

Covid-19 in Rio de Janeiro

Casa das Garças - August 2020

Marcelo C. Medeiros and Eduardo Zilberman
Department of Economics
PUC-Rio

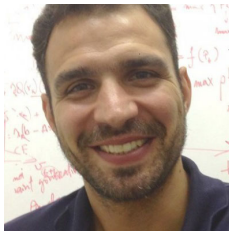


Who are we?

The Covid19Analytics team: the original group



M.C. Medeiros



A. Street



D. Valladão



G. Vasconcelos



E. Zilberman

Who are we?

The Covid19Analytics team: new associates



M. Fernandes



J. Antunes Neto



I. Ferreira



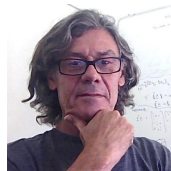
E.F. Mendes



T. Milagres



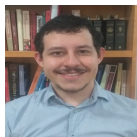
H. Pires



A. Veiga

Who are we?

The Covid19Analytics team: new associates



C. Belchior



I. Bruxelas



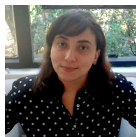
J. Collazos



R. Dias



R. Fonseca



Y. Gomes



G. Jardim



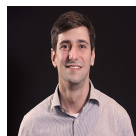
A. Maranhão



M. Mittelbach



A. Pinheiro



R. Sarlo

www.covid19analytics.com.br

The Covid19Analytics project

Goals

- Develop a tool to aid the Covid-19 crisis management in Brazil and inform the public.
- Forecasts for confirmed cases and deaths.
 - ★ Country-level and state-level
 - ★ Forecasting for up to 14 days.
 - ★ Forecasts for groups of municipalities according to their development level.
- Reproduction number calculation.
 - ★ State-level and country-level.
 - ★ Groups of municipalities
 - ★ Health regions
- Set of descriptive statistics and under-notification analysis .
- Covid-19 and economic indicators.
- Daily updates.

Motivation

Why Short-Term Forecasts?



Being able to forecast accurately the number of Covid-19 cases and deaths in the very short-run is crucial to manage properly the health system.

- More informed decisions on how to allocate hospital beds and ventilators, on whether to set more field hospitals, on whether to train more health workers, etc.
- Simple statistical model for **short-term real-time forecasting** of the number of Covid-19 **cases and fatalities** in countries that are *latecomers*
 - ★ i.e., countries where cases of the disease started to appear some time after others

The Model

Pros and Cons



Pros

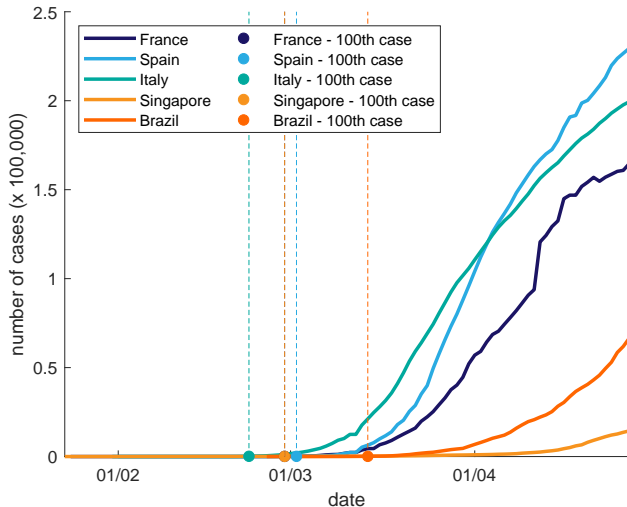
- “Structure-free”: avoid tuning of too many parameters
- Data speak for themselves.
- Focus on individuals pressing the health system.
- Simple and cheap to be implemented.

Cons

- Sensitive to structural breaks: the model will take a few days to adapt
- Sensitive to outliers.
- No information about lockdown timing or other policies (although this can be incorporated)

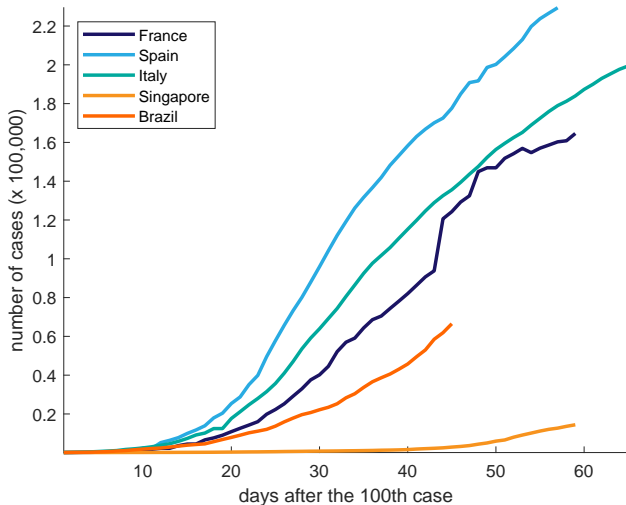
The Model

Data in Calendar Time



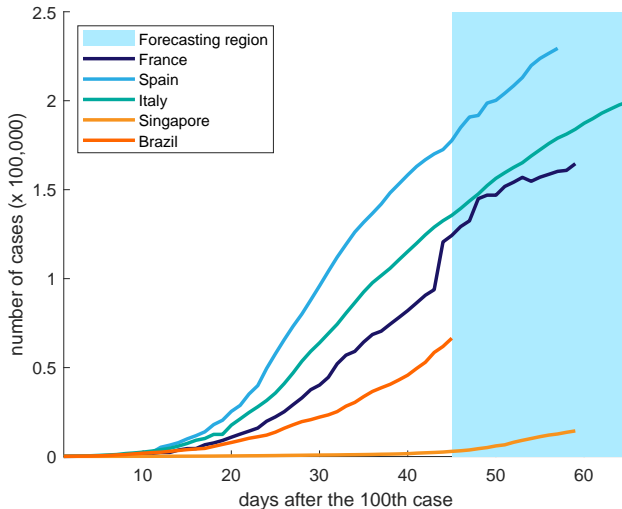
The Model

From Calendar Time to “Case Time” (# of days after the 100th case)



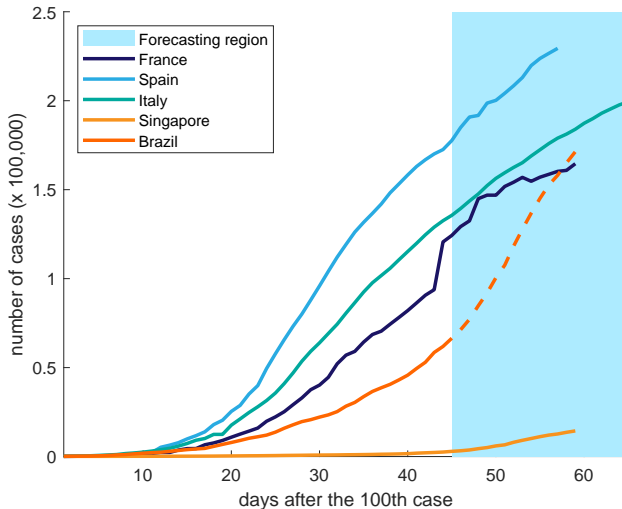
The Model

Other Countries are Ahead of Brazil



The Model

Forecasts (Partly) Based on Future Dynamics



The Model

How Many Countries Are in Fact Ahead?

- 31 countries ahead of Brazil

- ★ 17 countries 7 days ahead of Brazil:

- China, France, Germany, Iran, Italy, Japan, South Korea, Netherlands, Norway, Singapore, Spain, Sweden, Switzerland, USA, United Kingdom

- ★ 7 countries 14 days ahead of Brazil:

- China, France, Iran, Italy, Japan, Singapore, South Korea

- We have discarded China and France

- There are 152 countries behind Brazil. The methodology can be applied to these cases as well.

Where are we and to where are we going?

Forecasts on August 23



Painel Brasil

Dados atualizados em: 23/08/2020 14h28min

Total acumulado e novos casos e mortes nas 24h anteriores à atualização.
Variação percentual relativa ao dia anterior (▲|▼)

3.582.362

Casos acumulados
Confirmados

50.032

Novos casos
Confirmados

114.250

Mortes acumuladas
Confirmadas

892

Novas mortes
Confirmadas

Previsão para os próximos 7 e 14 dias

Total acumulado de casos e mortes previstos, usando modelo estatístico.
(+/-) é o erro padrão preditivo percentual.

3.826.347

+/- 4,98%

Casos acumulados
Previstos para 7 dias

4.042.437

+/- 9,84%

Casos acumulados
Previstos para 14 dias

121.785

+/- 2,82%

Mortes acumuladas
Previstas para 7 dias

129.832

+/- 5,58%

Mortes acumuladas
Previstas para 14 dias

0,96

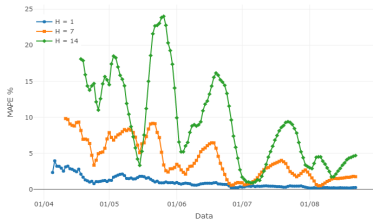
▼ 1,04%

Nº de Reprodução (R)

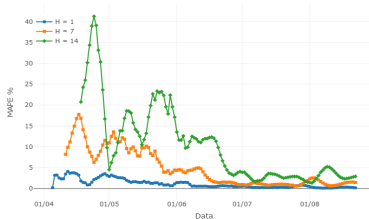
Número médio de pessoas contaminadas por cada infectado. (atraso de 1 semana)

Where are we and to where are we going?

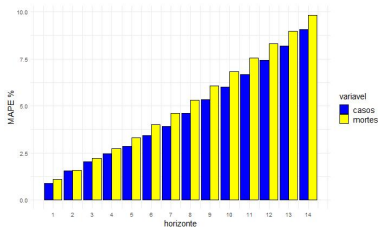
How good are our forecasts for Brazil?



cases 7-day window



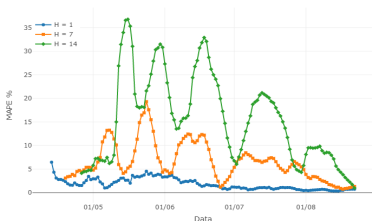
deaths: 7-day window



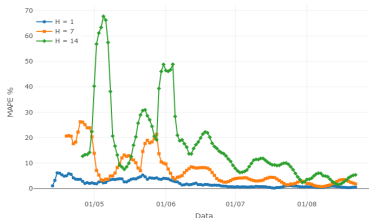
full-period

Where are we and to where are we going?

How good are our forecasts for the State of Rio de Janeiro?



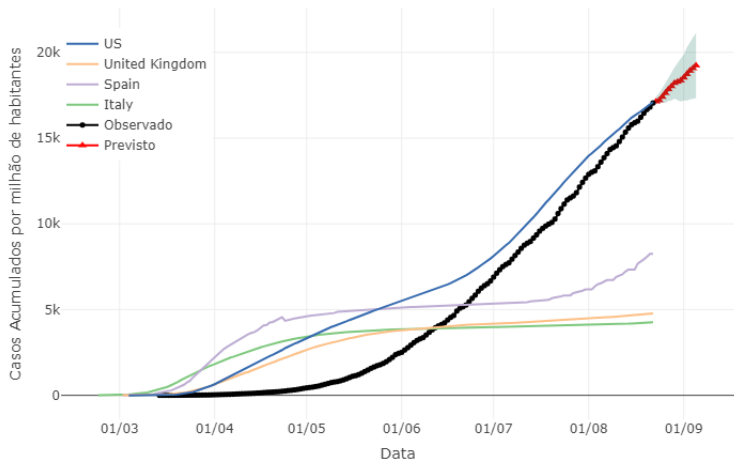
cases 7-day window



deaths: 7-day window

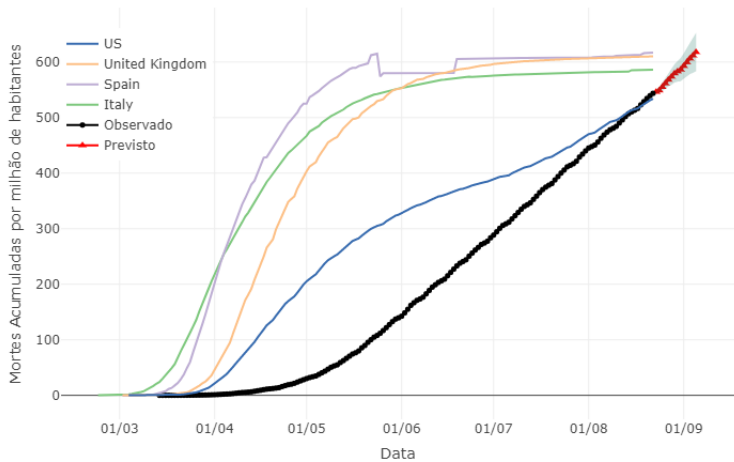
Where are we and to where are we going?

Cases per million of habitants



Where are we and to where are we going?

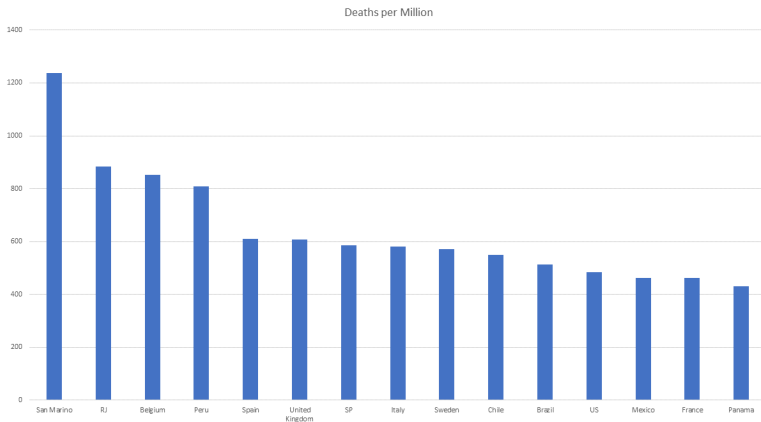
Deaths per million of habitants



Rio de Janeiro

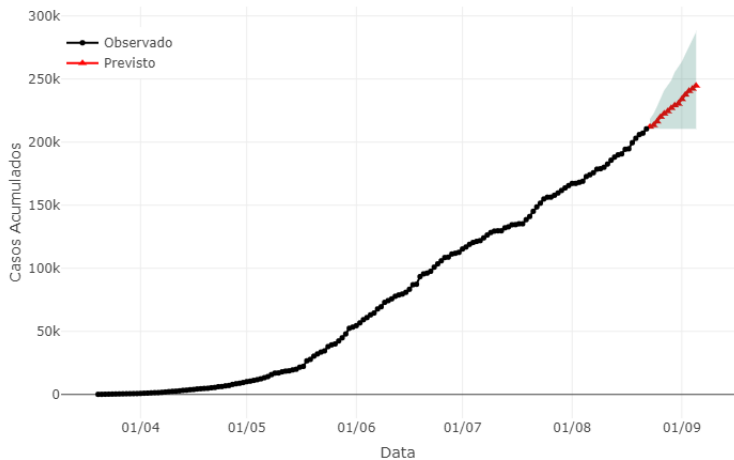
Rio and the rest of the World on the 156th day

A nefarious ranking



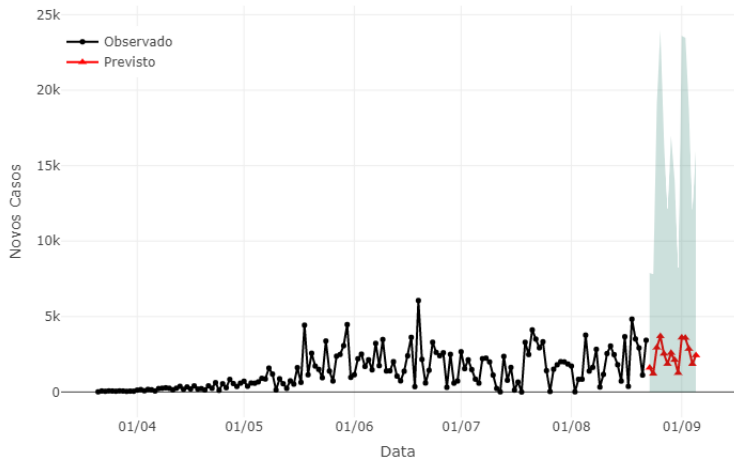
Where are we and to where are we going?

Cases



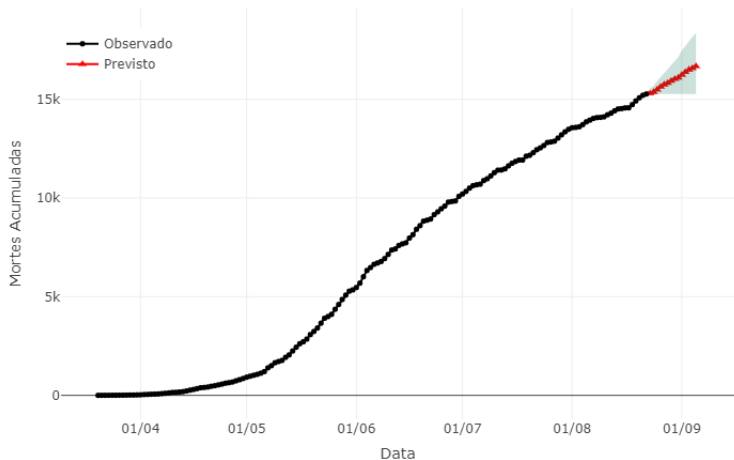
Where are we and to where are we going?

New Cases



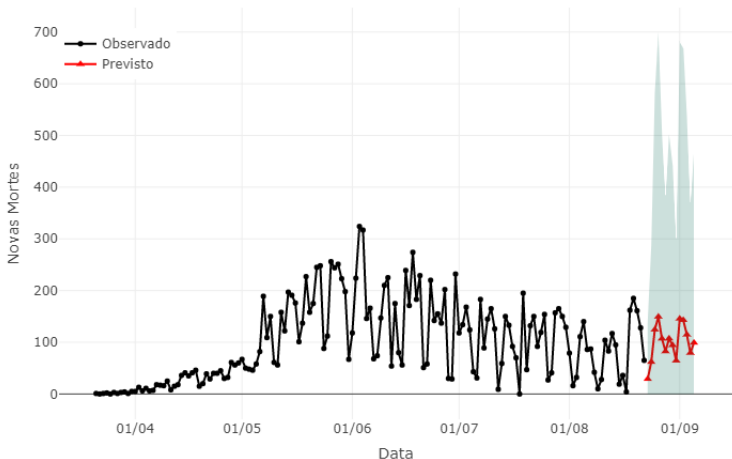
Where are we and to where are we going?

Deaths



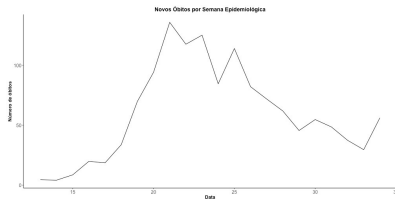
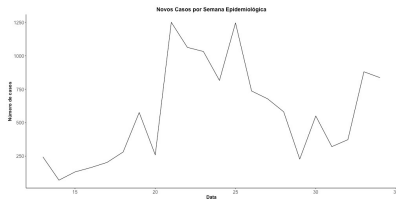
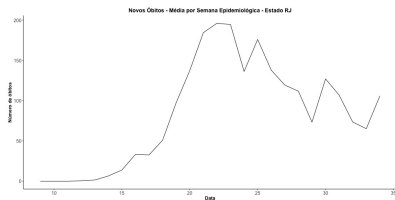
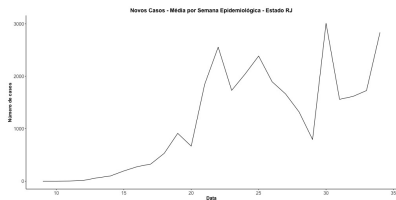
Where are we and to where are we going?

New Deaths



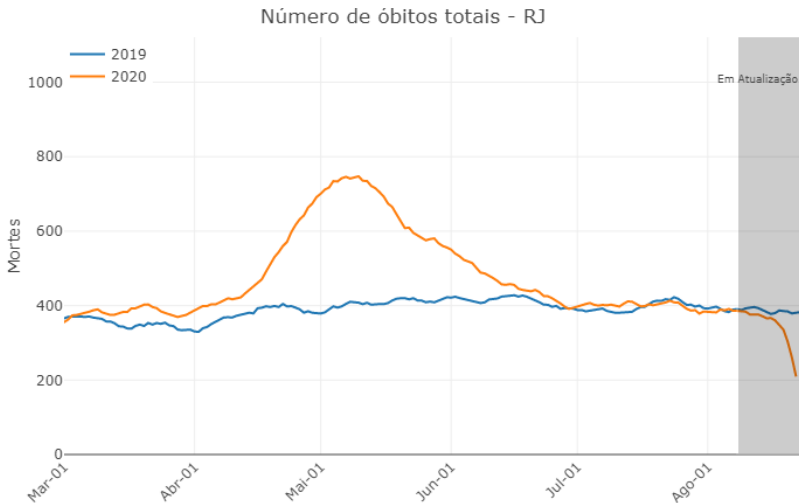
Where are we?

A second wave?



Where are we?

A second wave? Registry data (Arpen)

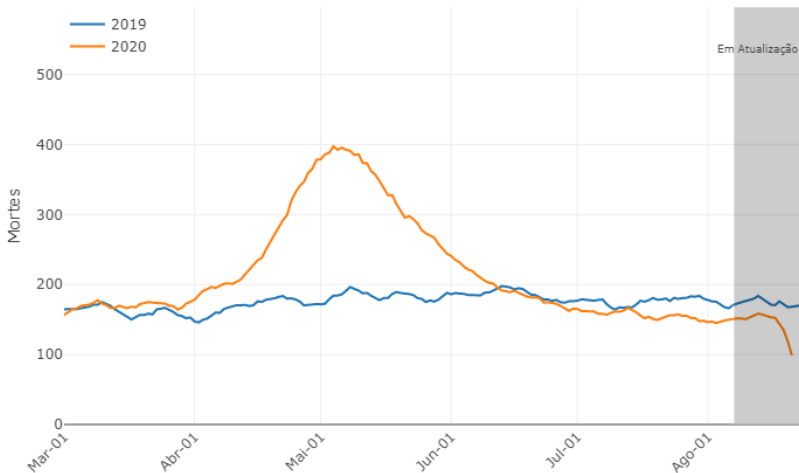


Where are we?

A second wave? Registry data (Arpen)

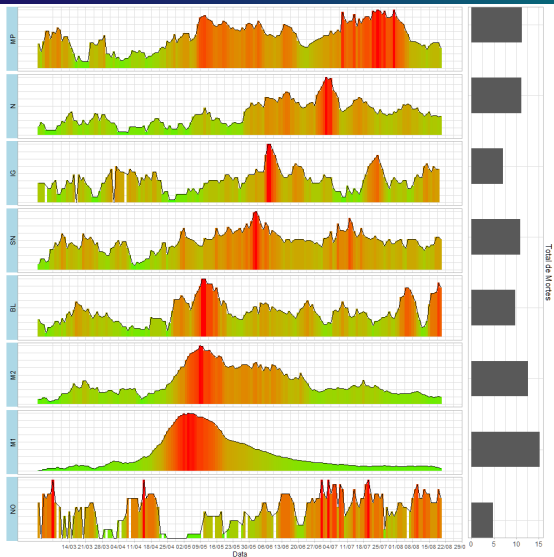


Número de óbitos totais - Rio de Janeiro



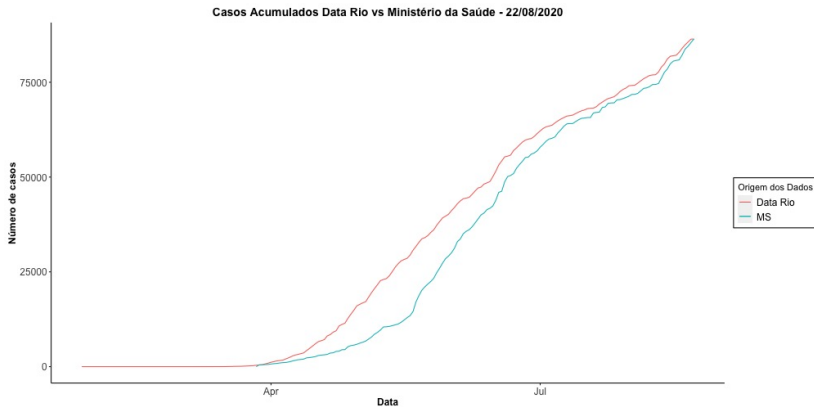
Where are we?

A second wave? Registry data (Arpen)



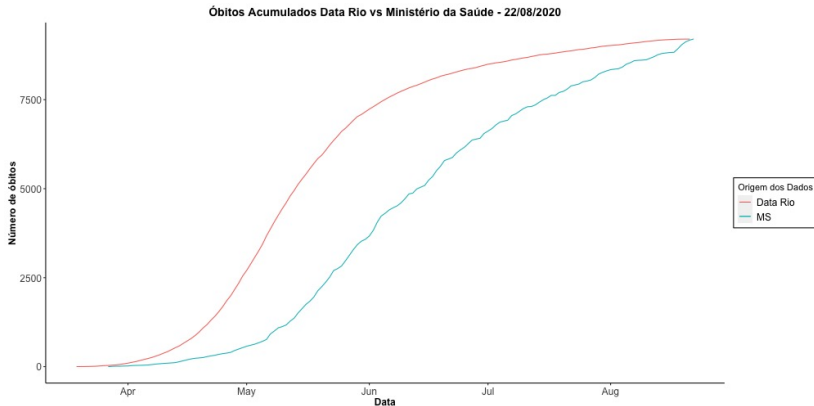
Where are we?

A second wave? Data.Rio



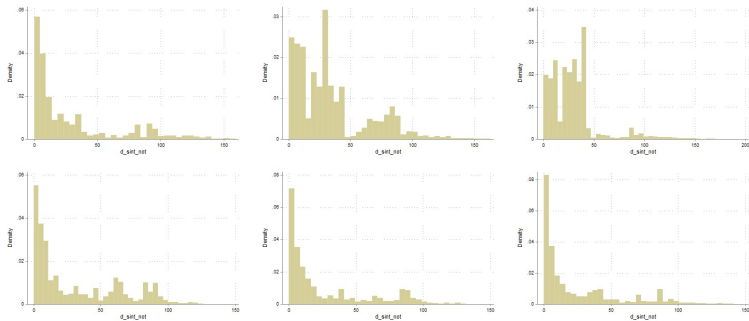
Where are we?

A second wave? Data.Rio



Where are we?

A second wave? Data.Rio

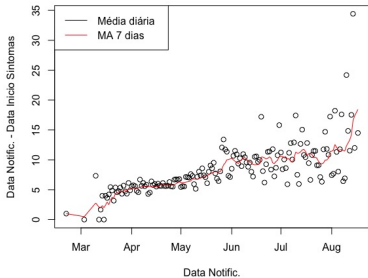


Where are we?

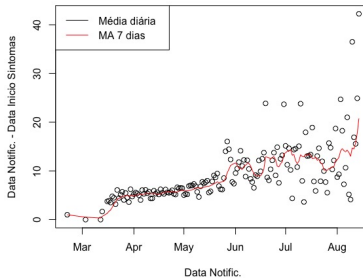
A second wave? Open Data SUS



COVID - Estado RJ



COVID - Cidade RJ

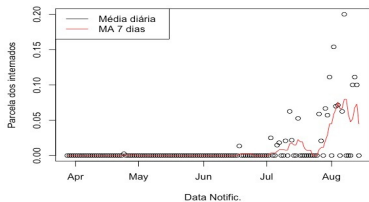


Where are we?

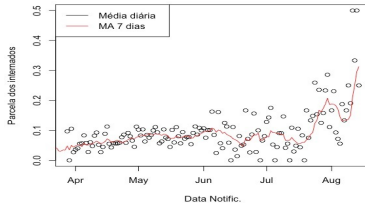
A second wave? Open Data SUS



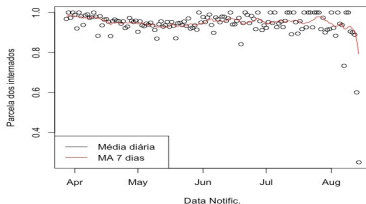
Internados que não fizeram tomografia (Cidade RJ)



Internados que não fizeram Raio X (Cidade RJ)



Internados que coletaram amostra p/ teste (Cidade RJ)

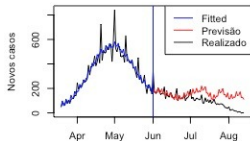


Where are we?

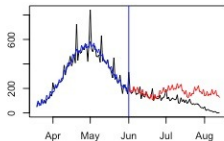
A second wave? Open Data SUS



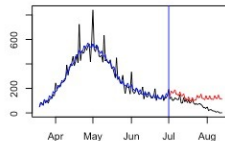
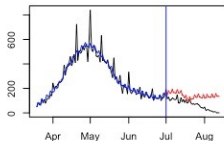
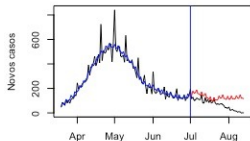
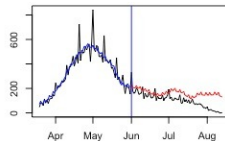
Com MA de 14 dias do GoogleMob.



Com MA dos últimos 10 dias



MA 14, excluindo os últimos 2 dias



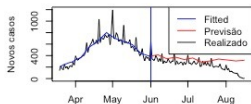
Data do início dos sintomas

Where are we?

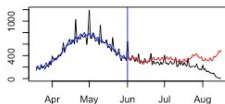
A second wave? Open Data SUS



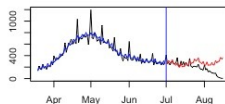
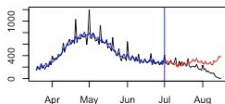
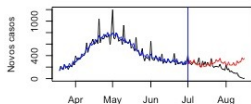
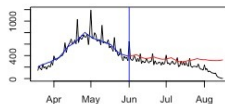
Com MA de 14 dias do GoogleMob.



Com MA dos últimos 10 dias



MA 14, excluindo os últimos 2 dias



Data do início dos sintomas

Where are we?

A second wave?



- There is no evidence of a second wave.
- The increase in the number of cases and deaths seem to be more related to delays in the notifications.
- New hospitalizations are partly due to some changes in the rules.
- Nowcasts do not show evidence of a second wave.



Web:

www.econ.puc-rio.br/mcm
www.covid19analytics.com.br



Email Address:

mcm@econ.puc-rio.br