

# RESPONDING TO COVID-19

Primer, Scenarios, and Implications

March 19, 2020 UPDATE

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The background is an abstract composition of warm, textured colors. It features a mix of deep reds, oranges, and yellows, with several large, dark, circular or oval shapes that resemble ink blots or organic forms. The overall effect is one of intense heat and dynamic movement.

**01**

# **EPIDEMIOLOGIC PERSPECTIVES**



# SUMMARY

## Context and purpose



The novel coronavirus has infected hundreds of thousands of people globally and is taking a severe toll on individuals, families, and economies as productivity drops and stock markets reflect increased global uncertainty

This document provides some baseline facts and guidance for business leaders as to critical questions to address in the immediate and near-term to ensure the continuity of their business and the safety, health, and wellbeing of their workforce and customers

## What is it?

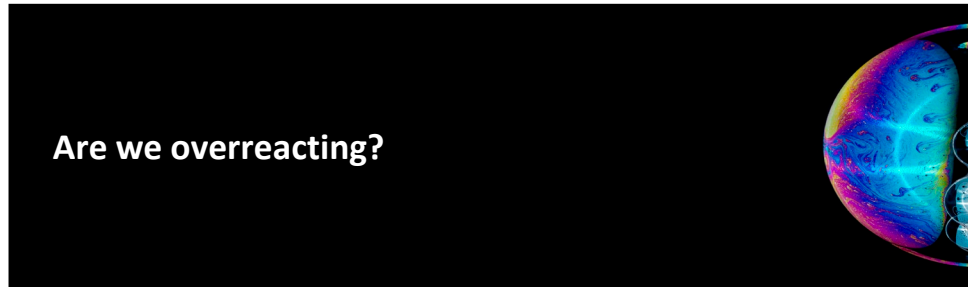


COVID-19 is the name for the illness caused by the novel coronavirus that originated in Wuhan, China in December 2019

It is from the same family of viruses that cause some common colds, as well as Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS)

It is considered similar to other respiratory infections such as influenzas; symptoms range from fever, cough, shortness of breath to more severe cases of pneumonia and organ failure

## Are we overreacting?



Current pace of spread and understanding of the disease suggest that we should take serious actions:

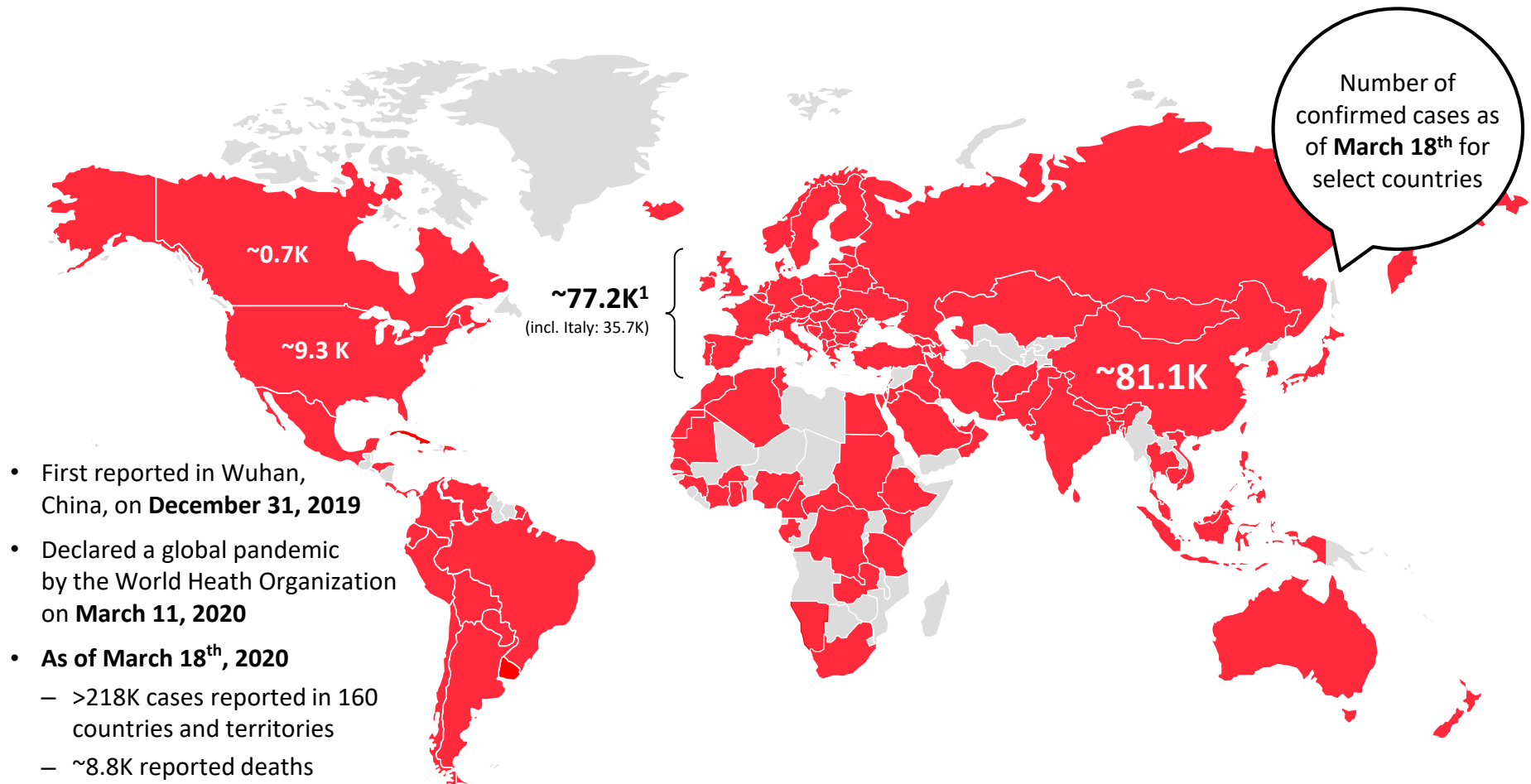
- Early data suggests that COVID-19 may be 2–3 times as contagious as the flu with a much higher case fatality rate
- Approximately **19% of confirmed cases are considered “severe” or “critical”, requiring hospitalization**<sup>1</sup>
- The infectious cycle for COVID-19 is complex and more difficult to manage for several reasons
  - The **incubation period** for COVID-19 appears to be longer than that of the flu, at **~5 days**<sup>2</sup> versus 2–4 days<sup>3</sup>
  - Multiple publications confirm that COVID-19 can be spread **asymptotically**<sup>4,5</sup>
  - The **infectious period appears long** – emerging data suggests that peak viral loads are reached rapidly after infection and shedding continues beyond symptom resolution<sup>6</sup>

We don't yet know if COVID-19 is seasonal like the flu; half of coronaviruses appear to be seasonal, and half do not; there is no direct evidence yet to suggest this is seasonal

As more data is collected, we may come to understand that COVID's spread and severity are more like the seasonal flu; and there is reason to believe that vaccine and treatment pathways will lead to more effective responses for severe cases.

1. China CDC; 2. London School of Tropical Medicine; 3. CDC; 4. JAMA. “Presumed Asymptomatic Carrier Transmission of COVID-19”, Feb 21 2020.;5. NEJM. “Transmission of 2019-nCoV Infection from an Asymptomatic Contact in Germany”. Mar 5 2020.; 6. MedRxiv. “Clinical presentation and virological assessment of hospitalized cases of coronavirus disease 2019 in a travel-associated transmission cluster”. Mar 8. 2020

# COVID-19 SPREAD GLOBALLY



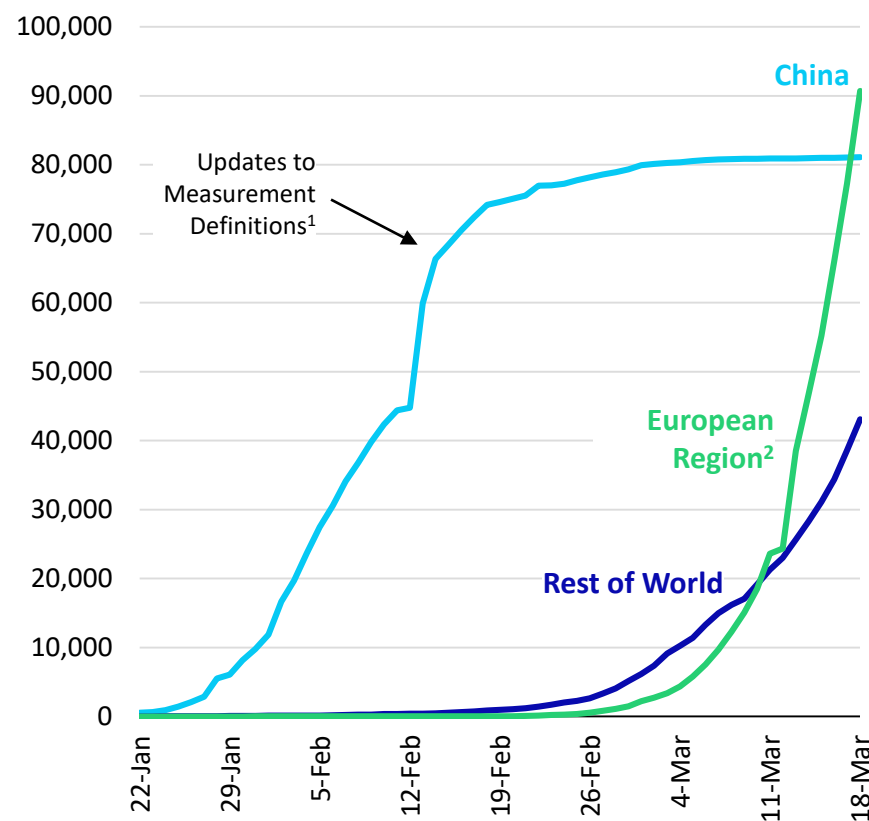
1. Countries included: All Countries in "European Region" Sub-region in WHO Situation Report  
 Source: Map from CDC ([link](#)), Numbers from John Hopkins University & Medicine ([link](#))

# COVID-19 TRENDS AND SPREAD OF THE DISEASE

The number of new cases in China has slowed – likely due to significant containment measures – as the outbreak spreads to other countries

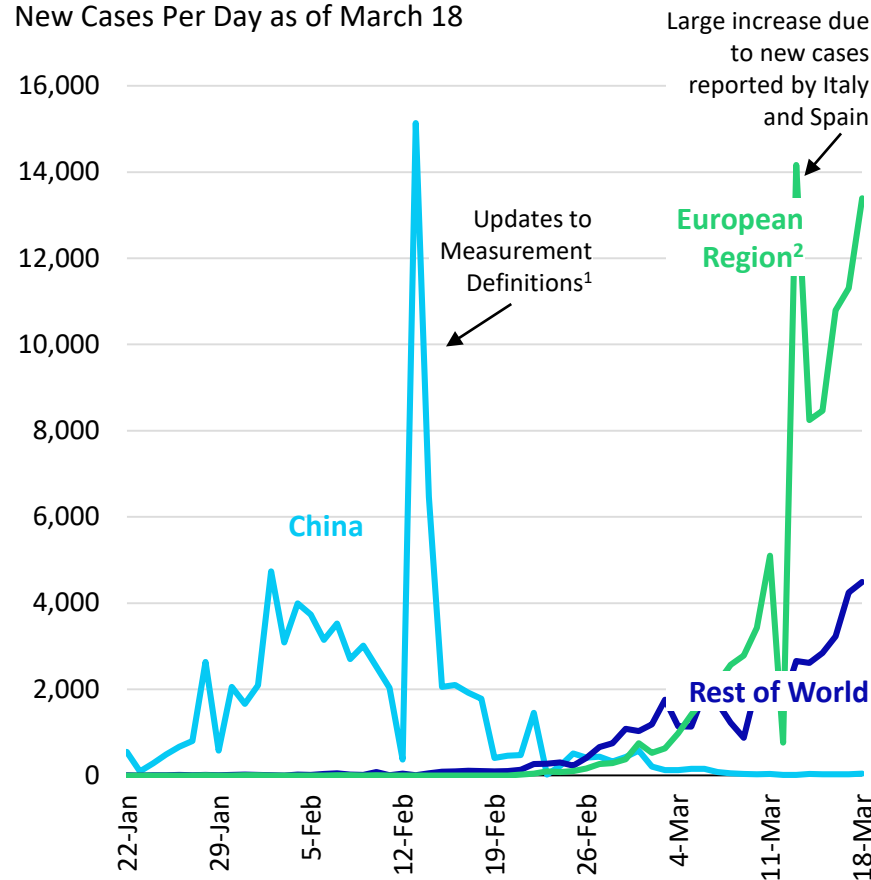
## Confirmed Cases of COVID-19

Cumulative Number of Cases as of March 18



## New Cases Per Day of COVID-19

New Cases Per Day as of March 18



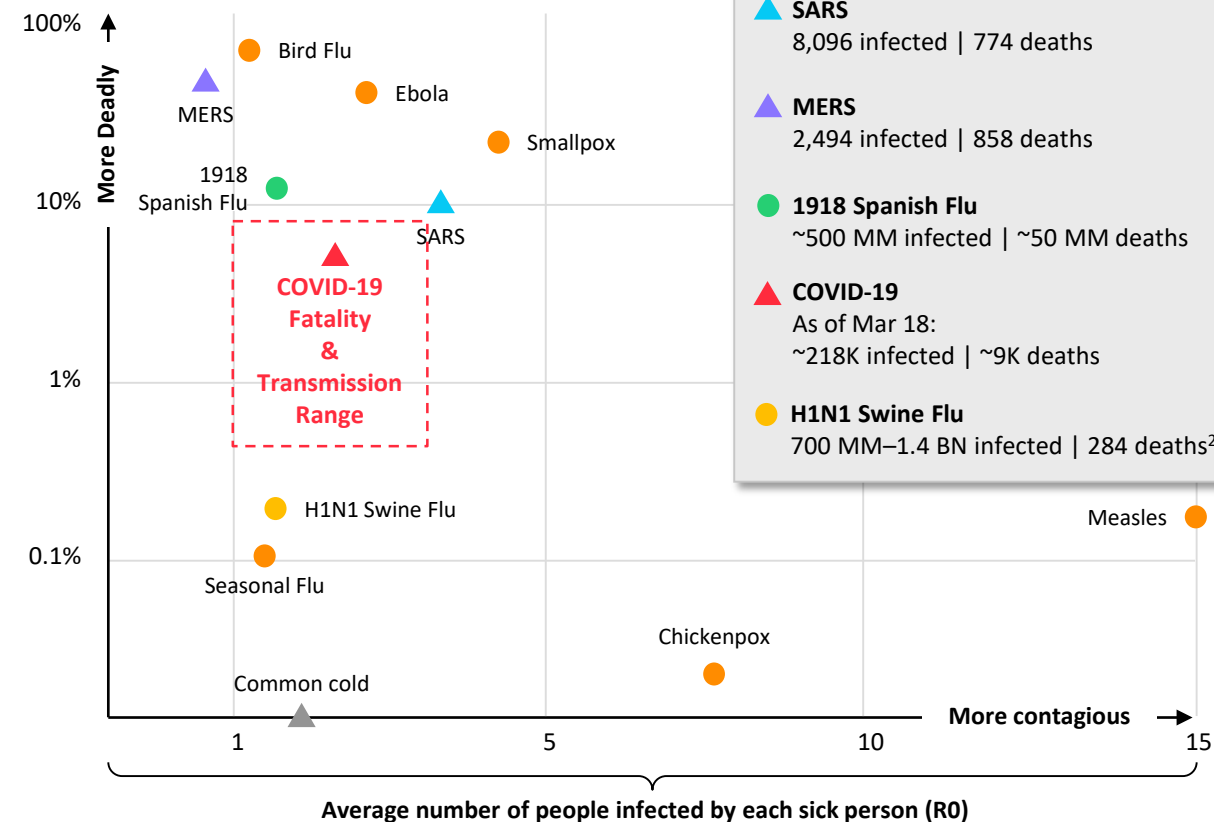
Source: John Hopkins University & Medicine Coronavirus Resource Centre

1. Until February 17, the WHO situation reports included only laboratory confirmed cases causing a spike in total cases. Some sources include this update as of February 13. The jump due to inclusion of non lab confirmed cases is not included in the new cases data in WHO situation reports.; 2. Includes countries categorized under "European region" based off of latest WHO Situation Reports

# HOW DOES COVID-19 COMPARE TO OTHER DISEASE OUTBREAKS? (1 OF 2)

COVID-19 is currently more deadly than the Flu, but the science on transmission and mortality continues to evolve

Fatality rate<sup>1</sup>  
Log scale



▲ Denotes Coronaviruses

## Additional details

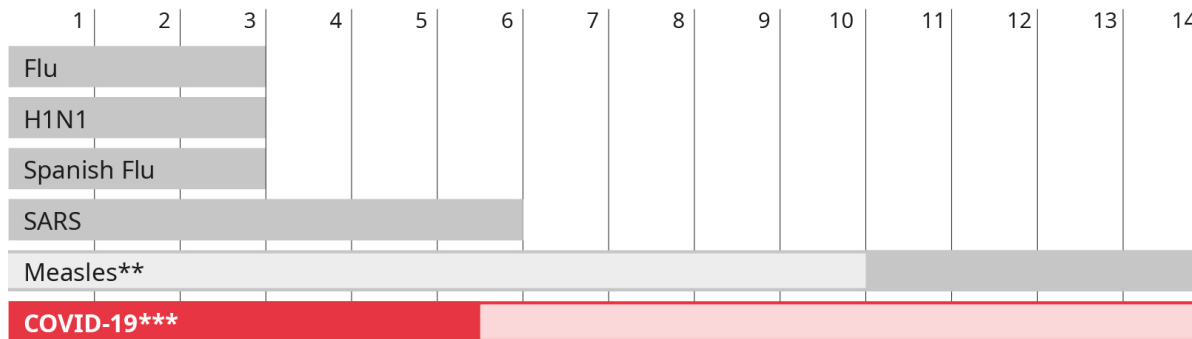
- R-naught (R0) represents the number of cases an infected person will cause. R0 for COVID-19 is currently estimated at between 2 and 3 (with edge of range estimates closer to 1.4 and 3.6), which means each person infects 2-3 others<sup>3</sup>; R0 for the seasonal flu is around 1.3<sup>4</sup>
- The global case fatality rate for confirmed COVID-19 cases is currently 4.4%<sup>5</sup> according to WHO's reported statistics versus 0.1% for the seasonal flu; the rate varies significantly by country (e.g., Italy – 7.9%, South Korea – 0.97%<sup>6</sup>)
- We expect case fatality rates to fluctuate as testing expands identifying more cases and as existing cases are resolved

1. New York Times ([link](#)) for fatality and R-naught comparisons, CDC timelines for case numbers (selected link: CDC [SARS](#) timeline); 2. Updated CDC estimates ([link](#)); 3. The R0 for the coronavirus was estimated by the WHO to be between 1.4 -2.5 (end of January estimate) ([link](#)), other organizations have estimated an R0 ranging between 2-3 or higher ([link](#)); 4. CDC Paper ([link](#)); 5. WHO Situation Reports – 55; 6. Calculated as Number of Deaths / Total Confirmed Cases as reported by John Hopkins University

# HOW DOES COVID-19 COMPARE TO OTHER DISEASE OUTBREAKS? (2 OF 2)

The infectious cycle of COVID-19 is unlike that of any other outbreak we have seen before

## Incubation Timeline (Days)\*, 1



\*All but SARS have the potential for asymptomatic transmission

\*\*Symptoms most commonly appear on Days 10-14

\*\*\*The median incubation period for COVID-19 is 5.5 days, but symptoms can develop as late as 14 days post exposure

## Why does this matter?

- The combination of a longer incubation period with asymptomatic transmission means that there is a longer window of time during which infected individuals are unaware that they are contagious

## Why is quarantine 14 days?

- While the median incubation period is 5.5 days, symptoms have been documented to occur over a longer time frame; 14 days should capture 99% of all cases<sup>2</sup>

## What do we still not know?

- We still do not accurately understand the full infectious period for COVID-19

## What we know about the infectious cycle?

- Multiple sources confirm asymptomatic transmission, but the exact timing of when an exposed individual becomes contagious is not known<sup>3, 4, 5</sup>
- Viral loads build rapidly and continue to shed until 6-12 days after symptoms have cleared<sup>6</sup>

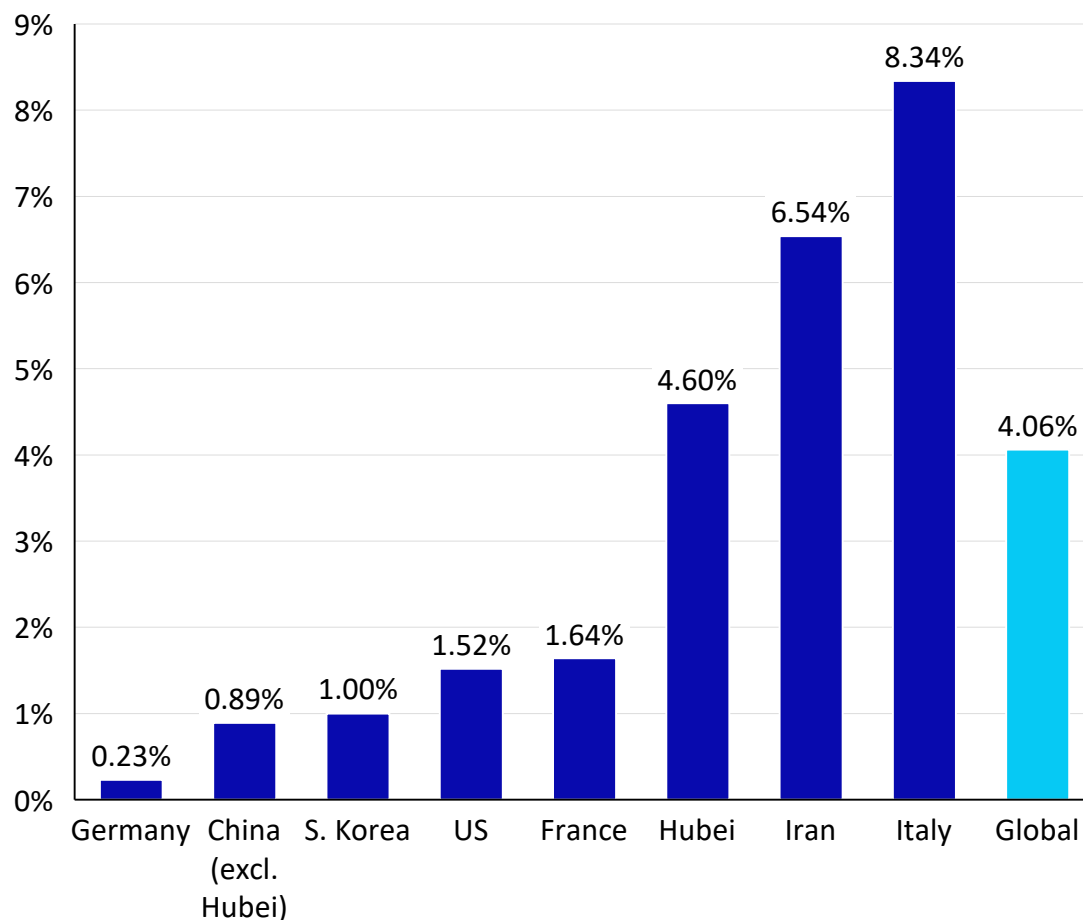
1. CDC 2. Annals of Internal Medicine ([link](#)) 3. JAMA ([link](#)) 4. NEJM ([link](#)) 5. Science ([link](#)) 6. medRxiv ([link](#))



# CASE FATALITY RATE (CFR) BY COUNTRY

While the global CFR is a useful metric to understand COVID-19, country-specific CFRs range by an order of magnitude

CFR by country<sup>1</sup>



## What is driving the variation?

- **Position along the trajectory of the outbreak:** For many countries (e.g., Europe, US), the vast majority of cases have not yet resolved and the CFR is changing rapidly
- **Breadth of testing:** Broader testing leads to a larger confirmed base of patients, decreasing CFR
- **Distribution of key risk factors within the population:** Age, gender and pre-existing conditions have a significant influence on mortality (see next page); countries with higher CFRs have a population skewed towards these risk factors (e.g., Italy has the second oldest population on earth)
- **Health system threshold:** Every country has a health system capacity, that when exceeded, will result in the inability to provide sufficient support to all patients thereby resulting in a higher CFR

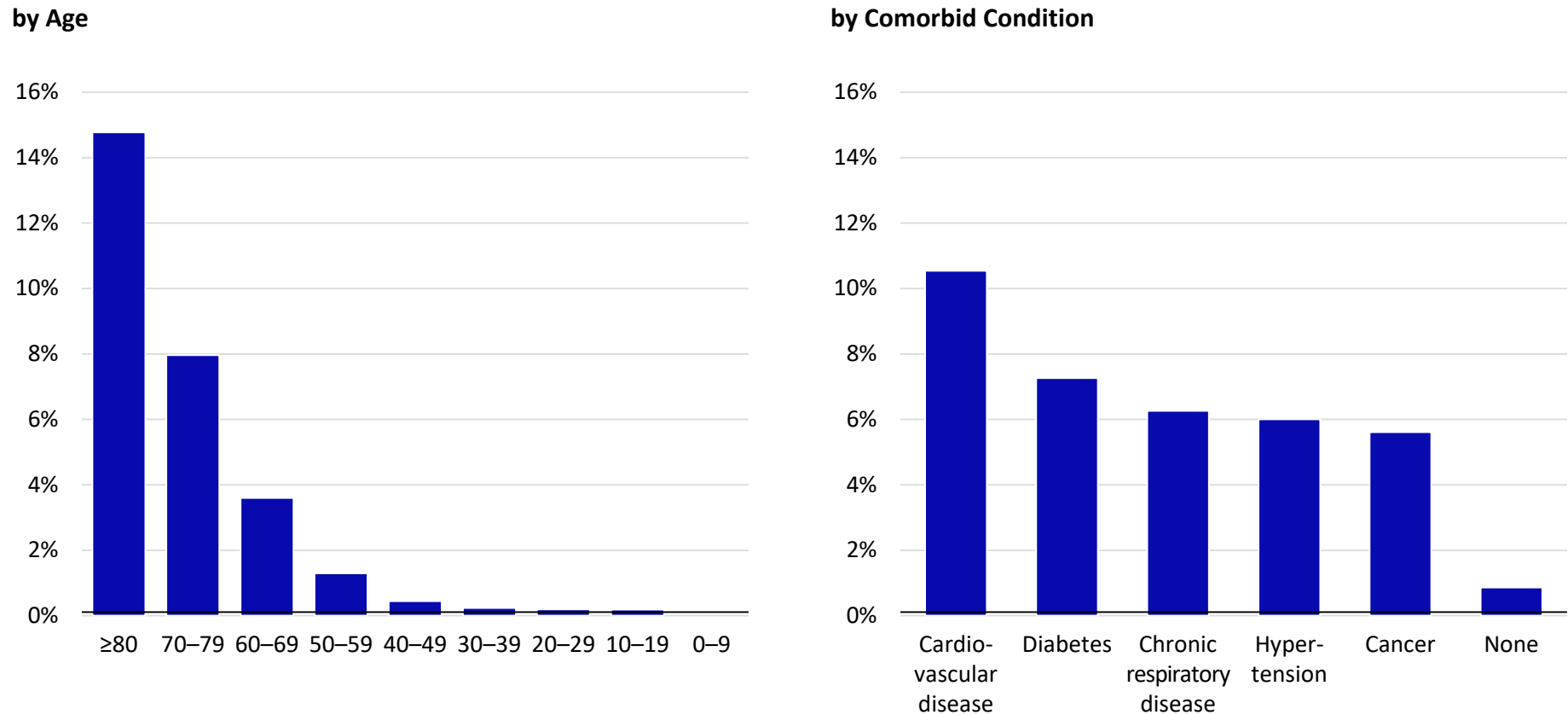
1. Calculated as Number of Deaths / Total Confirmed Cases as reported by Johns Hopkins University as of 3/18/20

# CASE FATALITY RATE (CFR) BY PATIENT CHARACTERISTIC

Significantly higher death rates occur among the elderly and those with underlying conditions

## Case Fatality Rate by Specific Patient Characteristics

All confirmed cases in China as of February 11, 2020



Source: China CDC Weekly. Vital Surveillances: The Epidemiological Characteristics of an Outbreak of 2019 Novel Coronavirus Diseases (COVID-19) — China, 2020.

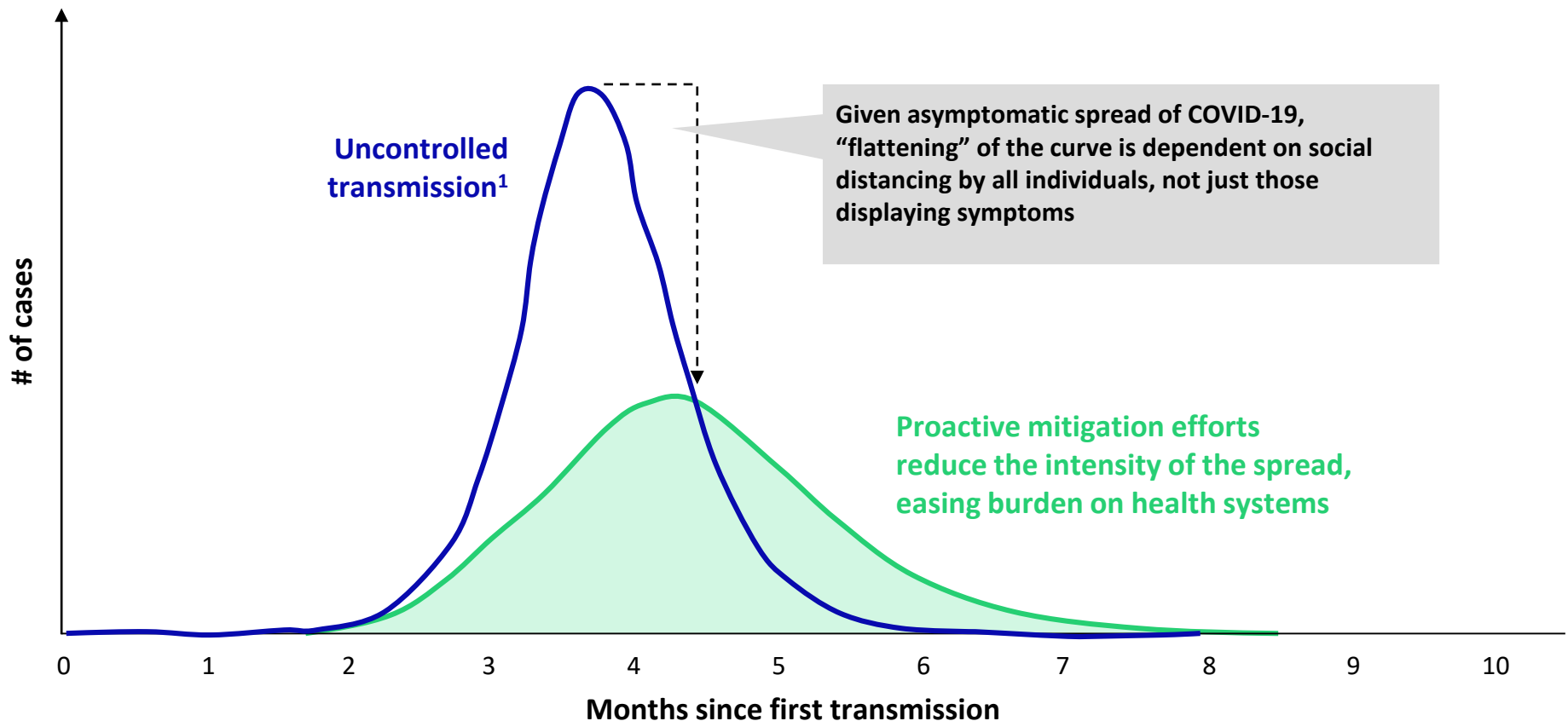
Notes: Data includes 44,672 confirmed cases reported through February 11, 2020.

# HOW CAN MITIGATION MEASURES LOWER THE BURDEN OF THE PANDEMIC?

Proactive and swift mitigation measures (e.g., social distancing) are critical to control the spread and reduce the overall burden on the healthcare system, as ~15–20% of confirmed cases require hospitalization

## Illustrative COVID-19 transmission with and without mitigation measures

Timing and width of peaks may vary between countries



1. Assuming case-based isolation only

Source: Adapted from “How will country-based mitigation measures influence the course of the COVID-19 epidemic”. Lancet. Mar 6 2020. [https://doi.org/10.1016/S0140-6736\(20\)30567-5](https://doi.org/10.1016/S0140-6736(20)30567-5)

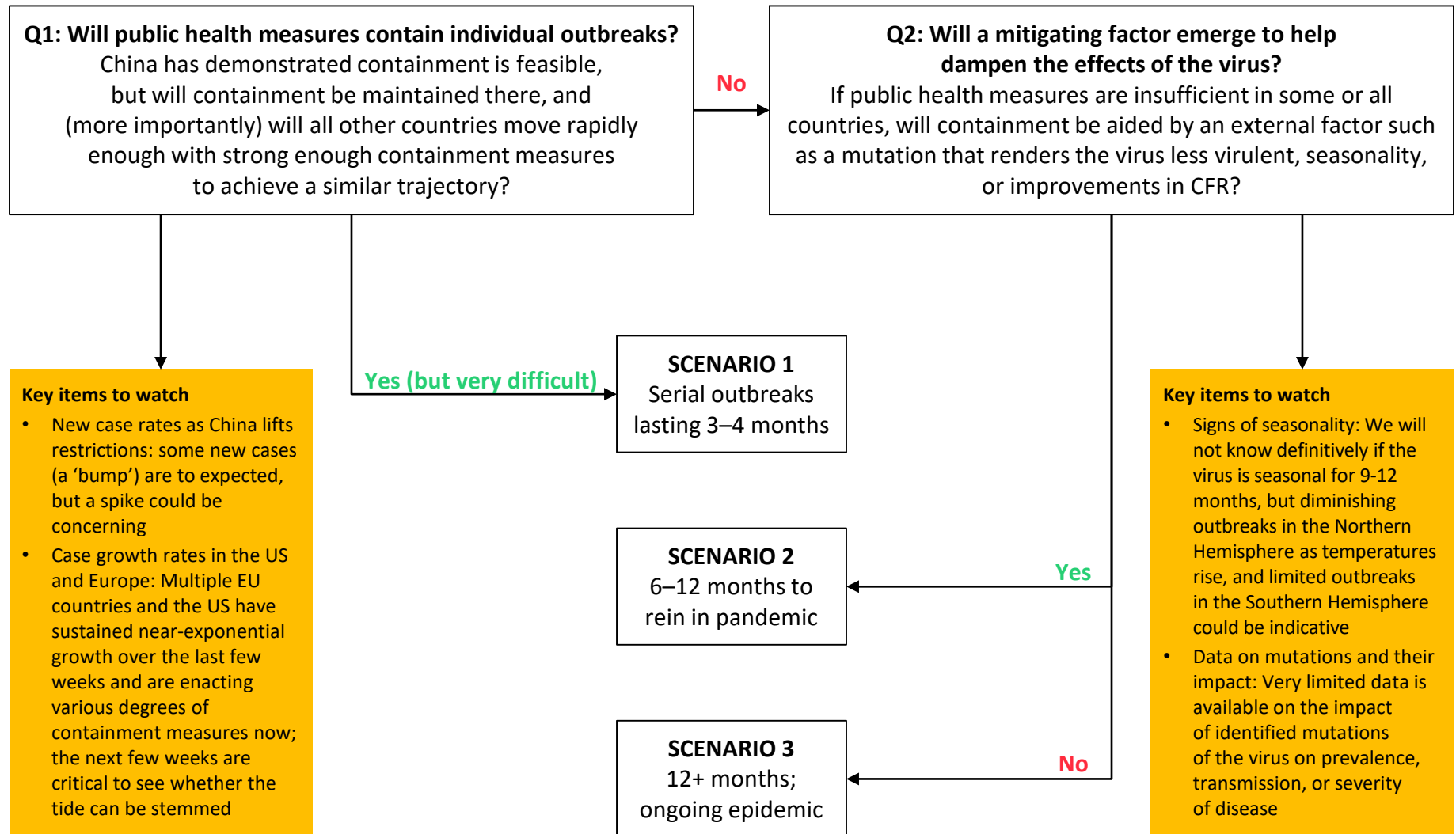
# EARLY OBSERVATIONS ON CONTAINMENT MEASURES

- Experience to date in Europe and the United States points to a much lower level of containment than seen in China
  - Response in Europe and the United States has been **fragmented**: from “**wait-and-see**” approaches, to “**partial**” solutions (i.e., limiting gatherings or travel in a city or region), to **total lockdown** of a country
- To arrest the growth of the confirmed cases, we have observed a number of **best practices**
  - Moving quickly with a seemingly small number of cases to implement **containment measures**
  - Deploying **extensive testing across a population to identify cases**, particularly in light of asymptomatic transmission of the virus
  - Implementing **aggressive containment measures** (e.g., closing bars, schools, restaurants, gyms, churches to maintain social distancing, restricting non-essential travel, quarantines of infected patients, even those who are asymptomatic)



# HOW LONG COULD THIS LAST? HOW MIGHT THIS PLAY OUT?

Two key questions, and a number of items to monitor, help define three potential scenarios





# OUR SCENARIO FORECAST GENERATOR HELPS TO QUANTIFY POTENTIAL SCENARIOS

The model paints the picture of the “book-end” scenarios and a range of trajectories in between based on a series of key inputs

## Oliver Wyman COVID-19 Scenario Generator

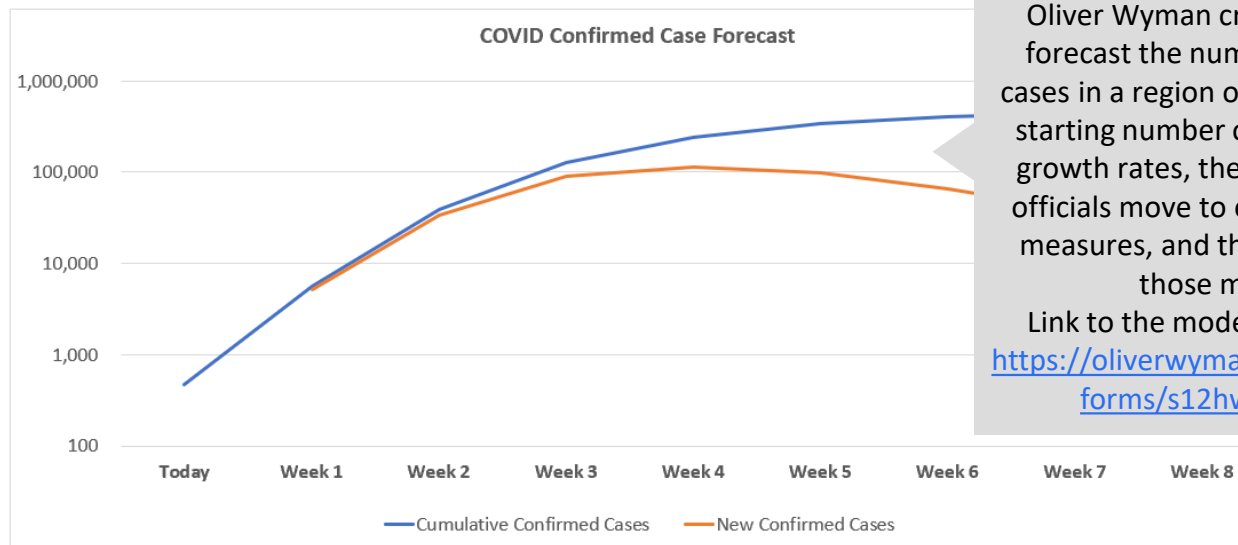
Version#: 1.0. Version Date: March 15, 2020

### Modeling Assumptions

Current Number of Confirmed Cases	476	Current number of Confirmed Cases for forecast region
Delay Until Containment Effort Starts (days)	7	Estimated days until increased containment measures are implemented
Expected Effectiveness of Containment Effort	Medium	Expected levels of containment measures (testing, social distancing, quarantines)
Current Daily Growth Rate in Cases	50%	<i>s</i> is ideally calculated as: $(\text{Confirmed Cases}(\text{day}) / \text{Confirmed Cases}(\text{prior day})) - 1$ . If data are not available, see

### Scenario Output

Case Type	Today	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
Cumulative Confirmed Cases	476	5,698	39,479	128,744	243,284	340,545	406,033	444,917	466,518
New Confirmed Cases		5,222	33,782	89,264	114,540	97,261	65,488	38,884	21,601



Oliver Wyman created a model to forecast the number of confirmed cases in a region or area based on the starting number of cases, daily case growth rates, the speed with which officials move to enact containment measures, and the effectiveness of those measures.

Link to the model can be found at <https://oliverwymangroup.wufoo.com/forms/s12hwj5h0qqcxx1/>

# HOW LONG COULD THIS LAST? HOW MIGHT THIS PLAY OUT?

## Scenario 1: Serial outbreaks lasting 3–4 months

### What you'd have to believe

- New case rates spike with initial outbreak in a region and increased testing, but level off within ~8 weeks
- Public health officials enact early and aggressive containment measures to contain localized outbreaks (e.g., Norway, India, Czech Republic), learning from the “playbook” set by China, Singapore and refined by the next regions to experience outbreak
- Population largely complies with public health directives, slowing human-to-human transmission; health systems are not overwhelmed, CFR does not rise
- New case rates in China do not increase after quarantines and travel restrictions are relaxed and schools reopen

### What we know so far

- Aggressive containment measures in China (100 MM under quarantine in February 2020, 59 MM remain so as of early March) contained spread within 8 weeks of identification
- New case rates in China have declined; similar compliance would be necessary in rest of world to contain
- China has not yet returned to “normal” (e.g., schools are still closed with staggered re-opening planned for Mar-May)

### Anticipated business impacts

- Supply chain shocks reverberate into Q2 in some sectors; Chinese manufacturing shutdown in part tempered by inventories stockpiled in advance of Lunar New Year
- Corporate and government-mandated (e.g., US restriction on European travel announced 3/11) travel restrictions in affected regions lead to drop-off in demand in airlines, hotels and impact retail supply and demand
- Earnings dented post outbreak in a particular region, but swift recovery and rebounding consumer confidence allows companies to return to normal one to two quarters later
- Complete global recovery takes until Q4 or longer, given serial pattern of outbreaks and containment; recovery more rapid if virus proves to be seasonal

#### Oliver Wyman COVID-19 Scenario Generator insights

- Containment measures can take a few days to take hold, but once they do, we see a steady decay in the growth of cases and a flattening of the curve
- High levels of containment in a country with 100 starting cases and a growth rate of 50% per day, can contain the problem to 10,000 cases over an 8 week period (a ~100X difference compared to delayed, and minimal containment measures)

# HOW LONG COULD THIS LAST? HOW MIGHT THIS PLAY OUT?

## Scenario 2: 6–12 months to rein in pandemic

### What you'd have to believe

- While some countries move rapidly to replicate aggressive containment measures, others either do not or are unable to drive compliance
- Countries with slower, less aggressive response and/or poor compliance are not able to contain the virus with case rates continuing to increase beyond expected 6–8 week window
- Some countries with initial containment see spike of cases after lifting containment measures
- Insufficient public health measures are offset by an external factor (e.g., viral mutation affecting virulence, early identification and improved treatment, seasonality) that either decreases CFR or helps contain spread

### What we know so far

- Other countries may be unable (e.g., lack of resources to rapidly erect hospitals, lack of infrastructure and surveillance capabilities to track and isolate cases) or unwilling to mount the same public health response as China
- Compliance with public health recommendations is more difficult to enforce in many countries (e.g., broken quarantine of patient in New Hampshire, USA)
- Virulence-lowering viral mutations have been observed previously (e.g., SARS) and there is emerging evidence of at least two strains of COVID-19, one less virulent than the other
- While ~50% of coronavirus family have proved to be seasonal, no direct evidence yet indicates COVID-19 is seasonal
- Aggressive testing and documentation of effective treatment protocols has contributed to a dramatically reduced CFR in South Korea (0.97% as of 3/17) compared to that of other regions

### Anticipated business impacts

- Employers reluctant to relax travel and WFH mandates without guidance from public health officials
- Vulnerable industries experience a continued drop in demand as consumer confidence wavers into Q2 and Q3 and take measures to stabilize balance sheets and ensure liquidity
- Supply chain shocks play out over a six month period, after which momentum could begin to stabilize and recover
- Moderate to serious recession in impacted countries; larger, more diversified economies with less dependence on international trade and/or foreign income than other economies prove better able to weather slowing growth
- Significant central bank intervention and government support programs (e.g. extended unemployment insurance, credit support for SMEs) are implemented

# HOW LONG COULD THIS LAST? HOW MIGHT THIS PLAY OUT?

## Scenario 3: 12+ months; ongoing pandemic

### What you'd have to believe

- Virus proves to either not be seasonal, or seasonal and endemic (rising, falling and returning seasonally by Hemisphere)
- Regions are unable to contain outbreaks; virus spreads widely, affecting ~20–60%<sup>1</sup> of adult population in next 2 years
- Mortality rates do not decline, placing significant strain on or overwhelming health systems and further increasing fatalities
- Vaccine is required to halt progress of disease

### What we know so far

- Insufficient data to support scenario as of yet
- Multiple vaccines under development but at least 1 year out
- Unless “spike” of cases in a region can be smoothed over a longer period of time, health systems become overtaxed and cannot adequately meet all patients’ needs (e.g., Wuhan, Italy)
- As health systems become overwhelmed, transmission and case fatality increases

### Anticipated business impacts

- Severe recession on the order of Global Financial Crisis in 2020, possibly into 2021
- Dramatic drop in demand (consumer confidence, access to supply, part-time/gig economy workers with less discretionary income) results in severe contraction in Q2 and Q3 with uncertain recovery in Q4
- Companies in particularly vulnerable industries (travel, energy, hospitality) require additional liquidity, and may trigger complications for related industries
- Massive central bank intervention plus government stimulus injected to protect vulnerable workers and businesses on a scale exceeding TARP

#### Oliver Wyman COVID-19 Scenario Generator insights

- If daily growth rate is 50%, a totally passive approach to managing the outbreak leads to a growth trajectory just shy of a truly exponential curve
- 100 cases become almost 1,000,000 over an 8-week period

# WHAT SHOULD COMPANIES BE THINKING ABOUT RIGHT NOW?



## Confirm Business Resiliency

All companies should be implementing business continuity plans to reassure employees and ensure readiness for **supply chain constraints, demand shocks, and impacts to business partners**, prioritizing critical business activities and creating contingency plans for disruption



## Model Financial scenarios

Companies should be **evaluating their financial outlook, modelling supply and demand** across a number of scenarios, identifying potential interventions and contingency plans for subsequent impacts and/or sustained challenges (e.g. *strategies for managing variable costs, cash flow, liquidity*)



## Reassure Customers

Consumer concerns need to be understood, mapped, and incorporated into the business continuity plan such that consumer needs are addressed and trust is maintained



## Move to Digitization Rapidly

Some industries are likely to see a **massive acceleration in the use of digital channels**. Retail, Financial Services, and Healthcare companies have experienced 100–900% growth in key digital channels in China during the outbreak. Customers with positive digital experiences are unlikely to return to analog channels



## Prepare for Long Haul

Pandemic business continuity plans will get companies through the next 2–4 weeks, but strategies may be required to get through 6–12 months (or more) of disruption if subsequent demand shocks exist. Companies should consider the nature and required timing associated with more structural changes to their operations



## Convene Industry

Companies should consider which industry and government collaborations are necessary to address safety concerns, share best practices, stimulate demand, and rebuild consumer trust

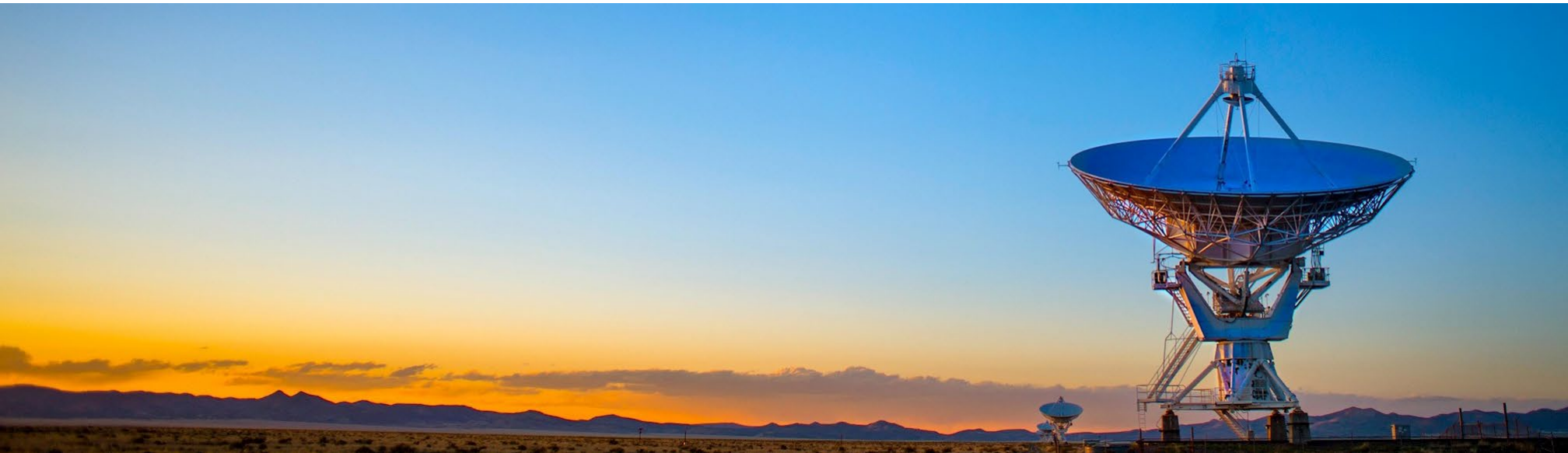


# READ OUR LATEST INSIGHTS ABOUT COVID-19 AND ITS GLOBAL IMPACT ONLINE

Oliver Wyman and our parent company Marsh & McLennan (MMC) have been monitoring the latest events and are putting forth our perspectives to support our clients and the industries they serve around the world. Our dedicated COVID-19 digital destination will be updated daily as the situation evolves.



[Visit our dedicated COVID-19 website](#)



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