



# Anatomy of an Outbreak:

## COVID-19 and the U.S. Health Care Delivery System

March 19, 2020

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Presented by  
Advisory Board Executive Insights

# Today's Research Expert



## Christopher Kerns

*Vice President, Executive Insights*

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Christopher oversees all senior executive research at Advisory Board, and is responsible for developing the research perspective, official point of view, and overall Advisory Board message to executives from across the health care sector.



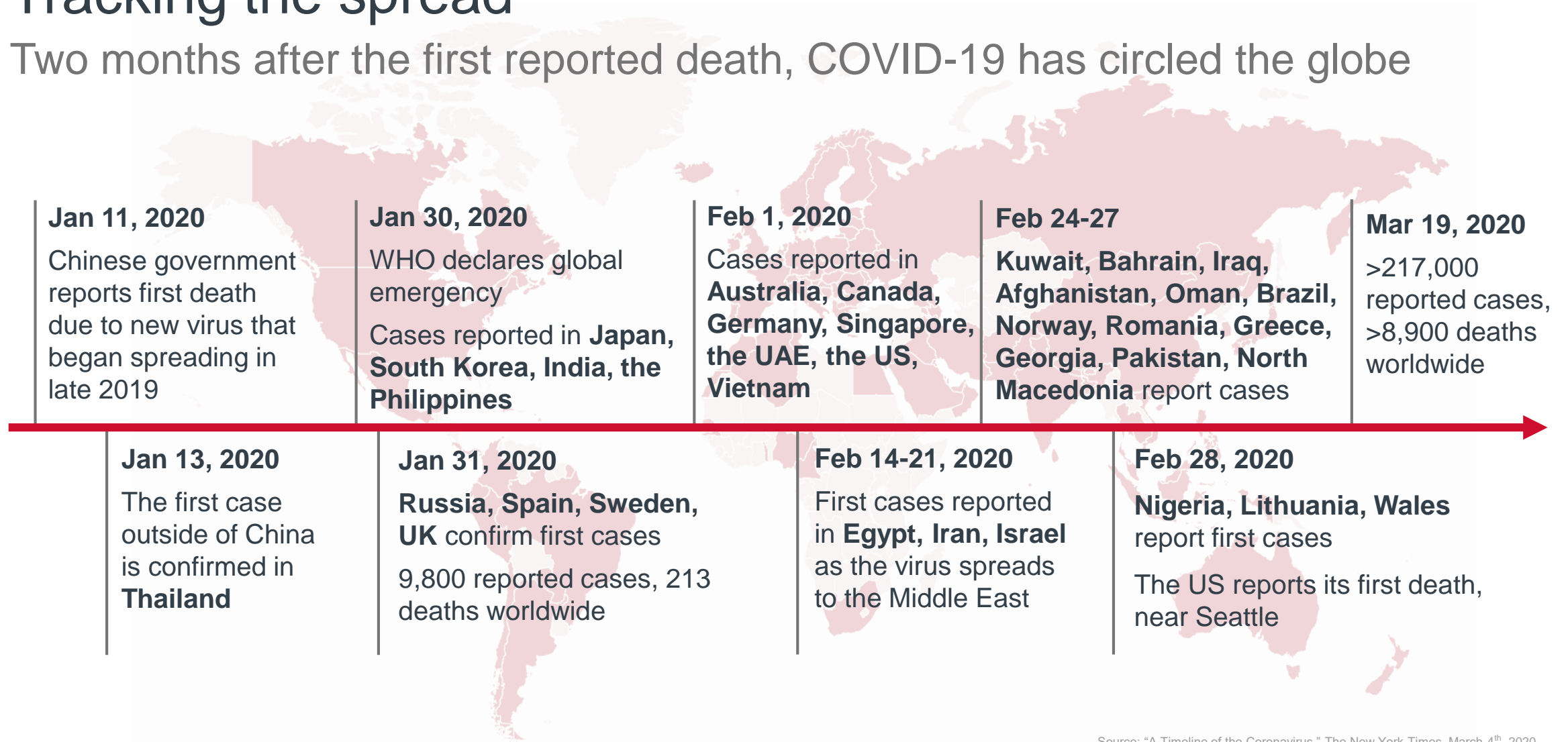
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# Tracking the spread

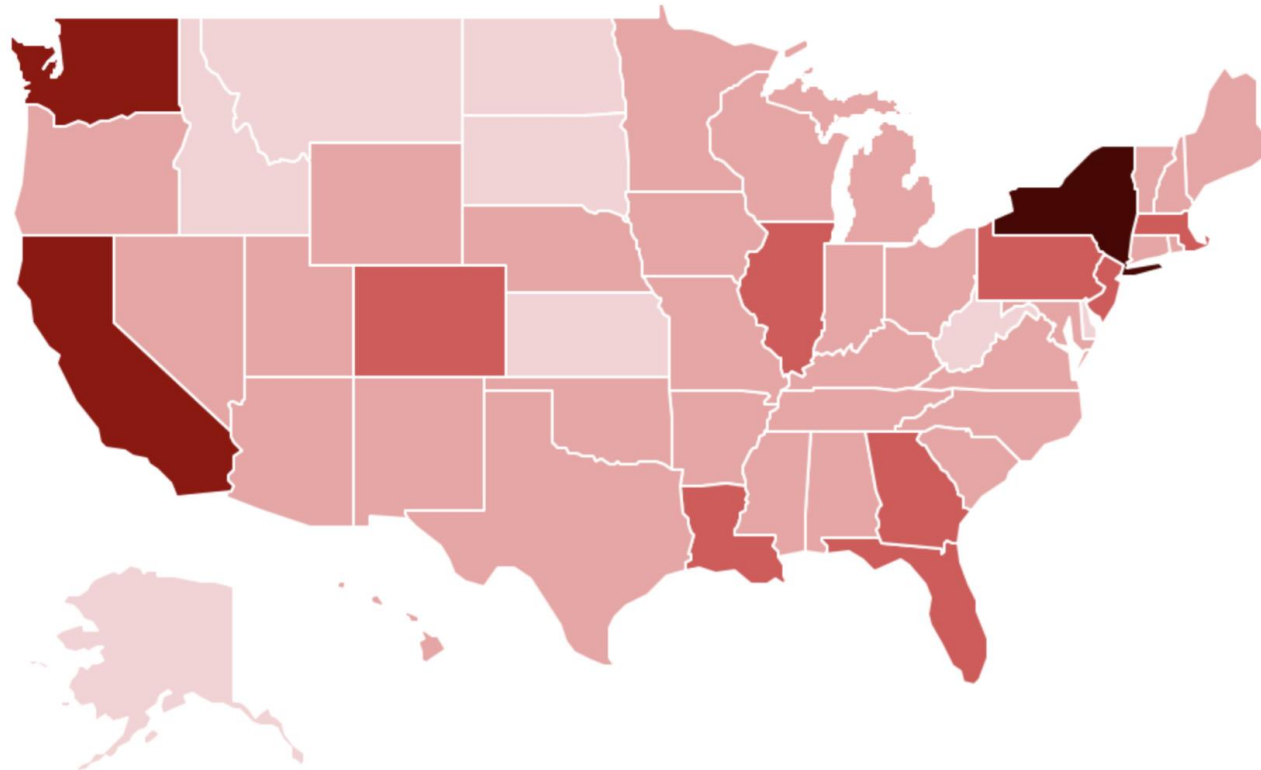
Two months after the first reported death, COVID-19 has circled the globe



Source: "A Timeline of the Coronavirus," The New York Times, March 4<sup>th</sup>, 2020.

# Coronavirus cases in the United States

Current as of March 18, 2020



● < 10 cases   ● < 100 cases   ● < 500 cases   ● < 1,000 cases   ● < 1,500 cases

## Current COVID-19 cases

At least 5,881 cases

50 states reporting cases

At least 107 deaths

## Estimate of possible effects

96 million cases

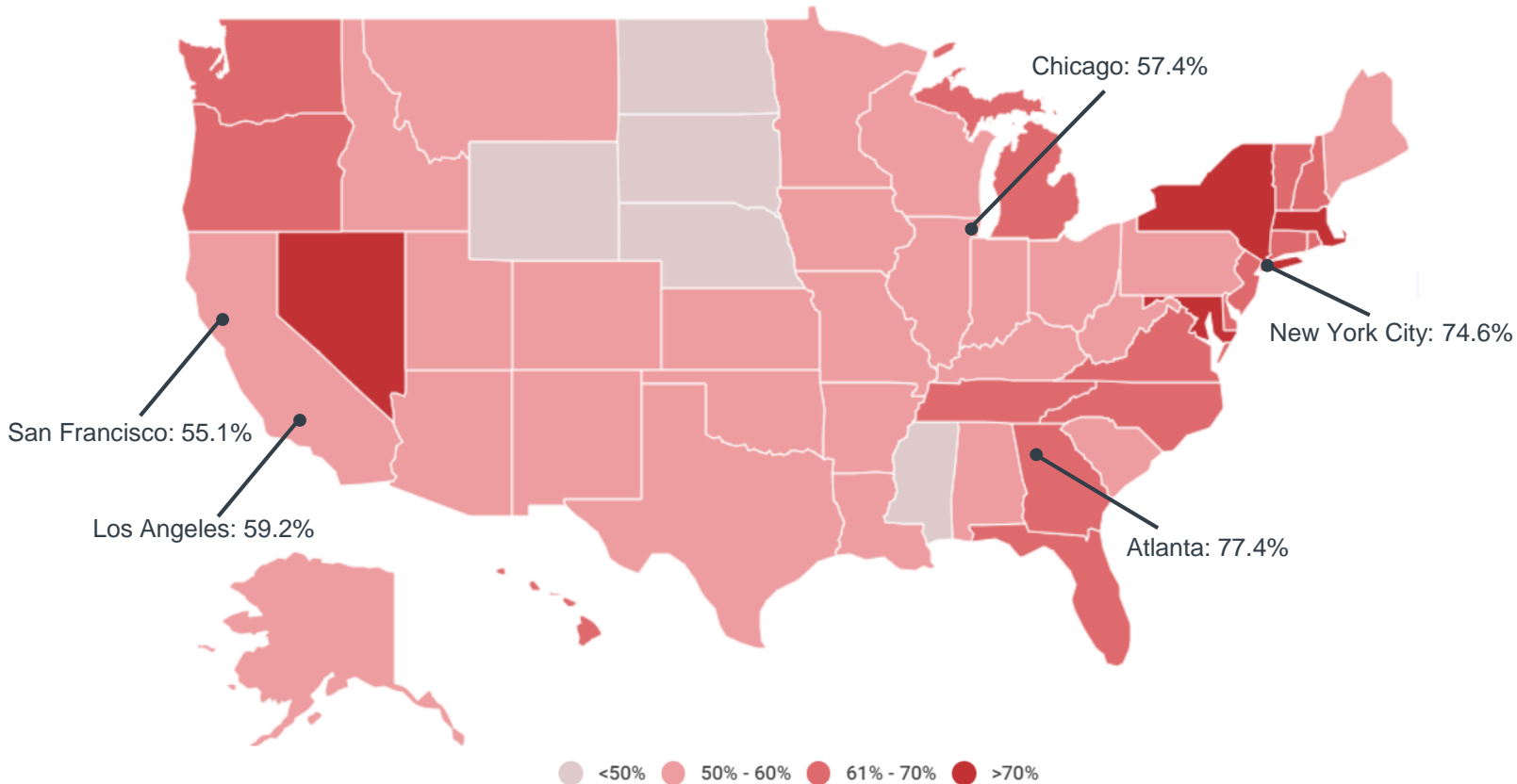
4.8 million hospitalizations

480,000 deaths

Source: "Coronavirus Disease 2019 (COVID-19) in the US," CDC, March 11, 2020. "One slide in a leaked presentation for US hospitals reveals that they're preparing for millions of hospitalizations as the outbreak unfolds," Business Insider, February 27<sup>th</sup>, 2020.

# Ready to absorb the shock?

## Average hospital occupancy by state



### DATA SPOTLIGHT

**80%**

Common heuristic for full occupancy

**60.7%**

U.S. aggregate hospital occupancy

**36.8%-73.4%**

Variation in occupancy from least (WY) to most (NY) heavily occupied state

# Current occupancy rates for states and largest cities

State	OR	State	OR	State	OR	State	OR
DC	80%	TN	63%	WV	57%	ND	42%
MD	74%	FL	62%	KY	57%	SD	41%
NY	73%	NC	62%	NM	57%	WY	36%
NV	72%	MI	61%	IN	56%		
MA	71%	PA	61%	ME	56%		
WA	69%	MN	60%	WI	55%		
CT	67%	OH	60%	MT	54%		
NH	67%	SC	60%	UT	53%		
GA	66%	TX	60%	OK	53%		
HI	66%	CA	60%	ID	51%		
VT	66%	MO	59%	KS	51%		
NJ	66%	AL	59%	AR	50%		
DE	66%	AK	58%	NE	50%		
RI	65%	IL	58%	LA	49%		
VA	64%	AZ	57%	IA	49%		
OR	64%	CO	57%	MS	49%		

City	OR
Baltimore	76.4%
Seattle	75.7%
Charlotte	75.4%
New York	74.2%
Boston	73.8%
Atlanta	73.3%
DC	72.1%
Nashville	71.5%
Minneapolis-St. Paul	69.9%
Orlando	68.5%
Dallas-Fort Worth	67.1%
Denver	67.0%
Portland	67.0%

City	OR
Houston	66.1%
Detroit	65.3%
San Diego	65.0%
Tampa-St. Petersburg	63.5%
Philadelphia	62.6%
San Antonio	62.5%
Phoenix	61.1%
Chicago	61.1%
Riverside-San bernardino	60.6%
LA	58.8%
Miami	58.8%
St. Louis	57.5%

# Many regions lacking capacity treat the influx of patients

Millions expected to be hospitalized for coronavirus infection

## COVID-19 effect on average annualized hospital occupancy rates<sup>1</sup>

	New COVID-19 hospitalizations (anticipated) <sup>2</sup>	New COVID-19 hospitalizations (moderate scenario) <sup>3</sup>	New COVID-19 hospitalizations (severe scenario) <sup>4</sup>	Current occupancy rate	Anticipated occupancy rate	Potential occupancy rate (moderate)	Potential occupancy rate (severe)
<i>New York</i>	293,097	61,062	586,195	74.2%	<b>86.90%</b>	76.9%	99.6%
<i>Los Angeles</i>	194,985	40,622	389,970	58.8%	<b>72.6%</b>	61.7%	86.5%
<i>Chicago</i>	139,345	29,030	278,691	61.1%	<b>73.4%</b>	63.7%	85.7%

1. Assuming hospitalizations spread proportionally across the United States.

2. Assuming there will be roughly 4.8 million COVID-19 hospitalizations.

3. A moderate scenario predicts roughly 1 million COVID-19 hospitalizations.

4. A severe scenario predicts roughly 9 million COVID-19 hospitalizations.

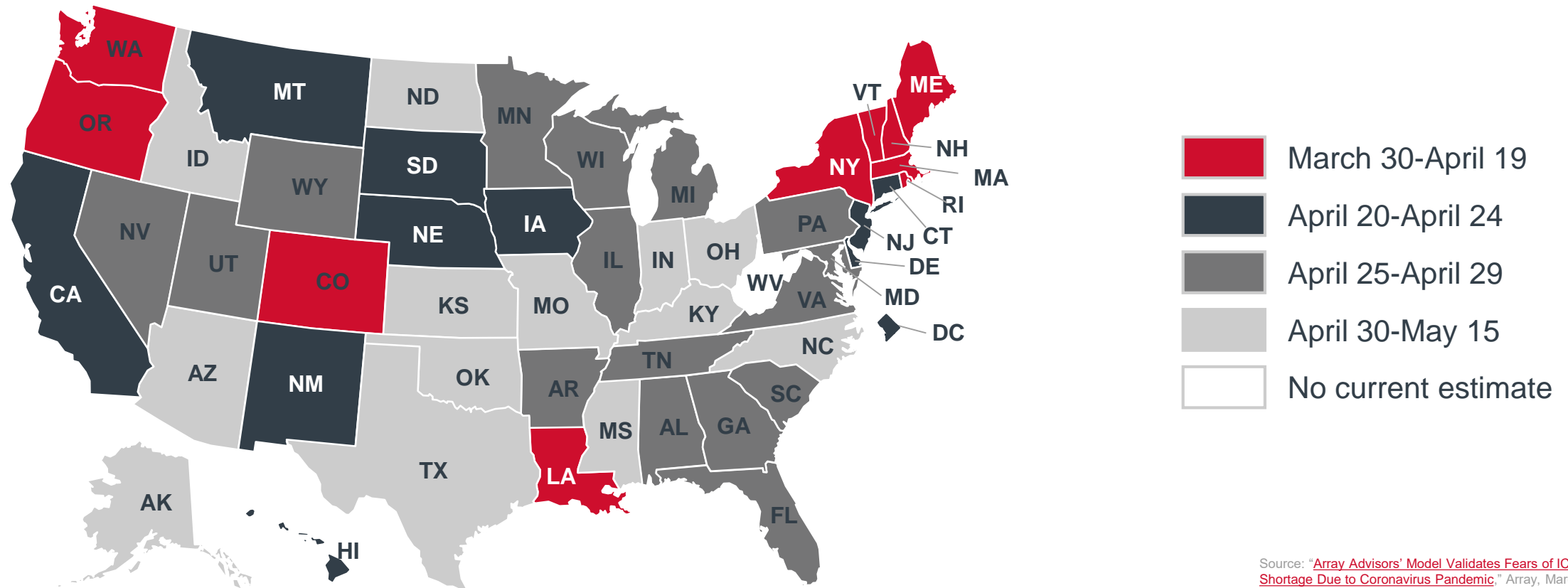
Source: "One slide in a leaked presentation for US hospitals reveals that they're preparing for millions of hospitalizations as the outbreak unfolds," Business Insider, February 27<sup>th</sup>, 2020.

# ICU bed shortages expected nationwide

New model projects rolling shortages will begin across April and May

## Array Advisors' projection of ICU bed shortages and initial shortage dates

Updated March 16, 2020

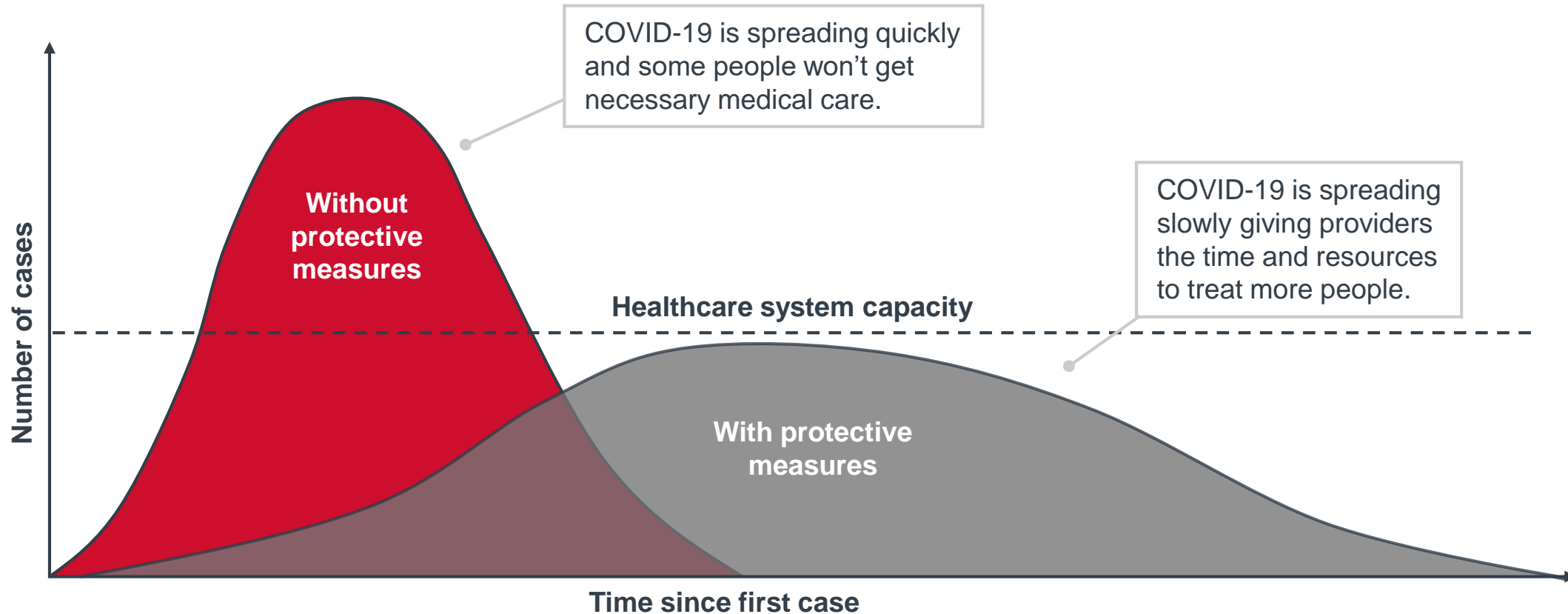


Source: ["Array Advisors' Model Validates Fears of ICU Bed Shortage Due to Coronavirus Pandemic."](#) Array, March 16, 2020.



# 'Flatten the Curve' to fight COVID-19

Protective measures slow the spread allowing providers to treat more people



Source: Qualls, Noreen, et al. "Community Mitigation Guidelines to Prevent Pandemic Influenza — United States, 2017." MMWR. Recommendations and Reports 66, no. 1 (2017): 1–34. <https://doi.org/10.15585/mmwr.rr6601a1>.

# Study concludes longer-term suppression strategy needed

Mitigation strategy may not be sufficient to prevent more than 1M U.S. deaths

March 16, 2020

## Impact of non-pharmaceutical interventions to reduce COVID-19 mortality and healthcare demand

Introduced by: Imperial College COVID-19 Response Team

**2.2M**

Predicted number of deaths in the U.S. in the absence of control measures (no action by the government and individuals to curb spread of COVID-19)

### Mitigation strategy

Slow the spread ( $R_0^1 > 1$ ) in order to reduce peak healthcare demand and protect high-risk groups

- Case isolation at home
- Voluntary household quarantine
- Social distancing of individuals over 70

**8X**

Minimum additional capacity<sup>2</sup> needed to prevent **1.1-1.2M deaths**

### Suppression strategy

Reduce overall number of cases to low levels ( $R_0 < 1$ ) in order to eliminate human transmission

- Case isolation at home
- Voluntary household quarantine
- Social distancing of entire population
- Closure of schools and universities

**18+**

Estimated number of months before a vaccine will be available

1. Reproduction number (average number of secondary cases each generates).  
2. Med/surg and ICU capacity.

Source: Ferguson N, Laydon D, et al, "Impact of non-pharmaceutical interventions (NPIs) to reduce COVID-19 mortality and healthcare demand," Imperial College COVID-19 Response Team, March 16, 2020.

# Trump Administration declares a national emergency

## CMS activates blanket waivers

### COVID-19 outbreak declared a national emergency



The Trump Administration declared the COVID-19 outbreak a national emergency on Friday, March 13, 2020.



Allows HHS to waive or modify certain Medicare, Medicaid, and CHIP requirements under Section 1135 of the Social Security Act.



CMS activates blanket waivers to help the health care industry respond to and contain the spread of COVID-19.

### Blanket waivers aim to<sup>1</sup>:

- **Maximize and flex acute and post-acute care capacity**
  - Allowing hospitals to move patients between units
  - Waiving bed size and LOS limitations at CAHs
  - Waiving SNF 3-day rule, LTCH 25-day ALOS requirement
- **Increase and flex provider supply**
  - Expediting Medicare's provider enrollment process
  - Waiving out-of-state provider licensure requirements
  - Expanding reimbursement for telehealth services
- **Reduce regulatory burden**
  - Streamlining process for DME replacement requests
  - Providing relief on home health reporting requirements

1. For a full description of each waiver, please see the [COVID-19 Emergency Declaration Health Care Providers Fact Sheet](#).

Source: "COVID-19 Emergency Declaration Health Care Providers Fact Sheet." Centers for Medicare & Medicaid Services, March 13, 2020.

# U.S. playing catch up on COVID-19 testing

Despite reactive measures, ability to administer mass testing remains unclear

## Barriers to comprehensive testing in the U.S.

	Who should get tested?	Where to get tested?	Who can run the tests?	Do we have sufficient testing supplies?	Do we have sufficient testing capacity?	How do we communicate results?
<b>Problem</b>	Guidelines too restrictive	Limited, hard to find testing sites	FDA requirements restrict private labs	Shortage of supplies to gather and analyze samples	Too few labs caused insufficient processing capacity	Disconnect between drive-through patients and follow-up coordination
<b>Intervention</b>	CDC expanded qualifying criteria	Health systems and retail venues added drive-through test sites	FDA relaxed requirements for EUA <sup>1</sup> ; government partnered with Quest, LabCorp	Government approved Roche, Thermo Fisher tests; invoked Defense Production Act to manufacture critical supplies	Newly-approved AMC and private labs rapidly ramped up capacity	Unclear
<b>Capacity estimate</b>	<b>76K</b> COVID-19 tests given in the US as of 3/18	<b>47</b> Drive-through test sites set up in 12 states by FEMA	<b>2,000</b> Commercial labs permitted to perform tests as of 3/15	<b>400K</b> Weekly supply of Roche's testing kits to approved labs	<b>20,000</b> Expected daily testing capacity at LabCorp by end of March	

Source: "Most recent data," The COVID Tracking Project, at <https://covidtracking.com/data/>; March 18, 2020; McCamon S, "Drive-through coronavirus tests begin to pop up around the United States," *NPR*, March 17, 2020; "Testing in U.S.," CDC, updated March 17, 2020; Vazquez M, "Trump to invoke Defense Production Act to expand production of hospital masks and more," *CNN*, March 18, 2020; Grady D, "Pence pledges high-speed coronavirus testing from 2,000 labs this week," *The New York Times*, March 15, 2020; "Roche begins shipments of first 400,000 COVID-19 tests to laboratories across US to begin patient testing under FDA Emergency Use Authorization," Roche; "Information from LabCorp about coronavirus disease 2019 (COVID-19)," LabCorp, March 18, 2020.

1. Emergency Use Authorization.

# Relaxing definition of “acceptable” PPE<sup>1</sup>

## Time to harness your inner MacGyver

### Creative “solutions” to the PPE shortage



#### *Finding new sources:*

- Procure masks, gloves, and gowns from non-traditional sources like Amazon and eBay
- Order PPE (e.g., N-95 respirators) from companies who supply goggles/masks to construction workers
- Use expired equipment from inventory or emergency stockpiles



#### *Extending useful life:*

- Align protocols with new CDC guidelines for surgical masks vs. N-95, L1/2 vs. L3/4 gowns
- Re-stitch elastic on old surgical masks
- Modify protocols so clinicians change PPE less frequently
- Introduce some washable cloth protective gowns



#### *Prioritizing PPE:*

- Delay/cancel elective surgeries
- Encourage telehealth visits



### CASE EXAMPLE



### Providence St. Joseph Health

Not-for-profit, 51-hospital health system • Renton, WA

- Hospital will run out of critical PPE (e.g., face shields, masks)
- Infection control and quality experts designed prototype face shields using office supplies and other on-hand materials:
  - Marine-grade vinyl, industrial tape, foam, and elastic
- Purchased supplies from local craft stores and Home Depot
- 20 administrative staff members at their headquarters volunteered, formed an assembly line, and built 500 new face shields
- *Next steps:*
  - Order more raw materials from wholesale suppliers and build more shields
  - Test another prototype facemask from surgical wrap material

Source: Goldberg C, “Got Extra Masks or Goggles? Mass. Hospitals Already Running Short, Ask for Donations,” CommonHealth; “FAQs on Shortages of Surgical Masks and Gowns,” FDA; Macias A, “Pentagon to free up 5 million respirator masks and 2,000 ventilators for coronavirus efforts,” CNBC; “Interim Infection Prevention and Control Recommendations for Patients with Suspected or Confirmed Coronavirus Disease 2019 (COVID-19) in Healthcare Settings,” CDC; “Frequently Asked Questions about Personal Protective Equipment,” CDC; Elgin B, Tozzi J, “Hospital Workers Make Masks From Office Supplies Amid U.S. Shortage,” Bloomberg; “Surgical Mask and Gown Conservation Strategies – Letter to Healthcare Providers,” FDA; “Interim Guidance for Healthcare Facilities: Preparing for Community Transmission of COVID-19 in the United States,” CDC.

1. Personal protective equipment.

# Providers getting creative with ventilator supply

Explore both federal and internal options



## What to demand of the government

- Release and distribute **national ventilator stockpile**
  - Pentagon released (on 03/17) 2,000 ventilators (*Still need to work through distribution process*)
  - US has a stockpile of about **10,000 ventilators** according to Vice President Mike Pence
- Free up **manufacturing capacity** to produce more ventilators through a national mandate
  - President Trump announced (on 03/18) that he will invoke the **Defense Production Act**, which could speed up and expand the US' supply of medical supplies and equipment (e.g., ventilators), *but will only use if needed*



## Strategies to implement in the interim

- Purchase additional ventilators, if possible, ahead of local demand
- Establish **regional inventory-sharing database** to balance local supply and demand
- Work with state or federal government to **redeploy local manufacturing lines** to make new ventilators and other critical equipment
- Use 3D printers to make ventilator parts and respirator valves
- Use **anesthesia machines as ventilators**
- Build simpler versions of ventilators (not as complex with fewer modes of ventilation)
- Fix broken ventilators; use expired ventilators
- **Cancel/delay elective surgeries**

Source: "Pentagon to free up 5 million respirator masks and 2,000 ventilators for coronavirus efforts," CNBC; "President Trump will invoke Defense Production Act to boost medical supplies," CBS News; Farmer B, "Coronavirus Pushes Hospitals to Share Information About Stock of Protective Gear," KHN; Davies R, "UK manufacturers to regear factories to build ventilators for NHS," The Guardian; Toussaint K, "These Good Samaritans with a 3D printer are saving lives by making new respirator valves for free," Fast Company; King R, "Fears grow over federal ventilators supply as coronavirus cases mount," FierceHealthcare.

# The front line in the fight against COVID-19

## How hospitals can help nursing facilities prevent an outbreak

### SNFs are particularly vulnerable to COVID-19



High-risk, elderly patient population



Low staff-to-patient ratios



Predominantly unlicensed staff



High turnover rates, nearly **52%** as opposed to 15% in hospitals

### Three strategies hospitals can use to support SNFs

#### 1 Provide additional advanced clinician support

- ▶ Mobilize SNFist program to offer clinical expertise for SNF patients and staff
- ▶ Ask your SNF partners about their need for staffing assistance, including additional RN support, or telehealth

#### 2 Facilitate infection prevention training for SNF staff, or invite SNF staff to internal hospital trainings on COVID-19 prevention

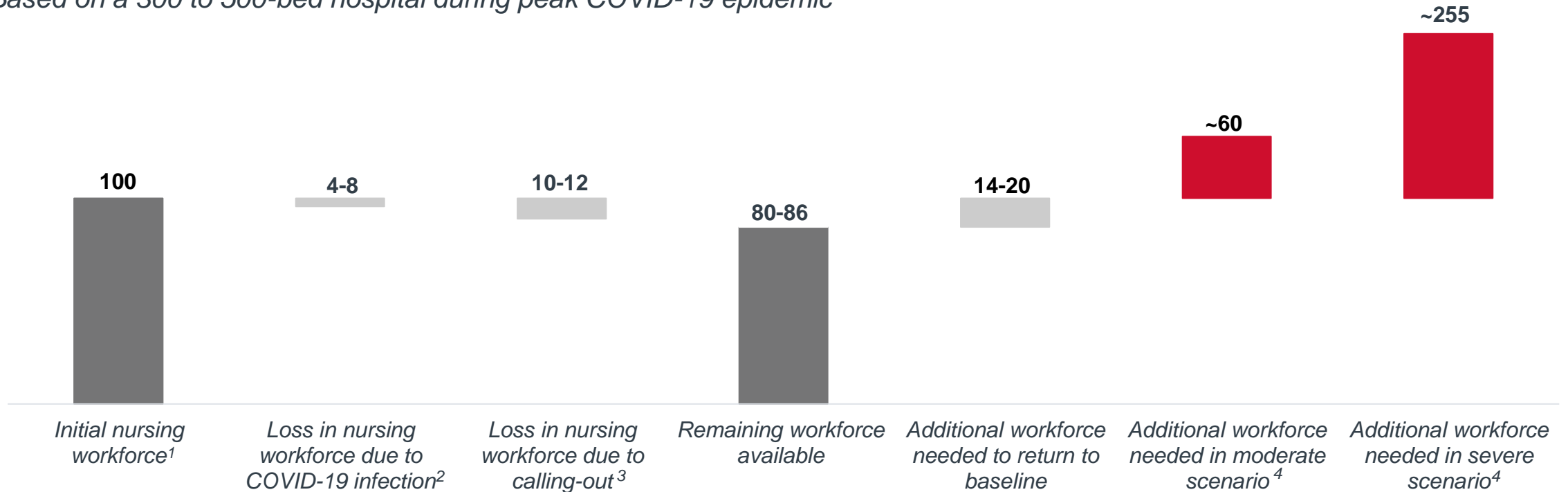
#### 3 Share infection prevention guidelines with post-acute partners

# Nursing supply critical part of capacity to admit patients

Some markets more limited by workforce constraints than bed constraints

## Nursing demand from a moderate and severe COVID-19 scenario

Based on a 300 to 500-bed hospital during peak COVID-19 epidemic



1. Assuming a full workforce is staffed at 80% bed capacity, and the workforce is measured in full time equivalents.

2. Assuming a 3.8% health care personnel infection rate, based off infection rates of China on February 24<sup>th</sup>, 2020 and adding up to an additional 4% due to unprotected exposure.

3. Assuming a call-out rate of 10-12% due to inability to care for COVID-19 patients due to caregiver child needs, personal health, etc.

4. Assumes all hospitals and health systems have even distribution of COVID-19 patients.

Source: "COVID-19 Crisis: US Healthcare Provider and Payer Preparedness," McKinsey & Company, March 17, 2020.



# Acting creatively to rapidly expand staffing

## Early ideas from Advisory Board members

### Within the Organization

#### Relax “top of license”

- For all the effort in keeping folks top of license, deploy teams as utility players flexing up and down; this includes blurring specialty lines and location silos

#### But – be creative on non-clinical

- The one exception on top of license would be finding anything non-clinical that can be shifted away from clinical staff to non-clinical staff and volunteers

#### Three options for “extra” staff

1. Deploy to front line
2. Backfill other roles to free that staff to front line
3. Help train/coach/educate staff taking on new tasks

### Beyond the Organization

#### Evaluating staffing across regions

- Leveraging existing partnership infrastructures (i.e. ACOs, CINs, and health plan collaboration) to track available staff across organizations

#### Revisiting retirees and students

- Asking to delay currently announced retirees, reviewing last two years of retirement, and evaluating local school capacity to help

#### Drafting staff from closed business

- As schools, sports teams, and colleges shut down, drafting trained medical personal into health system and physician practice roles

*Acknowledging beyond the organization options require additional legal/regulatory steps*

# Taking care of staff

## Early ideas from Advisory Board members

### Sleep

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#### Hotel capacity

- Acknowledging that many hotels are currently under-capacity, evaluating options to let staff rest/sleep in nearby hotels

#### Dorms

- For AMCs but also organizations close to academic facilities, leveraging dorms that have been emptied with school closures/shift to virtual learning

### Food

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#### Partnering with local restaurants

- Setting up delivery of food with local restaurants currently being impacted to support staff working above and beyond

### Stress

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#### Providing support for caregiving

- Child care or other primary care responsibilities are coming up as a critical issue; looking for ways to help address capacity needs (or help staff carve time to address needs)

#### Stagger shifts for commute, caregiving

- Recognizing larger community impact, stagger shifts at non-traditional times to avoid high volume commute times and to try and help create at home caregiving flexibility

# Establish clear COVID-19 communication channels for staff

## Five tips for executives

- 1 Give staff a consistent source of COVID-19 truth**
  - Send messages from the **same person**/email address
  - Send messages at a **consistent cadence** – even when there’s no “new” news to report
  - Link to **centralized page** of resources on intranet
- 2 Minimize non-essential emails**
  - **Centralize** the decision to send any org-wide emails that aren’t about your COVID-19 response
  - **Consolidate** any essential non-COVID-19 messages
- 3 Field and respond to rumors**
  - **Set up a channel** for fielding staff rumors. Options:
    - Dedicated phone line or survey where staff can share rumors anonymously
    - “What’s the buzz?” council with frontline staff representatives from across the org
  - Regularly **publish answers** to FAQs
- 4 Make yourself virtually accessible**
  - Establish regular **virtual office hours**
  - Hold **virtual town halls**
- 5 Share your gratitude personally and often**
  - **Acknowledge** the challenges and uncertainty staff are navigating
  - **Recognize** the sacrifices team members are making
  - Emphasize **staff health and safety** as much as patient/family health and safety

# Three things to do NOW to preempt clinician burnout



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## Build your organization's "stop doing" list

- **Press pause** on as many initiatives as possible. Ask:
  - Can we push this [project, meeting, report, training] out 8 weeks?
  - If not: what's the bare minimum we must do? Who absolutely has to be involved – and who can we release?
- **Tell staff** what is okay to de-prioritize



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## Double-down on supporting the emotional health of managers

- Remember: frontline managers have a **disproportionate impact** on both daily operations and the emotional health of their staff
- Make sure you have:
  - A **dedicated forum** for managers to share concerns
  - The list of things managers can **stop doing** so they can better support their teams



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## Be ready to capture and share moments of greatness

- Ensure leaders know **where to send stories** about how staff are rising to the challenge: Directly to the CEO? To a dedicated email inbox?
- **Share these stories** every chance you have:
  - Tell a **90-second story** in every team meeting about how staff are supporting patients/families/each other
  - Highlight **the wide variety of teams/departments contributing** to the response

# Key questions for executives

- Do we have the bed capacity, quarantine capabilities, supplies, and emergency staffing plans we need to care for a spike in COVID-19 in our community?
- Do we have the appropriate channels in place to distribute organization-wide communication? How can we get in front of myths and misleading buzz?
- What should we be doing to educate our community and how? Do caregivers know how to care for sick family members?
- How can we be prepared to support and engage staff members so that they can take care of a COVID-19 outbreak in the community? Are there any non-traditional measures we should take to limit stress on staff members?
- Do we need to change protocols for patient visitation and facility access? How can we most effectively screen patients, visitors, and staff members coming into the hospital?
- How can we minimize unnecessary ED visits and admissions? Are there telehealth capabilities we can deploy to minimize the spread of disease and prevent additional staff exposure?

# Coronavirus scenario planning guide

## 12 situations hospital leaders should prepare for



### FACILITY CAPACITY & SUPPLIES

1. Demand surge stresses capacity across inpatient units, with deepest strains in critical care.
2. Shortages of testing supplies impede ability to accurately diagnose patients and contain virus spread.
3. Local stores of prevention protection supplies are depleted, limiting the ability of hospitals to contain virus spread and protect workers.



### STAFF CAPACITY & RESILIENCE

4. Pronounced staff shortages among both clinical and non-clinical personnel limit effective capacity.
5. Staff across the organization experience stress, anxiety, and burnout.
6. Rapidly changing conditions necessitate that staff receive essential training and frequent, accurate updates.



### COMMUNITY COORDINATION

7. Emergent issues require swift coordination with other providers in the local health care ecosystem—especially primary care and post-acute care providers.
8. Facility access for visitors and suppliers must be carefully managed to prevent virus spread.
9. Concerned patients overwhelm access points across the system, limiting ability to identify and treat infected patients.
10. Uninfected yet vulnerable populations with chronic conditions will experience gaps in care management—and underestimate their virus risk.



### FINANCIAL MANAGEMENT

11. A disruption in the supply of drugs and other non-virus-related medical supplies—combined with sudden labor shortages—rapidly increases operating expenses.
12. Sudden margin pressures and a broader economic downturn threaten medium-term financial sustainability.



To learn more about these scenarios and review questions for pressure testing your strategy, visit [advisory.com/covid-19](https://www.advisory.com/covid-19)

# Your top resources for COVID-19 readiness



## CDC and WHO Guidelines

Compiles evidence-based information on hospital and personnel preparedness, COVID-19 infection control recommendations, clinical guidelines, and case trackers



## Managing clinical capacity

Examines best practices for creating flexible nursing capacity, maximizing hospital throughput in times of high demand, increasing access channels, deploying telehealth capabilities, and engaging clinicians as they deal with intense workloads



## Coronavirus scenario planning

Explores twelve situations hospital leaders should prepare for and helps hospital leadership teams pressure test the comprehensiveness of their preparedness planning efforts and check for blind spots



## Learning from previous outbreaks and disasters

Analyzes the lessons learned from previous viral outbreaks like H1N1 and the pandemic flu, and outlines how to prepare for the health impacts of a disaster



To access the top COVID-19 resources, visit [advisory.com/covid-19](https://advisory.com/covid-19)

# Meet the our experts



## Christopher Kerns

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Christopher oversees all senior executive research at Advisory Board, and is responsible for developing the research perspective, official point of view, and overall Advisory Board message to executives from across the health care sector.



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