

COVID-19: Act now to suppress the virus

With credit and many thanks to Tomas Pueyo and his team for their original article, [Coronavirus: The Hammer and the Dance](#) (published 20 March 2020)

22 March 2020



Document purpose

- **Overview** of current COVID-19 global situation
- Recommendations on **immediate course of action**

Key messages

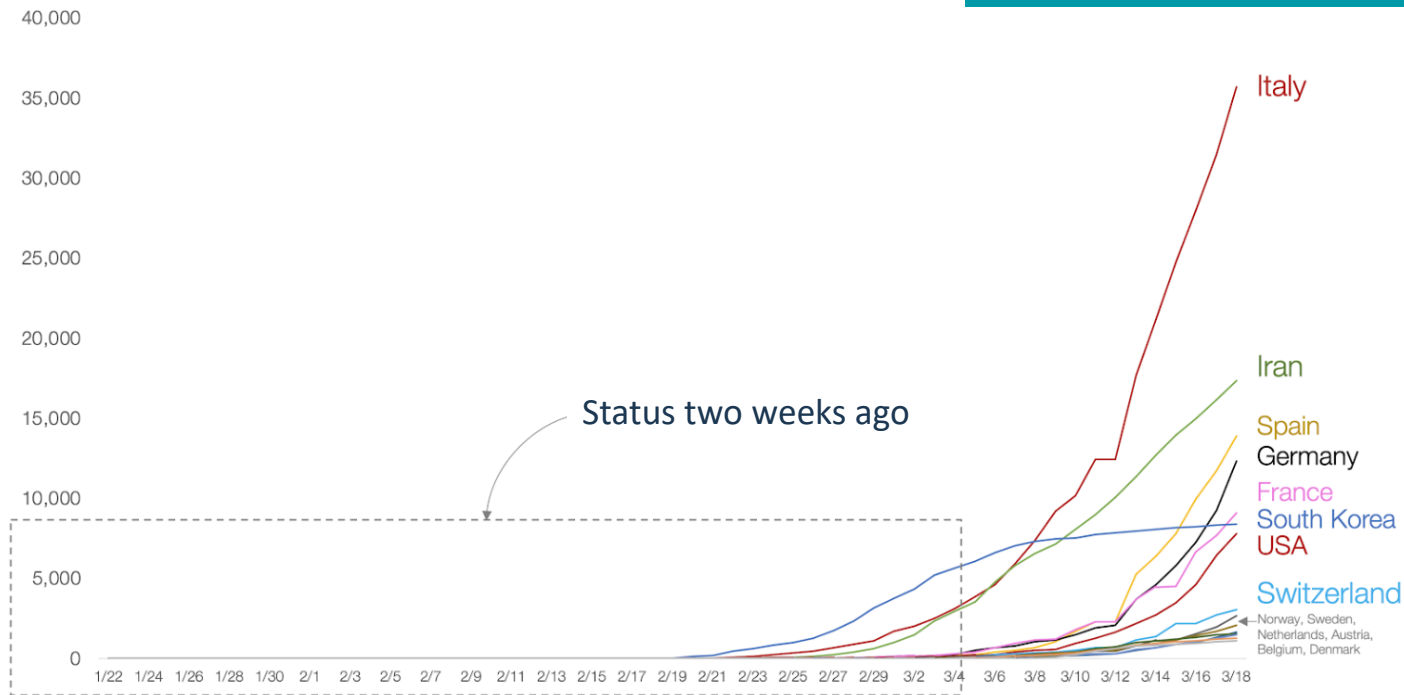
- **COVID-19 cases and fatalities continue to increase** significantly across the globe
- **Countries need to fight hard now** or suffer a massive epidemic and a greater economic distress
- A **Suppression strategy** with an **aggressive hammer-like tactics** can tackle **the outbreak in weeks** rather than months and help us **buy time**
- The time can be used to **increase testing, implement tracing, build additional capacity** and relieve the stress on the healthcare system, **learn more about the virus, develop treatments** and be **better prepared to manage the impact**

The number of COVID-19 cases continues to increase exponentially



- **167** countries now have COVID-19
- **22** countries have more than 1,000 cases
- **8** countries have more than 100 deaths

Number of coronavirus cases by country (excluding China)¹
(up to 18 March 2020)



Note: Only countries with over 1,000 cases are shown

Source: [Coronavirus: The Hammer and the Dance](#) (published 20 March 2020); [GISanddata](#)



Do nothing

- **No actions** are taken to contain or address the spread of the virus

Mitigate

- Let the **virus run its course** while people develop immunity
- Attempt to **reduce the peak of infections** and flatten the curve to reduce the burden on the healthcare system

Suppress

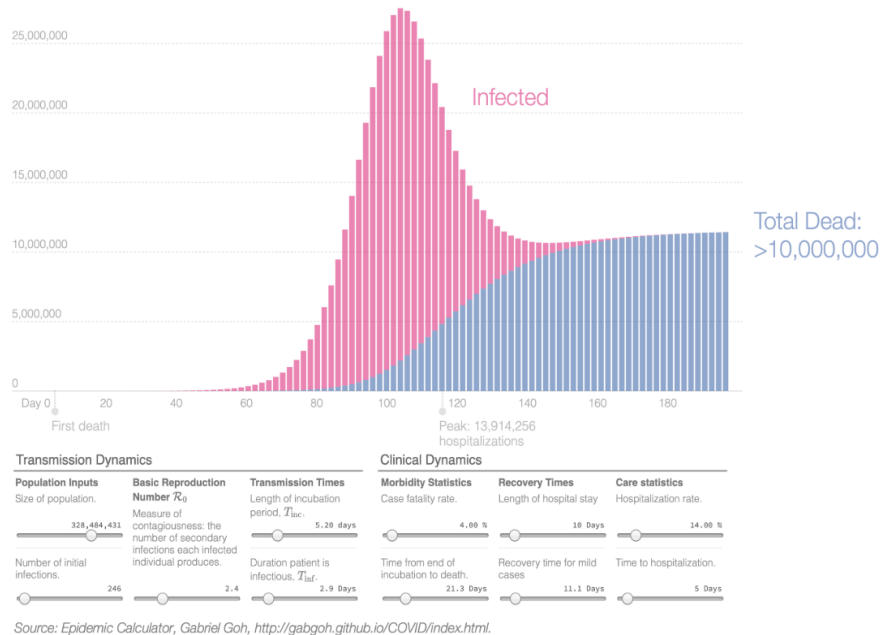
- Apply **heavy measures** (e.g. testing and tracing, travel restrictions, isolating and quarantining, ban gatherings) to **slow the spread of the infection**
- **Release measures following disease suppression** to reduce social and economic impact

Source: [Coronavirus: The Hammer and the Dance](#) (published 20 March 2020)

Do nothing: This approach will cause the largest number of fatalities, add strain on the healthcare system and create collateral damage

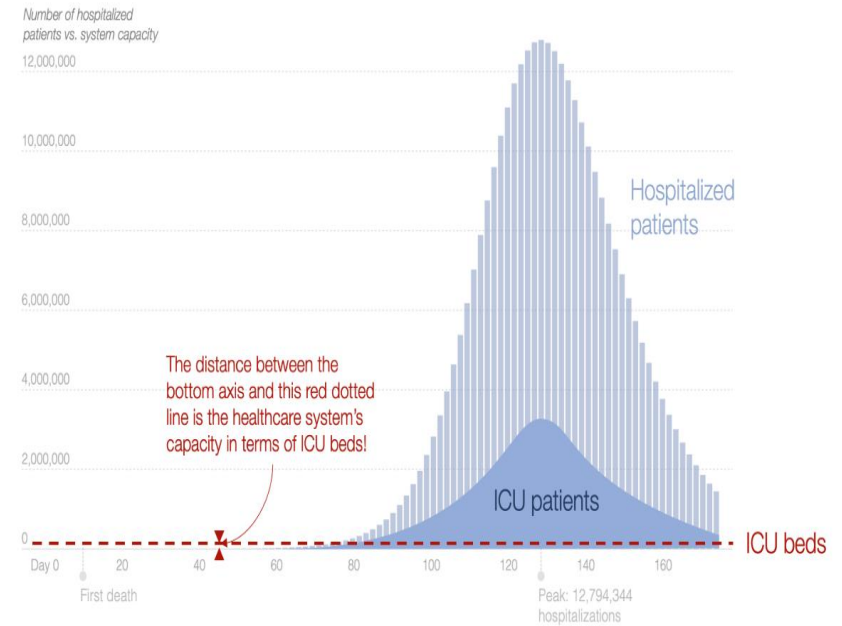


Forecast infections and deaths with no action: USA



Simulation suggests over 10 million people would die, either directly from the disease or as collateral damage

Patients requiring hospitalisation versus capacity: USA



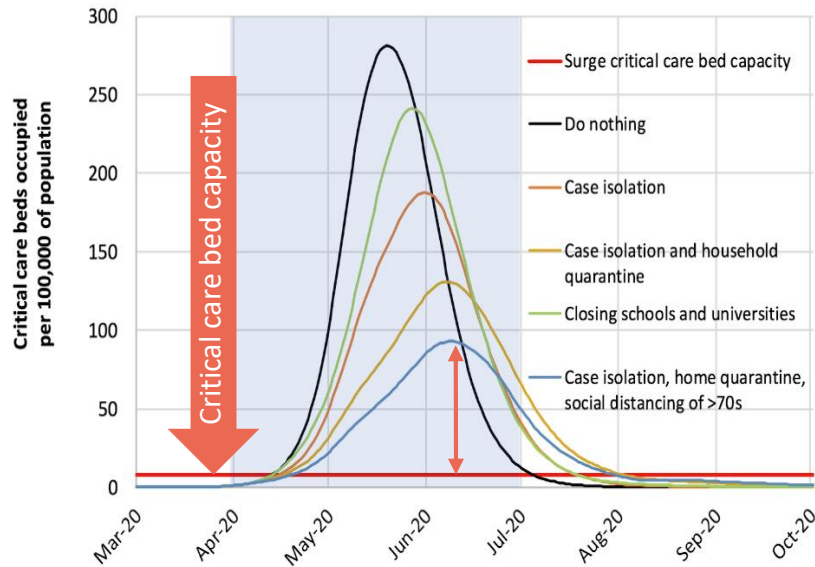
The healthcare system will not be able to cope with the number of coronavirus cases requiring hospitalisation or intensive treatment. This will prevent other patients from receiving treatment, causing additional deaths.

Source: [Coronavirus: The Hammer and the Dance](#) (published 20 March 2020)

Mitigate: Flattening the curve will alleviate some pressure on healthcare system, yet the virus will continue to mutate



ICU bed needs based on different measures: UK

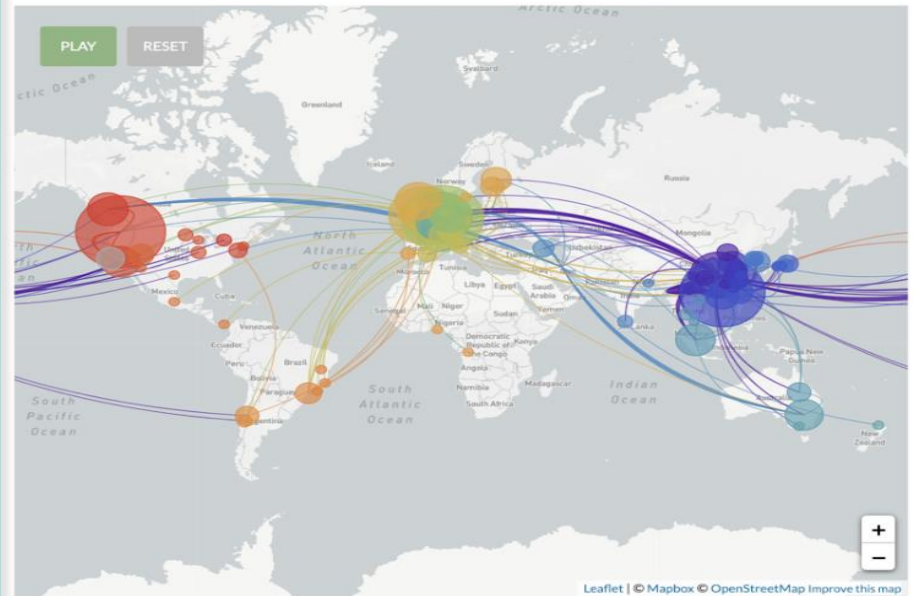


Source: Impact of non-pharmaceutical interventions (NPIs) to reduce COVID19 mortality and healthcare demand, Neil Ferguson et. al, Imperial College

It might take 4-5 months or more before the impacts of mitigation are seen

While the curve is flattened, it is **not sufficient to relieve** the capacity constraints of the healthcare system

Coronavirus mutations and global spread



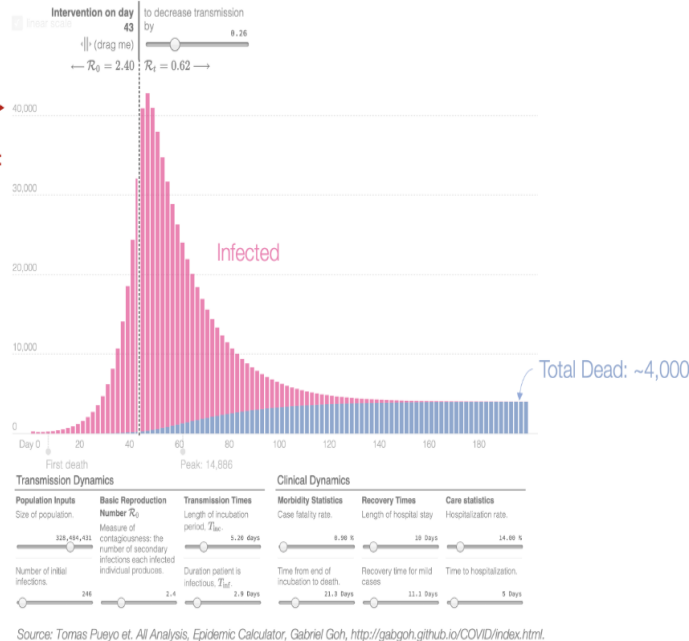
Virus mutations, which are likely and have already occurred, could re-infect individuals who have recovered from COVID-19 once

Source: [Coronavirus: The Hammer and the Dance](#) (published 20 March 2020)

Suppress: This will significantly reduce the number of fatalities and slow the spread within weeks, buying time to learn more and avoid future outbreaks



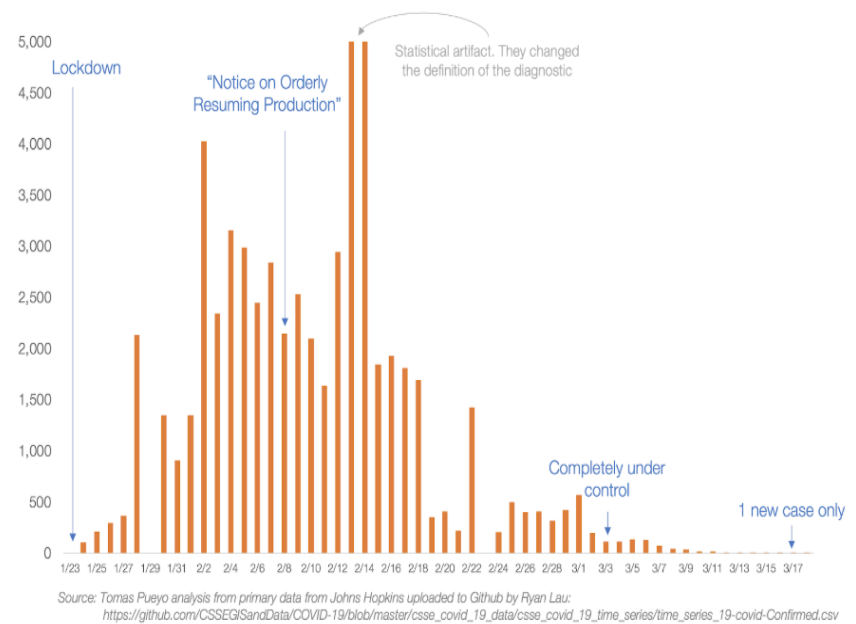
Coronavirus cases and deaths: USA



Significant reduction in the number of infections and deaths – in the thousands instead of the millions

Reducing the number of infections buys time to tackle the outbreak, while reducing fatalities and the burden on the healthcare system

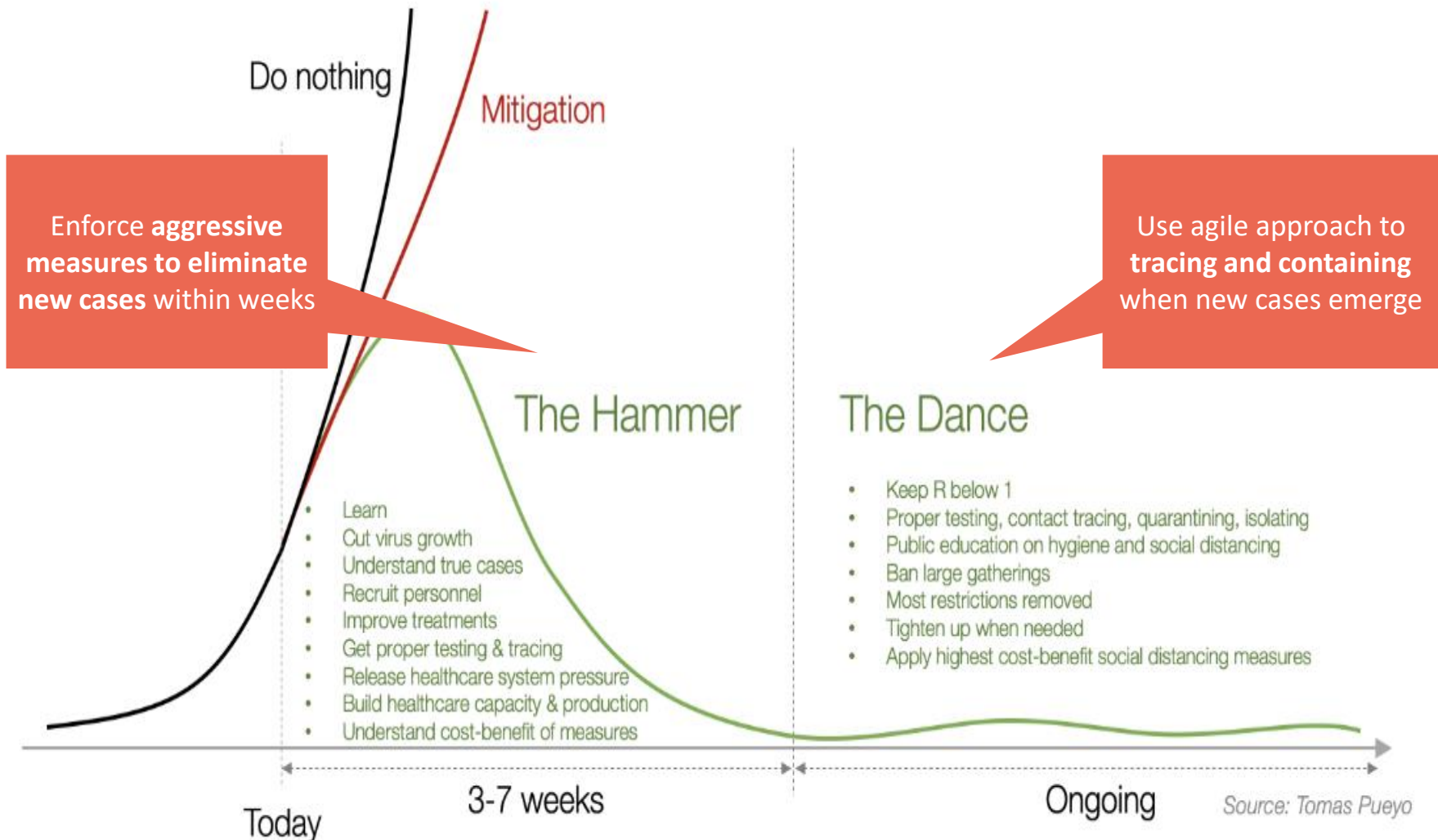
Evolution of cases in Wuhan



Example: Virus almost completely eradicated in Wuhan within seven weeks (new cases appearing is extremely small) with strong suppression measures

Source: [Coronavirus: The Hammer and the Dance](#) (published 20 March 2020)

Suppression deploys the 'Hammer' initially to reduce new cases and is followed by the 'Dance' to contain future infections



Source: [Coronavirus: The Hammer and the Dance](#) (published 20 March 2020)

The Hammer:

Aggressive measures should be implemented to suppress the spread of the virus



	Measures	Examples
Testing and Healthcare	<ul style="list-style-type: none">• Test aggressively• Recruit healthcare personnel• Increase bed capacity• Educate public on hand washing and sanitizing	<ul style="list-style-type: none">• Wuhan, Hubei (China)• South Korea
Contact tracing	<ul style="list-style-type: none">• Identify people's movements• Trace and track people in contact with infected individuals• Establish temperature checkpoints	<ul style="list-style-type: none">• Wuhan, Hubei (China)• South Korea• Singapore• Taiwan• Hong Kong
Isolation and Quarantine	<ul style="list-style-type: none">• Enforce travel restrictions• Isolate at Home• Ban gatherings above certain size• Lockdown cities: Close sports, bars, restaurants, schools and institutions• Ask citizens to remain home except for food and urgent needs	<ul style="list-style-type: none">• Wuhan, Hubei (China)• Singapore• Hong Kong

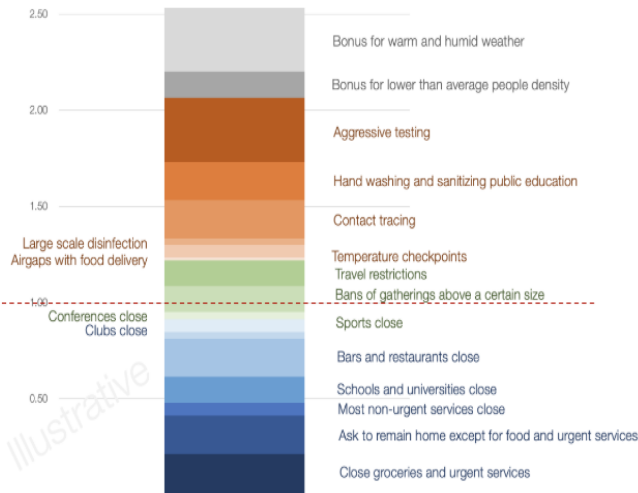
Source: [Coronavirus: The Hammer and the Dance](#) (published 20 March 2020); [New York Times](#); [Financial Times](#)

The Dance: Once the virus is suppressed, it is possible to balance the trade-off between containing transmission and maintaining both society and the economy



Illustrative

Managing transmission (R)



Learn which measures get you what R, to stay below 1 until there's a vaccine

Source: Tomas Pueyo

Note: None of these numbers are known today. But in one month, we might have enough data to quantify them. Furthermore, this graph suggests that these measures add up, when in fact they don't. For example, mandating at least 2m of distance between people would capture much of the benefit of other social distancing measures

In the absence of a vaccine, identify and implement the measures needed to **limit the transmission rate** to an acceptable threshold

Cost-benefit analysis

		Benefit in R	Confidence in benefit	Cost per week	Confidence in cost	Implement?
Social Distancing	Close groceries and urgent services	0.26	Low	\$1,000,000,000	Low	No
	Ask to remain home except for food and urgent services	0.22	High	\$ 500,000,000	Low	No
	Most services close	0.07	Medium	\$2,000,000,000	Low	No
	Schools and universities close	0.15	Very high	\$ 500,000,000	Medium	No
	Bars and restaurants close	0.24	Very high	\$ 300,000,000	Very high	No
	Clubs close	0.04	Medium	\$ 200,000,000	Very high	Yes
	Sports close	0.08	Medium	\$ 100,000,000	Very high	Yes
	Conferences close	0.04	Medium	\$ 120,000,000	Very high	Yes
	Bars of gatherings above a certain size	0.16	Very high	\$ 40,000,000	High	Yes
	Travel restrictions	0.16	Very high	\$ 300,000,000	Medium	Yes
	Airgaps with food delivery	0.02	Low	\$200,000	Very high	Yes
	Temperature checkpoints	0.08	Medium	\$ 3,000,000	Very high	Yes
	Reduce contagiousness	Large scale disinfection	0.04	Low	\$ 50,000,000	Very high
Contact tracing		0.25	Very high	\$ 20,000,000	Very high	Yes
Hand washing and sanitizing public education		0.25	Very high	\$ 200,000	Very high	Yes
Aggressive testing		0.41	Very high	\$ 25,000,000	Very high	Yes

R after all Chosen Measures a **0.94**

Source: Tomas Pueyo

This is for illustrative purposes only. All data is made up. However, as far as we were able to tell, this data doesn't exist today. It needs to. For example, the list from the CDC is a great start, but it misses things like education measures, triggers, quantifications of costs and benefits, measure details, economic / social countermeasures...

Modulate containment/relief measures can be adopted based on cost-benefit analysis to relieve the society and the economy

Note: R = transmission rate. Initially, R needs to be close to zero to quench growth, but once stabilised, infections will die down if R is kept below 1.

Source: [Coronavirus: The Hammer and the Dance](#) (published 20 March 2020)



A Suppression approach will allow us to:

- **Keep people alive by :**
 - Building additional capacity in the healthcare system
 - Finding and/or developing treatments
 - Developing and testing a potential vaccine
- **Learn more about the virus by:**
 - Testing more thoroughly to understand true infection rates
 - Researching how the virus behaves and is transmitted between people
- **Reduce transmission by:**
 - Increasing the number of tests to rapidly identify infections
 - Tracing cases to identify people's movements and people who have been in contact with infected individuals
 - Improving hygiene practices
- **Understand and implement cost/benefit trade-offs**

Source: [Coronavirus: The Hammer and the Dance](#) (published 20 March 2020)

Globally, everyone should act now to suppress COVID-19 – this includes governments, institutions, companies and individuals



Act now



Deploy specific and aggressive tactics



Buy time to prepare better to alleviate health issues and economic stress



Manage future transmission with actions informed by cost/benefit assessments

Are you “ready” and “equipped” to embrace these measures?