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COVID-19: Briefing Note

Global Health & Crisis Response Updated: March 16, 2020

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COVID-19 is, first and foremost, a global humanitarian challenge. Thousands of health professionals are heroically battling the virus, putting their own lives at risk. Governments and industry are working together to understand and address the challenge, support victims and their families and communities, and search for treatments and a vaccine.

Companies around the world need to act promptly. This document is meant to help senior leaders understand the COVID-19 situation and how it may unfold, and take steps to protect their employees, customers, supply chains and financial results.

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Executive summary

The situation now

COVID-19 has seen a consistent case decline in countries that had experienced rapid case growth early (esp. China, South Korea)

However, cases outside of Asia are growing dramatically, driven primarily by complexes in Europe and the Middle East. The United States, while it has confirmed only a limited number of new cases, appears to be set for a large increase in cases once testing kits become widely available

Possible future scenarios

Delayed Recovery: The virus continues to spread across the Middle East, Europe and US until mid Q2 2020, when virus seasonality combined with a stronger public health response drives case load reduction

Prolonged Contraction: The virus spreads globally without a seasonal decline, creating a demand shock that lasts until Q2 2021. Health systems are overwhelmed in many countries, especially the poorest, with largescale human and economic impact

Actions for companies to consider

A central, cross-functional Nerve Center can coordinate efforts to:

- Protect employees and give them a strong sense of shared purpose
- Stress-test financials
- Stabilize the supply chain
- Engage customers

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COVID-19 The situation now

Possible future scenarios Actions for companies to consider Leading indicator dashboards

COVID-19 appears to be more dangerous than the flu

Latest as of March 15, 2020

Features of the disease to date¹

1.5-2x

Higher reproduction than the flu

Up to 20%

Of cases have a severe/critical form of the disease⁶

~0.9%

Case Fatality Ratio in South Korea after widespread testing. CFR appears higher where cases are missed and is higher when health systems are overwhelmed²

Comparison to other diseases⁵

Early identification of the disease, intensification of viral control, and treatment, when available, will reduce reproduction number and case fatality



^{1.} Evidence on exact numbers are emerging, however expected to decrease as viral containment measures intensify and treatments are developed

- 3. In outbreak setting or the introduction of a new disease
- 4. Case Fatality numbers reflect outbreak settings and factors such as the patient's age, community immunity and health system capabilities
- 5. Estimates are very context and time specific, however are provided from prior outbreaks based on academic lit review
- 6. WHO estimates 15% severe and 5% critical

Sources: World Health Organization, CDC, Nature, The Lancet, PLOS One The Journal of Infectious Diseases, BMC Infectious Di seases, Infectious Disease Modelling, news reports

^{2.} WHO estimates the global average CFR at 3.4%, dependent on conditions such as patient age, community immunity, and health system capabilities. Latest case fatality ratios were calculated as death/ cases

The global spread is accelerating with more reports of local transmission

Latest as of March 15, 2020

1. Previously counted only countries; now aligned with new WHO reports; excluding cruise ship;

2. Previously noted as community transmission in McKinsey documents; now aligned with WHO definition

Sources: World Health Organization, CDC, news reports

Impact to date	>153,000	>5,700			
	Reported confirmed cases	Deaths			
>140	>80	~40			
Countries or territories with reported cases ¹	Countries or territories with evidence of local transmission ²	Countries or territories with more than 100 reported cases ¹			
<1%	~75%	>40			
China's share of new reported cases March 9 th -15 th	New reported cases on March 9-15 th from Europe	New countries with cases March 9 th -15 th			

The virus is located in 5 major "transmission complexes"

A complex is an area with confirmed local transmission, and more than 100 confirmed cases, where it is difficult to prevent people's movement





1. WHO data is lagging behind news reports for United States. In United States, CDC & WHO reports >1,600 cases; New York Times reports >3,600 cases

2. Includes Western Pacific and South-East Asia WHO regions; excludes China; Note that South Korea incremental cases are declining, however other countries are increasing 3. Eastern-Mediterranean WHO region

Total deaths >110

Progression varies widely among countries

Country			Stat	us	Recent Actions		
China				New cases at low levels	Strict containment and quarantine		
> 91 000	> 2 200	1 00/		throughout China	Significant testing at facilities and in Hubei		
>81,000 Cases	>),200 Deaths	~4.0% Case Fatality ²			Construction of makeshift hospitals to increase capacity		
South Korea				New cases declined ~75% in the last week with potential	Significant preparedness & rapid regulatory approval process for tests		
>8,100	>70	$\sim 0.9\%$	decline or plateau ¹ Rapid roll-out of diagnostics (e.g., diagno through)				
Cases	Deatils	Case Falanty-			Hospitalization available for lower-severity cases & significant hospital coordination		
Italy				~3,500 new cases on March	Efforts initially focused on Northern Italy, but efforts		
>21 100	>1,400 Deaths	~6.8%		15^{tn} – the highest in the	cancellations of larger gatherings		
Cases		Case Fatality ²		~180% increase in the	Healthcare recruiting efforts due to strain		
				last week ¹	Schools closed nationwide		
US ³				US cases are increasing daily,	A national emergency was declared on March 13 with Congress aiming to provide testing free of charge		
>1 600	>40	~2 1%		however official reporting	>29 states have declared emergency with a range of		
Cases	Deaths	aths Case Fatality ²		may be lagging'	actions including school closures, bans on large gatherings and large-scale testing plans		

1. Number of new confirmed cases on March 15th compared to March 8th

2. Case Fatality calculated as (total deaths) / (total cases) – this rate is evolving and dependent upon several factors, including number of suspected cases that are tested

3. WHO data is lagging behind news reports for United States; In United States, CDC & WHO reports >1,600 cases; New York Times reports >3,600 cases

Source: WHO situation reports, US CDC, press search

Overall, ~20% of cases are estimated to be severe/critical, requiring significant health capacity for testing and critical-care infrastructure

Context

WHO estimates ~20% of COVID-19 cases are severe (requiring oxygen) or critical (requiring ventilation)

This reflects a higher level of severity compared to influenza for instance

At a country level, mild cases may go undiagnosed

WHO estimated global distribution by severity of symptoms



Higher severity has potential to overwhelm hospital systems given that these cases may require treatment

People 50+ in age are ~40-76% of diagnosed cases

As of data from February 11, 2020, in China and as of March 16 and 15, 2020, in South Korea and Italy, respectively



1. Italy reports age segments slightly differently than South Korea and China thus categories are rounded

2. Note - Data reported from ISS March 15 reports 7.2%, however latest deaths/ cases from WHO indicates this may be higher

3. Note: Data reported from China February 11 reports 2.3%, however, latest deaths/cases from WHO indicate this may be higher

Case fatality rate data from three countries shows that older populations are at greater risk overall

Data as of February 11 in China, 2020, and as of March 16 and 15, 2020, in South Korea and Italy, respectively



1. Note - data reported from China Feb 11 reports 2.3%, however latest deaths/cases from WHO indicate this may be higher

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Scenario overview



The situation now

COVID-19 has seen a consistent case decline in countries that had experienced rapid case growth early (esp China, South Korea)

However, cases outside of Asia are growing dramatically, driven primarily by complexes in Europe and the Middle East. The United States, while it has confirmed only a limited number of new cases, may experience a large increase in cases once testing kits become widely available



Epidemiological scenarios

Delayed Recovery

China and East Asian countries continue their current recovery and control the virus by late Q1 or early Q2 2020

European and US case count growth rises rapidly through mid-April



Economic impacts

China and East Asian countries start recovery but supply chains remain impaired

US and Europe large-scale quarantines, travel restrictions, and social distancing drive drop-off in consumer spending and business investment in 2020

Prolonged Contraction

China and East Asian countries face a surge of re-infection as they attempt to restart economic activity

The virus is not seasonal with a mutated virus resurging in the fall of 2020

China and East Asia experience doubledip slowdowns as economic recovery is derailed in 2020 and pushed into Q1 2021

The United States and Europe experience demand-side reductions in consumer and business spending and deep recessions in 2020





Epidemiological scenario

European and US case-count growth rises rapidly through mid-April

Tests available, and extent of cases fully discovered by mid-April; More aggressive shutdowns and social distancing slows spread

New case counts peak by end April and decline by June with stronger public-health response and seasonality of virus

Fall 2020 sees a resurgence of the virus. Although countries have better public-health preparedness globally

Iran continues to be the epicenter in Middle East; Southeast and South Asia, Africa, and Latin America are spared worst effects due to their warm climates and young demographics

China and East Asian countries continue their current recovery and control the virus by late Q1 or early Q2 2020

Economic impacts

China and East Asian countries start recovery but supply chains remain impaired in much of Q2 2020 and consumer spending subdued

In the United States and Europe, large-scale quarantines, travel restrictions, and social distancing drive drop-off in consumer spending and subsequently, business investment in 2020

- Layoffs drive unemployment rates higher
- Corporate bankruptcies spike, putting pressure on the banking/financial system
- Monetary easing has limited impact with already low rates and fiscal responses prove insufficient and poorly timed
- Self-reinforcing recession dynamics extend GDP declines through Q3; recovery begins in Q4

2020 Global GDP growth falls sharply, driven by recessions in the United States and Europe and slower growth in China and other Asian countries.

Delayed recovery

The virus continues to spread across the Middle East, Europe, and the United States until mid-Q2, when virus seasonality combined with a stronger publichealth response drives case-load reduction





Epidemiological scenario

European and US public-health measures deliver initial containment of the virus only by early June

The virus does not prove to be seasonal with a mutated virus resurging in the fall of 2020, leading to a spike in cases across geographies throughout Q2

Restrictions on travel and quarantines in the United States, Europe, China, and East Asia are tightened further in an attempt to stem the tide

Iran continues to be the epicenter in Middle East; Southeast and South Asia, Africa, and Latin America are spared worst effects due to their warm climates and young demographics

China and East Asian countries face a surge of re-infection as a result of attempt to restart economic activity

Economic impacts

China and East Asia experience double-dip slowdowns as economic recovery is derailed in 2020 and pushed into Q1 2021

The United States and Europe experience demand-side reductions in consumer and business spending and deep recessions in 2020

- Layoffs and bankruptcies in the most affected sectors rise sharply throughout 2020, feeding into a self-reinforcing downward spiral
- Financial system distress is significant but a full-scale banking crisis is averted due to better capitalization of banks and new macro-prudential supervision in place
- Fiscal and monetary policy responses prove insufficient to break the headwinds

The global economic impact is severe, with significant GDP contraction in most major economies in 2020 and a slow-moving recovery beginning in only Q2 2021

Prolonged contraction

The virus spreads globally without a seasonal decline, creating a demand shock that lasts until Q2 2021. Health systems are overwhelmed in many countries, especially the poorest, with large-scale human and economic impact

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Possible future scenarios Actions for companies to consider Leading indicator dashboards

A crisis nerve center can play an important role in planning and managing COVID-19 responses

Crisis nerve centers can help in situations with **three determining features**:

- A disruption or crisis requires immediate attention. It may have arrived or be imminent
- The situation is novel due to the nature or scale of the threat, which distinguishes it from a "routine emergency"
- The disruption is unfolding faster than the organization can understand or interpret using the usual approaches, such as an extensive strategic study

COVID-19 fits these criteria, so a nerve center may help companies quickly assess the situation and consider and choose plans of action, and execute those plans. When setting up a nerve center, consider four key actions:

- Discover an accurate view of the situation through multisource "listening posts," assess how it might evolve, and derive implications for the organization
- Design a trigger-based portfolio of actions immediate and strategic—with a pragmatic operating model to develop detailed plans and act on them
- Decide on strategic actions quickly after stresstesting of hypotheses and alternatives, ensuring adherence to company and societal values
- Deliver in a disciplined, efficient way, keeping sufficient flexibility to adapt to the changing landscape

See next slides

Example COVID-19 Response Structure: 5 teams, 18 workstreams

Based on discussions with risk and health professionals and more than 200 companies across sectors

COVID-19

Integrated

Nerve

Center

	1	Policy & Management	Portfolio of policies and actions incl. prevention and incident response
	2	Two Way Communication	Multi-channel communications Confidential reporting mechanisms Source of truth
A Workforce	3	Personnel & contractors	Tiering (all/some/no WFH) Infra setup (VPN, laptops, desktops) Broadband availability
•	4	Facility & On-site norms	Staggering work shifts/times Prevention (e.g., Social distancing) Closures
	5	Health & Govt engagement	Local & federal regulators and public health officials
	1	Supplier engagement	Cross-tier risk transparency Supplier restart Order mgmt. New supplier qualifications
	2	Inventory management	Critical part identification Parts rationing Location optimization
B Supply Chain Stabilization	3	Production & Operations	Operational impact assessment Production capacity optimization
	4	Demand management	S&OP SKU-level demand signal estimates by macro scenario Production and sourcing plan
	5	Logistics	Ports Logistics capacity pre-booking Route optimization
	1	B2B transparency	Comms to B2B customers (e.g., microsite) Scenario-based risk comms
C Customer engagement	2	Customer protection	Prevention interventions across customer journey Cust. team training Execution monitoring
	3	Customer outreach	Customer comms re: COVID-practices Fact-based reports on issues Situation comms
➡ Stress-test	1	Scenario definition	Relevant scenarios based on latest epidemiological & economic outlook
D financials	2	Financial stress tests	Financials in different scenarios, especially working capital requirements
	1	Issue map & management	Single source of truth for issue resolution & tapping surge resources where needed
E Operate	2	Portfolio of actions	Trigger-based portfolio of actions (across all workstreams above)
	3	Leadership alignment	Align leaders on scenarios Roundtable exercises

Example Nerve center for a pandemic response

<Real sanitized example>



1. Includes procurement, supply chain, and logistics

A: Organizations should consider how to protect their workforce

Overall policies should consider safety first, especially for high risk individuals, as well as how to maintain business operations

These should be in-line with local health authority guidance and regulatory requirements

Checklist o	f things to	consider
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I. Policy & Management	1. Develop policies , which adhere to public-health recommendations and workplace laws, including those on sick leave, as well as business priorities/continuity
	 Set policies for remote working and who can access the workplace at what times (eg, staggering shifts, business-critical employees on site only)
	3. Set sign-off processes for policy changes
II. Two-way	1. Select communication channels and set protocols to communicate early and often
Communication	2. Develop approach for cascaded communications to provide clarity and direction
	3. Establish two-way communication and confidential reporting for employees
	4. Use official authorities for information (eg, WHO and CDC)
III. Personnel	1. Identify and tier critical functions and roles, including back-office functions
& contractors	2. Assess infrastructure needs for remote working or other flexible models (eg, VPN, broadband, laptops, remote desktop, etc.); consider piloting/testing system first to learn and adapt (eg, everyone on multiday pilot, remote desktop trials with subset of employees)
	 Adapt reporting and sign-off processes to reduce loss of productivity (eg, devolved responsibility); consider training managers on how to manage remotely
	4. Agree on adaptations required for collective bargaining units (eg, unions, int'l work councils)
	5. Agree on policies and incentives with contractors
IV. Workplace &	1. Implement physical mechanisms to reduce transmission (eg, cleaning, staggering shifts)
norms	2. Communicate with site leaders/N-1 leaders to clarify accountability and authority (eg, WFH)— err on side of agile and localized decision-making
	3. Define contingency plans for workplace closures (eg, seating capacity in other buildings)
V. Health	1. Engage with health officials to assess risk and response
and Government engagement	2. Collaborate with healthcare providers and payors to access appropriate care for individuals (eg, health-plan hotline)
	 Collaborate with appropriate government officials and other regulatory bodies to inform and implement policies
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A: Across these areas organizations are taking a range of actions **Examples of actions**

	Basic	Moderate (includes Basic)	Extensive (includes Basic and Moderate)		
I. Policies &	Remind employees of sick policy and adapt as needed	Expand sick-leave policy and primary caregiver policy	Quarantine affected employees including C-suite leadership		
Vanagement	Circulate guidelines for employees who recently travelled to high -risk areas or display symptoms	Restrict non-essential travel as well large gatherings	Develop specific policies limiting gatherings to X number of		
	Choose a lead and set a process to review policies	Prepare detailed guidance for functions on regulatory requirements	people		
	Ask all locations to assess their risk and define potential actions	Develop C-1 and C-2 contingency plans	Collaborate with industry colleagues to share best practices		
. Two-way	Publish communications (regularly and in response to major events)	Provide real-time communication channels, nurse hot-line, and ombudeman support	Cascade communications via site leaders/regional leaders Org	gani	
Communication	and travel, and resources on hygiene and health; assign multidisciplinary comms. leads to control messaging across functions	Develop confidential and compliant self-reporting mechanisms	Develop a global central intranet page with updated policies and information, automatic alerts from key sources, guidance by region (linked to country guidance)		
	Post hand-washing instructions and other hygiene resources in visible locations such as bathrooms	Provide regular updates from C -level or N-1 executives	Provided information not only to employees and caregivers/family members on cases (while maintaining confidentiality and in-line with authorities)	idelii tablis	
II. Personnel	Provide work-from-home options and infrastructure where feasible	Encourage all non - direct labor to work remotely	Enforce work from home for affected offices or functions	tions	
	Send tips on remote working	Install VPN for employees; provide devices where needed	Add redundancies for all critical enablers for remote	rick	
	Collaborate with contractors on planning for outbreak	Stagger work schedules to reduce crowding	working (eg additional telecom subscription or laptops)	uotic	
	Provide personal protective gear for select frontline workers where appropriate (eg, healthcare professionals)	Ensure sick leave is understood by all employees including contractors	Develop tools to allow traveling/remote employees to assess risk and obtain guidance for specific territories CON	nsult	
		Develop contingency plans for all middle/back offices	Provide guidance on productivity during WFH for field staff for when they cannot conduct visits (eg, trainings)	alth	
/. Workplace	Identify and reduce risk factors for transmission (eg shared tools)	Implement shifts to reduce overcrowding	Temporarily close offices in highly affected areas	otess	
& norms	Sanitize common areas and workspace more frequently	Restrict factory floor access; Restrict HQ access in	Provide on-site health personnel to provide information and Mu	ultiple	
	Provide hygiene supplies in key areas and encourage handwashing	affected area to outside visitors	answer questions and offer health checks at facilities gui	ideli	
	Limit cafeteria-style food and communal snacks	Divide production facilities by splitting critical workforce across different locations, sealing areas and doing	Convert fingerprint access to retinal access to reduce pro	ovide	
	Increase ventilation by opening windows and ensuring filters are replaced where needed	handovers without physical contact	the	e WH	
	Encouraged non-handshake greetings & social distancing	conference rooms	CD		
	Limit meeting sizes/conduct virtual meetings	Develop manager accountability and plan for staffing ¢g, hospitals, manufacturing)			
lealth &	Review WHO and local regulatory guidelines	Develop a risk assessment in partnership with a health	Conduct periodic testing with agency		
Government Engagement	Identify nearest healthcare providers/testing sites and collaborate with health insurers	Establish testing protocol with local regulatory bodies			

A: Organizations should consult official health sources for information, guidance, and tools

Examples provided; Please check online for latest information

WHO

Situation reports and information examples

oronaviru tuation Re	us disease 2019 (COVID-19)	
	on materialise by CA 447 CET 10 Marcel 2001	_
HLIGHTS 5 new country Guernary and P	Companyation	
As of 5 March 2 health measure public health-at restrict the mov- to the public he information at characterizity 1 in Tocus"	International (Add. Section 2017) International (Add. Section 2017) Add. Section 2017) International (Add. Section 2017) Inte	Tranganda
WHO Director: - the threat of + - first pandemic is	What is a component "	۲
	What are the symposes of COMD-911	۲
	How does (QMD-19 spread?	۲
	Hotel Control Con	or jour a pair m m mi inter mi inter menter menter menter menter menter menter hans menter hans hans hans hans hans hans hans hans
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https://www.who.int/news-room/q-a-detail/q-a-coronaviruses https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200310sitrep-50-covid-19.pdf?sfvrsn=55e904fb_2

CDC

Overall prevention, business guidance, and industry guidance examples



https://www.cdc.gov/coronavirus/2019-ncov/about/prevention.html https://www.cdc.gov/coronavirus/2019-ncov/community/guidance-businessresponse.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2 019-ncov%2Fspecific-groups%2Fguidance-business-response.html https://www.cdc.gov/coronavirus/2019-ncov/healthcare-facilities/prevent-spread-inlong-term-care-facilities.html Local health authorities & adapted info Overall information, business guidance, public poster examples



https://www.nhs.uk/conditions/coronavirus-covid-19/ https://www.sfcdcp.org/infectious-diseases-a-to-z/coronavirus-2019-novelcoronavirus/#links-and-documents-public https://www.cdc.gov/coronavirus/2019-ncov/downloads/sick-with-2019-nCoV-factsheet-chinese.pdf

A: Policies & Management

Organizations should develop companywide policies to each of these scenarios and work with local leaders to tailor / adapt

Sick family member

High transmission

An employee indicates that their family member recently tested positive for COVID-19 and they were exposed

They also recently attended the latest company retreat

Exposure on the line

One employee on the floor or call center tested positive for COVID-19

At least 20 other individuals were exposed including some temp agents

Workforce on sick leave

After a recent exposure, the next day 60% of the workforce call in sick

Critical functions are now at risk

Colleague may be sick

Employee observes that a colleague is starting to exhibit symptoms of illness; they have an underlying health condition and request to work from home

Workforce remote

Company has made decision to make all employees in a site work remotely

All critical functions are being performed remotely, for the first time

C-Suite symptoms

The CEO and CFO both recently came down with possible symptoms

They are both in the same location, yet offices exist around the world

High severity

B: There are multiple endto-end immediate supply chain actions to consider in response to COVID-19

regions

Optimize production Create transparency **Estimate realistic** 3 on multi-tier supply chain and distribution capacity final customer demand Determine critical components, Assess impact on operations and available Work with S&OP to get demand and determine origin of supply resource capacity (mainly workforce) signal to determine required supply Assess interruption risk and identify Leverage direct communication Ensure employee safety and clearly channels with direct customer likely Tier 2+ risk communicate with employees Look to alternative sources if Use market insights/external Conduct scenario planning and assess impact suppliers in severely affected databases to estimate for on operations based on available capacity customer's customers $\overline{\mathcal{M}}$ DC Tier 2 supplier Tier 1 supplier Plant Customer Analyze available Leverage available logistics capacity inventory Estimate inventory along the value Estimate available logistics capacity for air/sea/road/rail chain, including spare parts/ re-Accelerate customs clearance manufactured stock Change mode of transport and pre-book air/rail capacity given Use after sales stock as bridge to current exposure keep production running Collaborate with all parties to jointly leverage freight capacity

Customer's customers B: Supply chain actions to consider in the next two to four months



Evaluate alternative sourcing for all materials impacted – availability of suppliers, additional cost due to logistics, tariffs, estimated component price increases

Enhance the demand verification process to correct inflated demand to mitigate the whiplash effect

Provide continuous support to small and mid-sized tier 2-3 suppliers in financial trouble

Assess regional risks for current and backup suppliers



Kick off designing resilient supply chain for the future

Establish a supply chain risk function

Digitize 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 relationships with external partners

Work with public agencies to explore opportunities for support

Engage investors and other stakeholders to improve transparency and get help

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COVID-19 The situation

now

Possible future scenarios

Actions for companies to consider $\mathbf{04}$

Leading indicator dashboards

Medium

Low

Impact 📕 High

Supply chains are being disrupted around the world, but the full impacts have not yet been felt

	Supply – production	Ι	logistics – transportatio	Customer demand						
			or of a	or 📄 🕞						
	80% plants restarted	2M idle containers	60% China flights suspended⁵	60% truck staff available	90% decline in car sales					
Situation today	Across China, ex-Hubei, with large enterprises restarting, albeit with ~60% capacity, at much higher	8.8% of global container capacity affected by reduced demand	Commercial flights account for ~50% of air cargo capacity, some airlines converting flights for	1-14 day quarantine- and capacity -induced increase in freight transport times	China consumer sentiment sharply lower; online/express deliveries up					
	rate than smaller ones	52% BDI increase	cargo ^o 2x TAC index	MED	MED					
		Baltic Dry Index ¹ 52% higher since CLNY ³ but at same level as February 2019	TAC index rate +98% for US- China, +117% EU-China ² , +21% China-US, and +2% for China-EU since CLNY ³	Demand for express last -mile delivery has spiked in China due to quarantine and social distancing	Europe & US sentiments evolving, but localized					
	MED	7,000 TEU/wk reduction	5% global air traffic decrease ⁴	High	High					
What to expect	Parts and labor shortages leading to further SC disruptions (eg,	Volumes will return as factories restart, may see peak for restocks	Decline in capacity available due to travel ban on commercial flights	Trucking capacity constraints in China likely to ease	Demand slump may persist Inventory "whiplash" - 7-8 weeks					
	decreased production capacity)	Future capacity 2.3% reduction for	YoY global air freight belly	Declines at US ports foreshadow	for auto, 2-4 weeks for high-tech					
	production capacity reductions	a Asia-US route from May due to sea freight alliance revisions	capacity reduction of 14% in March 2020 ⁴	declines in US intermodal (rail)	Inventory hoarding and demand spikes due to uncoordinated					
	prioritization	MED	Rates likely to continue to		actors exacerbate SC					
		Impact on freight will take an extended period of time to correct with slower ramp -up								
		Logistics capacity returns but faces o	constraints; near -term price increases							
 Assessment of routes, data as Frankfurt (FR/ 3. End of extender for US-China T 	Assessment of risk premium to ship raw materials on a number of shipping routes, data as of 3/13 4. Estimated prior to implementation of EU-US travel ban 5. Commercial flights from China 5. Commercial flights from China 6. Companies such as Cathay Pacific and Singapore Airlines now starting to fly for US-China TAC 2/10-3/2 for other TAC routes)									

Source: Baidu, WSJ, Bloomberg, Alphaliner, Quartz, TAC index, IATA, Seabury Consulting, A.P. Moller-Maersk Group of Denmark, Agility Logistics

Click on buttons for more detail

l

COVID-19 Leading indicator dashboard

Propagation of COVID-19 across new transmission complexes

Europe

Middle East²

Americas



COVID-19 Leading indicator dashboard for China

Tracking toward economic restart

Hubei impact

How deep is the impact, and when could economic activity restart?



Hubei remains deeply impacted; return to economic activity tough to foresee until mid Q2



China economic restart

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



Restart has begun, especially for larger companies, despite challenges such as labor shortages and movement of goods



China consumer confidence

When will Chinese consumer confidence and purchasing activity return?

restarts

6

8

17



Earliest Example consumer school behavior metrics

(anecdotal)

Retail passenger car sales down 92%

Smartphone sales down 37%

Spending on food & drinks down \$60B in January and February

Hotel occupancy down 80%



Source: WHO Situation Reports; National Bureau of Statistics of China; McKinsey Global Institute; OCED Data, Johns Hopkins CSSE, press research, TomTom traffic index, Baidu QianXi, CDC, New York Times, Reuters, The Economist, Peking University HSBC Business School, Tencent News, Sina news, Beijing Environmental Protection Monitoring Center, Shenzhen Environment Network

i Middle East



Example country		Epidemiological Indicators ⁷						Economic/policy indicators				
	Date of initial case	Total number of cases	New cases in last 14 days	5-day new case trend	Crude case fatality ratio ¹	Peak case count observed? ²	-	Number of countries/ territories restricting travel	Number of airlines suspending service to country ³	Traffic congestion ⁴	School closures	
Iran	02/20	12,729	9 12,136	881 1,075 1,289 1,365 958	4.8%	⁵ N		87	ब् हि र x9	Data N/A	Country-wide	
Rest of region	02/15	1,221	1,108	40 51 51 51 51 51 53 51 53 51 53 51 53 51 53 51 53 51 53 51 52 51 51 51 51 51 51 51 51 51 51 51 51 51	1.2%	Ν						

Current phase

Stage 1: Small number of cases identified; no sustained local transmission

Stage 2: Disease spread and sustained local transmission

Stage 3: Government action and shifts in public behavior. Not all affected regions enter stage 3, but interventions and economic impact signal prolonged recovery

Stage 4: Case growth and stretched health systems

Stage 5: New cases drop, activity resumes



Source: WHO Situation Reports, TomTom traffic index, Baidu QianXi, CDC, IATA, BBC, NYT, Japan Times, NPR, Reuters, press research

í Europe



Example country			Epid	emiological Indicators ⁷	Economic/policy indicators					
	Date of initial case	Total number of cases	New cases in last 14 days	5-day new case trend	Crude case fatality ratio ¹	Peak case count observed? ²	Number of countries/ territories restricting travel	Number of airlines suspending service to country ³	Traffic congestion ⁴	School closures
Italy	01/31	21,157	20,029	2,651 2,547 ^{3,497} 2,313	6.8% ⁶	Ν	94	°⊕ື" x 18	74 10	Country-wide
France	01/25	4,469	4,369	372 495 591 ⁷⁸⁰ 829	2.0%	Ν	55	ත්විං ත්විං ත්විං	74 25	Country-wide
Germany	01/28	3,795	3,738	802 693 733 157 ²⁷¹	0.2%	Ν	52	මේම	56 45	Local
Spain	02/01	5,753	5,708	615 501 825 1,266 1,522	2.4%	Ν	49	ogo	59 5	Country-wide
Rest of region	01/29	9,900	9,754	8771,192 1,125 2,086 2,222	0.6%	Ν				

Current phase

Stage 1: Small number of cases identified; no sustained local transmission

Stage 2: Disease spread and sustained local transmission

Stage 3: Government action and shifts in public behavior. Not all affected regions enter stage 3, but interventions and economic impact signal prolonged recovery

Stage 4: Case growth and stretched health systems

Stage 5: New cases drop, activity resumes



None

Traffic congestion⁵



Source: WHO Situation Reports, TomTom traffic index, Baidu QianXi, CDC, IATA, BBC, NYT, Japan Times, NPR, Reuters, press research





Epidemiological Indicators⁷ Economic/policy indicators Example country Number of Number of airlines Date of Total New cases Peak case countries/ suspending Crude case Traffic initial number in last 14 territories service to School count fatality ratio¹ observed?2 country³ of cases days 5-day new case trend restricting travel congestion⁴ closures case ත්තිං ත්තිං ත්තිං 1 224 ²⁹¹ 277 59 Local US 01/23 Ν 1,616 2.4% 28 1,678 16 245 105 122 0.7% Rest of region 01/27 699 677 Ν 49



Stage 1: Small number of cases identified; no sustained local transmission

Stage 2: Disease spread and sustained local transmission

Stage 3: Government action and shifts in public behavior. Not all affected regions enter stage 3, but interventions and economic impact signal prolonged recovery



Stage 5: New cases drop, activity resumes



i South-Asia (ex-China)



Stage 2: Disease spread and sustained local transmission

Stage 3: Government action and shifts in public behavior. Not all affected regions enter stage 3, but interventions and economic impact signal prolonged recovery

Stage 1: Small number of cases identified; no sustained local transmission

Stage 4: Case growth and stretched health systems

Stage 5: New cases drop, activity resumes



None

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Source: WHO Situation Reports, TomTom traffic index, Baidu QianXi, CDC, IATA, BBC, NYT, Japan Times, NPR, Reuters, press research

References

COVID-19 Leading indicator dashboard for China

- Case fatality ratio calculated as (deaths on day X) / (cases on day X). Previous versions of this dashboard calculated CFR = (deaths on day X)/ (cases on day X-7) to account for incubation.
- 2. Measures movement of population into destinations as of 3/15/2020
- 3. Wuhan included only for comparison
- 4. 7-day average (9-Mar to 16-Mar) compared to 2019
- 5. Car traffic only. Congestion reflects % increase in travel time compared to free-flow conditions

Note: All countries and regions have documented third-generation cases

Region-specific details

- Case fatality rate calculated as (deaths on day X) / (cases on day X). Dashboards before February 29 calculated CFR as (deaths on day X)/ (cases on day X-7) to account for incubation.
- 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, Paris, Berlin, Madrid, Los Angeles
- 5. O new reported cases in US on 3/15 likely a reporting anomaly and not indicative of overall trend
- 6. Crude case fatality ratio likely to fall as testing becomes more widely available
- 7. Epidemiological data current as of 3/15 WHO Situation Report

Note: All countries or regions have documented third-generation cases