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Coronavirus COVID-19: Facts and Insights

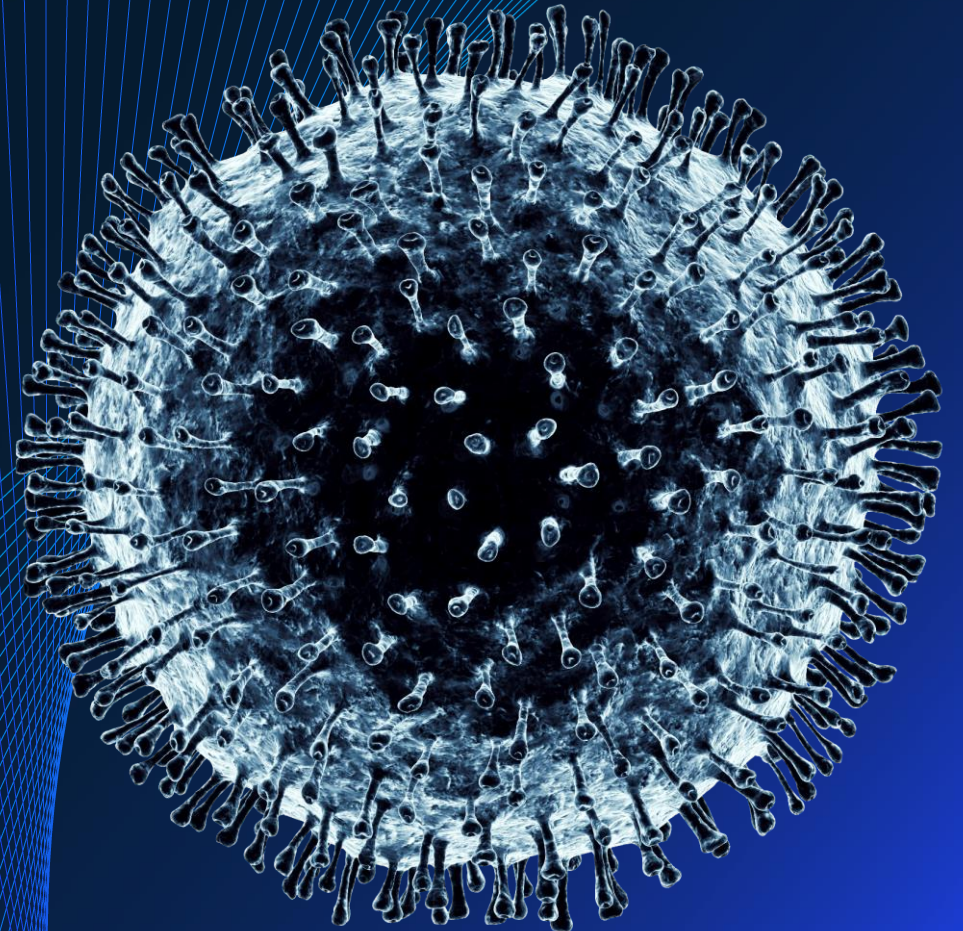
Updated: February 28, 2020

Global Health + Crisis Response

**DOCUMENT INTENDED TO PROVIDE
INSIGHT AND BEST PRACTICES RATHER
THAN SPECIFIC CLIENT ADVICE**

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- **COVID-19 is, first and foremost, a humanitarian challenge.** COVID-19 has affected communities on multiple continents, with over 2,800 deaths out of over 82,000 reported cases. To date, Wuhan and Hubei province have been the most affected locations. Thousands of health professionals are heroically battling the virus, putting their own lives at risk. Overstretched health systems mean that Wuhan and Hubei will need time and help to return to a semblance of normalcy.
- **Solving the humanitarian challenge is the top priority.** Much remains to be done globally to respond and recover, from counting the humanitarian costs of the virus, to supporting the victims and families, to developing a vaccine.
- **This document is meant to help with a narrower goal: provide facts and insights on the current COVID-19 situation to help decision-makers understand best practices.** In addition to the humanitarian challenge, there are implications for the wider economy, businesses, and employment. This document sets out some of those challenges and how organizations can respond in order to protect their people and navigate through an uncertain situation.

Executive summary (February 28, 2020)

COVID-19 passed an inflection point this week, with more new cases outside China than in China for the first time. New cases increased ~4.5x outside China, while those in China decreased ~3x1 compared to the previous week. However, China still reported more than 3,000 new cases, demonstrating that the epidemic is not over for them.

The global surge reflects a new inflection point in this epidemic. Four ‘major transmission complexes’ (i.e., China, East Asia, Middle East, Europe) are now active, with the US at a tipping point.

Governments globally are preparing for broader spread. Outside of China, deep economic connections and people movements within these complexes will make it difficult to stop intra-complex transmission – even as individual regions go under lockdown, there are likely to be continued instances of viral “leakage”. This likelihood is enhanced by the disease’s inherent high transmissibility. Additional spread that creates new complexes is being considered an inevitability by governments around the world. The U.S. CDC, for example, has set clear expectations that the virus will appear there with community transmission. Scenarios to consider:

[BASE CASE SCENARIO] Continued spread within established complexes plus community transmission in new complexes drives ~0.3-0.7% reduction in 2020 global GDP growth

- **China continues on its path to recovery**, achieving a near-complete economic restart by mid-Q2
- **East Asia, Middle East, and Europe see continued case growth until early Q2.** This drives each region to go under various forms of lockdown (e.g., self-imposed, company-imposed, mandated by local governments), in an attempt to stop or slow down the spread. The lockdown drives a sharp reduction in demand, which in turn drives lower economic growth that lasts through Q2 and early Q3. Demand recovery depends on whether case growth reduces as a result of seasonality, or if fatality levels are low enough, where the general public resumes daily activities
- **Complexes that have not yet seen sustained case growth (e.g., Americas) see localized transmission.** Greater awareness of COVID-19, plus additional time to prepare, may help these complexes manage case growth. However, complexes with less robust health systems could see more general transmission, and bear the brunt of economic impact in early Q2
- **The impact on demand slows down growth of the global economy – between 1.8-2.2% instead of the 2.5% growth envisioned at the start of the year.** Sectors are impacted differently – certain sectors (e.g., aviation, tourism, hospitality) see lower demand for a longer duration. For others (e.g., consumer goods), demand is initially lower but expected to rebound quickly

[CONSERVATIVE SCENARIO] COVID-19 sees generalized, global spread through 2020, resulting in a demand shock that lasts for most of the year. In this scenario, the virus would not show significant seasonal effects, or result in far higher transmissibility (e.g., through asymptomatic transfer), before health systems can detect and react to it effectively at scale

Companies are still assessing the full impact of disruptions as COVID-19 continues to spread. Companies with strong, centralized procurement teams and good supplier relationships are feeling more confident in the visibility to their suppliers at risk (including tier 2/3+), but many companies are still grappling with their exposure in China and other transmission complexes. Given the relatively quick economic restart in China, many companies are focused more on temporary stabilization (e.g., parts rationalization, demand plan updates driving new production/ SKU plans, booking logistic capacity, other), rather than alternative suppliers outside China. Companies are, however, making strategic, longer-term moves that they were considering – with the COVID-19 outbreak as an accelerant

Given the rapid spread, companies could consider the following actions:

- **Protect employees:** Follow the most conservative guidelines among leading global and local health authorities (e.g., CDC, WHO). Communicate with employees frequently on decisions made, support any impacted employees per health guidance. Benchmark efforts in terms of workplace actions
- **Stand-up a cross-functional, global COVID-19 response team:** Designate lead at the C-suite/CEO-1 level. Appoint 5 workstreams focused on (a) employees, (b) financial stress-testing and contingency plan, (c) supply chain, (d) customers; and (e) other relevant constituencies
- **Protect customers:** Protect customers (e.g., no penalties for cancellations, waiving fees); preserve customer loyalty (e.g., premium discounts); pursue online strategy as means of outreach
- **Stress-test financials and liquidity, and create contingency plan:** Model cash flow, P&L, balance sheet in each scenario; identify input variable triggers that could drive significant liquidity events (incl. breach of covenants). Identify critical operations, employees. Create pragmatic, trigger-based contingency plans. Conduct table-top exercises with top team .
- **Maintain supply chain:** Define extent and timing of Tier 1 / 2+ exposure. Pursue immediate stabilization (e.g., critical parts rationing, pre-book freight capacity, plan for restart). Plan for how to manage a supply market with unusual spikes in demand, as supply comes back
- **Demonstrate purpose:** Support epidemic efforts where possible

COVID-19

Latest epidemiological information as of February 27, 2020

Impact to date¹

>82,000	Reported confirmed cases
2,800+	Deaths
47	Countries affected
~1/2	Proportion of affected countries with new cases in the last 7 days ⁴
18	Countries with any evidence of community transmission (Highest: China, S. Korea, Italy, Iran, Japan, Singapore)
8	Countries with more >50 reported cases
55%	New reported cases are in China in the last 7 days

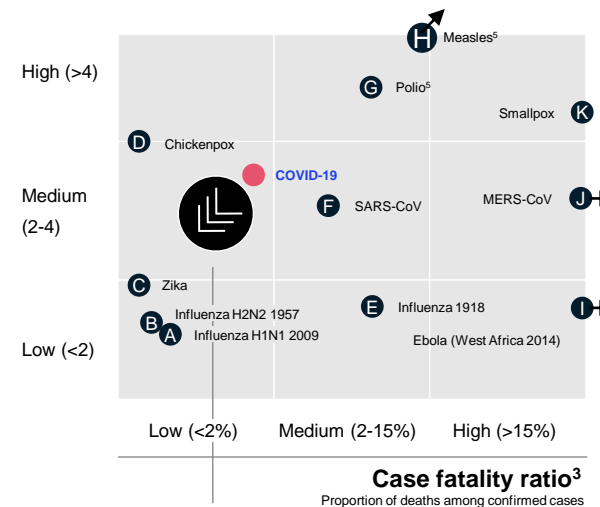
Features of disease to date

1.5-2x	Higher transmission compared to the flu ²
Up to 20%	Patients have severe disease
<1/40	Patients die; fatality rates are significantly lower outside Hubei

Comparison to other diseases

Reproduction number⁵

The average number of individuals infected from each infected individual



Identification of cases early in the disease (i.e., with fewer symptoms), **intensification of viral control methods**, and **deployment of treatments** (when available) will drive down the reproduction number and reduce case fatality

Global considerations

- Numbers of affected countries has risen significantly with >35 countries with new cases in the last 7 days
- Community transmission suspected in at least 18 countries, with >50 cases: South Korea, Japan, Singapore, and Italy – a number of cases are still under investigation to identify source of infection
- Oversight is intensifying in weaker health systems less capable of handling outbreak

China (outside Hubei)

- Daily incremental case count remains low for the last 7 days; <1 reported cases per million
- The number of confirmed cases reported is generally trending down

1. Latest numbers are available from a number of sources, including daily situation reports from the World Health Organization

2. Evidence on exact numbers are emerging, however expected to decrease as viral containment measures intensify and treatments are developed

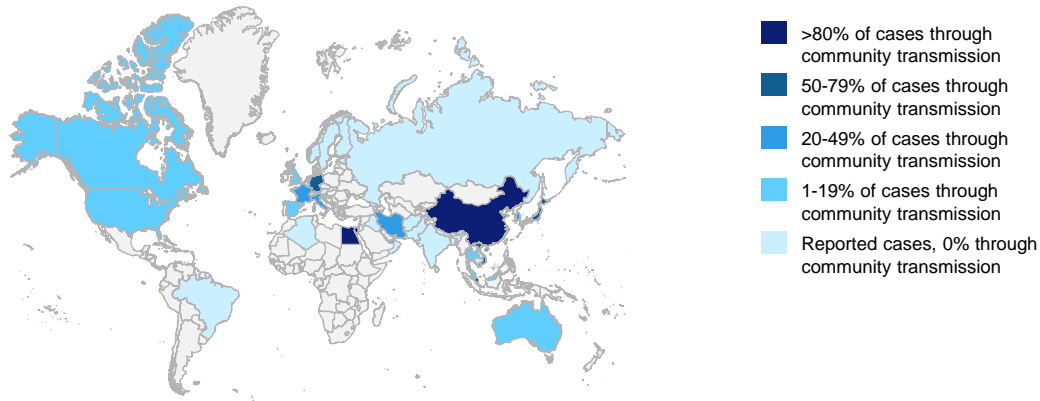
3. Case fatality numbers are reflective of the outbreak setting and depend on a number of factors, including patient's age, community immunity, health system capabilities, etc. This graphic aims to offer a broad comparison.

4. Excluding cruise ship

5. In outbreak setting or at the beginning of the introduction of a new disease

COVID-19 is spreading globally and governments are responding

A rising number of countries show evidence of community transmission¹



Governments worldwide are reacting with different measures

Selected measures along the global regions

East Asia

South Korea declared highest level threat "red alert", closed schools and created "rapid response teams" for cluster investigation

Middle East

Iran closed schools, universities and cultural centers

Several countries partially closed borders (e.g., Armenia, Afghanistan, Iraq, Turkey, Pakistan)

Africa

WHO helped to train >11,000 African health workers and shipped >30,000 sets of personal protective equipment

Europe

Italy signed an order issuing a ban to leave or access affected areas, suspension of demonstration and all kinds of events, suspension of childcare and school education and quarantine for people in contact

America

USA implemented mandatory quarantine, airport screenings, partial travel restriction, repatriation flights from areas with substantial COVID-19 transmissions and stocked up on masks; general public announcement made on need for preparedness

1. Corresponds to cases from reporting country not linked to Wuhan or travelers from Wuhan

As the situation is evolving, we are learning more about the disease – a number of unknowns remain

Disease characteristics

Reproduction number

- Reports from Cruise ship
- Calculations from academic publications (e.g., Nature, Imperial, NEJM, Lancet)

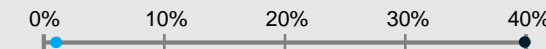


Implications

Transmissibility is expected to be less as outbreak evolves and cases are identified early (+/- treatments / vaccines emerge)

Asymptomatic infection rate

- Reports from Cruise ship
- Calculations from academic publications (e.g., Nature, Imperial, NEJM, Lancet)



High uncertainty surrounding asymptomatic infection rate due to missing data/evidence

High rates of asymptomatic infections warrants additional measures beyond traditional screening

Case fatality estimates¹

- Calculations for countries with >50 cases based on reported cases and deaths



Actual death ratio may be lower due to high number of unreported cases that are generally milder in symptoms

Correct number important to estimate severity of COVID-19

Influenced by patient characteristics, countries' preparedness and health system capacities

¹ This is not a standard epidemiological measure - it is meant to reflect some of the ongoing challenges in tracking the evolution of the disease; it does not correspond to Case fatality ratio, which requires better of understanding of number of cases at the time of infection vs. death;

Wuhan and Hubei continue to be deeply impacted...

The epicenter of the outbreak is facing emergency conditions and will need time to return to normalcy

Humanitarian toll and economic impacts are high

- ~59M** Individuals under quarantine
- 200+** New confirmed cases daily¹
- 1,700** Health worker infections
- March 10** Continued shutdown of businesses in Hubei province²

A large effort has been underway to regain control...³

- **46** designated hospitals
- **~20,000** beds devoted to virus care
- **Converted stadiums, office buildings, schools** providing additional beds
- **30,000+** medical staff from across China have come to Wuhan to provide support

...but Wuhan and Hubei will need time to return to normalcy

- **Infection rates remain high** – Hubei has had between 200-800 infections every day for the last 5 days – far higher than 50-100 for the rest of China combined
- **Fatality rates are more than 3 times higher in Hubei** relative to the rest of China – indicative of a stretched medical system and / or changing virus characteristics
- Once these measures are under control, Hubei will need time to **lift the quarantine, disinfect and restart safely**

1. Refers to reported cases using new confirmed case definition, including clinical feature and laboratory-confirmed, latest available information available from a number of sources
 2. As per Bloomberg, companies engaged in supply chain production
 3. Latest update from 2/27/2020

...but February 24th represented an inflection point for COVID-19

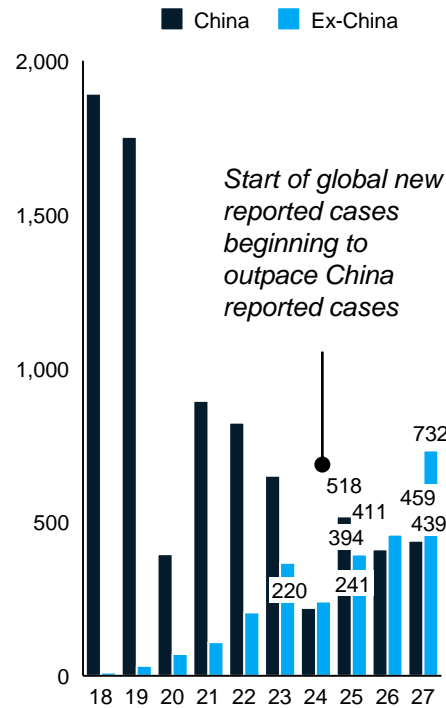
Whereas case growth will still fluctuate, outside China exceeded in-China cases for the first time

● Towns in quarantine ■ >250 reported cases ■ 100-249 reported cases ■ 50-99 reported cases ■ 10-49 reported cases ■ <10 reported cases ■ Reported cases, number unclear

Example of countries with confirmed community transmission¹

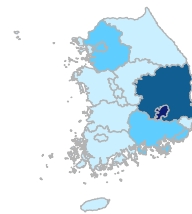
Daily incremental reported cases

Count



South Korea

The government raised COVID-19 alert to its 'highest' level as confirmed cases surpass 600



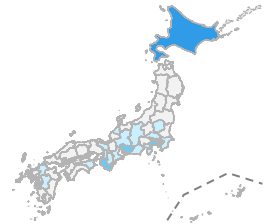
1766 Reported confirmed cases
1738 Reported cases in the last 14 days
13 Reported deaths

Measures implemented by the South Korean government

- Closure of schools
- Reduced travel operations
- Rapid response team for cluster investigation (e.g., linked to a religious group)

Japan

Japan is under pressure to act due to the upcoming Tokyo 2020 Summer Olympics



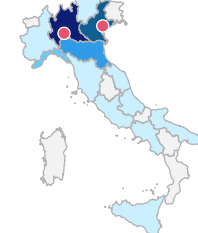
186 Reported confirmed cases
157 Reported cases in the last 14 days
3 Reported deaths

Measures implemented by the Japanese government

- Travel restrictions
- Postponing preparations for the Tokyo 2020 Summer Olympics (e.g., Volunteer training)

Italy

The number of cases in two northern regions is rising and several towns are under strict quarantine



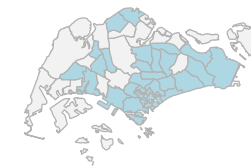
400 Reported confirmed cases
397 Reported cases in the last 14 days
12 Reported deaths

Measures implemented by the Italian government

- Schools and universities closed
- Public Events stopped (e.g., Venice carnival)
- Towns under full quarantine with curfew

Singapore

Singaporean Prime Minister Lee fears that the coronavirus could bring a recession



93 Reported confirmed cases
43 Reported cases in the last 14 days
0 Reported deaths

Measures implemented by the Singaporean government

- Travel restrictions (e.g., air borders closed with mainland China)
- School policies implemented (e.g., no assemblies)
- Policies to limit profiteering in place (e.g., price increase of surgical masks)

Iran

Iran health officials are working to identify source of outbreak and have asked for limits on mass gatherings in affected areas



141 Reported confirmed cases
141 Reported cases in the last 14 days
22 Reported deaths

Measures implemented by the Iranian government

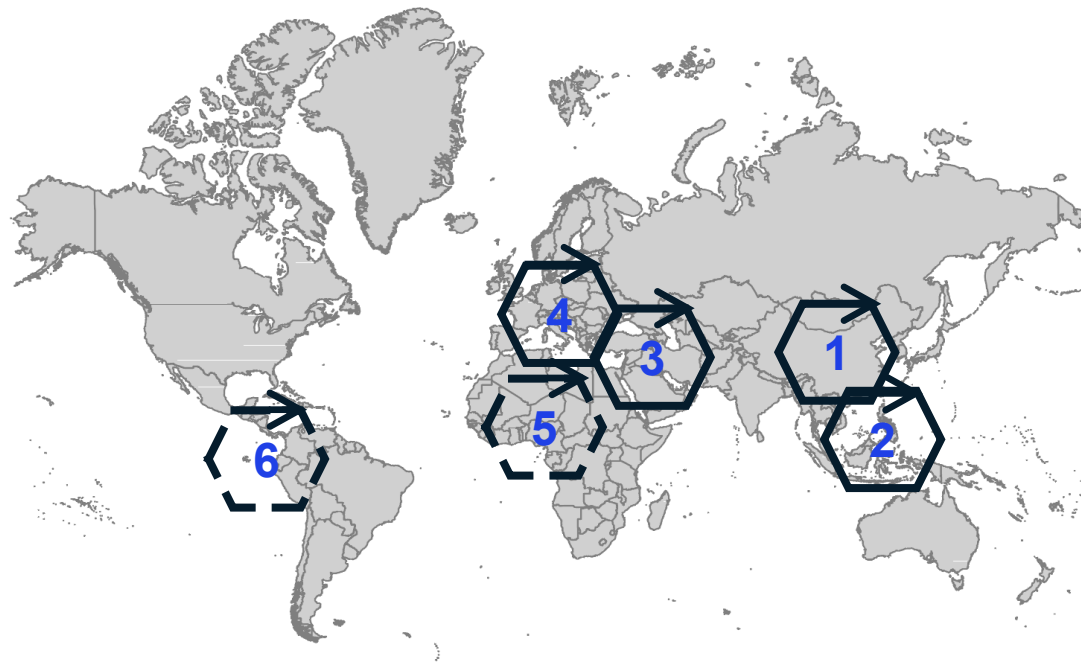
- Schools, universities and cultural centers closed
- Surrounding countries responded with border closure (e.g., Armenia, Afghanistan, Iraq)

1. Refers to sustained in-country transmission, not linked to epicenter of outbreak (Wuhan) or affected travelers from affected regions

There are now 4 established COVID-19 transmission complexes to monitor globally

A complex combines confirmed community transmission with tough-to-prevent people movement

Four complexes around the world where COVID-19 is now confirmed. Deep economic integration and regular human and material movements mean that it will be tough to limit virus propagation within these complexes



China complex: Mature propagation

Disease continues to impact Hubei, but stringent public health measures (and the ability to enforce them more comprehensively) has meant that cases in the rest of China are low (under 100 cases/ day), and trending down in spite of measured economic activity restart



East Asia complex: Early propagation

Multiple countries with strong health care systems are seeing sustained community propagation (South Korea, Japan, Singapore). Concerns around “case leakage” (i.e., lack of confidence that every possible transmission has been identified and is being treated) are persisting. While emergency measures are being placed, the ability of these countries to have a comprehensive quarantine is limited



Middle East complex: Early propagation

Iran is closely connected to its neighboring countries (e.g., Iraq, Syria, Afghanistan, Yemen) with frequent people and material movement across porous borders. Significant case count growth with new confirmed cases across many countries stemming from Iran



Western Europe: New propagation

Italy represents the first European case of sustained community transmission. While quarantine is being attempted across Northern Italy, new cases are emerging across Europe. Any sustained quarantine will prove challenging to execute. Effective clampdown on cross-border people movement is politically and economically difficult



Africa complex: No reported propagation

While we have no evidence that the virus is circulating in Africa, health experts globally continue to be concerned about the possibility of an outbreak on the continent, partially because travel hubs connecting into China (e.g., Addis Ababa) continue to operate throughout the period of propagation of the virus



America complex: No reported propagation

While the US documented their first case of community transmission in the last week, a number of 2nd generation cases have emerged in the Americas. Ability to contain these imported cases will determine activity of cluster over the next weeks.

COVID-19 propagating in countries that represent 32% of global GDP

Country ¹	GDP		Case counts
	\$Tn	% of global	
China	13.61	16.1	78,630
South Korea	1.62	1.9	1766
Italy	2.08	2.5	400
Japan	4.97	5.9	186
Singapore	0.36	0.4	93
Iran	0.45	0.5	141
Germany	3.95	4.7	21
Total	27.04	32	~82,000

Even limited propagation within the Europe complex (e.g., to France, Germany), and concern around “case leakage” could cause **large behavior changes by governments, firms, and individuals** (e.g., curtailment of travel)

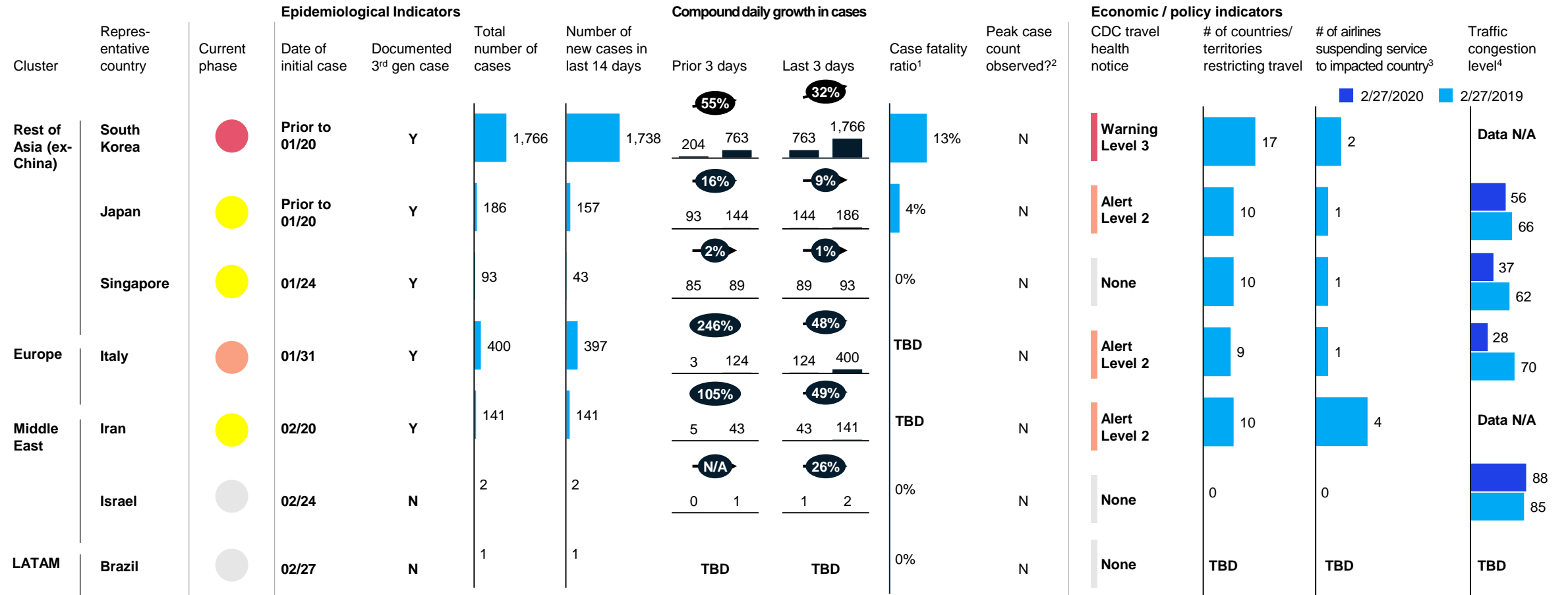
Regardless of the precise clinical situation, such actions could easily **drive a global economic impact that takes longer to recover from** relative to previous estimates

1. Defined as countries showing at least 10 cases of in-country transmission

COVID-19 Leading Indicator Dashboard

Propagation of COVID-19 across new transmission complexes

- **Pre-phase 1:** Small number of cases identified; no sustained community transmission
- **Phase 1:** Disease start and sustained community transmission
- **Phase 2:** Government action / shift in public behavior. Not all affected regions enter phase 2, but significant gov. intervention / economic impacts signal prolonged recovery
- **Phase 3:** Case growth / stretched health systems
- **Phase 4:** New case drop, activity resumption



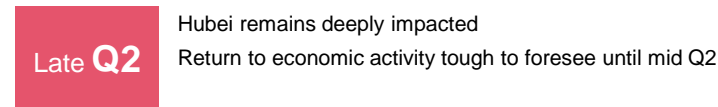
1. Calculated as Total Deaths / Total cases Today – 7 days; 2. Assessment based on observed stoppage in growth of cases and medical community's opinion validated by external sources; 3. Anecdotal reports of airline suspensions based on press searches; 4. Based on representative cities, Tokyo, Singapore, Milan, and Tel Aviv

COVID-19 Leading Indicator Dashboard – China-specific

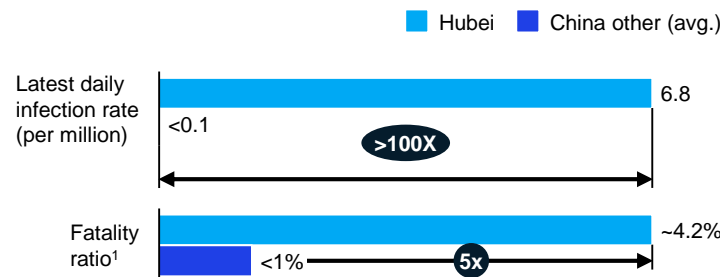
Currently tracking towards restart in China

Hubei impact

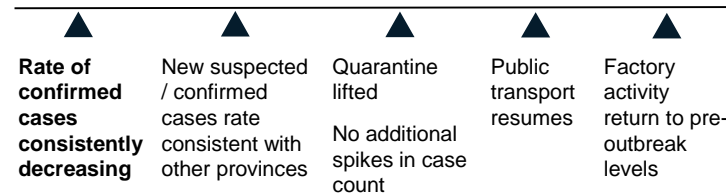
How deeply is Hubei (esp. Wuhan) impacted, and when could economic activity restart?



Hubei epidemiological status

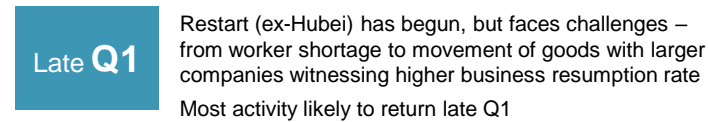


Hubei recovery milestones to watch

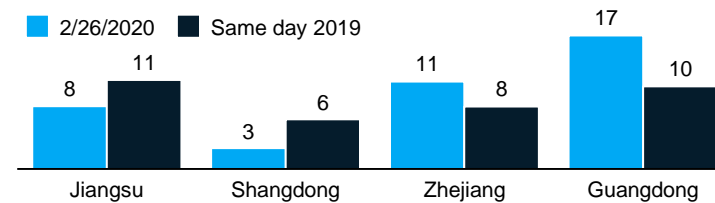


CN economic restart

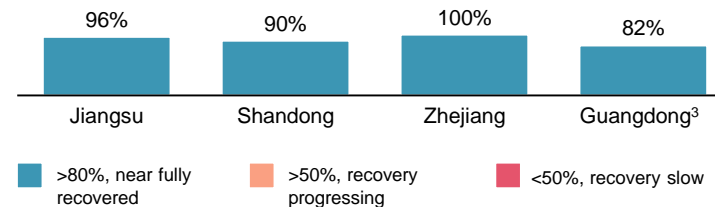
How quickly could economic activity restart in China (ex-Hubei)?



Labor availability (Inbound movement of population to major industrial provinces in China)²



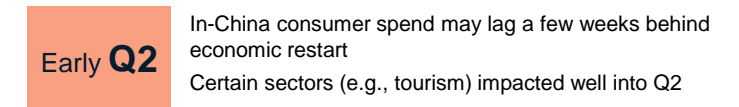
Resuming status of “Above Designated Size” industrial enterprises



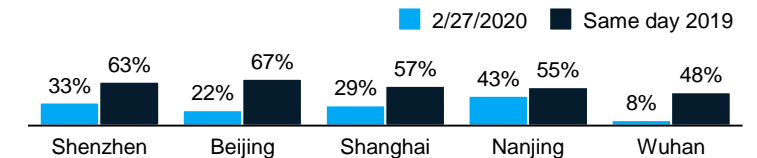
Small businesses are facing more challenges from labor disruption – fewer workers returning to work, per reports – % resumption significantly lower based on reports

CN consumer confidence

How quickly will Chinese consumer confidence and purchasing activity return?



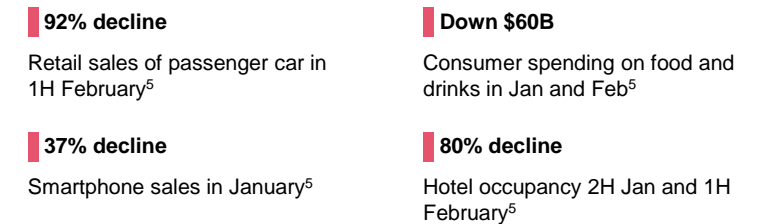
City congestion level in major cities in China⁴



Earliest school restarts in China at province level



Example consumer behavior metrics [anecdotal]



1. Total deaths / total cases t-7 days to account for lag in final outcome of disease; 2. Measures movement of population into destinations as of 2/26/2020; 3. Latest data from Guangdong as of 2/22, Shandong as of 2/23, Zhejiang as of 2/25, and Jiangsu as of 2/24; 4. Car traffic only. Congestion level measures % increase in travel time compared to free flow condition; 5. Year over year comparison

Three scenarios for how COVID-19 could evolve

Scenarios for stress testing and contingency planning – what you have to believe

Quick recovery

Late Q1

- **Ex-Hubei China** economic restart >80% relative to pre-outbreak levels, with large industrials leading while small-medium enterprises slower
- **Hubei** starts to return to normalcy in March; result of a large-scale health response having an effect
- **Community transmissions** in East Asia (South Korea, Japan, Singapore) and Europe (Italy, etc.) are brought under control

End Q2

- **Community transmissions** in Middle East are controlled
- **Consumer confidence** starts to return, even in setting of community transmissions, due to lower case fatality ratio, case growth slowdown, promising treatment options; consumer demand persists, especially in certain sectors (e.g., food, necessities via online channels)

Mid Q2

- **Cases peak** in multiple regions; evidence mounts that the virus is not resilient to seasonality
- **Aviation, tourism, hospitality** sectors back to normal as countries lift travel bans

Intra-complex transmission contained; economic impact mostly restricted to Q1

Global slowdown (BASE CASE)

Late Q1

- **Continued path to recovery in China. Ex-Hubei China** economic restart >80% relative to pre-outbreak levels, with large industrials leading while small-medium enterprises slower
- **Moderate decline in private consumption** and exports of services

Early Q2

- **China at near-complete economic restart by Q2. Hubei** is back to normalcy, a result of a large-scale health response and containment measures having an effect
- **East Asia, Middle East, and Europe** see continued case growth, contributing to perception of “leakage,” impacting economic growth in all three regions. Each goes into lockdown, either government, company, or self-imposed. Early Q2 is the first time they see a reduction in new cases in certain complexes. **Newer complexes** see localized transmission

Late Q2, Q3

- **Consumer confidence dampened through Q2 and potentially Q3.** Demand recovery depends on evolution of disease, considering potential impact of seasonality, fatality levels
- **Impact and recovery** differs by sector – e.g., aviation, tourism, hospitality sectors longer to rebound than consumer goods

Sustained intra-complex transmission. Global slowdown in 2020 – growth at 1.8-2.2%, down from 2.5% growth envisioned at beginning of year

Global pandemic and recession

Late Q1

- **Ex-Hubei China** economic restart >80% relative to pre-outbreak levels, with large industrials leading while small-medium enterprises slower

Early Q2

- **Hubei** starts to return to normalcy, a result of a large-scale health response and containment measures having an effect

Mid-late Q2

- **Generalized, global spread – East Asia, Middle East, and Europe** transmission complexes all see continued case growth until mid-Q2, potentially with less robust health / containment response; mid-to-late Q2 is the first time they see a reduction in new cases
- **COVID-19** resistant to seasonal effect, or results in higher transmissibility, before health systems can detect and react effectively at scale; continues to expand to other parts of the world

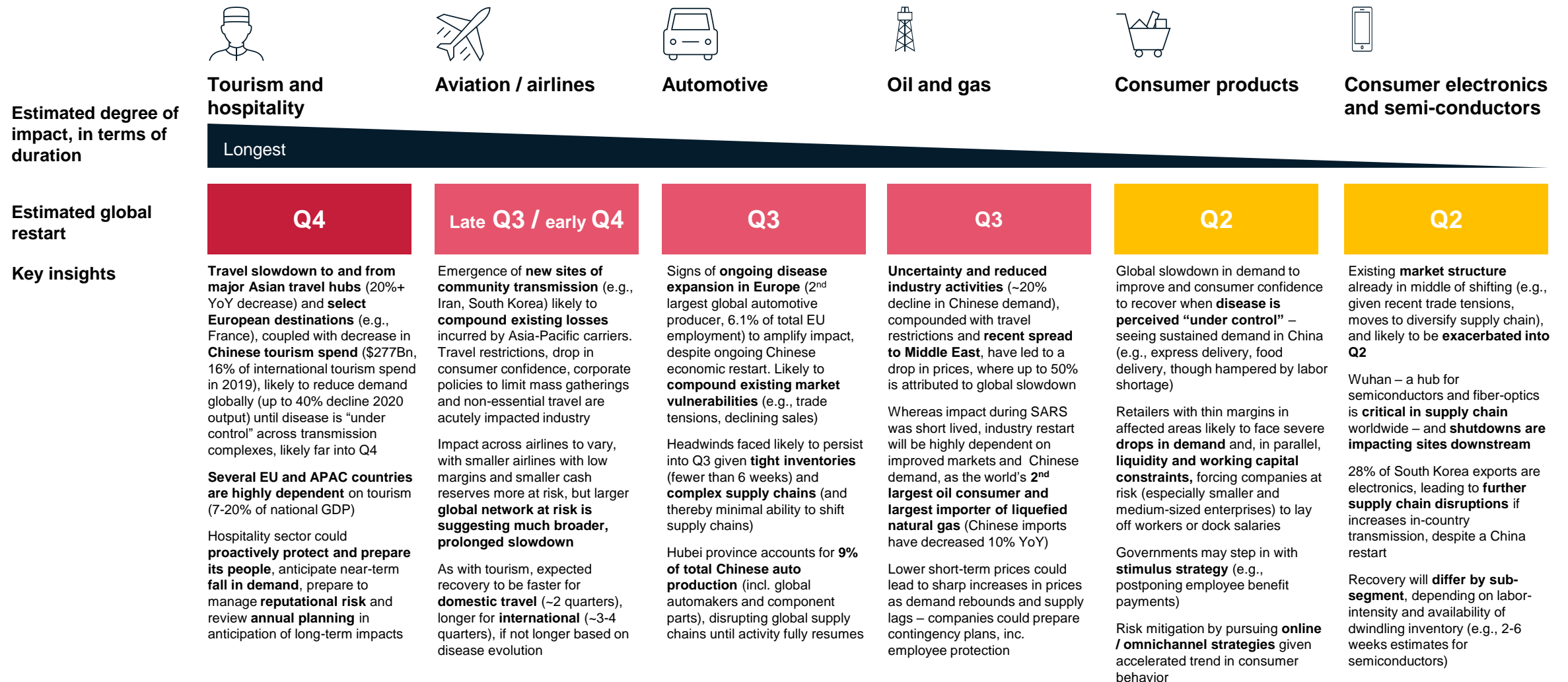
Q4

- **Substantial demand shock that lasts through bulk of year** – fall in private consumption, level of exports and services, financial market “contagion”
- **Consumer confidence** remains anemic, although certain sectors might recover earlier; air travel restrictions remain in place until late 2020

Transmission jumps, new complexes. Global pandemic drives a recession that lasts bulk of the year

All sectors are impacted, with several seeing more severe consequences through Q2 2020 through the rest of the year

Preliminary views based on base case – Subject to change as the COVID-19 outbreak evolves



Cross-sector impacts due to logistics challenges

COVID-19's impact on logistics have global repercussions that will likely persist through the end of the year

Overview

Global logistics market (transportation, inventory management, warehousing, order processing, and other supply chain activities) accounts for **~\$8-12Tn USD, representing ~12% of global GDP**

- Modes of **transportation** (road, rail, air, and sea freight) and represent **~\$4-5Tn**
- **Asia Pacific** constitutes largest component of global logistics (~45% market revenue)

Today, we are **more connected with and reliant on China** in trade than in 2003 (SARS). Global trade has increased from \$7.6Tn in 2003 to \$19.6Tn in 2019

Since the initial outbreak of COVID-19, **most logistics impact has been focused on China**. Demand pressures, along with supply chain challenges, have led to **decreasing exports** as China is slowly restarting economically. The logistics industry **faces a relative greater impact** since unutilized capacity is lost and more acutely affects logistics companies' bottom line. Many container shipping lines have cancelled services and are running fewer ships

Given spread of COVID-19 to new transmissions complexes to rest of Asia (see South Korea, Japan), the logistics impact on global scale will likely **persist for months longer** even as the sector recovers in China

Once logistics industry recovers, there may be **over-supply** (i.e., demand for logistics services) as other sectors recover. Logistics companies could consider a suite of actions to be **prioritize and create capacity** to accommodate, bouncing back quickly

Sector-specific considerations due to COVID-19 outbreak

COVID-19 has severely **impacted logistics sectors, increased the complexity** for logistics companies – for example, 51,000 companies worldwide have direct suppliers in the affected regions to date, over 8 post and parcel operators suspended services to China alone. Shipping operators are running losses due to lost revenue with significant unused capacity due to pre-bookings



Global maritime shipping volumes have **decreased** heavily from recent COVID-19 outbreak

- **46%** of scheduled departures on a major Asia to Europe route had been cancelled in the past four weeks as of Feb 20
- **80%** of world goods trade by volume is carried by sea. The **9 busiest container ports** in the world are in China (7), Singapore (1), and S. Korea (1)
- COVID-19 has led to **1.7M TEA** lost in global container business as of Feb 23, **equal to 1% of total global volume** in 2019; global container volumes grew 0.7% in 2019, meaning the **impact of COVID-19 on volumes** has more than **erased the full global growth seen in 2019**
- This has resulted in **~350M USD** loss in revenue per week

General changes in policy have also occurred, with providers enacting stricter cancellation policies, and not accepting less than truckload (LTL) shipments – only offering full container capacity



Global air freight has experienced **decreased capacity** driven by reduction in passenger belly capacity and **increased rates** due stemming from overdemand

- Passenger bellies represent **~45%** of all the capacity in and out of China; **decreases in belly-hold** from flight reductions (global air traffic estimated to have a **~5%** reduction in 2020 due to COVID-19 with **70+ airlines** reducing number of flights), has resulted in moderate increases in rates
 - TAC index rates from Shanghai to Europe have increased by **9%** from just before the Lunar New Year.
- Flight restrictions have led to **pre-booked or over booked orders which operators can't fulfill**; especially with uncertainty around how to fulfill demand when it opens back up (e.g., air travel to and from China has been made **optional with pilot unions** by two major international logistical carriers, UPS and FedEx
- There has been an **increased demand for air for urgent goods** (e.g., medical supplies to support the crisis) and an increase from shippers less willing to bear delays **due to strained supply chains from the prolonged shutdown**.
- The need to ramp up stock levels and given the disruptions to other modes of transport air freight rates have risen as a result. Disruptions expected through at **least March**.



Land transport velocity has slowed down locally, in part due to both inbound and outbound volume reductions and labor shortages; this slowdown is expected to ripple globally in the next weeks and months

- Truckers and train drivers are experiencing additional restrictions and regulations by different provinces; limiting transport and leading to a shortage of drivers. **<50%** trucking staff on duty in China and trucking companies have **stopped accepting new business** due to labor shortage; truck availability is as low as **10-20%** in certain Chinese regions)
- The slow down is causing **overstocking in a number of ports**, including Shanghai, Ningbo, and Xingan
- **Rail freight** has seen **less disruption** to date, and there has been an increased dependency on rail for long-distance transportation, provided the shipments can be transported to the nearest rail platforms that have train departures
- While there has been an increased demand for rail, **capacity is scarce**, and **first/last mile remains a constraint** due to driver labor shortages

Looking forward

COVID-19 impact on global logistics will take an **extended period of time to correct**; ramp-up time for logistics is likely to be slower than other industries

- Normal logistics operations not likely to return until April in China, provided the viral spread declines by then
- In China, freight pick-up has restarted but reports indicate wait times of 10+ days to get out of China and surcharges to get product into China

Non-Chinese ports have not yet reported falling throughput volumes, but this may change in the next few weeks, as ships from Asia may not arrive with containers from China

Inbound container volumes at U.S. seaports projected to be down 12.9% in February from 2019 and down 9.5% in March from 2019

Tech hardware companies are shipping products to **alternative production** sites (e.g., shipping parts to Vietnam via air and sea)

Some airlines have started to use **passenger aircraft** for cargo as a **temporary** means to **mitigate shortage** in belly-hold capacity

To date, the UIRR anticipates **intermodal transport** to and from **Northern Italy** will continue as normal; however **road transport** is expected to experience limitations

What logistics companies should do:

- **Work with customers to identify and understand:** key constraints that will affect planned volume work, changes in demand capacity based on operational and strategic needs
- **Be able to predict when and where capacity will be needed and allocate resources rapidly** to accommodate situational changes; consider how to create extra, surge capacity to handle uptick in demand as other sectors recover

Actions to consider in response to COVID-19

Checklist for COVID-19 planning actions

Protect employees

- Follow the most conservative guidelines available among leading global and local health authorities (e.g., CDC, WHO)
- Communicate with employees frequently and with the right specificity; support any impacted employees per health guidance
- Benchmark efforts (e.g., certain companies curbing non-essential travel to all countries with community transmission)

Stand-up a cross-functional COVID-19 response team

- Designate overall at the C-suite/CEO-1 level; team should be cross-functional and fully dedicated
- Appoint 5 workstreams: a) employees, b) financial stress-testing and contingency plan, c) supply chain, d) marketing and sales e) other relevant constituencies
- Define specific, rolling 48-hour, 1-week goals for each workstream based on planning scenario
- Ensure a simple but well managed operating cadence and discipline. Output and decision focused. Low tolerance for “meetings for the sake of meetings”
- Deliver minimum viable products: a) Rolling 6-week calendar of milestones; b) 1-page plans for each workstream; c) dashboard of progress and triggers; d) threat map

Workstream based goals (other than employees)

Financial stress-testing and contingency plan

- Define scenarios that are tailored to the company – including global slowdown over multiple durations; identify baseline planning scenario
- Identify variables that will impact revenue and cost. For each scenario, define input numbers for each variable through analytics and expert input
- Model cash flow, P&L, balance sheet in each scenario; identify input variable triggers that could drive significant liquidity events (incl. breach of covenants)
- Identify trigger-based moves to stabilize organization in each scenario (A/P, A/R optimization; cost reduction; portfolio optimization through divestments, M&A)

Customer care

- Protect customers (e.g., no penalties for cancellations, waiving fees, flexible booking models)
- Preserve customer loyalty (e.g., premium discounts, loyalty packages)

Supply Chain (deep dive on following page)

- Define extent and timing of exposure to areas that are experiencing community transmission (Tier 1, 2, 3 suppliers; inventory levels)
- Immediate stabilization (critical parts rationing, optimize alternatives, pre-book rail/ air freight capacity, after-sales stock as bridge, increase priority in supplier production, support supplier restart)
- Medium/ longer-term stabilization (updated demand planning and network optimization – solve for cash, accelerated qualification for alternative suppliers, drive resilience in supply chain)

Marketing and Sales

- Immediate stabilization (inventory planning, near-term pricing changes, discounts)
- Medium/ longer-term stabilization (investment and micro-targeting for priority segments with long-term growth)
- Examine online vs branch strategy (e.g., in China now, no footfall traffic in major metropolitan areas but significant online demand; investing much more in digital)

Practice plan with top team through in-depth table-top exercise.

- Define activation protocol for different phases of response (e.g., contingency planning only, full-scale response, other)
- Key considerations: Clarity on decision owner (ideally a single leader), roles for each top team member, “elephant in room” that may slow response, actions and investment needed to carry out plan

Demonstrate purpose

- Support epidemic efforts where possible

Supply chain actions to consider in response to COVID-19

Immediate (2-4 weeks)

Understand exposure

1. **Determine truly critical components** and understand risks of tier 1 to tier 2 suppliers onwards
2. **Define current inventory buffer** and locations¹
3. **Identify origin of supply** (i.e., Hubei/ Wuhan) to identify severity of risk
4. **Conduct scenario planning** to understand financial and operational **implications in prolonged shutdown** (scenarios 2 and 3)
5. **Work with S&OP to get 3-6 month accurate demand signal** segmenting likely to be impacted demand to **determine required supply**

Take action to address anticipated shortages

6. **Look to ramp up now on alternative sources** if supplies are in Hubei and accelerate exploration of additional options
7. **Change mode of transportation** to reduce replenishment lead-time and **pre-book air freight² / rail capacity** as required by current exposure
8. **Optimize limited production** determining highest margin and highest opportunity cost / penalty production
9. **Collaborate** with all parties to **jointly leverage freight capacity, new/alternate supply** sources, etc.
10. **Watch for extending lead times** to gauge performance and capacity against supplier promises
11. **Use after sales stock as bridge** to keep production running

Ensure resources required to restart

12. **Work with supplier to source personal protective equipment for production lines** operating in affected markets (e.g., glasses, gloves and masks)
13. Engage with crisis communication teams to **clearly communicate to employees** on infection risk concerns (e.g., disseminate facts about virus from credible source) and work from home options
14. **Consider short-term stabilization for suppliers** (e.g., low-interest loan) to allow for a faster restart

Understand additional options

15. **Determine what portion of supply can be swung to another site** if shutdown persists **based on sourcing strategy** (single, dual, multi)
16. **Identify ways to expedite qualification process** and/or insource
17. **Determine possible geographies and supplier shortlists** in case alternate supply is required

1. Buffer stock from Chinese New Year may provide a cushion and potential false sense of security. Impact likely to be felt first in JIT supply chains (e.g., automotive).
2. Given costs, airfreight might not be an option for many industries; availability is already limited



Mid-term (2-4months)

Continuously improve material supply stability

Evaluating **alternative sourcing options for all the materials impacted** – availability of suppliers, additional cost due to logistics, tariffs, estimate of price increase of the components

Enhance the **demand verification process** to correct inflated demand to mitigate the bullwhip effect

Provide continuous **support the mid-small size tier 2-3 suppliers** in financial troubles

Assess **regional risks** for current and backup suppliers

Kick off designing resilient supply chain for the future

Establish a **supply chain risk function**
Digitalize process and tools to integrate demand, supply, and capacity planning

Trigger the new supply network **design for resilience**

Codify the processes and tools created during the crisis management as formal documentation

Convert war room into a **reliable risk management process**

Build collaborative relationship w/ ext. partners

Work with government to explore **potential tax benefits**

Actively engage investors and other stakeholders to build transparency on the situation and get help