



COVID-19: Why you must act now

13 March 2020



Purpose of the document

- With everything that's happening around COVID-19, it can be difficult to decide what to do today
- This document gives an overview of required immediate actions and the implications of not doing them
- It also gives you an idea of what the government may need to do to arrest the virus spread

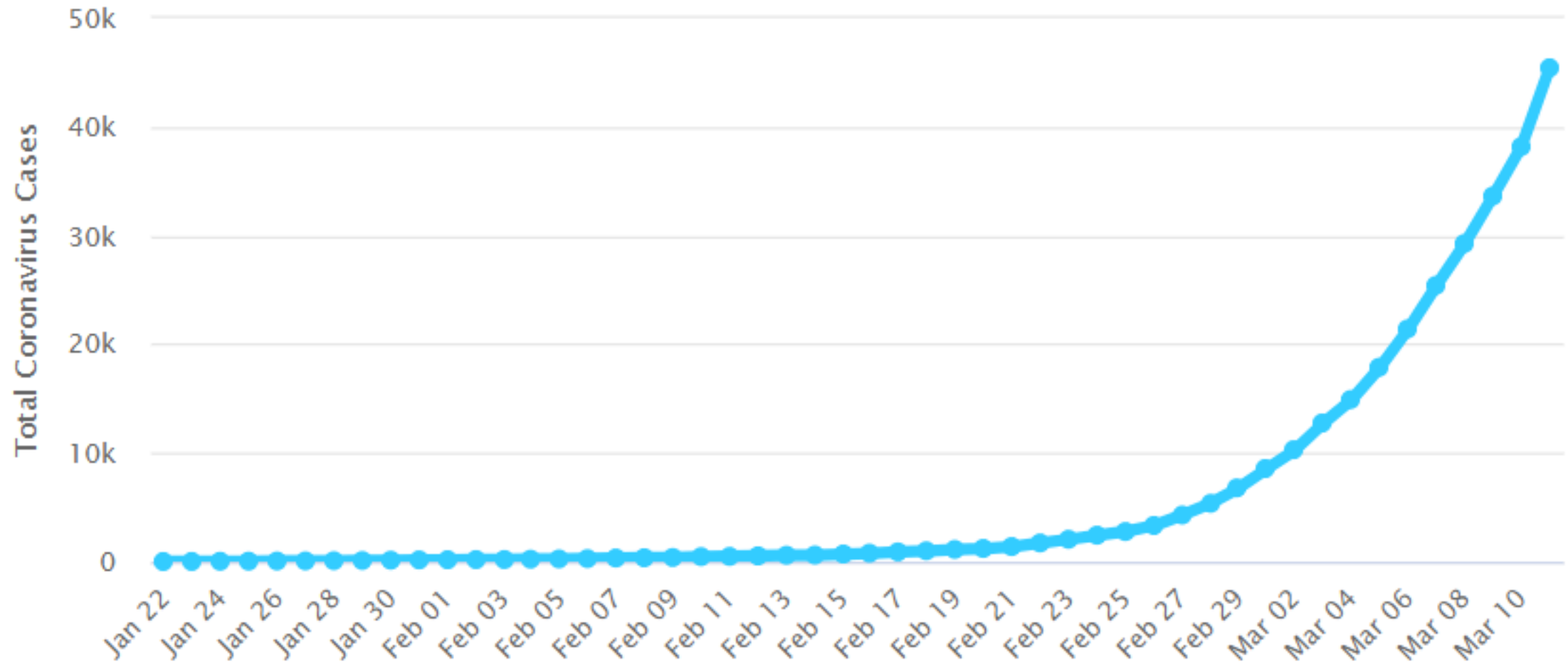
Key messages

- The coronavirus is coming to your country and your workplace
- It's coming at an exponential speed: gradually, and then suddenly
- It's a matter of days, maybe a week or two
- The death rate is highly dependent on severity and speed of preventive actions
- Action is needed to flatten the infection curve and reduce pressure on the healthcare system
- The only way to prevent this is social distancing TODAY, not tomorrow
- That means keeping as many people as possible at home, starting now
- Governments may shut down whole countries and we need to be prepared for this broad and swift action

The number of coronavirus cases outside of China is growing exponentially



Total cases of Coronavirus outside of China

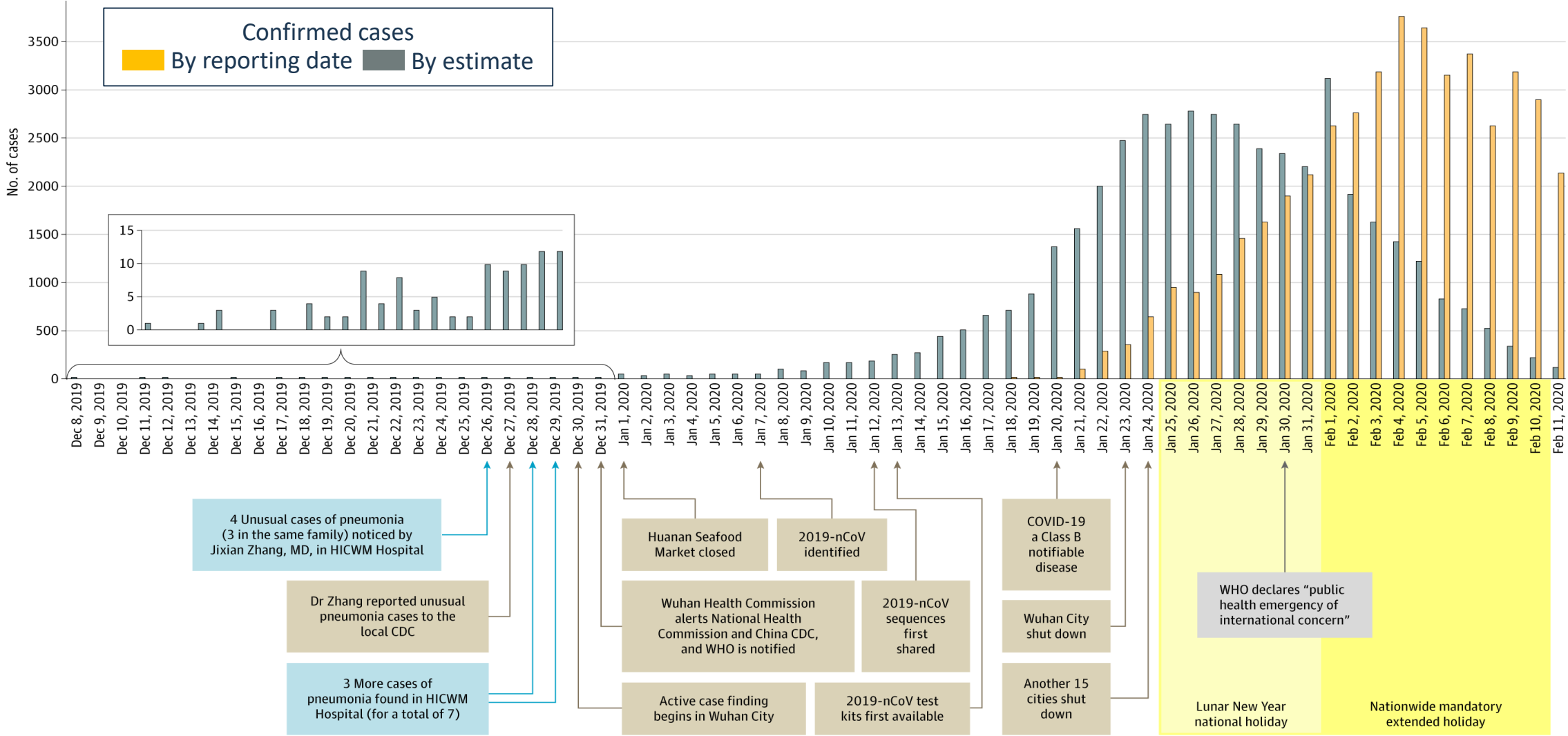


Source: <https://www.worldometers.info/coronavirus/coronavirus-cases/#case-tot-outchina>

Reported coronavirus cases lag the actual growth rate, so actions must be immediate



Timeline of events in Hubei

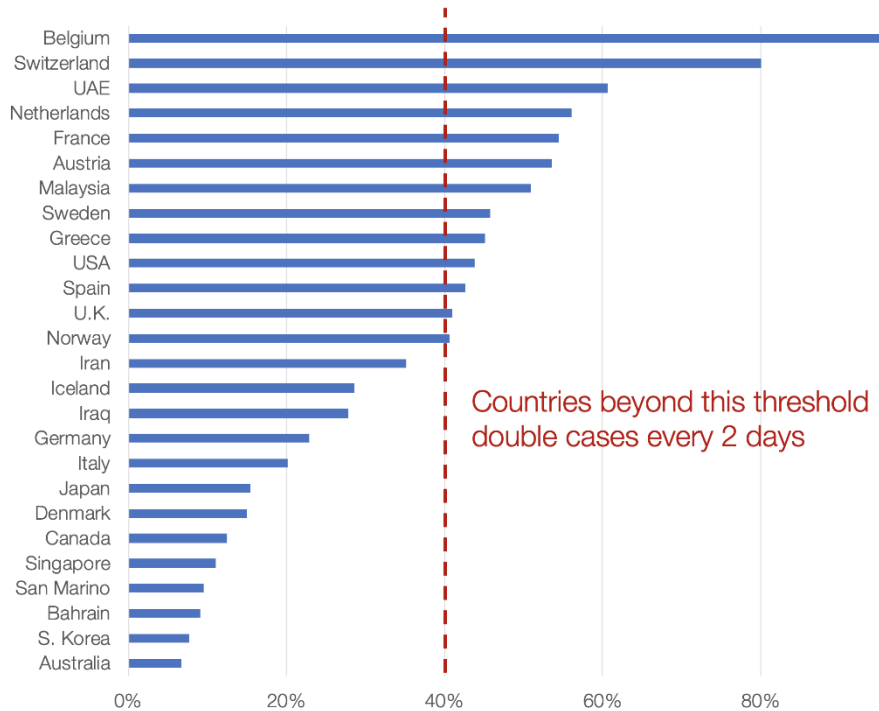


Source: Journal of the American Medical Association

South Korea, Italy and Iran are making headlines, but places like France, Germany and Spain will catch up in a matter of days

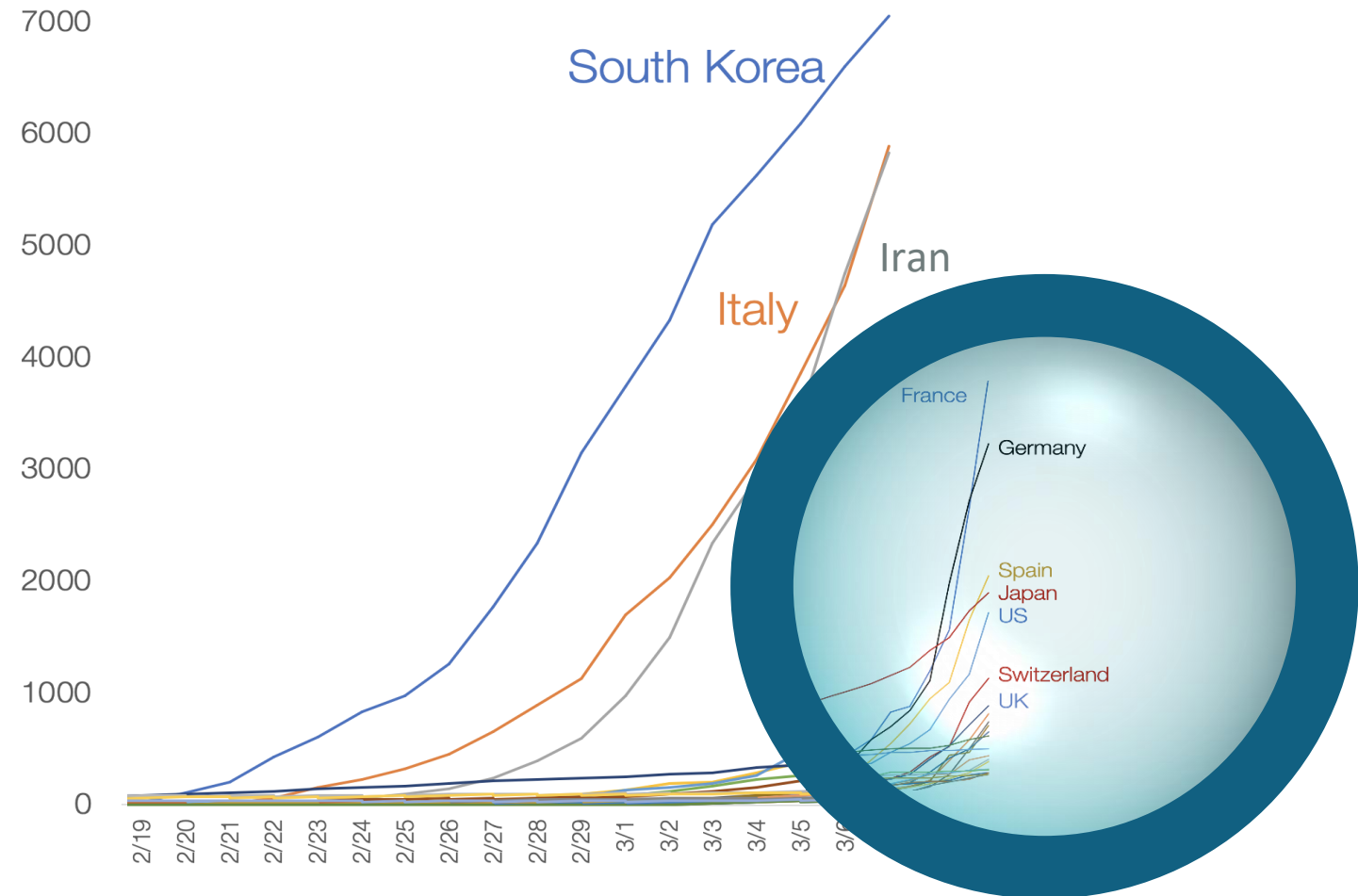


Daily growth rate of cases between 3/5 and 3/6¹



Only includes countries that have >20 cases and >5% growth rate

Coronavirus cases per country

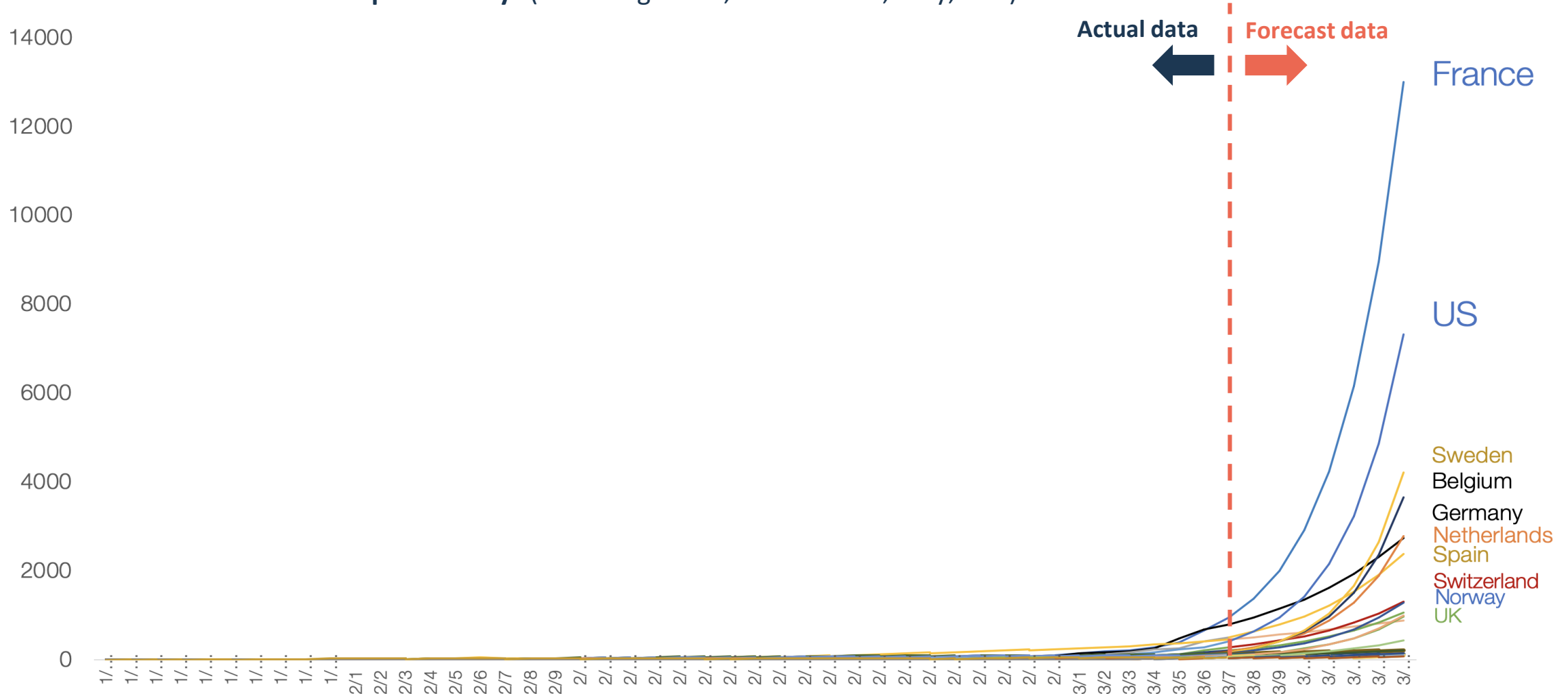


Source: <https://medium.com/@tomaspueyo>

If current growth continues, there will be a dramatic increase in the number of infected people



Forecast of Coronavirus cases per country¹ (Excluding China, South Korea, Italy, Iran)



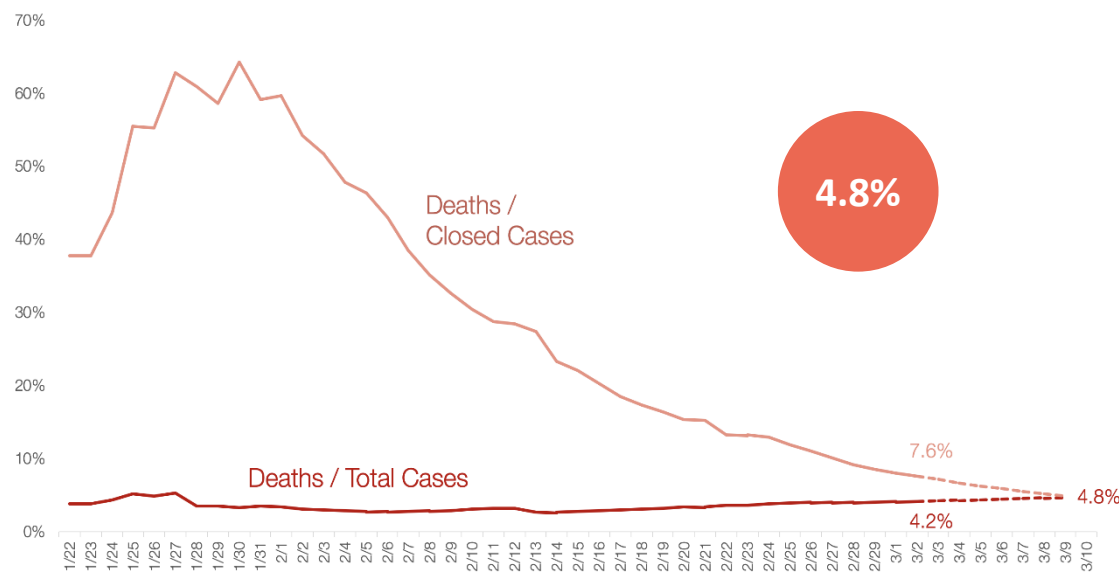
1) Based on average growth rate between 3/7 and 3/7 for 7 more days

Source: <https://medium.com/@tomaspueyo>

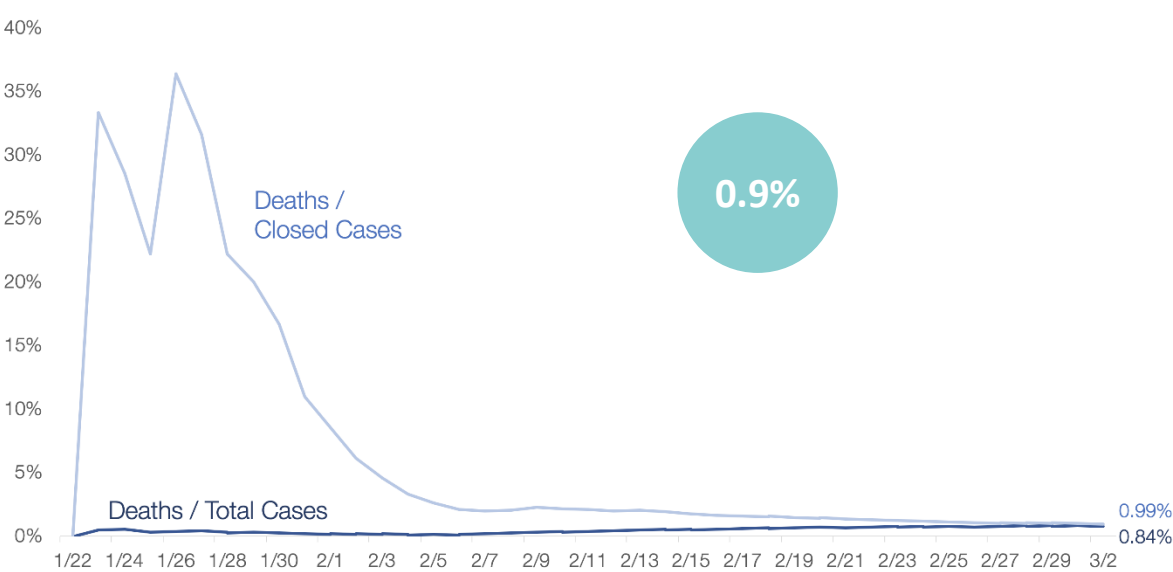
Immediate actions outside Hubei allowed China to reduce the fatality rate from 5% to 1%



Fatality rates in Hubei Region, China



Fatality rates in China, excluding Hubei

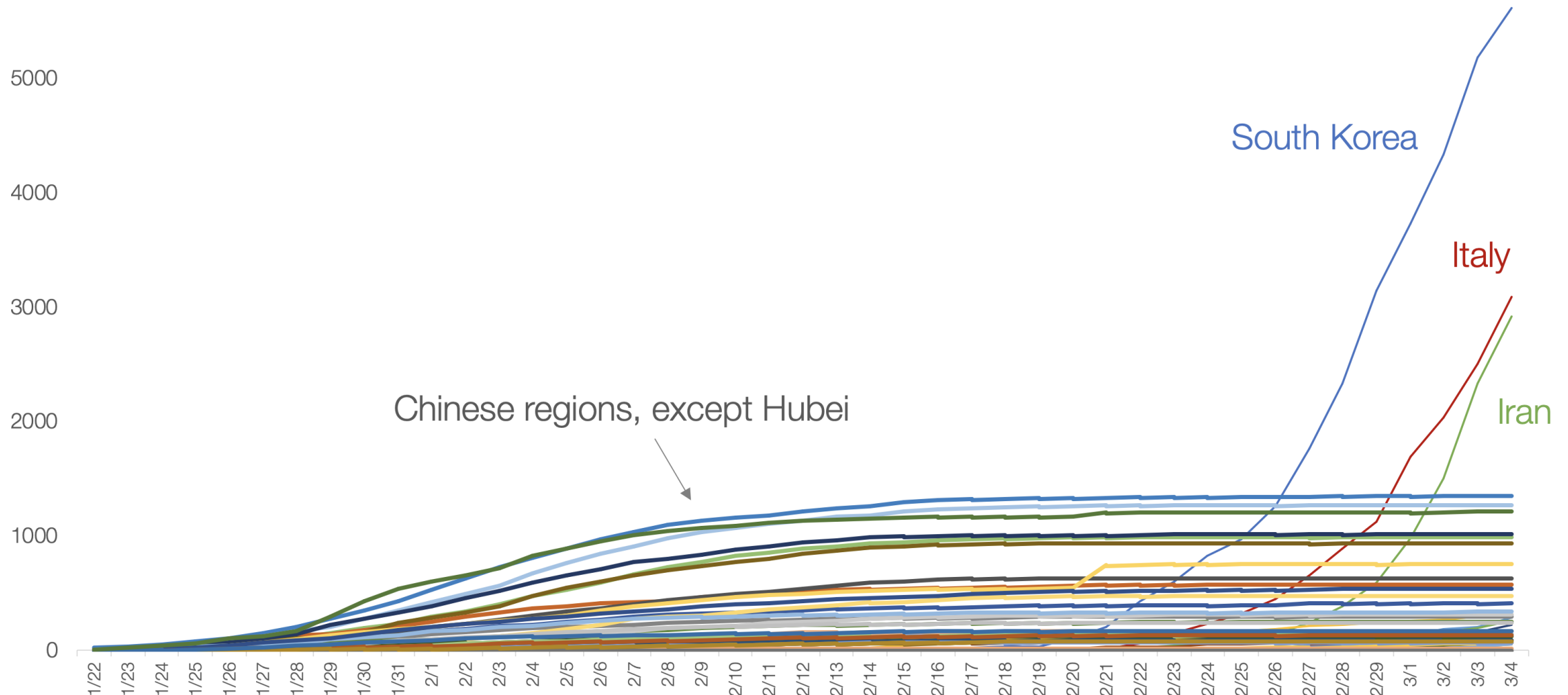


Source: <https://medium.com/@tomaspueyo>

While immediate and drastic measures in China kept growth rate flat outside Hubei, those who reacted slower like South Korea, Italy and Iran have experienced exponential growth



Chinese regions outside Hubei vs. Italy, Iran and South Korea



Source: <https://medium.com/@tomaspueyo>

The biggest impact isn't from individual cases, but how swiftly and broadly a government acts – the slower the response, the more invasive the virus



A tale of two countries with first case reported on 31 January

Taiwan: 49 cases, 1 death



- ✓ Tracking of high-risk individuals
- ✓ Border control of sea and air
- ✓ Information sharing of patient travel history accessible to health care workers
- ✓ Large amounts of testing per capita
- ✓ Daily press briefings with facts

All done within two weeks after the first case

<https://jamanetwork.com/journals/jama/fullarticle/2762689>

Italy: 12,652 cases (and counting), 827 deaths (and counting)



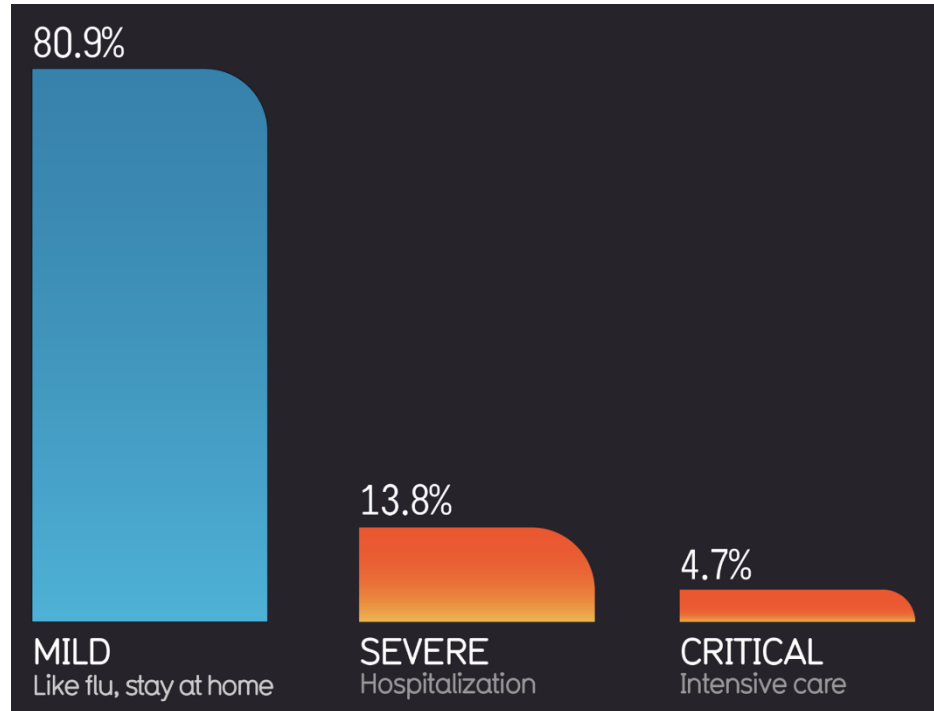
- ✓ Border control instituted and internal person movement restricted
- ✓ Closure of all business activity including offices, factories. Only commerce involving pharmacies and supermarkets (controlled)
- ✓ Increase in testing recently

All done in the last week, over six 6 weeks after the first case

https://en.wikipedia.org/wiki/2020_coronavirus_pandemic_in_Italy#First_confirmed_cases



Seriousness of symptoms distribution



Impact of coronavirus on US healthcare system

Best Guess Epidemiology

- $R_0 = 2.5$; Doubling time 7-10 days
 - Community attack rate = 30-40%
 - Cases requiring hospitalization = 5%
 - Cases requiring ICU care = 1-2%
 - Cases requiring ventilatory support = 1%
 - CFR = 0.5%
- Community epi wave 2 months
US: 96 million cases
US: 4.8 million admissions
US: 1.9 million ICU
US: 1 PPV
US: 480,000 deaths

• **PREPARE FOR DISEASE BURDEN ROUGHLY 10X SEVERE FLU SEASON**



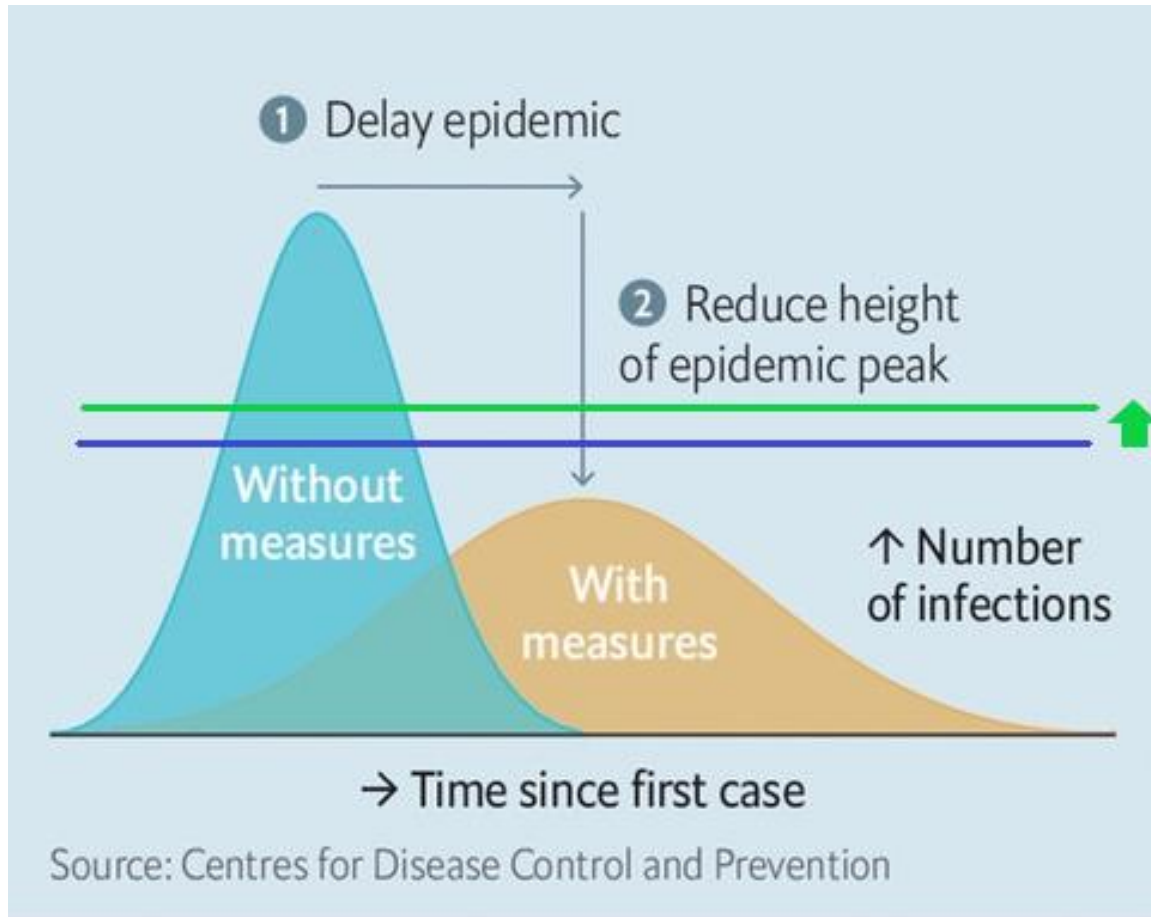
AHA webinar

Source: Dr. James Lawler, professor at the University of Nebraska Medical Center, for the American Hospital Association, via Business Insider, <https://www.businessinsider.com/presentation-us-hospitals-preparing-for-millions-of-hospitalizations-2020-3>

- Intensive Care Unit (ICU), and around 1% require very intensive help, with items such as ventilators or ECMO (extra-corporeal oxygenation)
- The problem is that items such as ventilators and ECMO can't be produced or bought easily. A few years ago, the US had a total of 250 ECMO machines, for example

Source: <https://medium.com/@tomaspueyo>

Intended impact of social distancing measures



Improved healthcare capacity (e.g. dedicated clinics, remote assessment)
Current healthcare capacity

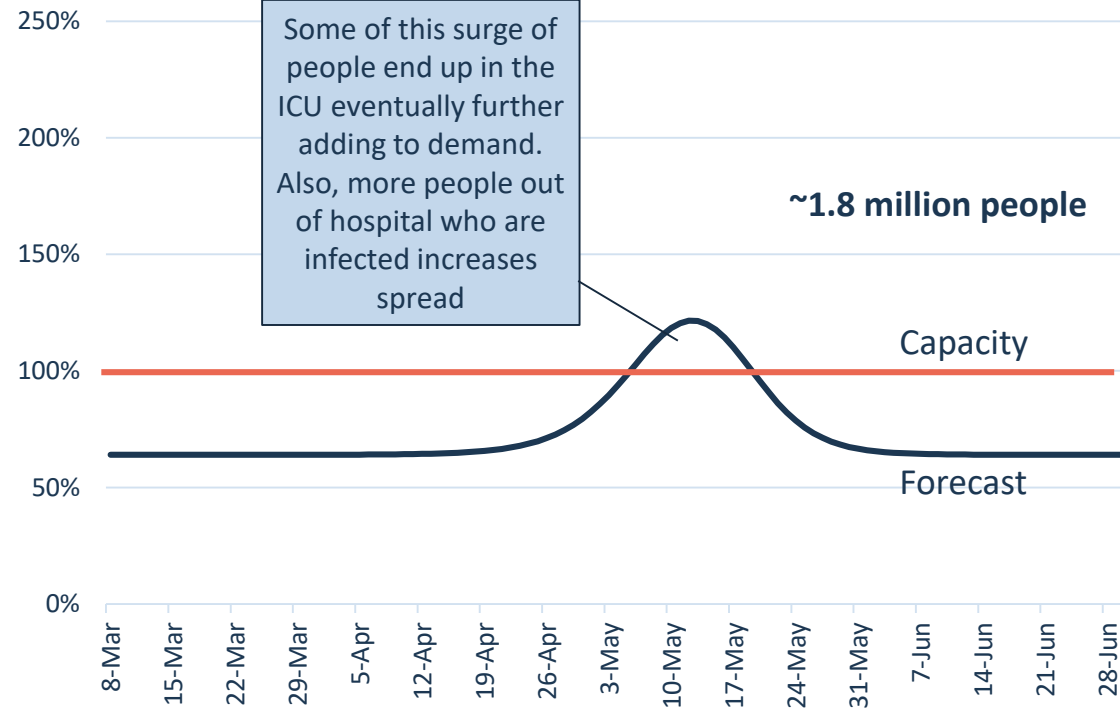
The Economist

Source: The Economist



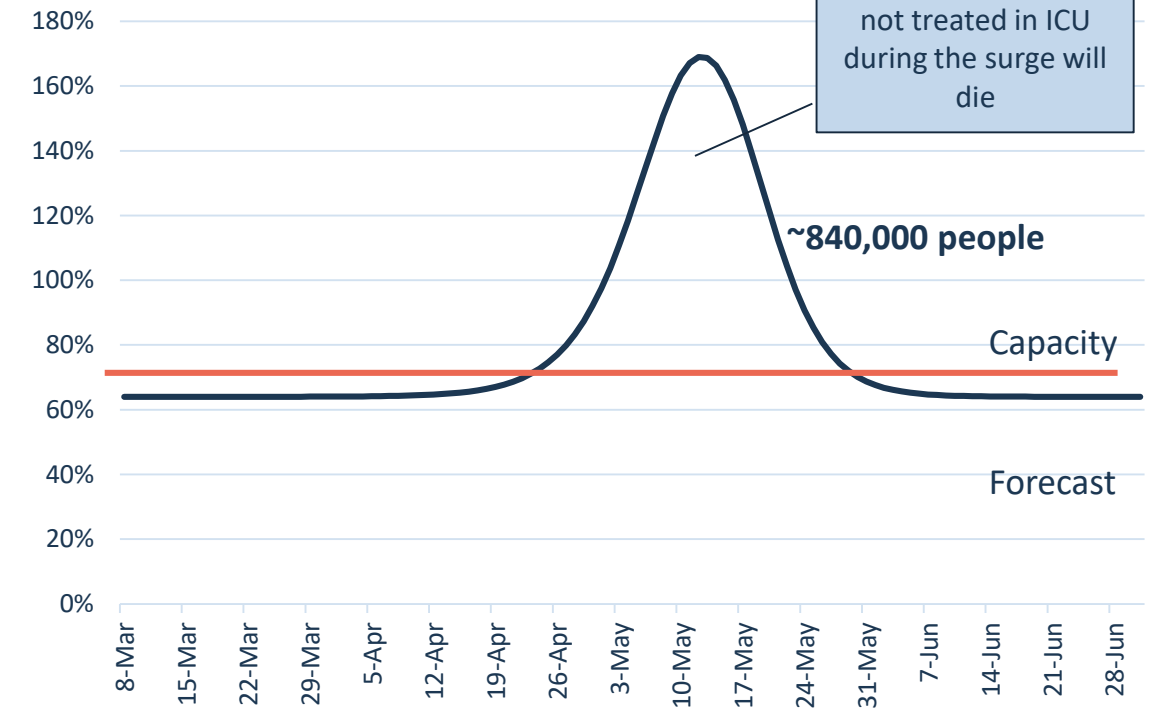
US Hospital capacity: no government action

% of total beds



US ICU capacity: no government action

% of total beds



- The real hazard is related to the spike in bed utilization during mid to late April.
- No space in hospitals will cause the ICU requirements to climb, and then the ICU capacity limitations will cause the death rate to climb

While this sounds extreme, it's happening in Italy right now



← Thread

Jason Van Schoor @jasonvanschoor · Mar 9

From a well respected friend and intensivist/A&E consultant who is currently in northern Italy:
1/ 'I feel the pressure to give you a quick personal update about what is happening in Italy, and also give some quick direct advice about what you should do.

5:27 PM · Mar 9, 2020 · Twitter for iPhone

32.1K Retweets 46.5K Likes

Jason Van Schoor @jasonvanschoor · Mar 9
Replying to @jasonvanschoor
2/ First, Lombardy is the most developed region in Italy and it has an extraordinary good healthcare, I have worked in Italy, UK and Aus and don't make the mistake to think that what is happening is happening in a 3rd world country.

Jason Van Schoor @jasonvanschoor · Mar 9
3/ The current situation is difficult to imagine and numbers do not explain things at all. Our hospitals are overwhelmed by Covid-19, they are running 200% capacity

Jason Van Schoor @jasonvanschoor · Mar 9
4/ We've stopped all routine, all ORs have been converted to ITUs and they are now diverting or not treating all other emergencies like trauma or strokes. There are hundreds of pts with severe resp failure and many of them do not have access to anything above a reservoir mask.

Jason Van Schoor @jasonvanschoor · Mar 9
5/ Patients above 65 or younger with comorbidities are not even assessed by ITU, I am not saying not tubed, I'm saying not assessed and no ITU staff attends when they arrest. Staff are working as much as they can but they are starting to get sick and are emotionally overwhelmed.

← Thread

Jason Van Schoor @jasonvanschoor · Mar 9
6/ My friends call me in tears because they see people dying in front of them and they can only offer some oxygen. Ortho and pathologists are being given a leaflet and sent to see patients on NIV. PLEASE STOP, READ THIS AGAIN AND THINK.

Jason Van Schoor @jasonvanschoor · Mar 9
7/ We have seen the same pattern in different areas a week apart, and there is no reason that in a few weeks it won't be the same everywhere, this is the pattern:

Jason Van Schoor @jasonvanschoor · Mar 9
8/ 1) A few positive cases, first mild measures, people are told to avoid ED but still hang out in groups, everyone says not to panic
2) Some moderate resp failures and a few severe ones that need tube, but regular access to ED is significantly reduced so everything looks great

Jason Van Schoor @jasonvanschoor · Mar 9
9/ 3) Tons of patients with moderate resp failure, that overtime deteriorate to saturate ICUs first, then NIVs, then CPAP hoods, then even O2.
4) Staff gets sick so it gets difficult to cover for shifts, mortality spikes also from all other causes that can't be treated properly.

Jason Van Schoor @jasonvanschoor · Mar 9
10/ Everything about how to treat them is online but the only things that will make a difference are: do not be afraid of massively strict measures to keep people safe,

Jason Van Schoor @jasonvanschoor · Mar 9
11/ If governments won't do this at least keep your family safe, your loved ones with history of cancer or diabetes or any transplant will not be tubed if they need it even if they are young. By safe I mean YOU do not attend them and YOU decide who does and YOU teach them how to.

Jason Van Schoor @jasonvanschoor · Mar 9
12/ Another typical attitude is read and listen to people saying things like this and think "that's bad dude" and then go out for dinner because you think you'll be safe.

Jason Van Schoor @jasonvanschoor · Mar 9
13/ We have seen it, you won't be if you don't take it seriously. I really hope it won't be as bad as here but prepare.

Jason Van Schoor @jasonvanschoor · Mar 9
@doctimcook @GSTTanaesthesia @RCOAnews @elboghdadly @AAGBI_GAT

Jason Van Schoor @jasonvanschoor · Mar 9
@threadreaderapp unroll



Social distancing measures

- Self-isolate if you have symptoms
- Maintain a distance between people – aim for 1.5 metres
- Ask people to work from home
- Postpone non-essential meetings
- Avoid unnecessary movement between regions

If you're a business leader and you want to know what you should do, the best resource for you is [Staying Home Club](#)

Source: <https://medium.com/@tomaspueyo>



Risk-based examples

- If your company has 100 employees in the Washington state area that has 11 coronavirus deaths, there's a 25% chance at least one of your employees is infected, and you should close immediately
- If your company has 250 employees mostly in the South Bay (San Mateo and Santa Clara counties, which together have 22 official cases and the true number is probably at least 54), you have ~2% probability that at least one employee is infected
- If your company is in Paris (intramuros), and it has 250 employees, today there's a 0.85% chance that one of your employees has the coronavirus, and by tomorrow it will be 1.2%, so if you're only comfortable with a 1% chance, you should close your office by tomorrow

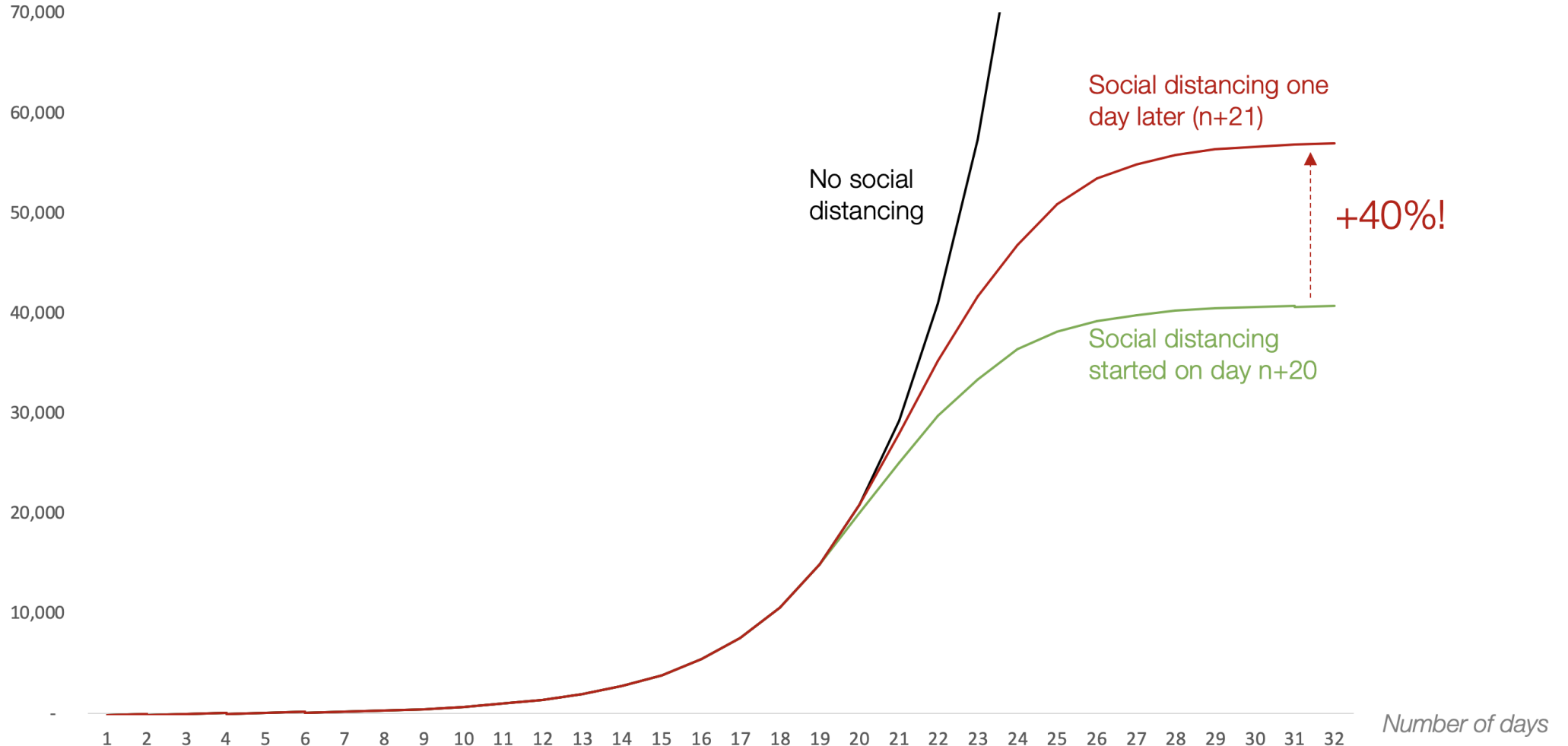
If you're still hesitating because no one seems sick, just realize 26% of contagions happen before there are symptoms

A quick response is essential – one additional day creates 40% more cases!



Model of daily new cases of coronavirus with social distancing measures taken one day apart

Cumulative cases








Source: <https://medium.com/@tomaspueyo>

An aggressive and drastic effort to slow down the spread of CoVID will be implemented by the government of most countries – you need to be prepared



Possible slow down actions performed by government

	Elimination of out of state and out of country travel	Airports and flights will be closed and Travel on interstates will be restricted for a few months	<ul style="list-style-type: none">•How will we complete projects?•How will we get our team home?
	Curfews	Limitation of who can leave the house when during key months. Prohibition of any social gatherings ongoing	<ul style="list-style-type: none">•How will we get our team home?
	Shut down of all non-essential business	Closure of all businesses except critical such as supermarkets and pharmacies for a few months	<ul style="list-style-type: none">•How will we continue to operate?
	Closure of schools	Closure of schools and universities at least for a semester but potentially longer	<ul style="list-style-type: none">•How will those with children be able to work?
	Removal of non-critical cases from the hospital system	Non-emergency services eliminated. Temporary assessment centers established.	<ul style="list-style-type: none">•How will we protect our staff from CoVID?•What will happen if there's an accident?