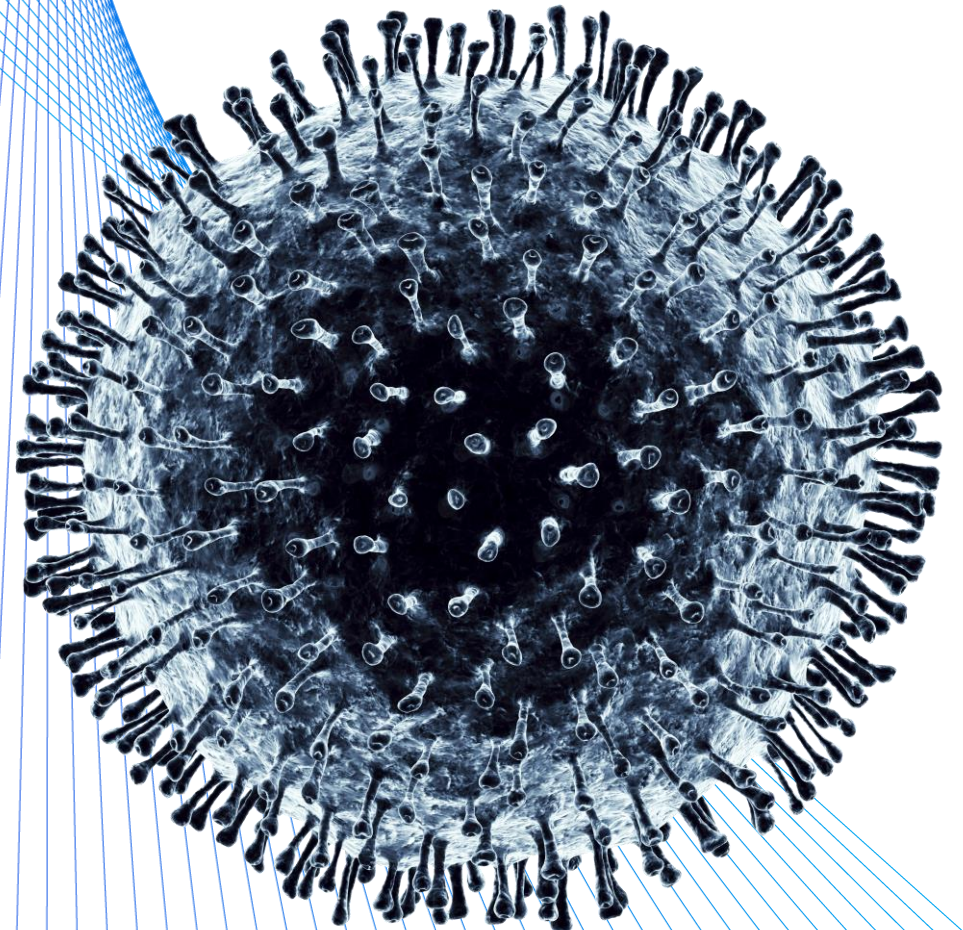


# 2019-nCoV Acute Respiratory Disease Response

Updated: February 4, 2020

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# Executive Summary

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**2019-Novel Coronavirus Acute Respiratory Disease (2019-nCoV) has caused 24,000 confirmed cases and nearly 500 deaths** as of February 4<sup>th</sup> 2020. 99% of the cases have been in China. The transmission rate of the virus appears to be 1.5-2x higher than the flu, but may fall with public health measures. 20% need hospitalization, and 0.1-2% of all cases are fatal.

**A robust Chinese and international response has not prevented a spread of the virus to 25 countries, prompting many countries to suspend flights and take quarantine measures at scale.** China, for instance, has instituted history's largest quarantine, and curtailed movement for 60 million people. The World Health Organization declared 2019-nCoV a Public Health Emergency of International Concern, and many countries have instituted travel restrictions. At the time of writing, evidence of the effectiveness of such measures remains limited.

**Early estimates suggest a 1-2% reduction in China's GDP growth in Q1 2020 – an impact of \$60B.** This will almost certainly have an impact on global growth, driven partly by the much greater structural importance China has in the global economy today. China today is 17% of global GDP – 4X what it was in 2003. Certain sectors – automotive, transportation, high-tech, travel/leisure – are likely to be deeply impacted with significant global ramifications.

## **Three scenarios for how the situation could evolve:**

- **Quick Recovery:** No new self-sustaining sites established, disease peaks in Q1, existing drugs prove to be effective, reducing fatality estimates. This drives resumption of economic activity in China and globally
- **Partial Recovery:** A partial industrial restart in China (for some industrial sectors such as automotive), but continued impact to transport, hospitality and other tertiary sectors. Chinese consumer spending does not return in 2020, but impact to the global economy is muted
- **Global Pandemic:** New information raises the clinical risk to a pandemic, and the global economy considers the virus as the “last straw” that breaks the back of the global economy (building on Brexit, US-China dispute, geopolitical tensions and other factors)

**What companies need to do:** Besides the basics on protecting employees & following health advisories, we believe now is the time to establish a systematic nerve center to respond to the crisis. The first task of this center needs to be to assess the company's financials in each of the scenarios above, and ensure that there is a robust response for supply chain, pricing, working capital & balance sheet management in place. Next, the company should consider establishing a portfolio of tactics based on clear triggers for when to act.

# 2019-nCoV acute respiratory disease – basic information

Coronaviruses are common causes of respiratory infections. They have previously been implicated in viral outbreaks, including SARS-CoV and MERS-CoV, but are also responsible for some common colds. The 2019-novel coronavirus acute respiratory disease (2019-nCoV) is a new virus, without known prior human infection.

**Our knowledge on the disease characteristics are evolving daily<sup>1</sup>...**



**Transmission rate**

**1.5-2X**

higher transmission compared to the flu<sup>3</sup>



**Disease severity**

**Up to 20%**

patients have severe disease



**Rate of people with infections dying**

**<1/50**

Patients are at risk of dying, with refined data to come

## Public Health Emergency of International Concern (PHEIC)

*Declaration by the World Health Organization recognizing the outbreak as a public health risk requiring a coordinated international response.*

The World Health Organization declared a Public Health Emergency of International Concern on January 30, 2020.<sup>2</sup>

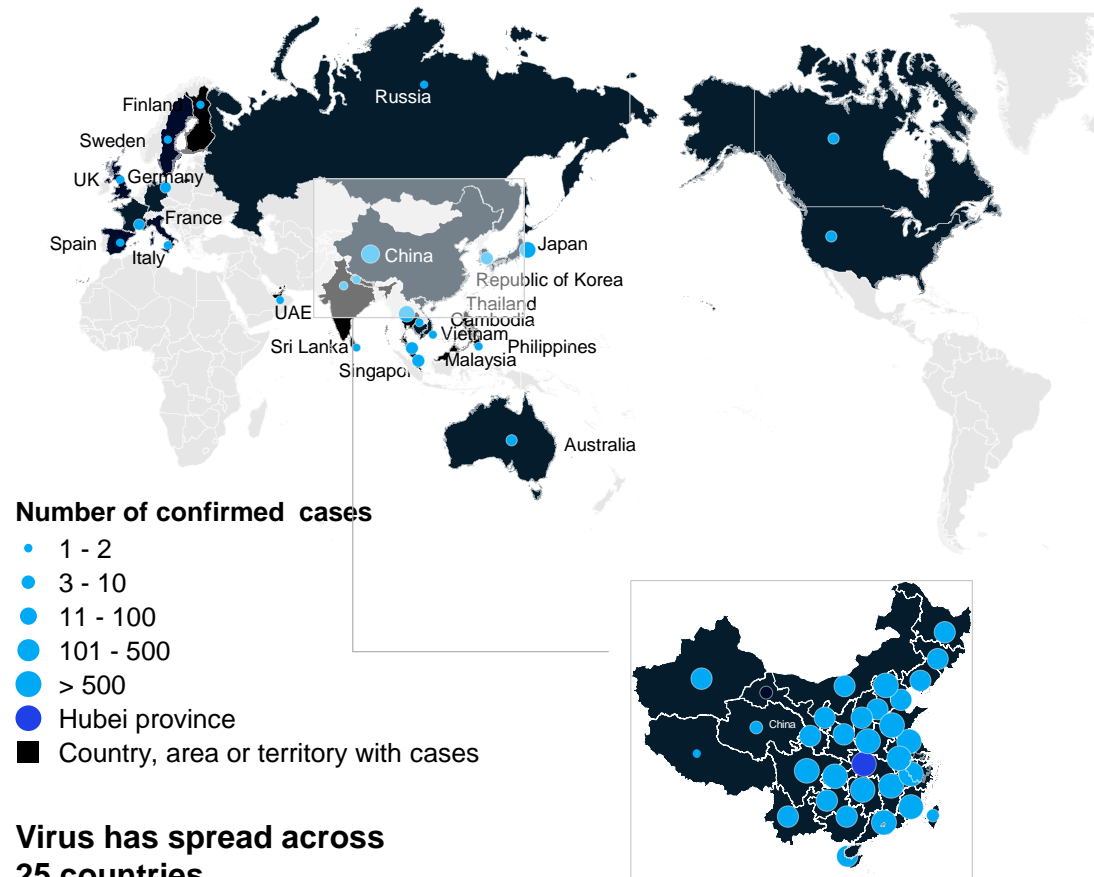
Historically, declarations of PHEIC led to a number of other societal responses, such as additional travel advisories, market fluctuations and cross-country collaboration.

1. These numbers reflect the latest thinking at time of writing; information is expect to evolve rapidly and change; this should not replace the latest available information through public health officials  
2. Statement by the World Health Organization available online [here](#)  
3. Evidence on exact numbers are emerging, however expected to decreased as viral containment measures intensify and treatments are developed

# 2019-nCoV acute respiratory disease – transmission and spread

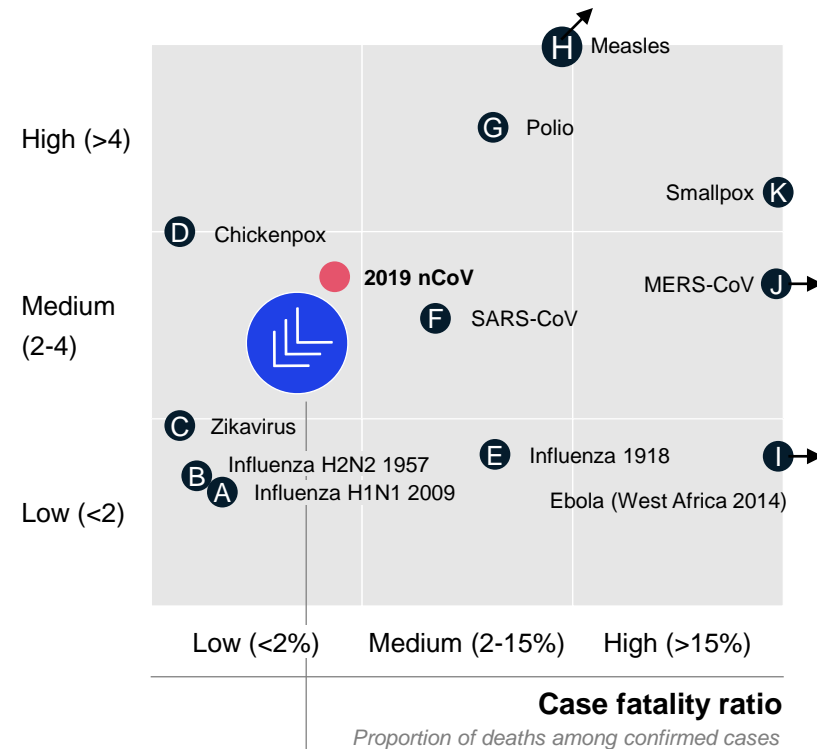
As of February 4<sup>th</sup>, 2020

## 2019-nCoV transmission status



## Reproduction number

The average number of individuals infected from each infected individual



**Viral control and improved case management will push 2019-nCoV to behave more closely to recent Influenza and Zikavirus outbreaks**

**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

1. Latest numbers are available from a number of sources, including daily situation reports from the World Health Organization available [here](#)

# 2019-nCoV acute respiratory disease – impact to date

■ 2019-nCoV ● SARS ◆ Ebola

## Impact to date

LAST UPDATED: Feb 4<sup>th</sup> 2020

24,000+<sup>2</sup> Confirmed cases

490+<sup>2</sup> Deaths

24+<sup>2</sup> Countries affected

## Estimated impact

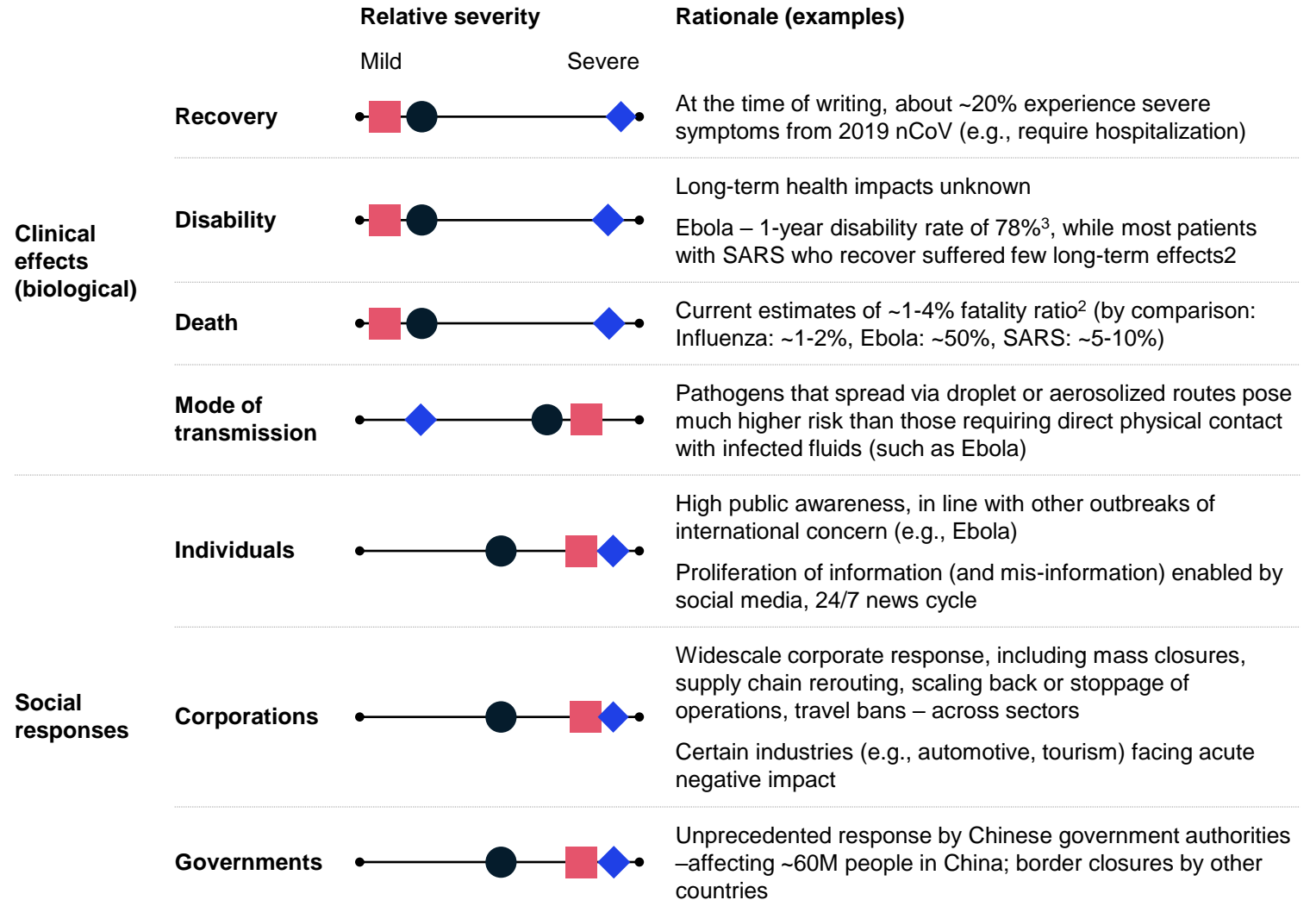
~\$90B+<sup>1</sup> Estimated annual economic impact based on ~0.1% shock to global economy

~\$60B+<sup>1</sup> Est. Q1 2020 acute shock to Chinese economy

1. Highly preliminary - plausible global impact as of February 4, 2020; total economic GDP impact of prior pandemic potential viral outbreaks; heavily dependent on severity of outbreak, effectiveness of response and recovery; exacerbated by China's significance in and integration with global economy. China GDP growth impact based on compilation of analyst estimates, reports (see Appendix)

2. Latest numbers are available from a number of sources, including daily situation reports from the World Health Organization available [here](#)

3. Jagadesh et al, Disability Among Ebola Survivors and Their Close Contacts in Sierra Leone: A Retrospective Case-Controlled Cohort Study, Clinical Infectious Diseases (Jan. 2018)



# Key factors that will influence the containment and severity of impact of 2019-nCoV

## Differentiating factors relative to the SARS epidemic in 2003 (not exhaustive)

### Clinical effects (biological)

- **Faster spread of cases** - within 5-week window, the total number of cases has already surpassed the total case counts for SARS-CoV (which occurred over 6 months) and MERS-CoV cases (which spanned years)
- **Increased individual mobility with higher population density** (relative to 2003) likely to increase spread
- **Asymptomatic transmission** has not been ruled out; it did not occur with SARS-CoV and was rare (but did occur) with MERS-CoV
- **Healthcare system significantly improved** in China since SARS, with increases in public funding for health, improved access to healthcare and modernization of the healthcare infrastructure
- **Improvements in genome sequencing assets**, enabling rapid characterization of the virus (e.g., identifying and quarantining the origin, tracking genetic changes during the epidemic)
- **Improvements in vaccine development technology** and creation of Coalition of Epidemic Preparedness Innovations “CEPI”, the leading vaccine development group that led (and funded) the development of the vaccine for MERS

### Socio-economic responses

#### Individuals

- **Increased flow of information**, driving awareness (e.g., > 9x access to internet today versus 2003); significant media attention
- **Significant propagation of misinformation** given uncontrolled communication
- **Modern transportation infrastructure** accelerates spread of infectious disease; launch of high-speed rail in 2008 has quadrupled public transport passenger traffic from 2013 to 2019; timing of outbreak coincided with Lunar New Year, largest annual human migration

#### Companies

- **Wuhan and Hubei as central hub** for multiple industries, e.g., automotive manufacturing (with plants for Nissan, PSA, Honda, GM, Renault, etc.), high-tech (e.g., semiconductor)
- **China as significantly larger contributor** to global economic growth today vs 2003 (4% vs. 16% share of global output); Wuhan was forecasted to grow faster than national average in 2020; Chinese economy also more dependent on certain sectors that suffered the most during the SARS outbreak
- **Greater global connectivity and supply chain dependency on China** and **reliance on Chinese consumption** to drive growth – certain sectors heavily exposed (e.g., >\$250Bn Chinese tourist spend a year); in general, greater economic fragility

#### Governments

- **Aggressive actions to curtail spread of 2019-nCoV** at a scale never seen before in history – e.g., restrictions on travel, school / restaurant / company closures; effective quarantine of over 50M people
- **Early recognition of importance of data sharing**, evidenced by more openness in rapid publication and dissemination of information (e.g., viral genome)
- **Likely underreporting of cases** given challenges in data collection (e.g., distinguishing between mild and severe cases)
- **Medical supplies, beds, facilities** in short supply, exacerbated by lockdown preventing supplies from reaching hospitals; quick actions taken (e.g., building two additional hospitals in <10 days) likely insufficient to meet demand

- Exacerbating factor
- Mitigating factor

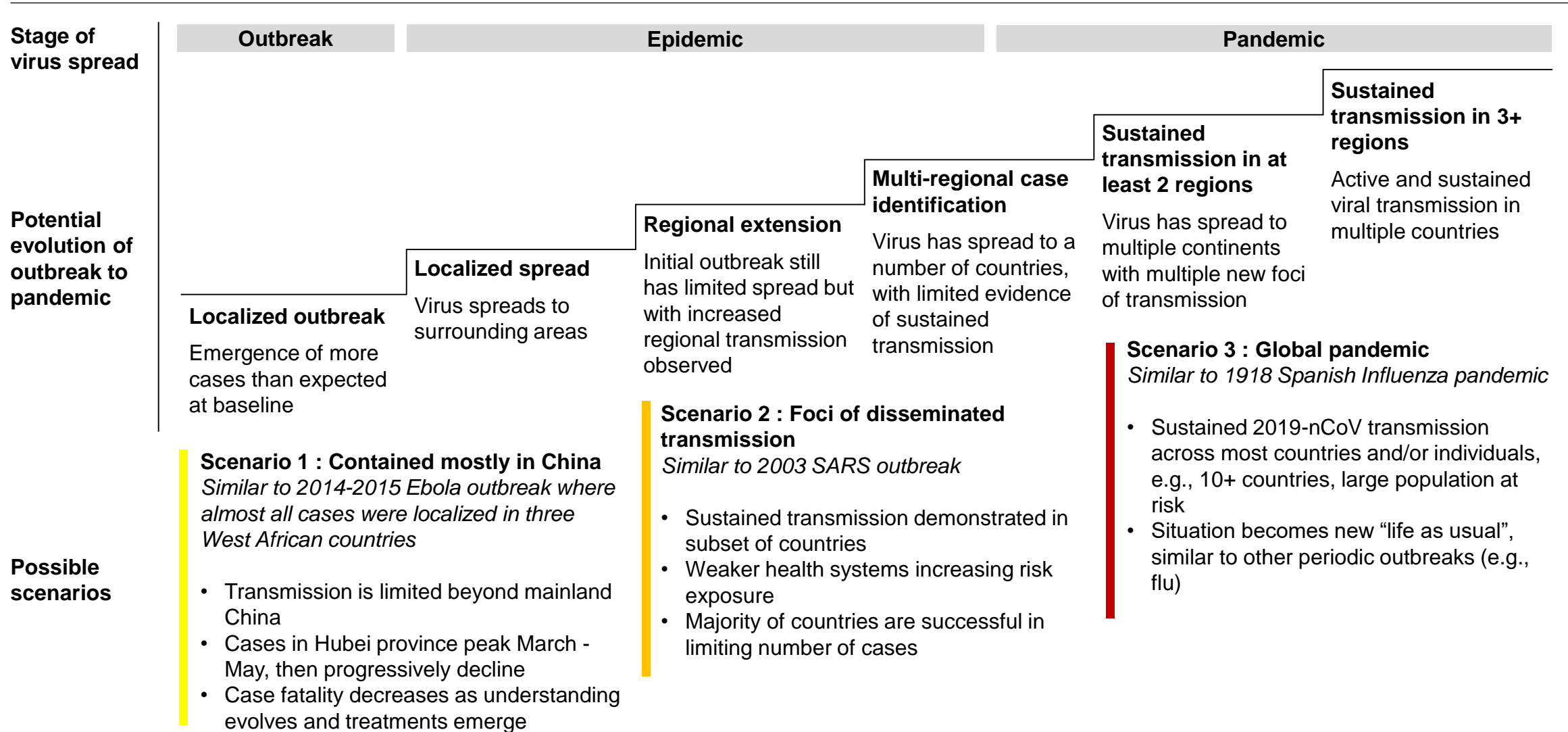
### Total economic impact of 2019-nCoV dependent on:

**Effectiveness and speed of control measures** (e.g., containment)

**Ability to and effectiveness of treatment** – supported by a number of tailwinds (e.g., strengthening of healthcare systems in China, aggressiveness of government action) and

**Headwinds** (e.g., supply chain dependency on Hubei) and **tailwinds** (e.g., strength of contingency planning by corporations, criticality of suppliers in Hubei)

# Three possible epidemiological scenarios



# Potential evolution of the macroeconomic situation

Examples of different scenarios to consider as part of contingency planning

Potential scenarios

“What you have to believe” – not exhaustive

## 1 Quick recovery

- **Impact of disease acute** for Wuhan and Hubei province, but disease is largely contained
- **Supply chains temporarily affected**, but **economic activity resumes**
- **Lagging consumer demand** recovers

- **Severity and mortality rate for 2019-nCoV** will continue to stay in-line with (or below) those of the flu
- **Drug cocktail found to be effective**
- **Individuals can reasonably protect themselves** from infection from 2019-nCoV through simple and inexpensive precautions (e.g., washing hands, face masks)
- Global economy more resilient against weaknesses

## 2 Partial recovery

- **China restarts economic** activity, especially in certain sectors less vulnerable to outbreak impact; **supply chain resumes activity**
- **Weakening of consumer confidence and demand** persists in China; however, strong Asia demand overall combined with a strong US economy averts a sustained global slowdown

- **Near-term treatment options** not effective or not readily available; vaccine unlikely to be discovered in near term
- China and more broadly the world **learn to live w/ “2 flus”** situation, pressing through while vaccine development takes 9-12+ months for development and at-scale production
- Economic pressure plus more insulated industries (e.g., less impacted by consumer demand) means that economy “restarts” in those sectors first

## 3 Pandemic

- **“Straw that breaks the camel’s back” scenario** – 2019-nCoV virus outbreak as trigger for **global economic recession**
- **Companies make irreversible decisions** such as wholesale shifts in supply chain, distribution channels – supply chain broken, especially in certain sectors
- **Governments continue drastic actions** including border closures, travel bans, import/export implications

- Potential evolution of **disease with severe intensification** (e.g., change in mortality rate); lack of treatment options
- **Global spread of virus** including **additional self sustaining sites** outside of China; **global governments unable to contain/quarantine** the virus in the near term
- Global economies **unable to react or sustain near-term solvency** in face of global quarantines



# Leading indicators to monitor

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## Situation

## Implication

Confirmation of sustained transmission outside of China



Most cases outside China have been linked to recent travelers. If evidence emerges of ongoing acquisition of disease in patients who did not travel or have contact with someone returning from China, the potential public health impact of the disease will rise significantly.

Rapid increase in case numbers in affected countries



Many unknowns remain. Rates of transmission in asymptomatic individuals, viral mutations, and decreased efficacy of protective measures, for example, could lead to increases in infection rates. Weaker health systems, in particular, could be at higher risk. This would increase uncertainty on potential recovery.

Signals of supply chain restart



Signals of supply chain restart in China would be an early sign of recovering markets. Early markers could include government reports, social media chatter, firms conversations and / or communications with their customers.

Changes in consumer spending indicators



In epidemic settings with containment measures, consumer spend decreases. Changes in consumer spending indicators, especially in China, India, and broadly globally, may point to potential recovery and / or protracted nature of the situation.

US treasury yield curve



Overall market fluctuations and associated treasury yield curve, especially in the US, will point to overall confidence in market and expected trajectory. Increasingly negative curves may hint to longer economical impacts.

# Immediate actions to take in response to 2019-nCoV

PRELIMINARY

## Establish control through central nerve center

- Set up and deploy a **centralized nerve center** focused leading and coordinating all activities related to 2019-nCoV and providing real-time awareness of the evolving situation
- Ensure nerve center leaders have **appropriate decision authority and resources** (e.g., financing) to provide steer and make strategic choices
- Map out **stakeholders** and oversee coordination, including with relevant **public health authorities** to source latest information and recommendations, including guidance from the World Health Organization

## Protect employees

- Evacuate all **expat employees from China** and any other heavily afflicted areas
- Institute **work from home policies** in high risk areas where possible and **avoid all non-essential travel** to China and other heavily impacted regions
- Define and facilitate **relevant precautions** (e.g. hand-washing, facemasks) and plan for **possible screening capabilities** in communal work environments

## Create purpose

- Be proactive and transparent when **communicating with employees**, providing relevant updates on clinical and business impacts of 2019-nCoV
- Assess opportunities to **strengthen purpose and morale among employees**
- Consider **ways to aide in response efforts** (e.g. financial, R&D, medical staff, etc.)

## Define scenarios and conduct contingency planning

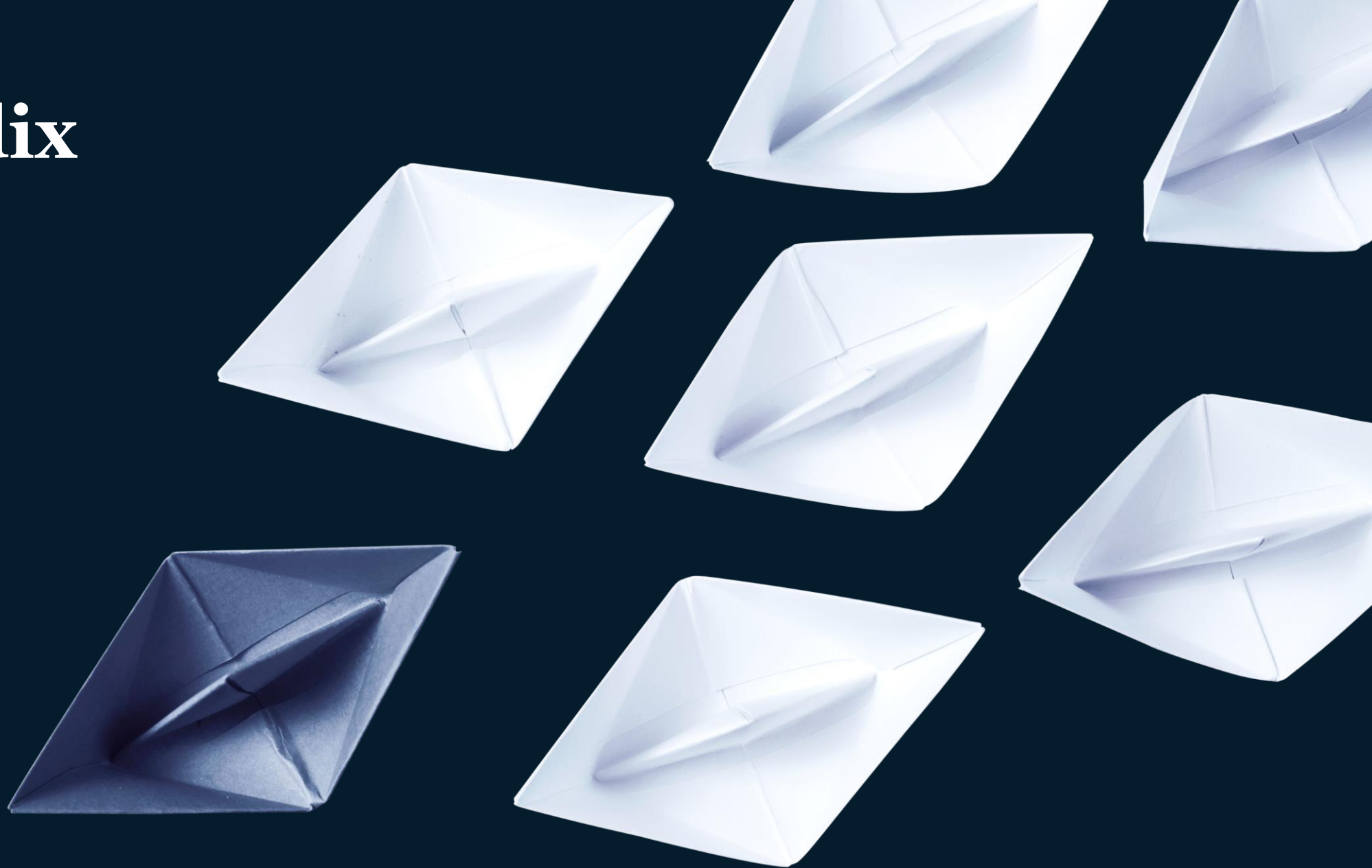
- Develop **contingency plans for prioritized scenarios** with **trigger-based portfolio of tactics** and associated **leading indicators** required to respond to each scenario
- Stress test **balance sheet and/or liquidity flexibility** to understand potential impact of sustained epidemic
- Assess **supply chain impacts and alternatives** based on supplier exposure to 2019-nCoV
- Assess sales and inventory planning to **refocus on growth outside the Chinese market** in the near-to-mid-term

# Examples of trigger-based actions to consider if situation escalates

## Example actions by scenario – high dependent on industry and type(s) of impact

Area of impact	Partial recovery	Pandemic
<b>Direct operations, including employees</b>	<ul style="list-style-type: none"> <li>• Prepare workforce for ‘soft restart’</li> <li>• Maintain inventory of finished goods to prepare for slow restart of economy</li> </ul>	<ul style="list-style-type: none"> <li>• Consider workforce ramp down in impacted areas and ramp up in alternate locations</li> <li>• Shift operations out of impacted region (e.g., outsourcing or alternate locations)</li> </ul>
<b>Supply chain and distribution channels</b>	<ul style="list-style-type: none"> <li>• Assess options for and impact of using existing alternate suppliers in the short term</li> <li>• Examine temporary distribution channel changes to maximize flow of goods around impacted areas</li> <li>• Complete supply/demand planning to account for multiple pauses/restarts of supply chain</li> </ul>	<ul style="list-style-type: none"> <li>• Solidify temporary alternate contracts to weather 4-6 month shutdown of supply chains in affected areas</li> <li>• Develop alternate paths for single-source materials and inputs</li> <li>• Reroute distribution channels away from affected regions</li> </ul>
<b>Business strategy, including customer and market</b>	<ul style="list-style-type: none"> <li>• Temporarily refocus sales outside of the region for non-essential goods</li> <li>• Increase online sales to compensate for lower in-store, brick-and-mortar traffic</li> <li>• Launch cross-channel communications to dispel misinformation and share safety review findings</li> </ul>	<ul style="list-style-type: none"> <li>• Refocus 1-2 year business strategy on growth areas not impacted by pandemic</li> <li>• Halt distribution in impacted areas where market unlikely to recover within 6-12 months</li> <li>• Prepare for months-long headwinds in global economic recession, with eventual ramp-up in staggered phases</li> </ul>
<b>Financial strength, including balance sheet</b>	<ul style="list-style-type: none"> <li>• Understand existing debt covenants re: financing stability</li> <li>• Consider 4-6 month liquidity options</li> <li>• Assess options for additional short-term financing for ‘soft restart’</li> </ul>	<ul style="list-style-type: none"> <li>• Consider options for long-term financing (e.g., HoldCo?)</li> </ul>

# Appendix



# Bringing the best toolkit to bear on global pandemics

Our Global Health Practice, with McKinsey Crisis Response, bring proven toolkits to pandemic management

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Pandemics pose a major threat to global health, social development, and the economy. Frequently they threaten our most vulnerable communities

High-functioning nerve centers, and end-to-end, trigger-based contingency planning, can go a long way towards improving effectiveness and speed of scarce resources in an emergency pandemic situation

Through our work with over 150 public and private crises around the globe in the last decade alone, as well as over 40 engagements disease outbreak management, McKinsey's Global Health Practice, together with McKinsey Crisis Response, have developed multiple tools and approaches that support more effective responses that helps organizations navigate pandemics more effectively



# A snapshot of our work in pandemics & crisis response

Over 150 cross-sector crises globally in the last 15 years, including 40 in disease outbreak management

1

## 2015: Zika

Supported governments across multiple Latin American countries to respond to Zika, both in the acute phase and in building resilience against the disease

2

## 2014: Ebola

Worked on multiple aspects of the global response, including emergency operations, funding, planning and R&D coordination

3

## 2014: MERS-CoV

Supported immediate response & contingency planning for the 2014 MERS CoV outbreak

4

## 2009: Influenza

Helped develop a plan to address the threat of pandemic influenza, with a focus on sufficient vaccine production

5

## 2019: Twin Cyclones

Helped an NGO improve its Emergency Operations Center after a twin cyclone in Mozambique



# Our team of epidemiology and crisis management experts are here to support you

## Crisis management experts



### **Mihir Mysore (Partner, Houston)**

Global leader of the Crisis Response Practice with extensive crisis management experience across multiple sectors on topics including crisis preparation, simulation, and response



### **Linda Liu (Partner, New York)**

Core leader in the Crisis Response Practice serving public sector and Fortune 100 clients on enterprise risk management, long-term comprehensive strategic planning, crisis response and preparedness, and regulatory remediation



### **David Chia (Senior VP, Miami)**

Core leader in the Transformation Practice and expert in travel, transportation, logistics, and healthcare strategy and operations in the crisis management context



### **Ophelia Usher (Expert, New York)**

Experience in private and public sector crisis management with specific expertise in threat identification, stakeholder assessment and strategy, and business continuity

## Global public health, inc. epidemics



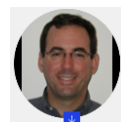
### **Matt Wilson (Senior Partner, NYC)**

Overall leader of the Global Health Practice focused on infectious diseases, and healthcare systems and services



### **Matt Craven (Partner, Silicon Valley)**

Leader of our work in Infectious Diseases; Medical doctor with deep expertise in outbreak response; leadership role in the WHO's Ebola Response in Sierra Leone; work on multiple other outbreaks with McKinsey



### **Michael Conway (Senior Partner, Philadelphia)**

Former leader of the Global Public Health Practice and work on multiple prior outbreaks, including Zika, MERS, influenza and Ebola



### **Sanjiv Baxi (Engagement Manager, Silicon Valley)**

Leader in the Healthcare Practice with significant expertise in Epidemiology, serving clients on strategy and operations topics



### **Marie-Renee B-Lajoie (Engagement Manager, Boston)**

Global public health expert focused on response preparedness operations and supply chain

Practicing emergency physician with 10+ years experience in humanitarian response

# How we can support clients along two key dimensions

Key activities and deliverables for the first 2-3 weeks

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## Set up a 'nerve center'



**Stand up a central team** to maintain a real-time view of the situation and oversee and coordinate response activities

**Create stakeholder maps to understand potential impacts** on employees, customers, and suppliers



- Best-practice nerve center infrastructure
  - Emergency response leadership construct and response leadership coaching
  - Clearly delineated decision authority
  - Real-time dashboards that display curated, relevant information for decision making
- Communications plan including path for information escalation
- Master planning calendar
- Detailed integrated stakeholder map and stakeholder-specific mitigation strategies

## Scenario / contingency planning



**Identify and monitor threats** and leading indicators

**Define range of potential scenarios** and associated mitigating actions based on evolution of situation

**Develop comprehensive view of risk exposure** and, where possible, potential impact

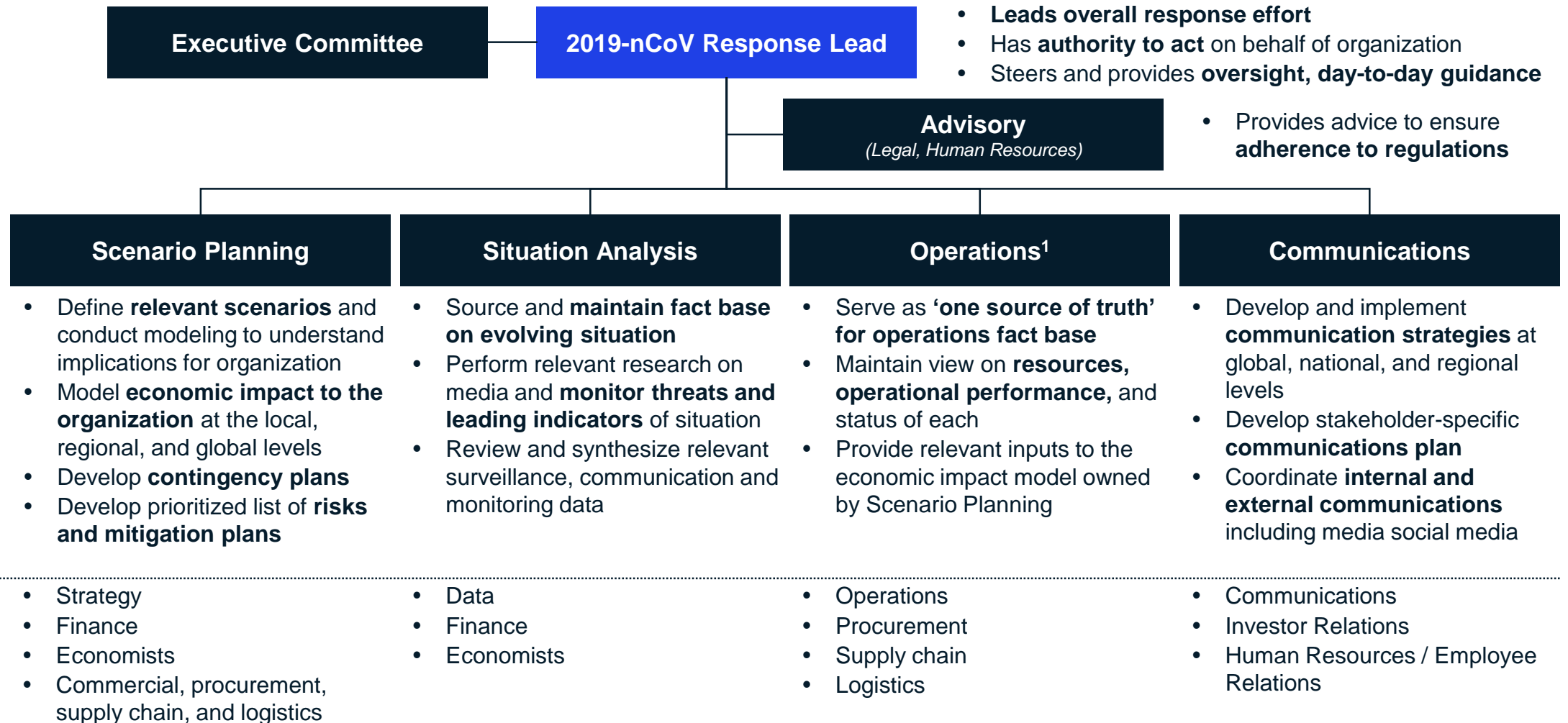


- Externally stress-tested scenario models supported by fact base and evidence
- Contingency plans for each scenario
- Stress testing by dedicated team of the data and policy / action given data uncertainty
- List of prioritized risks including view on likelihood and impact (quantified where possible), leading indicators, potential mitigation actions and owners



# Example: Nerve center

Illustrative



1. Includes procurement, supply chain, and logistics