Puerto Rico
Public Health Trust

Importance of SARS-CoV-2 testing along the curve

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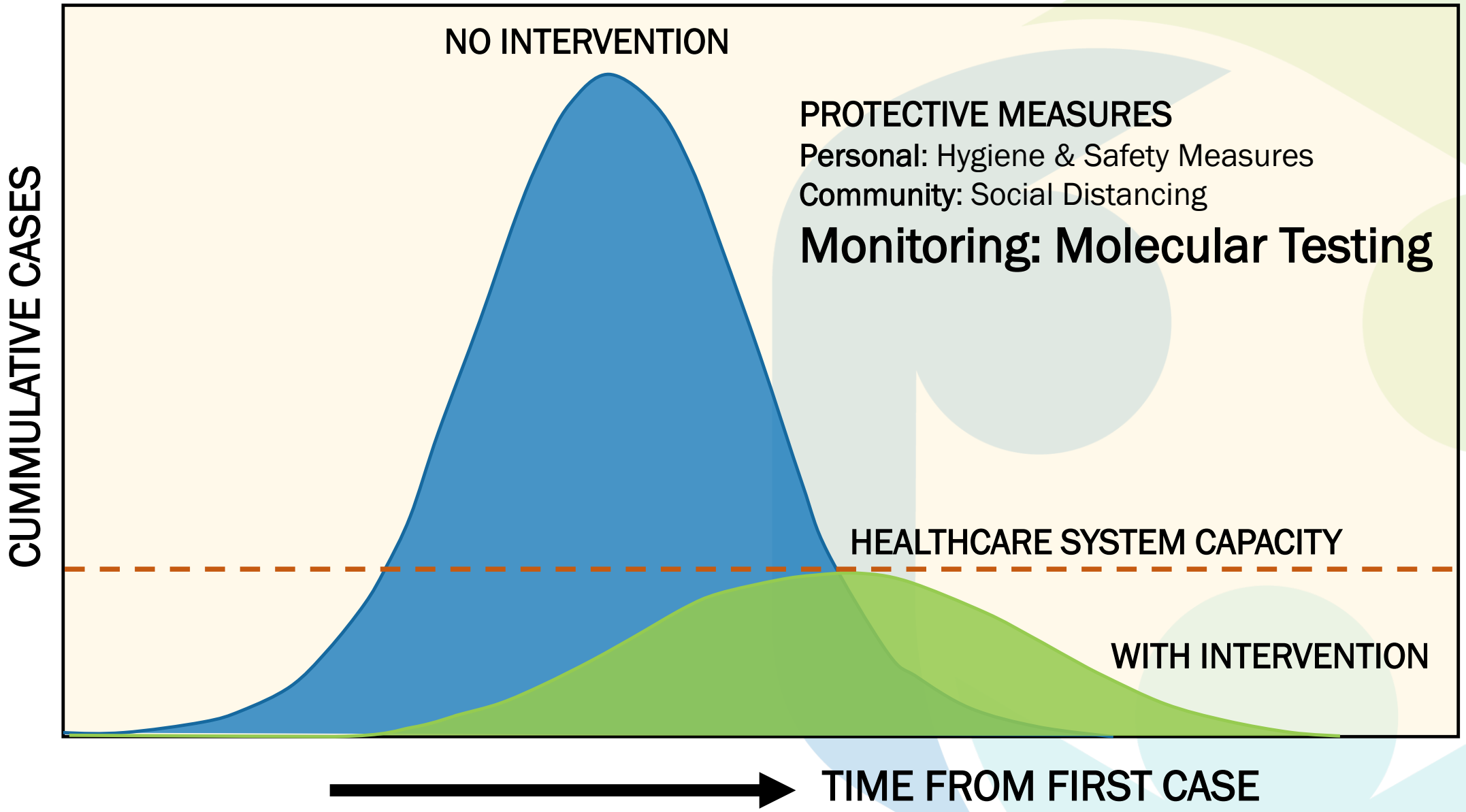
A program of the: Puerto Rico Science, Technology & Research Trust

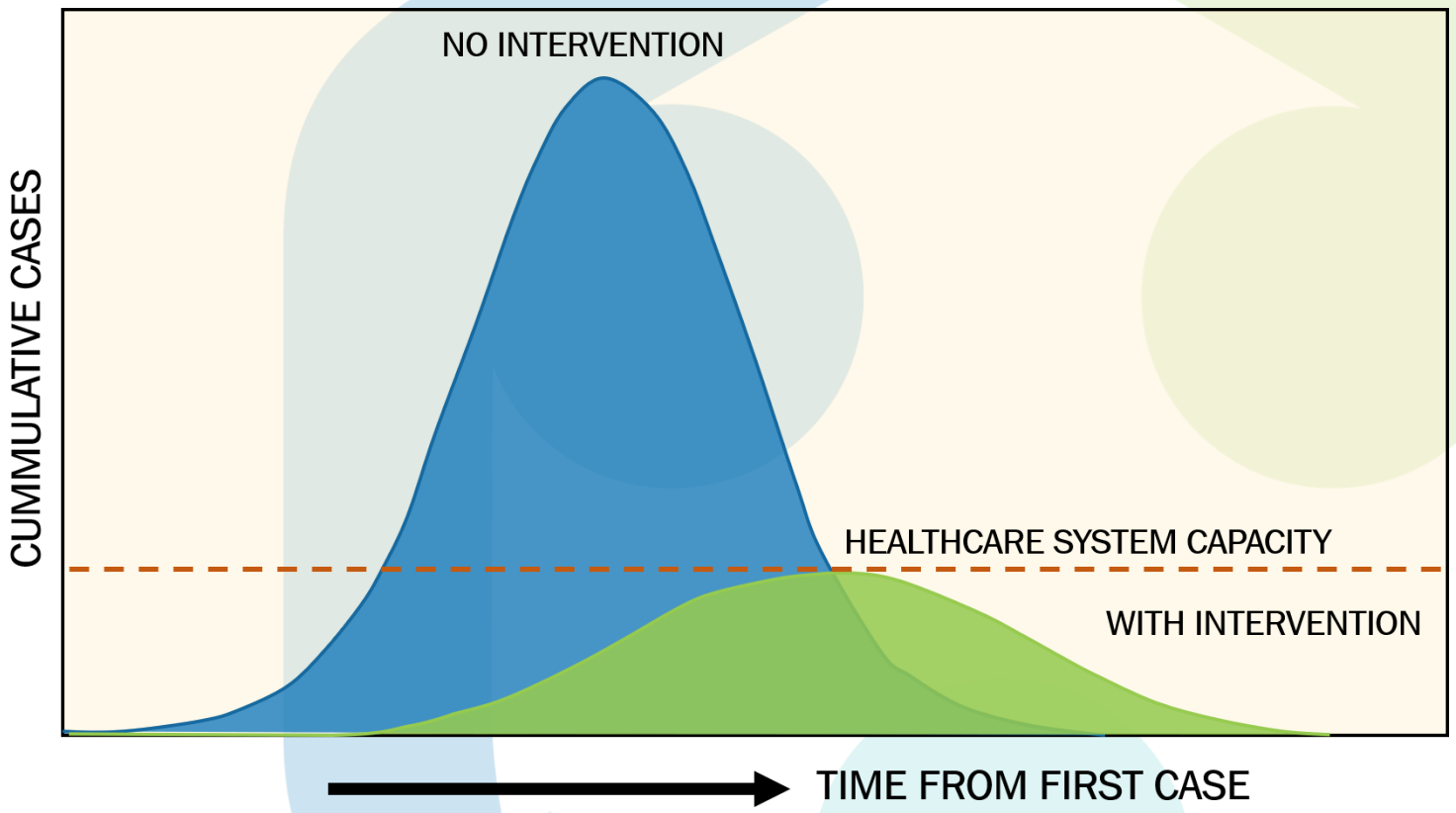
The concept of ‘flattening the curve’



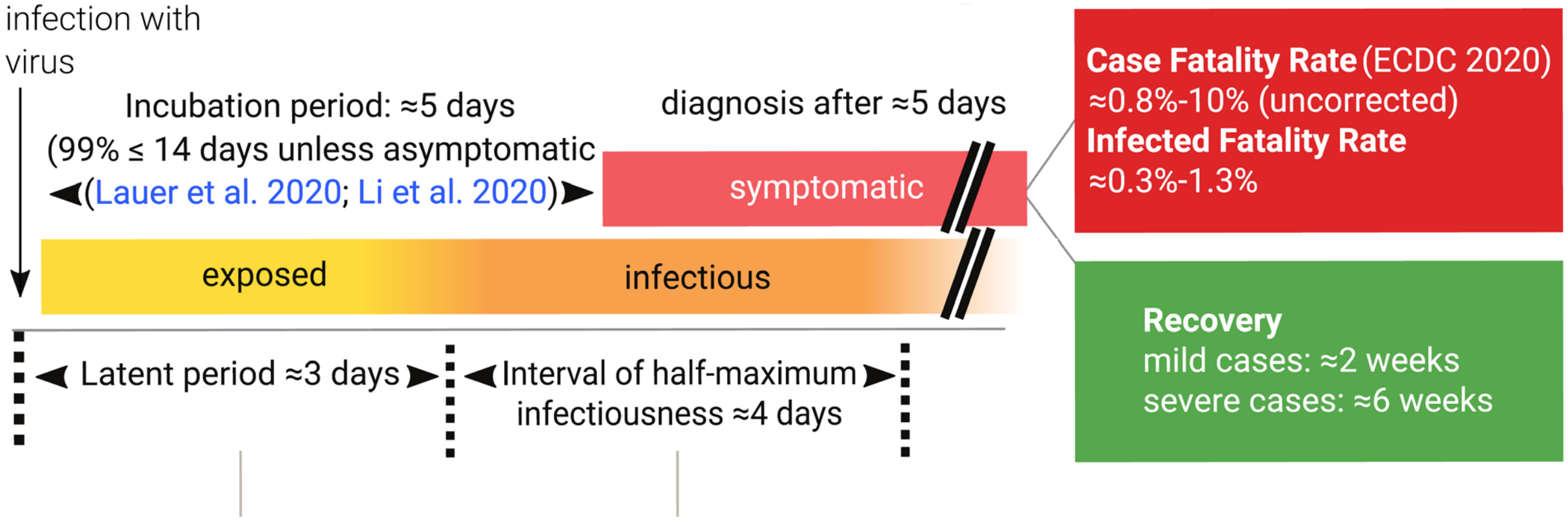
Molecular testing results are the eyes of any intervention

Molecular testing results is the only way to monitor the “no-intervention” and “with intervention” curves.

Molecular testing is the only way to “flatten the curve” with ours eyes wide open, not blindfolded!



Infection progression in a single patient



Inter-individual variability is substantial and not well characterized. The estimates are parameter fits for population median in China and do not describe this variability (Li et al. 2020; He et al. 2020).

Molecular testing

- Molecular testing for COVID-19 is achieved by a technique called reverse transcription **polymerase chain reaction (RT-PCR)**
- This technique is a nucleic acid amplification test (NAT) that detects unique target sequences of the virus that causes COVID-19 (SARS-CoV-2) in **respiratory tract specimens.**
- The use of this testing has been authorized and reviewed by FDA

Laboratory

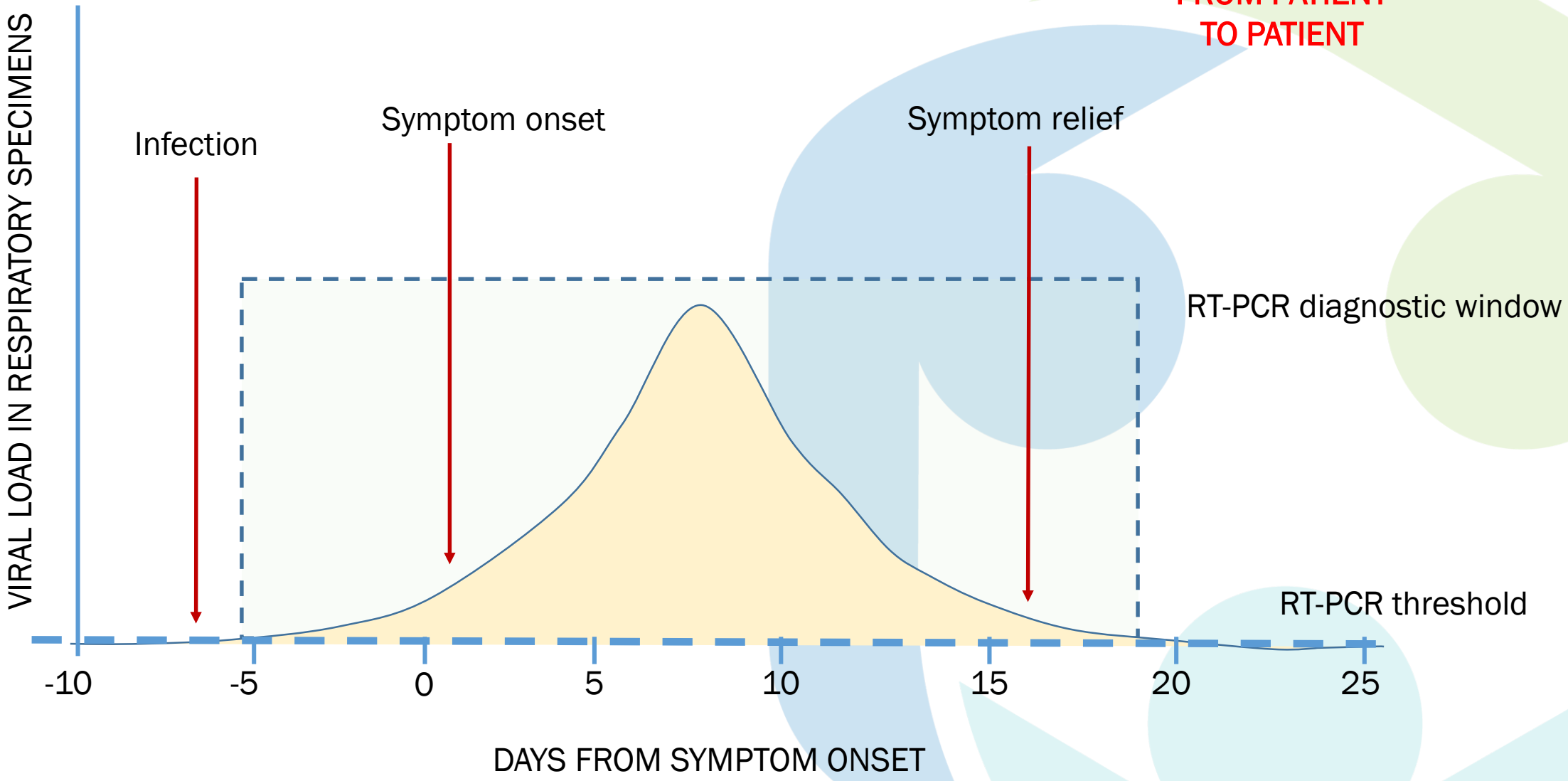
COBAS 6800 - Roche

Point-of-care

Abbott ID NOW

Utility of molecular testing

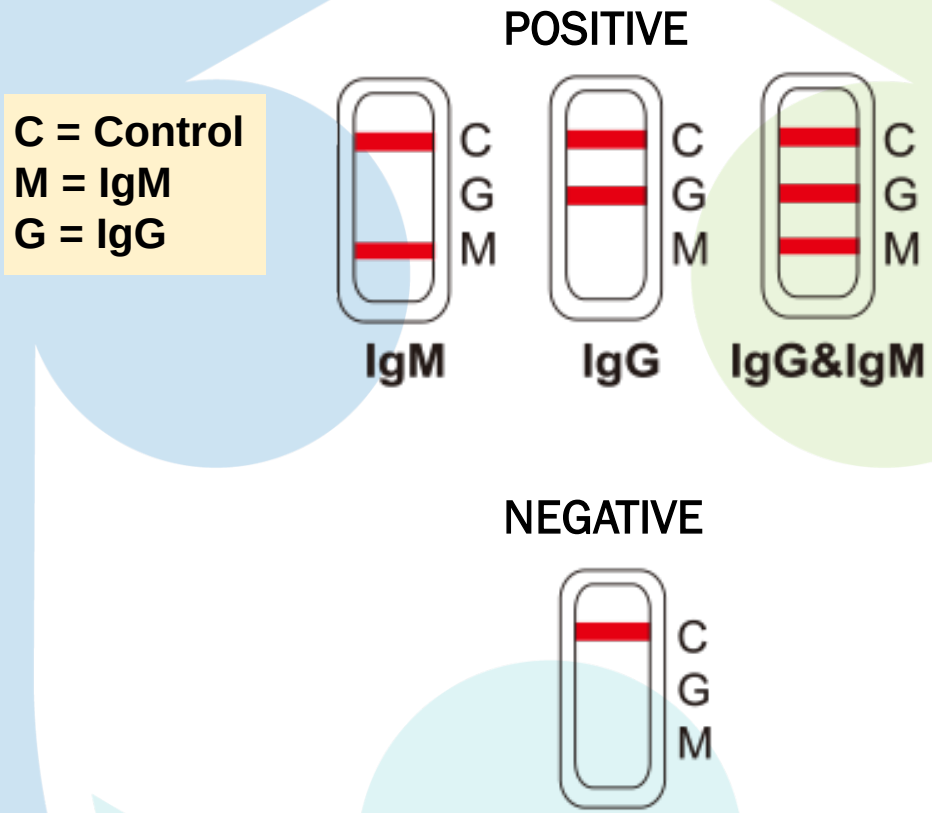
MAY VARY
FROM PATIENT
TO PATIENT



Lippi G, Plebani M. Clin Chem Lab Med. 2020 Mar 19. pii: /j/cclm.ahead-of-print/cclm-2020-0240/cclm-2020-0240.xml. doi: 10.1515/cclm-2020-0240.

Serological testing (rapid tests)

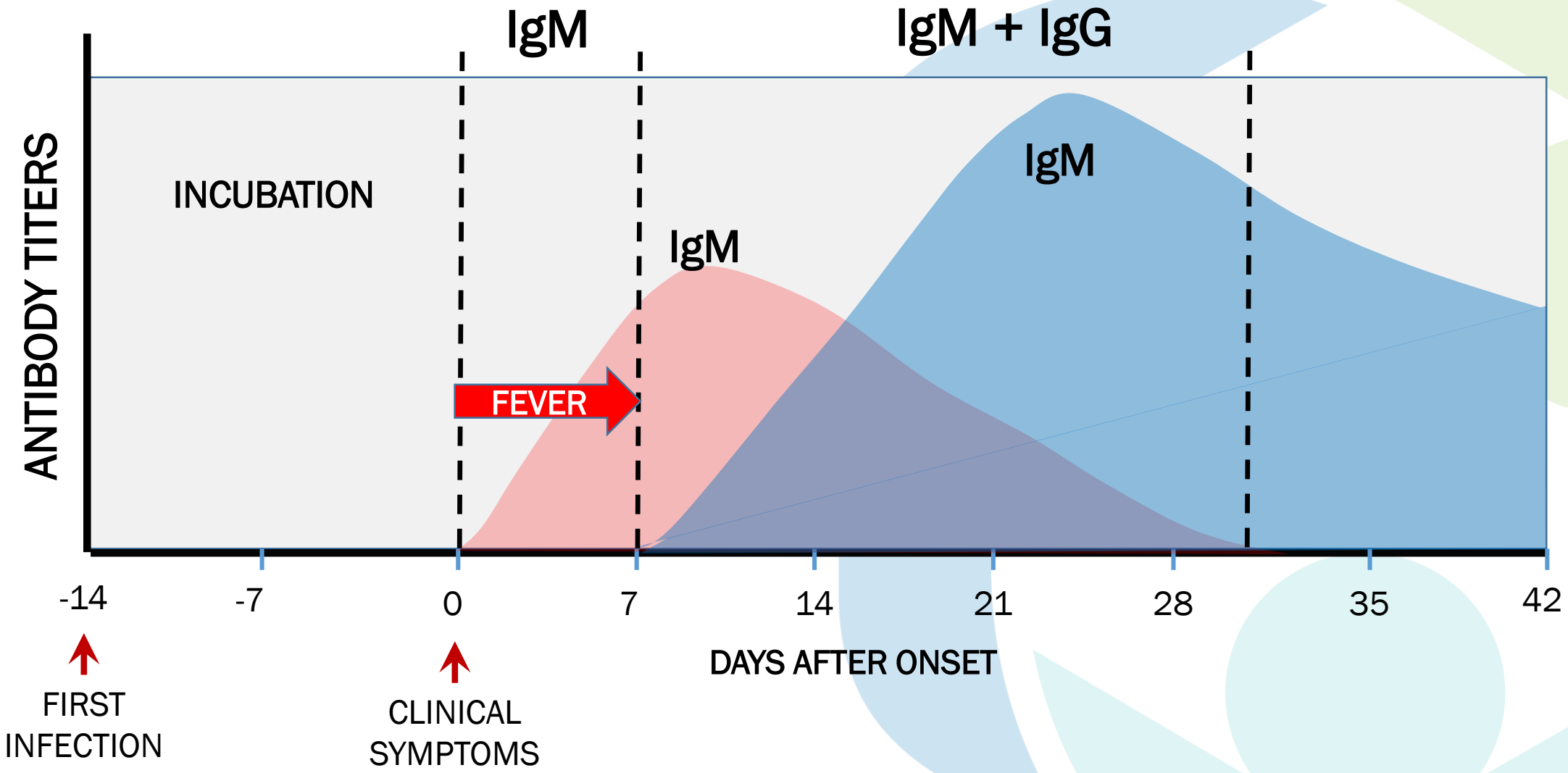
- It detects IgM & IgG antibodies against SARS-CoV-2 infection in blood, serum or plasma.
- Positive cases with symptoms must be confirmed by RT-PCR
- Negative cases, specially the ones with symptoms, do not rule out infection.
- Cost is $ 2-8 dollars per test
- So far, only one manufacturer has been granted a EUA from FDA. Several others have notified FDA.



J Med Virol. 2020 Feb 27. doi: 10.1002/jmv.25727. [Epub ahead of print]

Utility of serological testing

MAY VARY FROM PATIENT TO PATIENT



Clin Infect Dis. 2020 Mar 21. pii: ciaa310. doi: 10.1093/cid/ciaa310. [Epub ahead of print]

Hospitalized patients

- Must be confirmed by RT-PCR
- Their course must be monitored by RT-PCR and other biomarkers
  - Cytokines (IL-6)
  - C-reactive protein – Severe viral infection/viremia/viral sepsis
  - Procalcitonin
  - Other biomarkers depending on clinical approach

Treatment

- None, but convalescent plasma helps a lot!

Research

JAMA | Preliminary Communication

Treatment of 5 Critically Ill Patients With COVID-19 With Convalescent Plasma

Chenguang Shen, PhD; Zhaoqin Wang, PhD; Fang Zhao, PhD; Yang Yang, MD; Jinxiu Li, MD; Jing Yuan, MD; Fuxiang Wang, MD; Delin Li, PhD; Minghui Yang, PhD; Li Xing, MM; Jinli Wei, MM; Haixia Xiao, PhD; Yan Yang, MM; Jiuxin Qu, MD; Ling Qing, MM; Li Chen, MD; Zhixiang Xu, MM; Ling Peng, MM; Yanjie Li, MM; Haixia Zheng, MM; Feng Chen, MM; Kun Huang, MM; Yujing Jiang, MM; Dongjing Liu, MD; Zheng Zhang, MD; Yingxia Liu, MD; Lei Liu, MD

JAMA. Published online March 27, 2020. doi:10.1001/jama.2020.4783

Treatment

Table 1. Clinical Characteristics of SARS-CoV-2-Infected Patients Who Received Convalescent Plasma

	Patient				
	1	2	3	4	5
Sex	Male	Male	Female	Female	Male
Age, y	70s	60s	50s	30s	60s
Weight, kg	55	85	60	41.5	87
Smoking	No	No	No	No	No
Blood type	B	B	B	A	B
Coexisting chronic diseases	None	Hypertension; mitral insufficiency	None	None	None
Disease presentation and course					
Estimated incubation period, d[a]	1	7	3	7	15
Interval between symptom onset and admission, d	2	4	2	2	3
Interval between admission and plasma transfusion, d	22	10	20	19	20
Complications prior to plasma transfusion	Bacterial pneumonia; severe ARDS; MODS	Bacterial pneumonia; fungal pneumonia; severe ARDS; myocardial damage	Severe ARDS	Severe ARDS	Severe ARDS
Most severe disease classification	Critical	Critical	Critical	Critical	Critical
Treatments					
Steroids	Methylprednisolone	Methylprednisolone	Methylprednisolone	Methylprednisolone	Methylprednisolone
Antivirals	Lopinavir/ritonavir; interferon alfa-1b; favipiravir	Lopinavir/ritonavir; arbidol; darunavir	Lopinavir/ritonavir; interferon alfa-1b;	Interferon alfa-1b; favipiravir	Lopinavir/ritonavir; interferon alfa-1b

Abreviations: ARDS, acute respiratory distress syndrome; MODS, multiple organ dysfunction syndrome; SARS-CoV-2, severe acute respiratory syndrome coronavirus 2.

[a] Estimated incubation period defined as interval between estimated exposure to SARS-CoV-2 and symptom onset.

JAMA. Published online March 27, 2020. doi:10.1001/jama.2020.4783

Treatment

C-reactive protein
Procalcitonin
IL-6

All went down after transfusion

Table 2. Comparison of Viral Load, Clinical Indexes, and Laboratory Results Before and After Convalescent Plasma Transfusion

	Patient				
	1	2	3	4	5
Ct value[c] (viral load proxy)					
On admission to hospital	23.0	19.7	18.9	38.0	28.0
Lowest value during hospitalization[d] (highest viral load)	19.2	19.7	18.9	26.6	26.5
Just before plasma transfusion	28.5	22.0	33.0	26.6	35.9
Day 1 posttransfusion	30.0	23.7	38.5	28.0	Negative
Day 3 posttransfusion	34.4	25.0	Negative	Negative	Negative
Day 7 posttransfusion	38.0	32.0	Negative	Negative	Negative
Day 12 posttransfusion	Negative	Negative	Negative	Negative	Negative
Mechanical ventilation					
Onset, days before transfusion	11	2	12	9	2
Extubated, days posttransfusion	Intubated	Intubated	2	9	9
ECMO					
Onset, days before transfusion	Not received	1	Not received	Not received	Not received
Removal, days posttransfusion	NA	5	NA	NA	NA

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Treatment

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Day 1 posttransfusion	30.0	23.7	38.5	28.0	Negative
Day 3 posttransfusion	34.4	25.0	Negative	Negative	Negative
Day 7 posttransfusion	38.0	32.0	Negative	Negative	Negative
Day 12 posttransfusion	Negative	Negative	Negative	Negative	Negative
Length of hospital stay, d	Remains hospitalized	Remains hospitalized	53	51	55
Current status as of March 25, 2020	Stable, still receiving mechanical ventilation	Stable, still receiving mechanical ventilation	Discharged home	Discharged home	Discharged home

JAMA. Published online March 27, 2020. doi:10.1001/jama.2020.4783

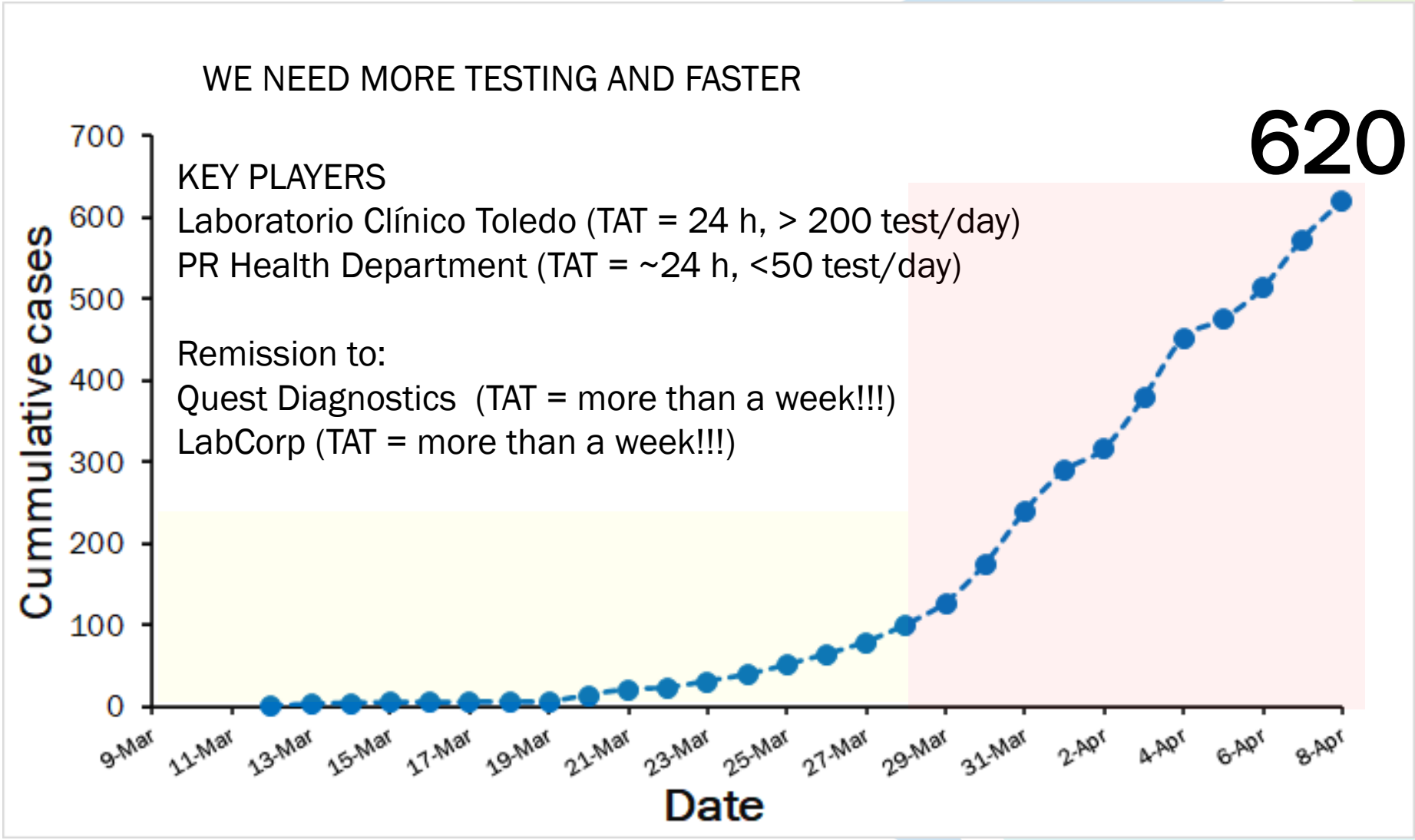
Is Puerto Rico going to implement convalescent plasma protocols?

- YES!

Puerto Rico Consortium
for Clinical Investigation

Are we flattening the curve?

- We are not there yet as we need more testing



Conclusions

- Importance of molecular testing is clear. We need it for all stages of clinical and epidemiological management of the pandemic.
- Molecular testing for detecting SARS-CoV-2 needs to be increased in the Island.
- We need to be cautious with serological testing as it is not a confirmatory tests
- We need a more aggressive approach from the government to try to furnish better laboratory facilities in the PR Health Department
- Social distancing, seems to be working.
- Please stay home as we are NOT THERE YET!
- NOT EVEN CLOSE!

The fastest way of flattening the curve...

STAY AT HOME AND WASH YOUR HANDS!