



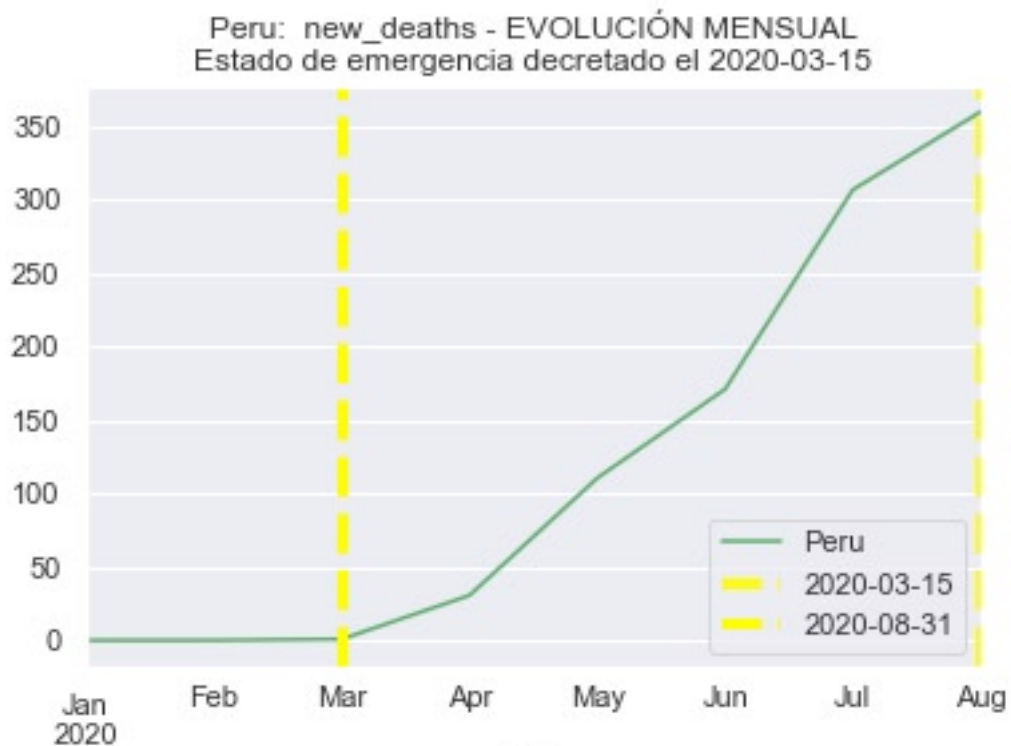
COLLECTION OF SAVED PLOTS

DAILY DEATHS REGISTERED IN FRANCE (Updated 2020-08-23)



Amount reaches 700

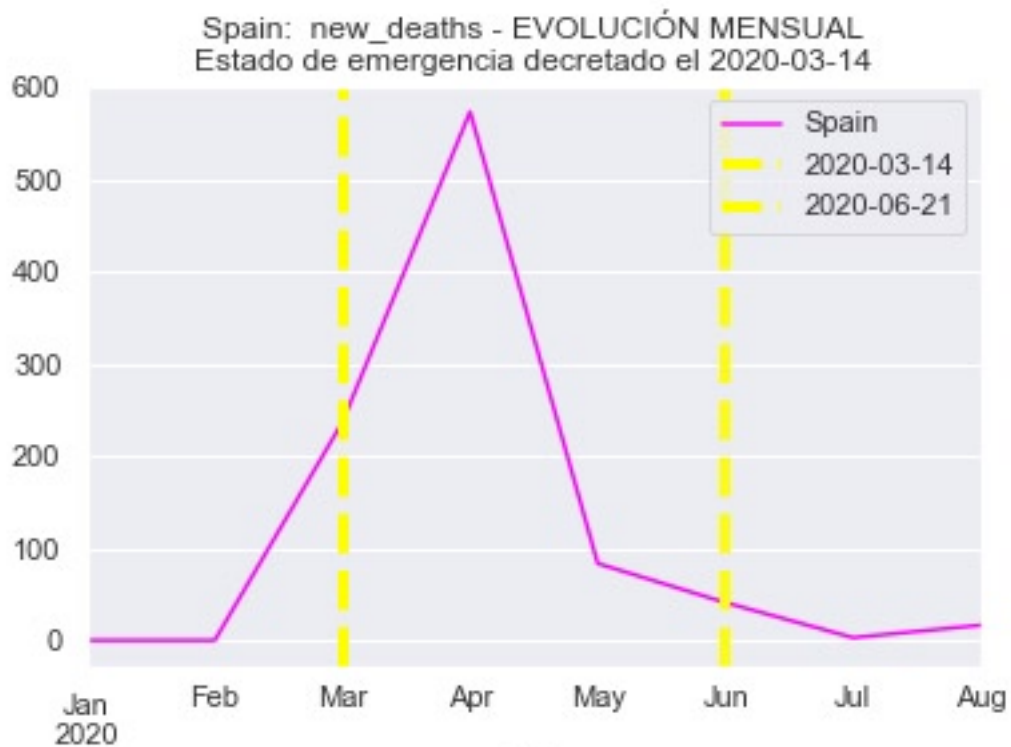
DAILY DEATHS REGISTERED IN PERU (Updated 2020-08-23)



Amount reaches 350

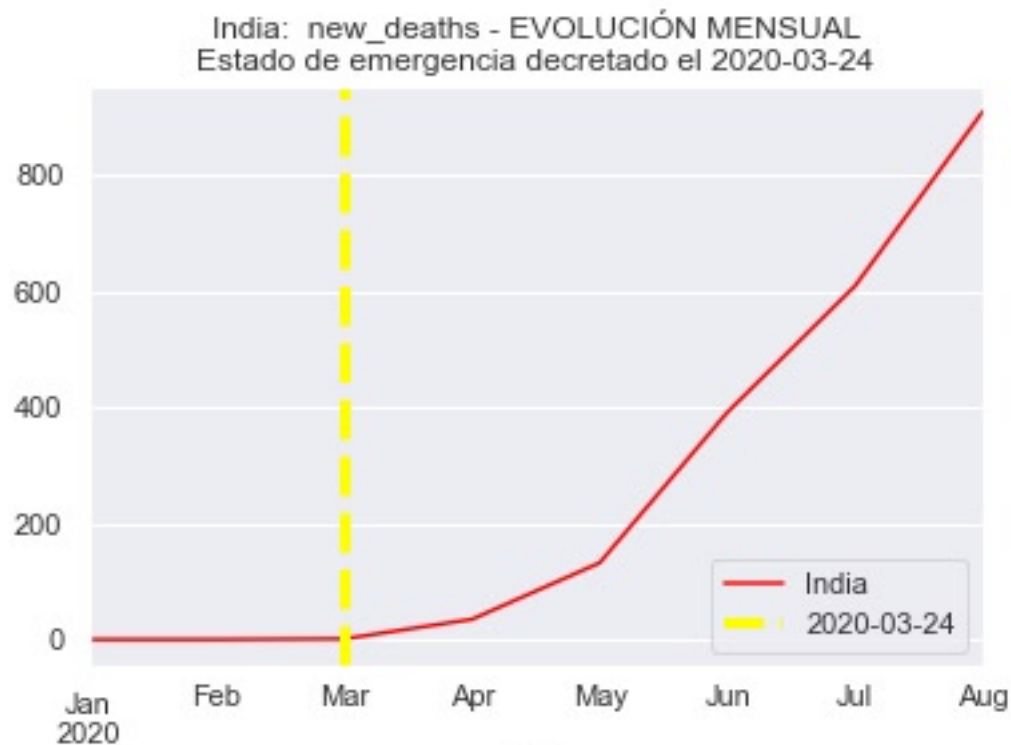
COLLECTION OF SAVED PLOTS

DAILY DEATHS REGISTERED IN SPAIN (Updated 2020-08-23)



Amount reaches 1.000

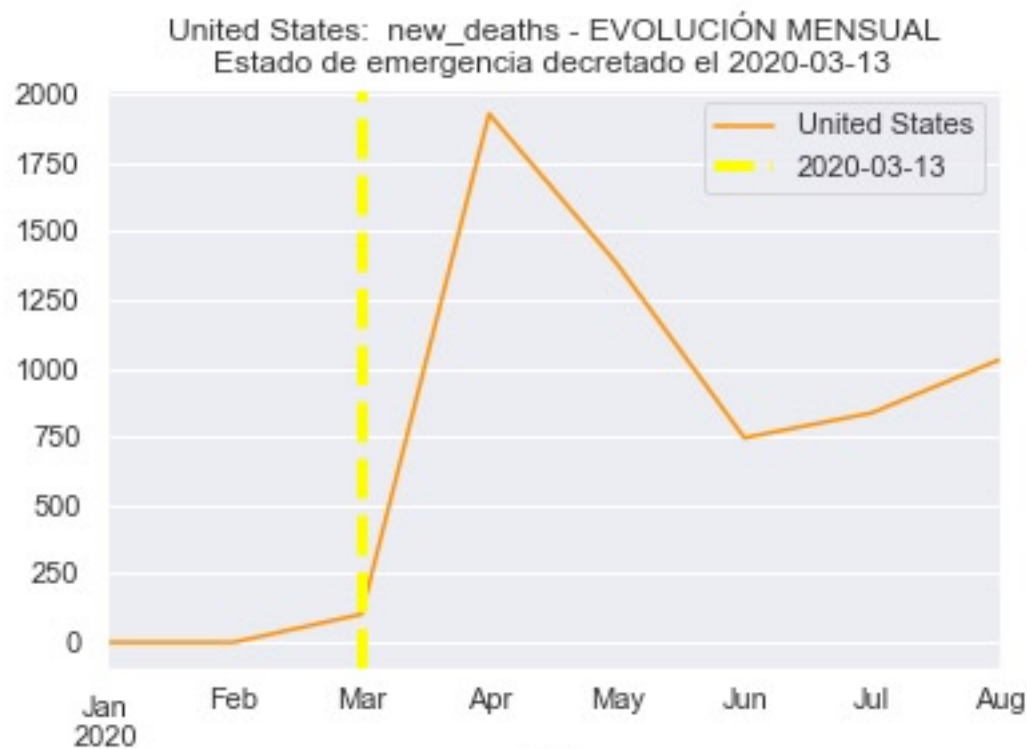
DAILY DEATHS REGISTERED IN INDIA (Updated 2020-08-23)



Amount reaches 850

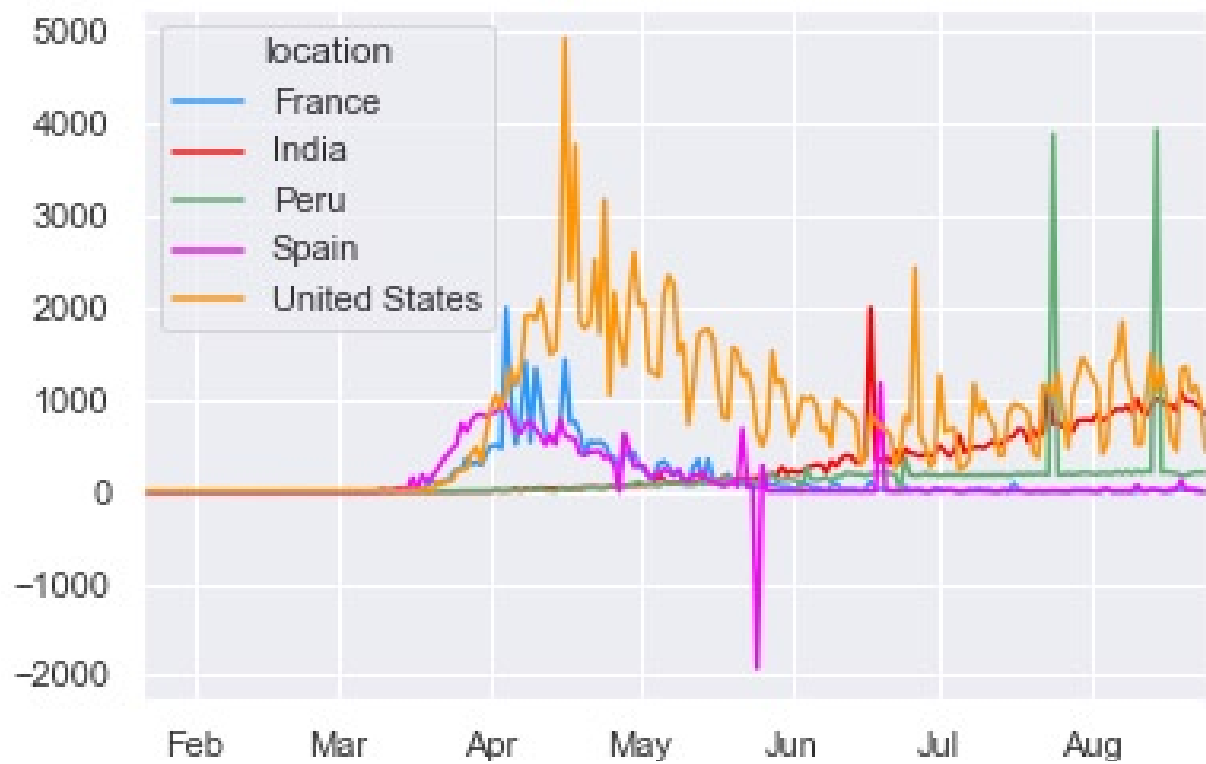
COLLECTION OF SAVED PLOTS

DAILY DEATHS REGISTERED IN USA (Updated 2020-08-23)



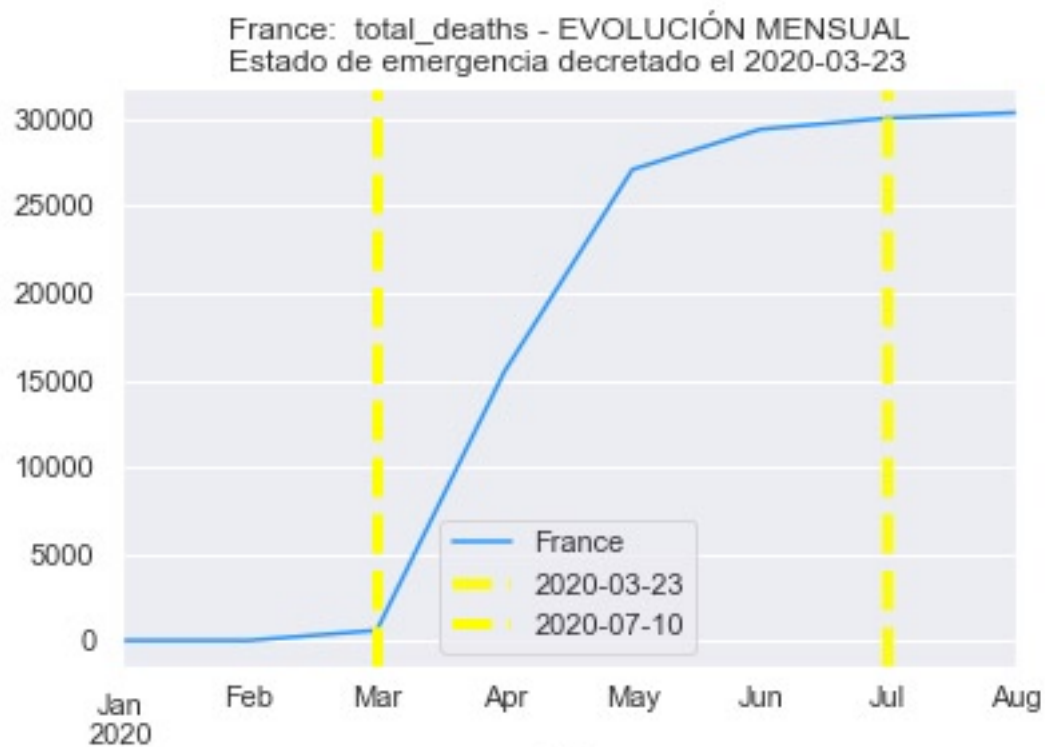
Amount reaches 5.000

DAILY DEATHS REGISTERED IN ALL COUNTRIES (Updated 2020-08-23)



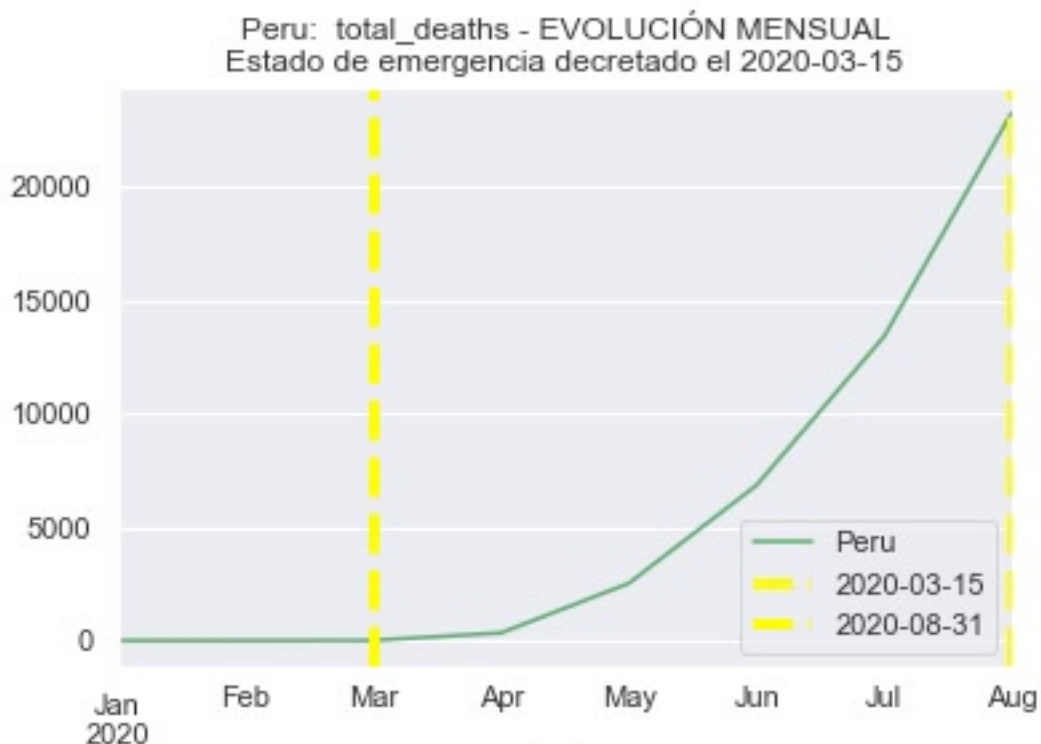
COLLECTION OF SAVED PLOTS

TOTAL DEATHS REGISTERED IN FRANCE (Updated 2020-08-23)



Amount reaches 30.000

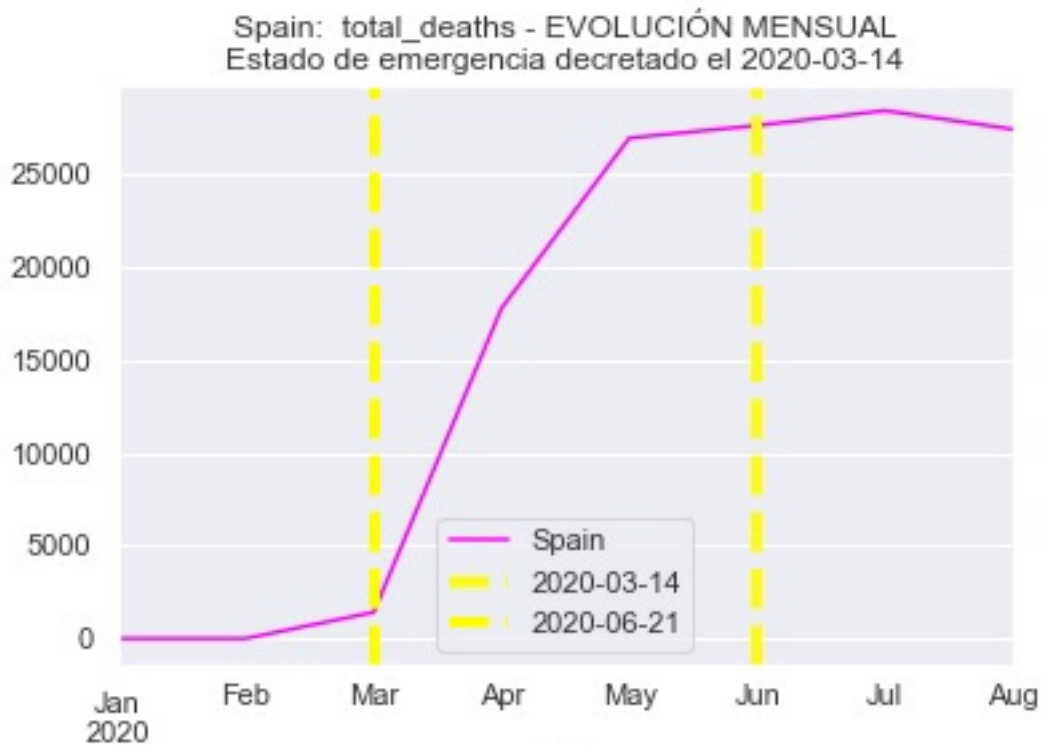
TOTAL DEATHS REGISTERED IN PERÚ (Updated 2020-08-23)



Amount reaches 24.000

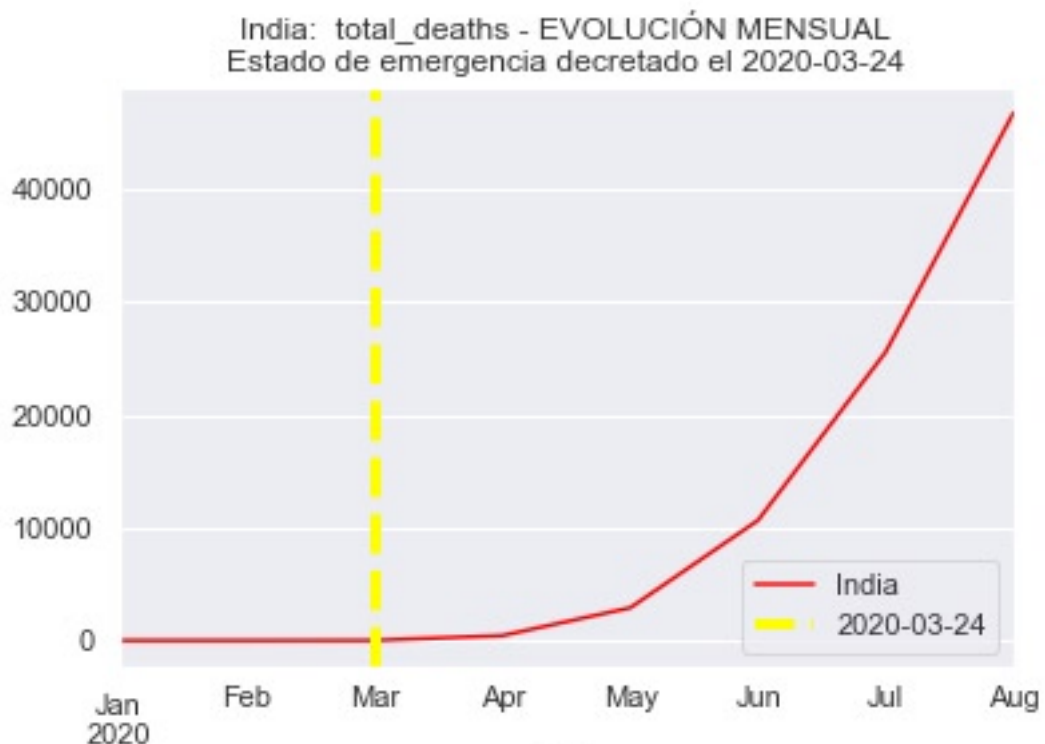
COLLECTION OF SAVED PLOTS

TOTAL DEATHS REGISTERED IN SPAIN (Updated 2020-08-23)



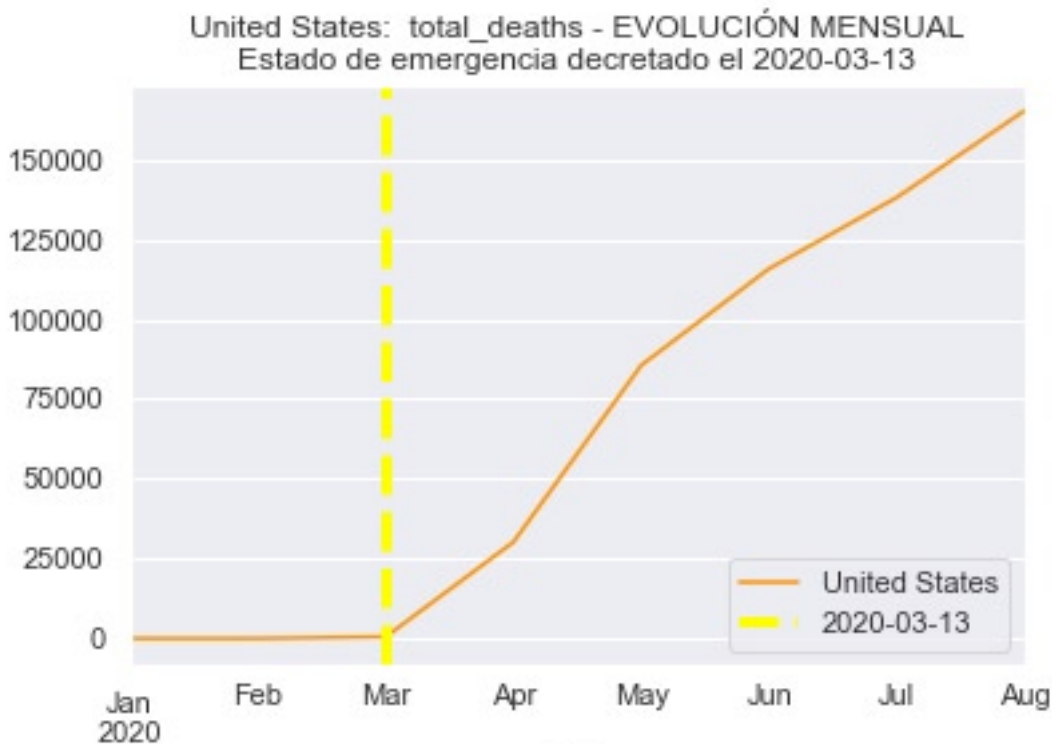
Amount reaches 27.000

TOTAL DEATHS REGISTERED IN INDIA (Updated 2020-08-23)



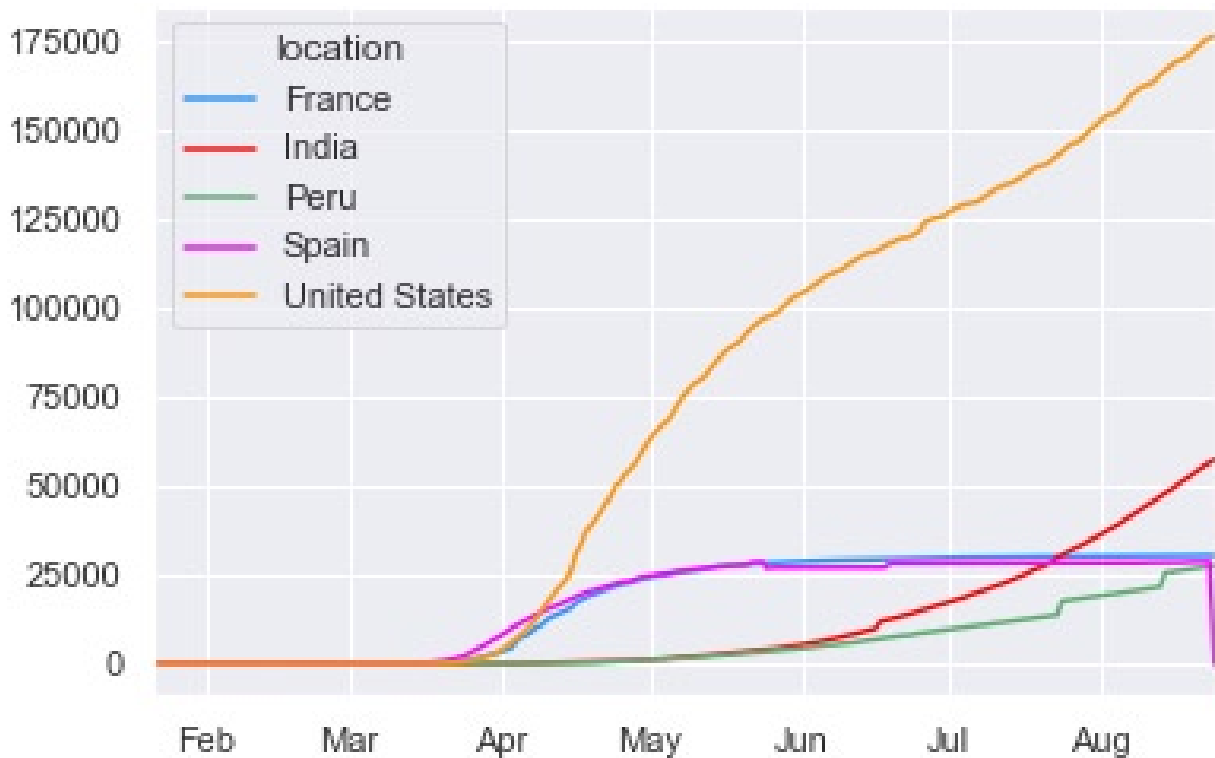
Amount reaches 50.000

TOTAL DEATHS REGISTERED IN USA (Updated 2020-08-23)

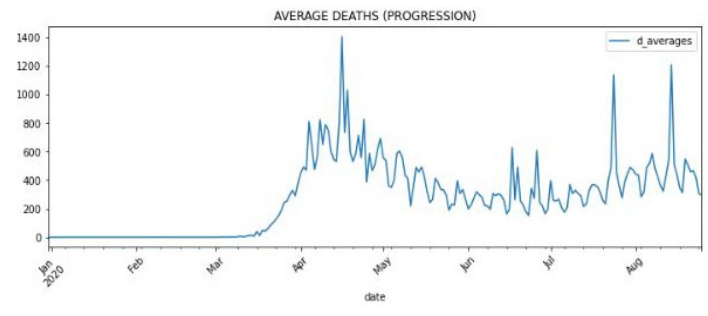
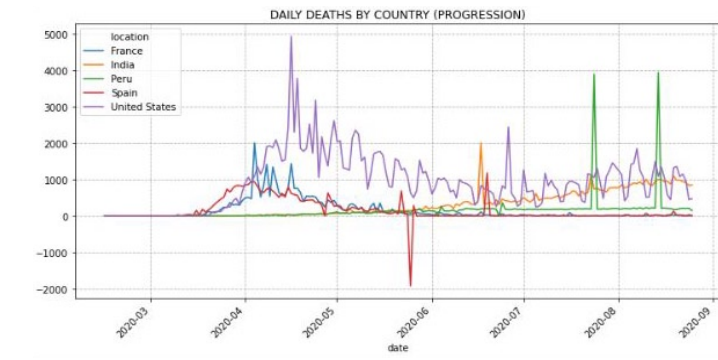
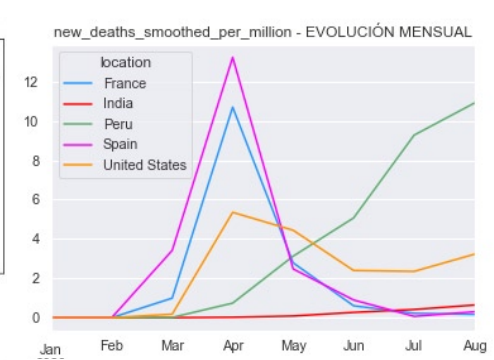
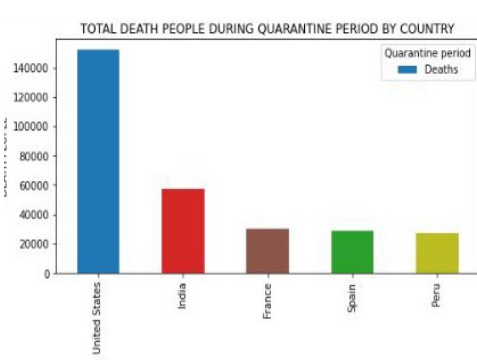
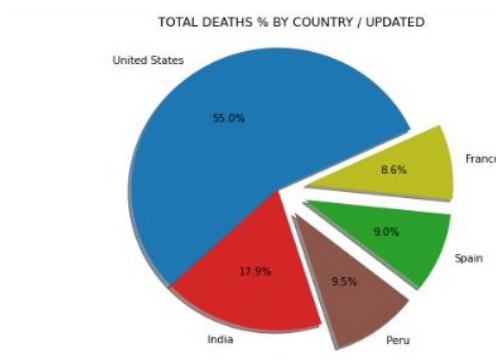
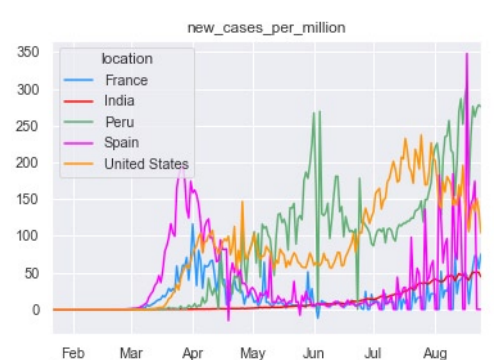
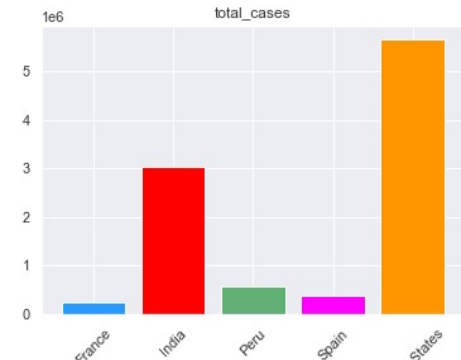
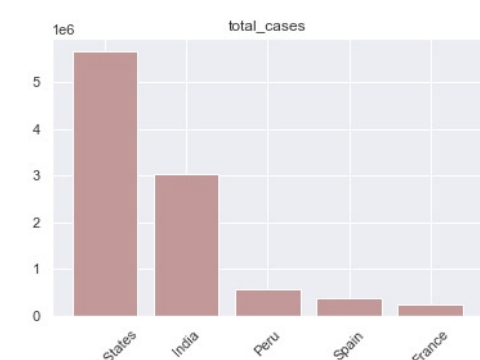
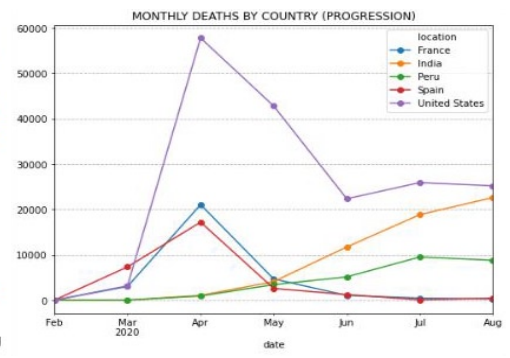
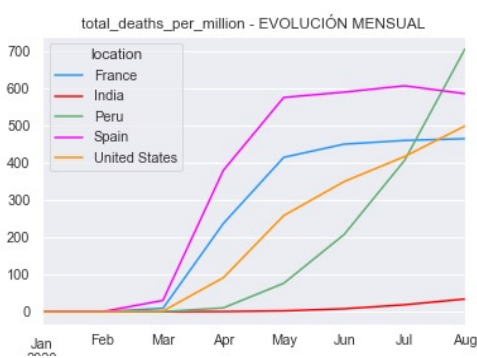
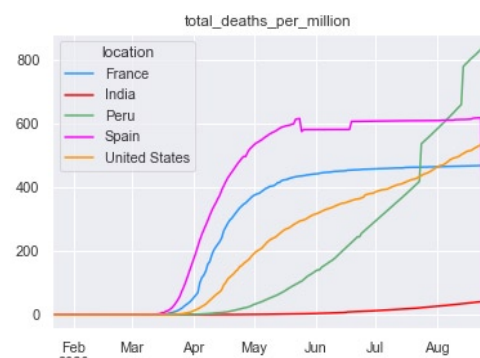
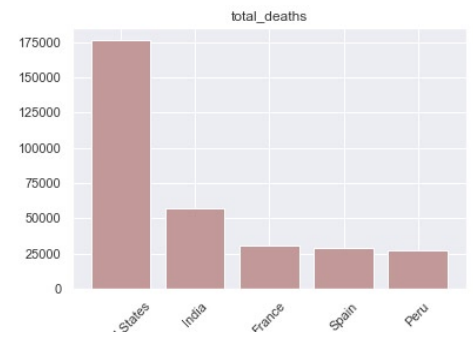
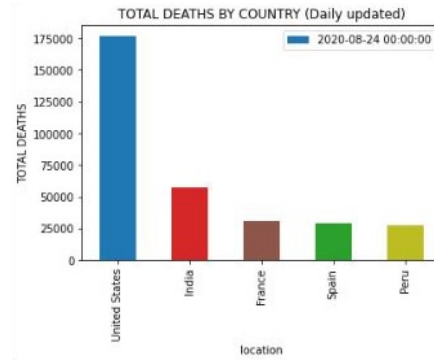
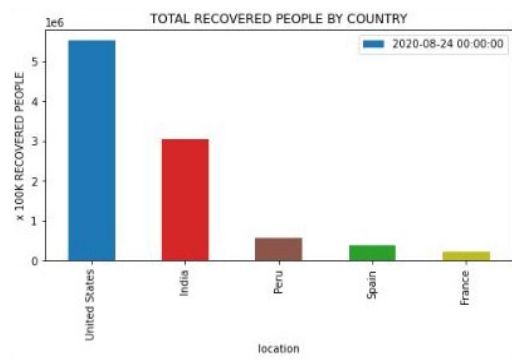


Amount reaches 175.000

TOTAL DEATHS REGISTERED IN ALL COUNTRIES (Updated 2020-08-23)



COLLECTION OF SAVED PLOTS - OTHER SAVED PLOTS



COMPARISON

Countries ranking by amount of infected people *(2020/08/07).

Country	Total infected people
USA	4.823.891
India	1.964.536
Perú	447.624
Spain	309.855
France	194.029

Countries ranking by amount of death people *(2020/08/07).

Country	Total death people	% of infected who died
USA	158.256	3,28 %
India	40.699	2,07 %
France	30.305	15,62 %
Spain	28.500	9,20 %
Perú	20.228	4,52 %

CONCLUSIONS

- Number of infected and death people is proportional to each country's population.
- Europe was hit by the virus in March while other countries registered first cases in April or May.
- While maximum infection rates in Europe were reached in May, we can see these infection rates are still growing in other countries.
- Amount of daily deaths is not growing in France and Spain, but it keeps growing in USA, India and Perú.
- It is remarkable to notice that death ratio is much lower in India and Perú. These are countries where health system is supposed to be worse, but we think the cause is the population's mean age in these countries is lower and we know the disease kills older people.
- This mean age difference is also reflected in the amount of recovered people.
- Lack of foresight on the part of authorities of each country is detected when it comes to taking social distancing and isolation measures. These measures have been proved as effective containing the infection ratios in Spain and France while alarm state was activated.
Measures taken in India, Perú and USA (not including lockdown) have been proved ineffective.

OUTLIERS

- We have found a great decrease in total number of death people in Spain dated in May 25th. The total number of deaths decreased by 1.918 people.
Spanish government said those deaths were not caused by covid and that was the reason told in the news.