



Anatomy of an Outbreak: May 28, 2020

Lessons learned from a global pandemic

Presented by
Health Care Advisory Board

Today's Research Experts



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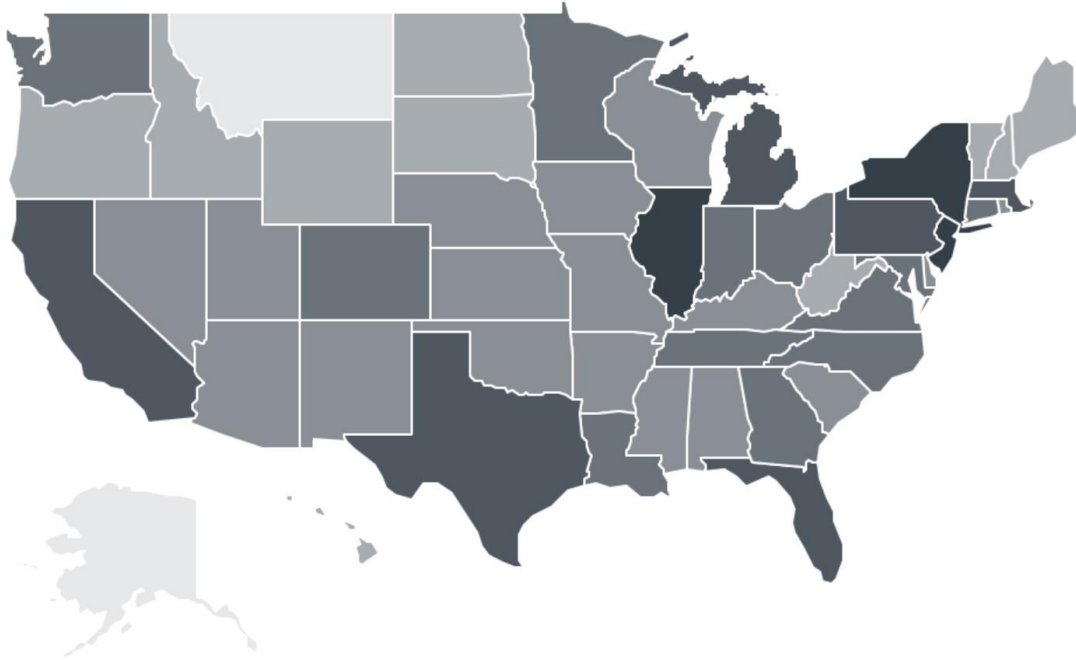


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Coronavirus cases in the United States

Current as of May 27, 2020



● < 500 cases ● < 5,000 cases ● < 20,000 cases ● < 50,000 cases ● < 100,000 cases ● > 100,000 cases

Current COVID-19 cases

At least 1,689,100 cases

368,669 cases in New York

At least 100,000 deaths

Original estimates of possible effects

96 million cases

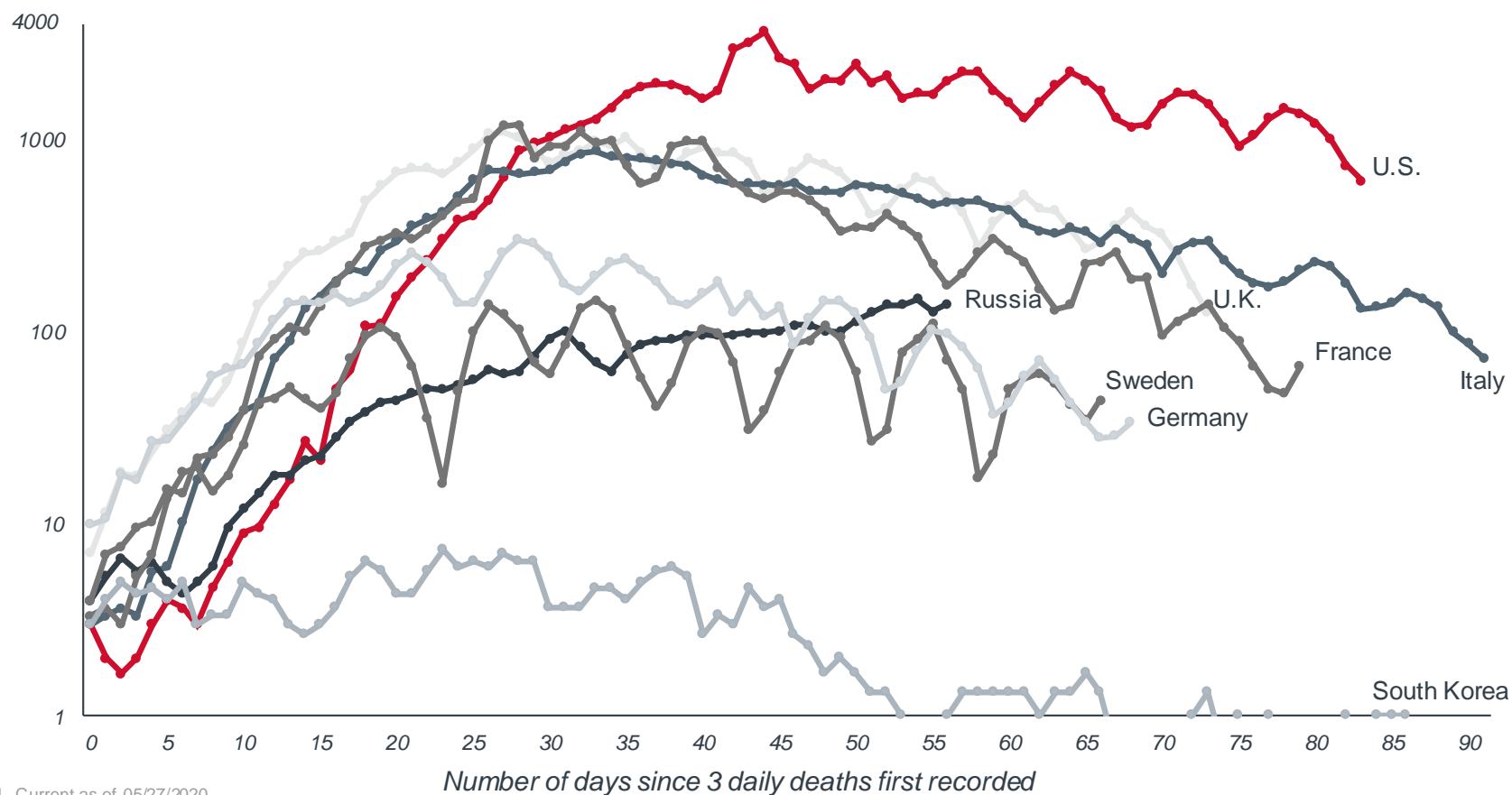
4.8 million hospitalizations

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 27th, 2020.

Worldwide daily death tolls slowly trending down

Daily coronavirus deaths (rolling 3-day average), by number of days since 3 daily deaths first recorded¹



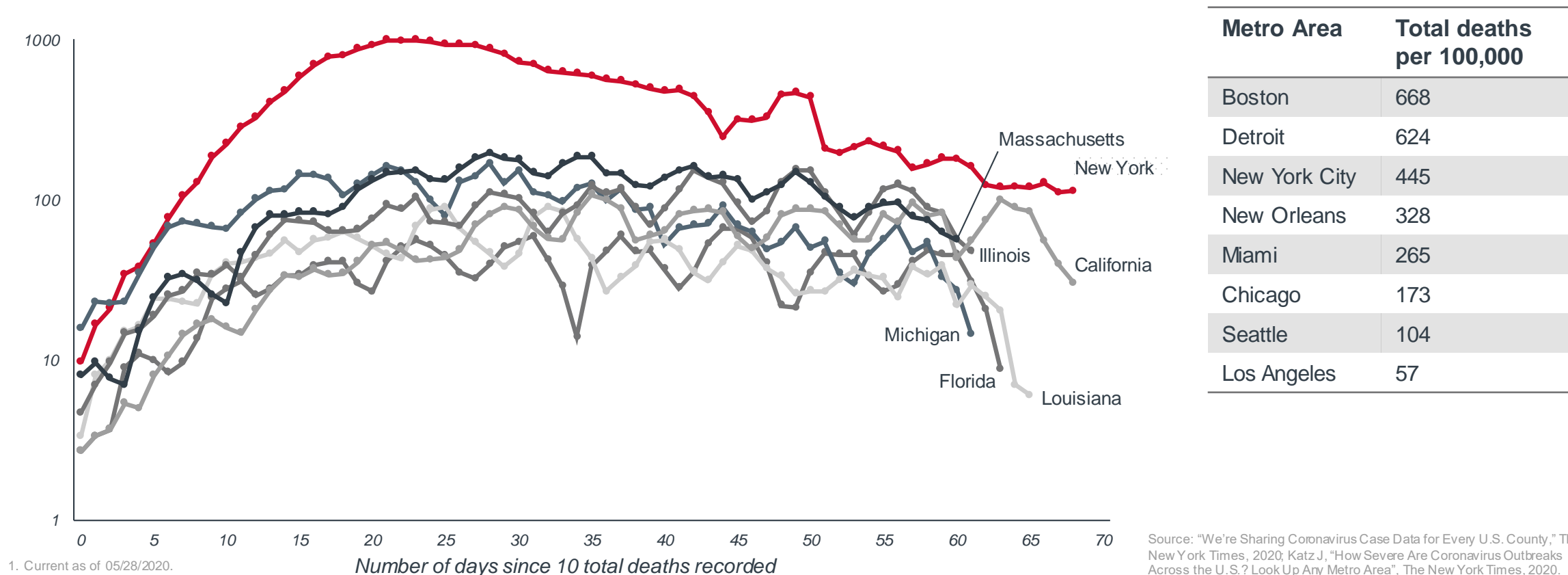
1. Current as of 05/27/2020.

Source: Roser Met et al., "Coronavirus Disease (COVID-19) – Statistics and Research," Our World in Data, 2020.

Sharp drops in state deaths warrant cautious optimism

But progress may be counteracted as states reopen in early June

Daily coronavirus deaths (rolling 3-day average), by number of days since 10 total deaths first recorded¹



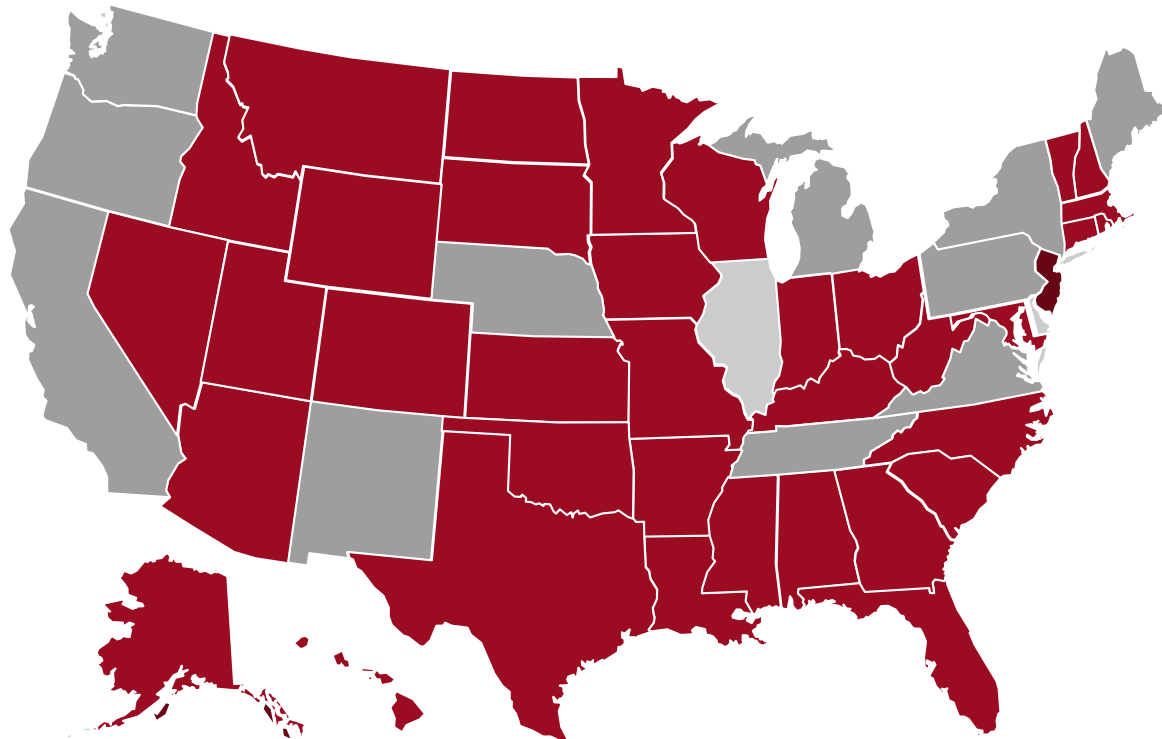
1. Current as of 05/28/2020.

Almost all states taking steps towards reopening

With continued pressure for increasing testing from the White House

States re-opening status

Current as of May 26th



Covid-19 Strategic Testing Plan

Trump Administration plan distributed to Congress

“State plans must establish a robust testing program that ensures adequacy of Covid-19 testing, including tests for contact tracing, and surveillance of asymptomatic person to determine community spread. States must assure provisions are in place to meet future surge capacity testing needs including POC (point-of-care) or other rapid result testing for local outbreaks.”

■ Shut down or restricted ■ Reopening ■ Regional reopening ■ Reopening soon

1. Institute for Health Metrics Evaluation.

Source: “See Which States Are Reopening and Which Are Still Shut Down,” *New York Times*, May 21, 2020.

No magic bullet to reopening strategies

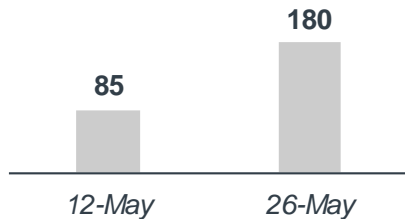
Different states at different stages experiencing both rising and falling cases

Arkansas

Never had a stay-at-home order

7.0% of tests are positive (increasing)

Daily Covid-19 positive cases

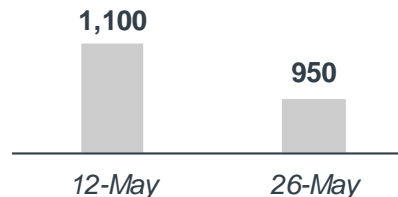


Texas

No stay-at-home order for 27 days

5.5% of tests are positive (decreasing)

Daily Covid-19 positive cases

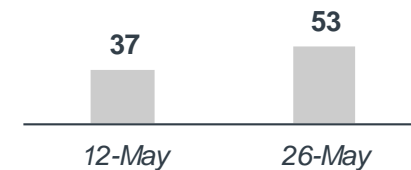


Maine

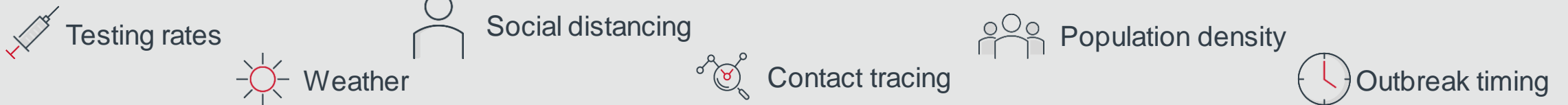
Stay-at-home order in place for 55 days

2.7% of tests are positive (increasing)

Daily Covid-19 positive cases



Several factors influencing Covid-19 spread as states re-open

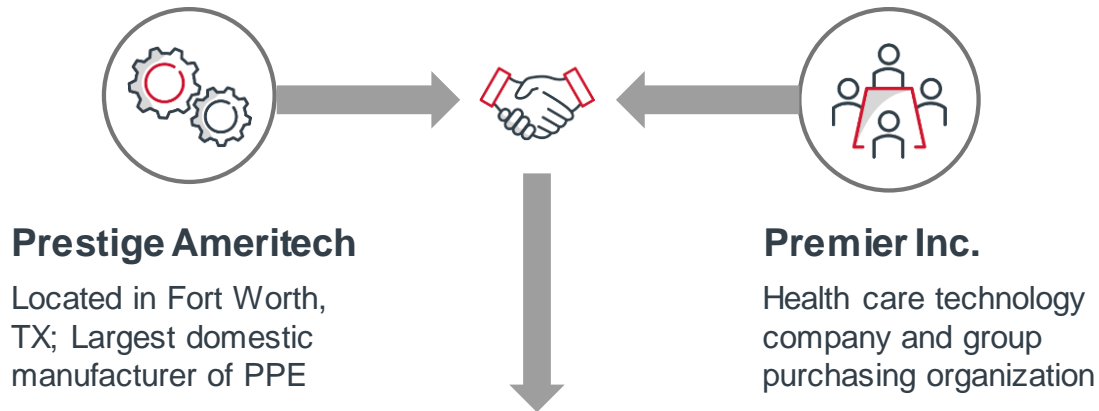


Source: "States are Reopening: See How Coronavirus Cases Rise or Fall," ProPublica, May 26, 2020; "How We Reopen Safely," Covidexitstrategy, May 26, 2020.

Providers “Buy American” to mitigate supply chain risk

Third parties continue to play major role in facilitating more resilient supply chain

Partnership details



- Premier and 15 of its large health system members **purchase minority stake in Prestige Ameritech**
- Members **commit to purchasing a portion of all face masks** they use from Prestige Ameritech for up to six years
- Arrangement part of Premier's broader **strategy to invest in domestic and geographically diverse suppliers** of PPE

Benefits of partnership

- 1 Supply chain resilience**
Domestic manufacturing and raw material sourcing creates a supply chain that is more resilient to shocks from overseas
- 2 Contract guarantees**
Investors are first in line to receive PPE in the event of a shortage
- 3 Economies of scale**
Combined purchasing scale alleviates increased spend associated with buying from domestic manufacturers



Outstanding questions

- Will providers' appetite to bolster their domestic supply chain extend beyond PPE?
- Will providers revert back to valuing cost savings over supply chain resilience as memory of Covid-19 fades?

Source: "Leading health systems invest to expand domestic PPE production through Prestige Ameritech," *Healthcare Purchasing News*, May 26, 2020; "Citing 'over-reliance' on Asia, Ballad Health hopes to diversify PPE supply," *Johnson City Press*, May 26, 2020.

Government calls to move some drug manufacturing onshore

Potential move to mitigate drug shortages puts pressure on pharma



BARDA¹ taps U.S.-based manufacturer to produce drugs and APIs² for Covid-19

- Virginia-based **Phlow Corporation** awarded \$354 million, four-year contract to manufacture generic drugs and APIs² needed to treat Covid-19
- Includes collaboration with private-sector, U.S.-based drug and chemical manufacturing companies

Partnership goals:

- 1 Allow U.S. to manufacture essential drugs at risk of shortages
- 2 Create “strategic active pharmaceutical ingredient reserve” to prepare for drug shortages or emergencies
- 3 Reduce reliance on drug products and active ingredients manufactured overseas

1) Biomedical Advanced Research and Development Authority.

2) Active pharmaceutical ingredients.



Policymakers talk of shifting even more pharma manufacturing to U.S.

- Rumored Federal executive order could mandate government agencies (e.g., VA) to purchase exclusively American-made pharmaceuticals
- Lawmakers have introduced ~20 bills to overhaul the drug supply chain since beginning of Covid-19

Possible implications:

- ▶ Increased prices of drugs and active ingredients
- ▶ Complications and delays in existing supply chain
- ▶ Loosening of environmental regulations that currently hinder pharma manufacturing in the U.S.

“Trump to Tap New Company to Make Covid-19 Drugs in the U.S.,” New York Times, May 18 2020; “Pharma panics as Washington pushes to bring drug manufacturing back to the U.S.,” StatPlus, May 26 2020

HHS allocates \$4.9 billion for SNF Covid-19 response

Funding influx significant, but less than half of what the industry requested



SPOTLIGHT

\$4.9 billion

In Provider Relief Fund payments designated for SNFs

Funds can be used to:

- Scale up testing efforts
- Secure protective equipment
- Address staffing needs
- Reimburse lost revenue

Who is eligible to receive funding?

Certified SNFs with **six or more certified beds** are eligible for this targeted distribution.

What is the distribution methodology?

\$50,000 + **\$2,500**

Fixed amount per SNF

Additional amount per bed

What is the additional criteria to receive funds?

Eligible facilities must comply with audit and reporting rules.

Source: "HHS Announces Nearly \$4.9 Billion Distribution to Nursing Facilities Impacted by COVID-19." <https://www.hhs.gov/about/news/2020/05/22/hhs-announces-nearly-4-9-billion-distribution-to-nursing-facilities-impacted-by-covid19.html>; HHS, May 2020. "Skilled Nursing Facility Relief Fund Terms and Conditions." HHS, <https://www.hhs.gov/sites/default/files/terms-and-conditions-skilled-nursing-facility-relief-fund.pdf>

SNFs still need testing, PPE, and regulatory support



PPE and testing support

SNFs lack access to critical supplies, which are being distributed in an uncoordinated fashion.

79%

Senior and long-term care providers need better access to supplies

54%

Senior and long-term care providers need better access to testing



Continued funding sources

SNFs need additional funds to secure staff, better infection control, and unanticipated needs.

65%

Senior and long-term care providers report increased staffing challenges

\$440 million

One-time cost of testing residents and staff, AHCA estimates



A unified regulatory approach

Lack of clarity regarding regulations is an obstacle to Covid-19 response.

“[We need] consistent unified information and regulatory direction that doesn’t differ from government and oversight entity to entity.”

Anonymous Senior Living executive

Did anyone get close to herd immunity?

Spain's national antibody survey shows hardest hit countries still far from it

CASE EXAMPLE

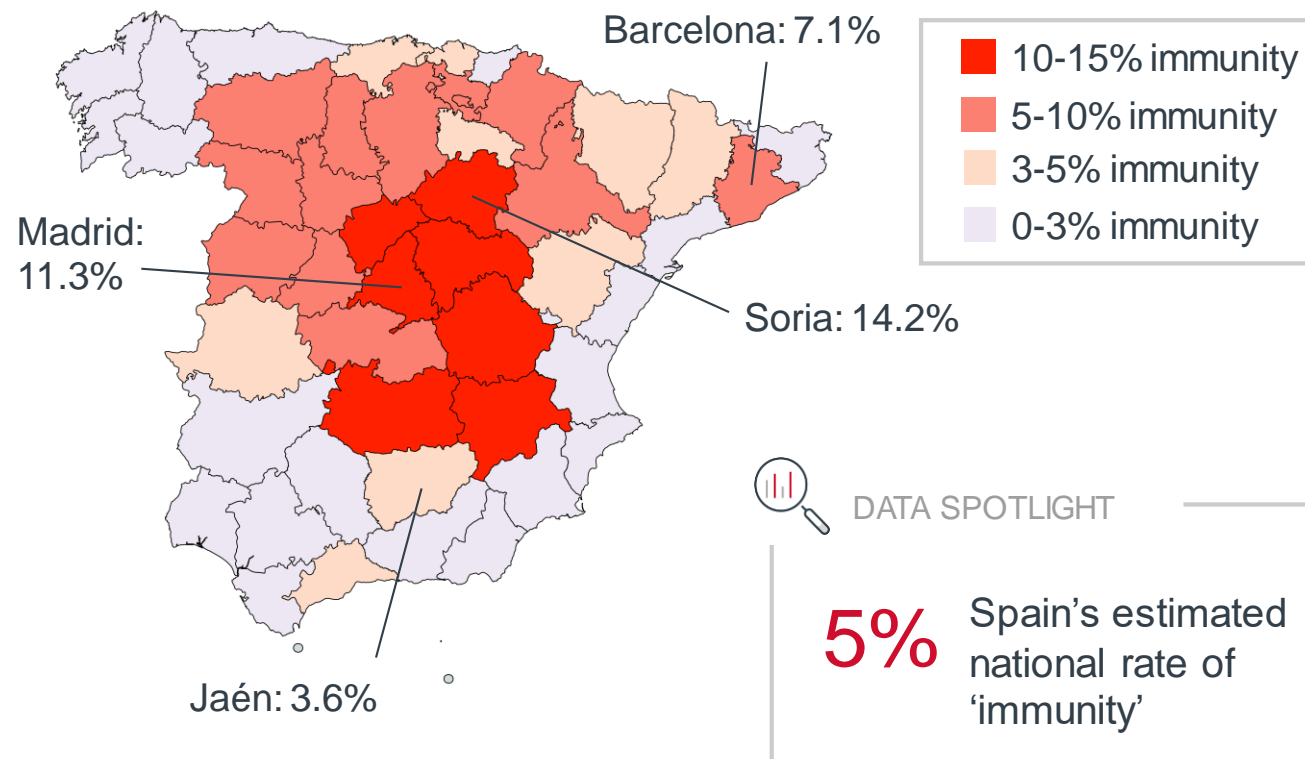


Carlos III Institute for Health, National Statistics Institute

Spanish equivalent of the US N.I.H.

- Conducted national antibody testing (IgG) survey of 70,000 citizens in partnership with the national statistics institute
- Samples obtained from randomly selected households (36,000) across all provinces
- Results show significant regional differences in positivity rate (1.1%-14.2%)
- Despite having third highest Covid death rate in Europe, study findings indicate that nationally only 5% of Spaniards have been infected with the SARS-CoV-2 virus

Estimated 'immunity' differs across Spanish provinces



Source: Financial Times "Spanish herd immunity is still far off, study finds"; Catalan News "Study reveals 7.1% of Barcelona residents have Covid-19 antibodies".

Comparing Covid mortality across countries quite tricky

Excess mortality paints more accurate picture than Covid-19 deaths

Explanations for data discrepancies emphasize need for caution



No universal death count methodology

- While **Belgium** always counted Covid deaths in nursing homes, the **UK** and **US** didn't until April



Covid-19 often under- or misdiagnosed

- Lack of pathologists in the **US** means not all deaths at home have been tested for Covid-19
- Doctors who make final decision may have different thresholds for what is a Covid-19 death
- Raw Covid-19 death count often doesn't take into account deaths caused by delayed care

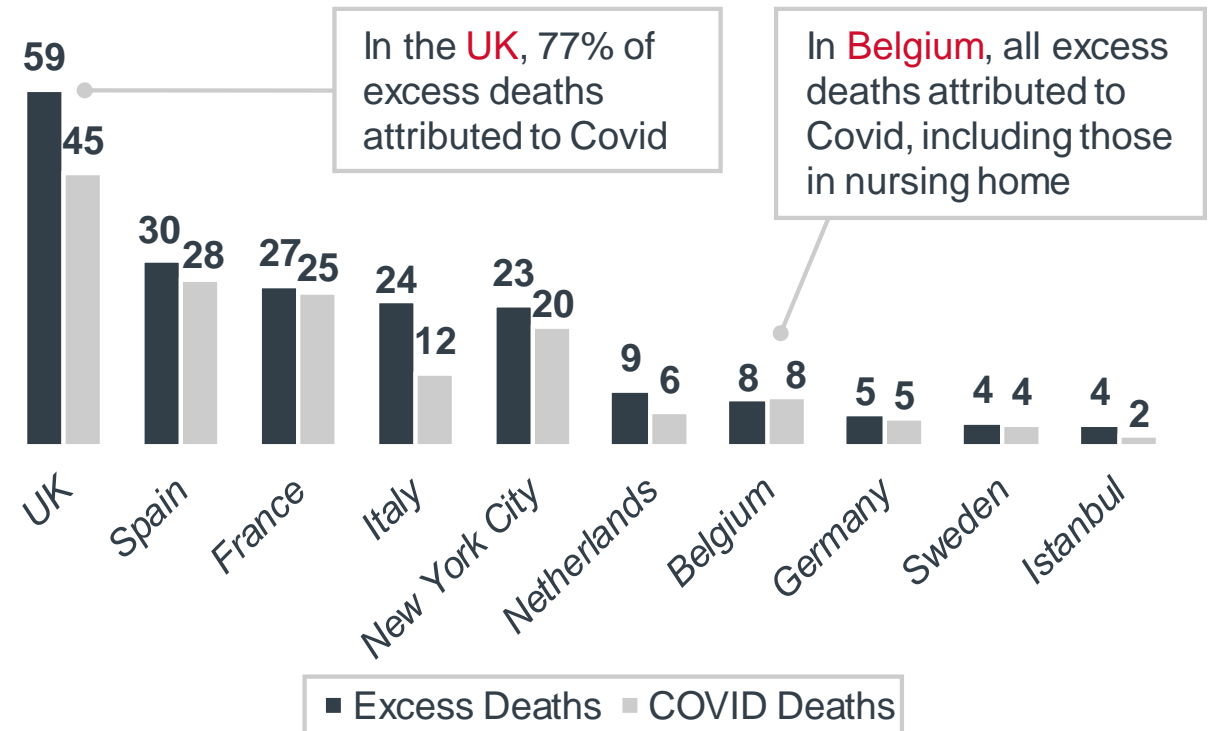


Demographics can skew death count

- Singapore's** low Covid-19 death rate is partly due to its relatively young, migrant population

Excess deaths and COVID deaths per jurisdiction¹

All values in thousands



1. Death count starts after the first 50 COVID-19 deaths in each jurisdiction and is current as of May 17, 2020. Excess deaths is the difference between total deaths and expected deaths, as compared to a five-year average.

Source: ["Tracking covid-19 excess deaths across countries"](#), *The Economist*, April 16, 2020; J Wu et al., ["Tracking the True Toll of the Coronavirus Outbreak"](#), *New York Times*, May 19, 2020.

Was there a “secret sauce”?

Three key pandemic response ingredients in countries with lower rates



Pre-baked pandemic response policies and protocols

Since MERS in 2015, **South Korea** has:

- Given its **KCDC greater decision-making authority** to respond to outbreaks
- **Revised data privacy laws** to prioritize social security over individual privacy at times of infectious disease crises
- Amended its Medical Device Act to establish an **emergency use authorization** policy
- Created a **legal framework for how central and local governments would cooperate** and make decisions during a crisis
- Created an **Office of Risk Communication** to provide public guidance on how to identify untrustworthy information during a crisis



Near-immediate quarantine steps taken

Country	Covid cases before national lockdown put in place
Czech Rep.	150
Portugal	448
Austria	504
France	5,423
Spain	7,641
Italy	9,172



Singapore, Taiwan, and Hong Kong avoided full lockdowns but shut national borders after only 100-600 cases



Data visibility into how the virus moves

4

Days it took for **Taiwan** to develop its “Entry Quarantine System” and grant all hospitals, pharmacists, and clinics access to patient travel data

28

Types of surveillance data (incl. GPS location, credit card records, CCTV footage) used to aid contact tracing in **South Korea**

345

Confirmed Covid-19 cases in **Singapore** before they rolled out *TraceTogether*, the national Covid-19 contact tracing app

Source: Oh S, “[South Korea's Success Against COVID-19](#),” The Regulatory Review, 14 May 2020; Huang Y et al, “[How Digital Contact Tracing Slowed Covid-19 in East Asia](#),” HBR, 15 April 2020; Ames P, “[How Portugal became Europe's coronavirus exception](#),” Politico, 14 April 2020; Roser M et al, “[Coronavirus \(COVID-19\) Cases](#),” Our World in Data, 27 May 2020; Ho G, “[Coronavirus: An unprecedented Singapore border closure, in unprecedented times](#),” The Straits Times, 24 March 2020; Wang C et al, “[Response to COVID-19 in Taiwan](#),” JAMA, 3 March 2020; Manantan M, “[Agile Governance Crushing COVID-19: Taiwan and South Korea](#),” The Diplomat, 22 May 2020; Salcedo A et al, “[Coronavirus Travel Restrictions Across the Globe](#),” NYT, 8 May 2020; Choudhury S, “[Singapore says it will make its contact tracing tech freely available to developers](#),” CNBC, 25 March 2020.

How is disease monitoring being implemented elsewhere?

The Western Hemisphere is entering its contact tracer hiring sprint

Global contact tracing app development sheds light on digital shortfalls



Privacy concerns limiting app uptake

Apps are opt-in only, leaving most countries far short of the 60% adoption rate necessary for them to be effective



Double down on surveillance

- Singapore



Bluetooth proving to be a shaky technology

Older phones lack BT tech, and signal is not always reliable; particular blind spot for the world's senior population



Double down on manual tracing

- Germany
- Spain
- US
- Canada
- Italy
- UK



Stand-offs with private industry delaying app releases

Google and Apple's decentralized protocol derailed several national apps, including the EU-wide app led by Germany; Proving to be an ongoing sticking point in other countries



Too many apps creating a coordination problem

Dozens of apps within single geographic areas will spread contact data across the various tools

184k

Contact tracers necessary to safely reopen the US economy, estimated by George Washington School of Public Health

Source: Dill K, ["What It Takes to Become a Contact Tracer on the Trail of the Coronavirus,"](#) WSJ, 21 May 2020.

Covid-19 gave us a playbook on how to flex up bed supply

Government responses yielded unprecedented increases in acute and critical bed supply, availability



DATA SPOTLIGHT

800

Critical beds **Italy** added in two weeks by halting electives and converting semi-intensive care beds

4,000

Critical care beds in **London's NHS Nightingale** field hospital, which doubled England's total critical care bed supply in just 10 days²

Measures taken in Ontario, Canada between 15 March and 14 April	Acute beds	Critical care beds	Critical care beds w/vent.
Hospital efforts to free up existing capacity (including canceling elective surgeries)	+6,849	+585	+583
Moving hospital patients to other locations	+1,000	0	0
Newly funded beds	+1,500	+500	0
Other expansion of critical care capacity	0	+992	0
Additional ventilator deployment	0	0	+1,492
Available beds in province prior to outbreak	906	357	356
Total additional beds made available	+9,349	+2,077	+2,075
Beds occupied by Covid-19 patients ¹	-910	-243	-193
Net increase in available beds¹ in province (% increase in parentheses)	+9,345 (+1,032%)	+2,191 (+482%)	+2,238 (+483%)

1. As of 14 April 2020.

2. In February 2020 England has 4,122 critical care beds.

Source: "[Ontario Health Sector: A Preliminary Review of the Impact of the Covid-19 Outbreak on Hospital Capacity](#)", Financial Accountability Office of Ontario, 28 April, 2020; Igmen A, "[How Italian hospitals added 800 ICU beds in 2 weeks in response to the pandemic](#)", Advisory Board, 20 March, 2020; West D, "[NHS hospitals have four times more empty beds than normal](#)", HSJ, 13 April, 2020.

PPE remains the global rate limiting factor

“

“**Canada** facing ‘major’ medical gear shortage as 68 countries restrict exports”

Financial Post

“How a lack of PPE in **Spanish** hospitals is leading to a health care crisis”

The Irish Times

“‘We’re not hungry, we need masks’ says **Australian** doctor on coronavirus frontline”

Reuters

“**London** [hospitals] to ‘run out of gowns this weekend’”

HSJ

”

Excerpt

Shortage of personal protective equipment endangering health workers worldwide

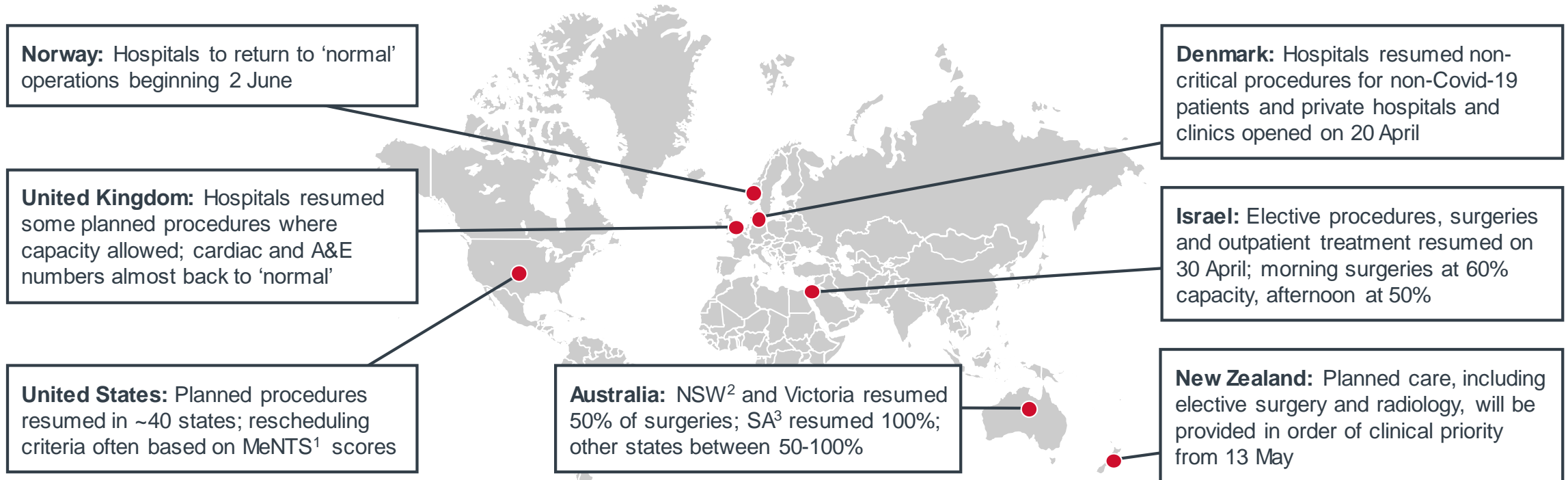
The World Health Organization has warned that severe and mounting disruption to the global supply of personal protective equipment (PPE)... is putting lives at risk from the new coronavirus and other infectious diseases.

...shortages are leaving doctors, nurses and other frontline workers dangerously ill-equipped to care for COVID-19 patients, due to limited access to supplies such as gloves, medical masks, respirators, goggles, face shields, gowns, and aprons.

World Health Organization

Source: HSJ "Trusts to Run Out of Gowns"; WHO "Shortage of Personal Protective Equipment Endangering Health Workers Worldwide"; Financial Post "Canada Facing Major Medical Gear Shortage"; Reuters "We're Not Hungry We need Masks.."; "IrishTimes "How a Lack of PPE is Leading to a Healthcare Crisis".

Restarting planned procedures around the world



Divergence in which procedures reopening first

United States⁴

- Inpatient joint replacement
- Elective EP⁵ and angioplasty
- Gastrointestinal surgery for stable patients
- Outpatient orthopedic procedures

vs.

Australia

- Joint replacements (including knees, hips, shoulders)
- Post cancer reconstruction procedures (such as breast reconstruction)
- Procedures for children under 18 years of age
- Cataracts and eye procedures
- Endoscopy and colonoscopy procedures

1. Medically Necessary, Time Sensitive.










2. New South Wales.

3. South Australia.

4. Common procedures that US systems are choosing to start with.

5. Electrophysiology.

Source: Berglund N, "[Schools, day care can fully re-open](#)," NEWSinENGLISH.no, 27 May, 2020; McCauley D, "[Government 'needs a plan to catch up' on elective surgery as wait lists balloon](#)," *The Sydney Morning Herald*, 22 May 2020; "[Controlled reopening of the Danish society](#)," Danish Police Politi, 20 April 2020; Illman J, "[Cardiac cases back to 'normal' levels as overall A&E attendances edge up](#)," *HSJ*, 22 May, 2020; "[Health and disability services at Alert Level 2](#)," New Zealand Government, 19 May, 2020; "[Israeli hospitals begin return to normal activity as COVID-19 numbers drop](#)," *Jewish News Syndicate*, 30 April, 2020.

	Singapore	Australia	South Korea	Germany	US	Sweden	Italy	UK	Spain
Disease penetration (deaths per million)	 3.93	 4.00	 5.25	 99.65	 298.00	 408.43	 545.06	 545.74	 579.99
Digital contact tracing	App uptake at ~25%; citizens must scan ID or QR code for entry to most public places	App uptake near 25%; will update app soon to be supported by Apple/Google operating systems	Revised data-sharing protocols to prevent peoples' travel routes from being shared publicly	Abandoned centralized PEPP-PT ¹ in favor of decentralized option supported by Apple/Google	Apple/Google supporting apps with decentralized data storage; health depts. to build local apps	No efforts to create an app or implement phone-based programs	Abandoned PEPP-PT in favor of Apple/Google decentralized technology	NHSX ² app still showing problems; back-up plan in place for Apple/Google decentralized app	Will likely use Apple/Google operating systems for contact tracing app
Social distancing and quarantine measures	Initial: Strict quarantine for those exposed; social distancing for others	Initial: Moderate stay at home orders; more strict measures at state/territory level	Initial: Strict quarantine for those exposed; social distancing for others	Initial: Moderate stay at home orders	Initial: Moderate stay at home orders issued state by state	Initial: Encouraged social distancing	Initial: Strict, police-enforced stay at home orders	Initial: Strict, police-enforced stay at home orders	Initial: Strict, police-enforced stay at home orders
	Current: Stay at home orders remain in place; restaurants, places of worship, non-essential businesses closed till 1 June	Current: In re-opening phase 1 of 3: most schools open; retail shops open; dine-in restaurant service for at most 10 patrons at a time	Current: Most businesses/ restaurants open; schools remain closed; bars and nightclubs closed after recent micro-surge	Current: Most schools reopened on 11 May; businesses reopening now; restaurants reopening on state-by-state basis	Current: Stay at home orders lifting on state-by-state basis; 30 states allow some dine-in eating; schools closed until fall in 47 states	Current: Encouraging social distancing; no bar service at restaurants	Current: Non-essential businesses, parks, factories reopened; places of worship, bars, and restaurants reopened 18 May	Current: In reopening phase 1 of 3; restaurants, most shops, and schools remain closed; residents allowed to exercise outside	Current: Entered phase 1 from preparation phase on 18 May; small businesses, retail, reopened; restaurants remain closed
Initial government economic support	Total stimulus: 12% of GDP	Total stimulus: 16.4% of GDP	Total stimulus: 25% of GDP	Total stimulus: 60% of GDP	Total stimulus: 14% of GDP	Total stimulus: Ad hoc support	Total stimulus: 44% of GDP	Total stimulus: 21% of GDP	Total stimulus: 12% of GDP
	Health care: Gov't paying all Covid-19 bills in public hospitals	Health care: Gov't bought public access to 34,000 beds in private hospitals	Health care: Initial stimulus funding provided to medical institutions	Health care: €2.8B to hospitals to cushion loss of revenue	Health care: \$180B to hospitals and health care sector	Health care: SEK 22B added to 2020 budget for health care and social services	Health care: €3.2B for ICU expansion, increased staffing costs, PPE costs	Health care: £10B to NHS; £13.4B hospital and CCG ³ debt written off	Health care: €2.8B to regional gov'ts for public hospitals, €1B to Ministry of Health
Planned procedures	Stopped as caseload increased in mid-April	States/territories resumed 50-100% of procedures	Planned procedures never fully stopped	Hospitals urged to postpone; unclear if advice has been reversed yet	Most states resumed planned procedures	Planned procedures never stopped	Planned procedures to resume soon	Certain procedures resumed mid-May	Private hospitals resuming planned procedures; public to follow soon

What is the world doing to prepare for wave two?

What we're hearing from the global membership

1

Bolstering urban preparedness

- Establishing “**hot**” and “**cold**” sites for future access
- **Hardwiring infection control protocols** with all provider partners

2

Setting up “circuit breakers”

- **Codifying metric threshold breach** that initiates return to outbreak management (i.e., R_0 or infection rate trends)

3

Surveilling ‘at-risk’ sites and populations

- **Identification of existing, at risk patients** who need added shielding and psycho-social support
- Outreach to **businesses with large, centralized workforce(s)**

4

Ramping up contact tracer workforce

- Public health **hiring tens of thousands of manual contact tracers** to prevent and/or respond to second waves
- **Hospitals creating in-house contact tracing teams** for Covid-positive patients and staff

5

Watching the southern hemisphere

- **Monitoring developments in Australia and New Zealand** as they enter their winter and flu season

The top 16 open questions we're looking at now

Executive discussion presentation available to all health care organizations

How will Covid-19 impact...



...the **demographic makeup** of the US—and future demand?



...the purchaser landscape and the nation's **payer mix**?



...the **competitive landscape** efforts to “disrupt” the industry?



...expectations about U.S. health care **capacity**?



...**site-of-care** shifts, including to virtual channels?



...perception of **government's role** in health care?



...**public perception** of industry stakeholders?



...the structure of the U.S. health care **supply chain**?



...demand for **behavioral health** services?



...**employers'** health benefits strategies?



...future fundraising and **philanthropy** efforts?



...the future of the **clinical workforce**?



...the U.S.' approach to post-acute and **long-term care**?



...the future of **value-based care** and risk-based payment?



...perceptions of the **value of systemness** and scale?



...the pharma, device, and tech **innovation pipelines**?

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



How COVID-19 is transforming telehealth—now and in the future

Explores how telehealth is being deployed against COVID-19 and essential next steps for telehealth implementation



To access the top COVID-19 resources, visit advisory.com/covid-19

Meet our experts



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