Health care providers across the world have been launching multifaceted efforts to respond to the rapid spread of Covid-19. We face different phases of urgency — some providers have had relatively little increased demand (patient volume), while others are actively experiencing overwhelming demand and depleted resources. Across these levels of urgency, there are five action areas providers should stay focused on: surge capacity, supply availability, workforce readiness, clinical operations processes, and Covid-19 governance structure and financial resiliency. The authors have developed a set of checklists for providers to leverage in both planning and active response to Covid-19 across each of these action areas.

Throughout the world, multifaceted efforts to address Covid-19 have included response and recovery that support affected patients, families, and communities, as well as accelerated efforts to develop a vaccine and therapeutics. To address this ongoing crisis, health care leaders across the board will need to respond in an evidence-informed manner. For health care providers in particular, this will require leveraging public health infrastructure and broader federal/regional collaborative efforts in parallel with significant internal response efforts, rooted in thoughtful planning that anticipates needs while also providing flexibility to pivot.

Worldwide, we have seen a similar trajectory early in the epidemic, but curves diverge based on measures taken by policy makers and individuals.\textsuperscript{1-5} With ranges of up to 20\% of cases estimated to be severe/critical, significant health system capacity for testing and critical care infrastructure is required,\textsuperscript{6,7} while maintaining the ability to treat patients who require urgent care for other non-Covid conditions. Around the globe, providers are facing different phases of increased demand,
with some still preparing for a wave of patients and some engaged in active but reasonable management. In areas such as New York City, providers have been experiencing massive overload of baseline resources.

Across these levels of urgency, there is a range of actions health systems should consider in response to Covid-19. Five imperatives for all providers to consider are: surge capacity, supply availability, workforce readiness, clinical operations processes, and governance and financial resiliency. We describe a set of best practices for these areas and have prepared accompanying checklists that may serve as tools for health care leaders (see Appendix). Given rapid changes and evolving behavior of the virus, providers are often facing the need to make decisions they have not prepared for and these checklists can serve as tools to ensure readiness across priority areas. Checklists were prepared by the authors based on expertise and experience serving health care stakeholders across the value chain through the Covid-19 crisis, previous pandemics, and relevant topics.

**Surge Capacity**

With the shortage of hospital beds accompanying the Covid-19 pandemic, hospitals should consider options to expand capacity. To rapidly increase bed capacity to treat Covid-19–positive patients, providers are (a) cancelling nonurgent procedures through the development of detailed procedural priority levels detailed at service-line levels (e.g., orthopedics, cardiovascular); (b) moving care of non–Covid-19 patients to telemedicine whenever possible; (c) encouraging and supporting Covid-19 patients with mild symptoms to stay home (and leverage remote care); (d) preparing to increase bed capacity for treating patients who need hospitalization by developing tiered surge plans or utilizing recently developed tools that guide decision-making with bed capacity thresholds as activation triggers; and (e) preparing to efficiently discharge patients once appropriate as they recover.

"Five imperatives for all providers to consider are: surge capacity, supply availability, workforce readiness, clinical operations processes, and governance and financial resiliency."

Options for increasing capacity include deploying mobile hospitals, bringing online decommissioned beds, increasing beds per room, exploring additional areas within facilities (e.g., physical therapy treatment areas), using attached specialty hospitals, converting existing post-acute care facilities, partnering with outpatient clinics, using non–health care facilities (e.g., college dorms or hotels), and partnering with other types of local hospitals (Figure 1 and Appendix). Providers should be selecting alternative care sites through a systematic process asking critical questions around location (e.g., assessing nearby existing real estate structures and availability for modular additions) and labor and supplies (e.g., associated workforce and labor needed driven by level of care required). For example, the Cleveland Clinic has converted a nearby health education building to house more than 300 beds to handle the surge of anticipated Covid-19 patients. The
building does not have ventilators but is equipped to care for low-acuity patients and has room for roughly an additional 700 hospital beds if the need arises.9

**FIGURE 1**

**Detailed Provider Checklist for Surge Capacity**

**Surge (care) capacity**

- Inventory bed count across ICU, Med Surg, and ED to estimate the maximum capacity for admissions based on availability of beds, clinical workforce, and adaptability of facility space
- Identify potential care areas for patient overflow for diagnostic holding or potential Covid-19 ward (e.g., auditorium, gym, PT treatment space, lobby, space for outdoor tents, parking lot)
- Establish protocols for utilizing alternative sites for patient evaluation/treatment:
  - Activation triggers for establishing alternate sites (e.g., based on bed capacity levels)
  - Outsourcing care of non-critical patients to appropriate alternative treatment sites (e.g., adapt outpatient departments for inpatient use, home care for low-severity illness, connecting patients with social needs to community-based services organizations, hoteling)
  - Consideration to segregation of Covid-19 and non-Covid-19 patients to separate sites to prevent disease spread should be given. This has implications on workforce and supplies needed, depending on site designation
  - Establishing a contingency plan for inter-facility patient transfer; verify availability and resources required for patient transportation
- Coordinate with other area hospitals on referral protocols and clarify your facility’s position within broader geographic network
- In coordination with public health authorities and other area health systems, identify additional sites that can be converted to patient care units (e.g., hotels, schools, community centers, gyms); develop operational plans (staffing, equipment, supplies, etc.)
- Coordinate with health authorities, neighboring hospitals, and private practitioners to define roles and responsibilities for each member of the local health care network to ensure continuous provision of essential medical services throughout the community
- Develop activation trigger and plan for initiating facility lock-down and/or limited access and entry

Source: The authors

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**Supply Availability**

Most providers have or will be facing significant challenges related to supplying critical protective and treatment items. As Covid-19 cases increase, these pressures will increase. Even as some regions see a leveling or decline of infections, the potential for additional waves of resurgence remains. Protocols, visibility, and collaboration are instrumental in mitigating supply chain risk. Centralizing buying, inventory balancing, and distribution at a system/regional level with a rapid response team will help ensure supplies reach areas of greatest need. Promoting supply conservation and establishing alternative clinical scenario plans are becoming realities.
Providers are developing tiered scenarios for each of the clinical supplies (e.g., alternative usage protocols based on certain threshold levels), and communicating plans to clinical site leaders. Some providers are utilizing a PPE (personal protective equipment) calculator provided by the Centers for Disease Control and Prevention (CDC) to help facilities determine their PPE consumption rate and future needs. Some of these plans include alternate sourcing and product use, and conservation strategies when possible. For example, the University of Alabama at Birmingham Hospital has begun to decontaminate and reuse their N95 masks, a practice increasingly being used.10

The largest determinant of collective success will be collaboration between providers, suppliers, manufacturers, and public agencies. For example, health systems with multiple facilities within a region have explored a Center of Excellence model, with facilities designated as Covid-19 sites while others attempt to treat other emergent volume, with appropriate PPE policies at each site. Another example of collaboration is the development of supply-demand aggregation platforms by many organizations: Project N95 is one of many that was created to serve as a national clearinghouse to connect health care providers with critical equipment (see Appendix).

**Workforce Readiness**

Hospitals likely will need to plan appropriate staffing levels based on a complex set of dynamics. These may include fewer available workers due to known or suspected Covid-19 infection, or those who are less available due to burnout or increased caregiving needs due to lack of child/elder care. Simultaneously, there may be a need for increased hours from the workforce resulting from rising patient burden — though potentially offset by more staff available due to cancelled elective procedures.

> Even as some regions see a leveling or decline of infections, the potential for additional waves of resurgence remains. Protocols, visibility, and collaboration are instrumental in mitigating supply chain risk."

Our volume-based estimates indicate that workforce needs could increase anywhere from around 40% to 120% at the peak of the epidemic, with wide variation predicated on the attack rate of the virus in specific regions, workforce callout and infection rate in a particular region, and the actions taken in response. Additionally, health care providers and states may struggle with providing training required to rapidly upskill staff, including training nurses to provide care to ventilated patients.

We anticipate escalating challenges with absenteeism, with 10% to 20% of staff calling off shifts due to illness, dependent care needs, quarantine, or other reasons. Given the rate of school cancellations, absenteeism will likely increase due to a lack of childcare alternatives. Some providers have been able to address this by establishing programs to provide childcare for the clinical workforce such as with Ohio State University’s Wexner Medical Center.11
Providers are also facing challenges when pursuing the usual solutions, such as agency or travel nurses. Attempts to increase workforce availability, including medical schools allowing their fourth-year medical students to graduate early or sending nurses across state lines, have been met with logistical challenges. These include having plans approved by state education and medical-licensing boards, and working with regulatory bodies to secure temporary licenses for doctors who were not planning to be in hospitals until July. Providers also should develop plans to address burnout and the mental health needs of their workforce, including anxiety and depression stemming from long hours and difficult work treating Covid-19 patients. For example, UCHealth offers employees behavioral health counseling, a 24-hour crisis hotline, and an employee leave program for times of hardship. Since Covid-19, it launched additional training to help health care workers deal with the mental toll of the outbreak (see Appendix).

Clinical Operations Processes

Given limited inpatient resources, providers have expanded their strategies to include preventing unnecessary visits to acute care sites by both persons under investigation, and those with mild confirmed Covid-19. To support this effort, providers are making significant investments in ambulatory care, telehealth, testing, and home health services. In addition, to support keeping Covid-19–negative patients uninfected, keeping the workforce healthy, treating sick patients efficiently and effectively, and protecting their financial position/ability to serve patients as much as possible during the peak of this pandemic, providers are making adjustments to their clinical operations (see Appendix).

A significant challenge in executing against all these efforts is the availability of tests and testing capacity. As a result of limited testing capacity and supplies as well as turnaround times, health systems in concert with public health and other government officials are addressing challenges through multiple considerations, including: modeling potential capacity based on available equipment and systems, workforce/staffing, etc.; determining bottlenecks; and adjusting workflow and resourcing in order to optimize testing capacity.

Governance and Coordination

All actions described here and in the Appendix will require coordination. We advise preparing a specific Covid-19 management strategy and establishing an Emergency Operations Nerve Center/Team. The Nerve Center should be organized to monitor development of the crisis and coordinate a response. It should act as the single source of truth, maintaining the organization’s perspective on pandemic progression, as well as a single point of aggregation of key operational metrics to track the organization’s ability to respond to the crisis. We recommend identifying a designated Covid-19 emergency response program lead with backups in case of burnout and/or clinical need.

“The largest determinant of collective success will be collaboration between providers, suppliers, manufacturers, and public agencies.”

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Several systems have shared that their analytics capabilities were unable to support the real-time decisions required during the crisis. Thus, we also recommend deploying a data lead and team to develop a comprehensive dashboard to prioritize continuous monitoring of key operational (e.g., beds, volumes), supply (e.g., ventilators, masks, advance purchasing), and financial (e.g., days cash on hand, supply cost variability, elective volume declines) metrics. The Nerve Center should provide the ability to look forward by tracking leading indicators to warn leadership of likely developments or operational shortfalls — while much of the organization is forced to focus on the present. It should act as a channel for interventions, serving as the single point of escalation for decision-making and deployment of top-down resources to unblock operational challenges (e.g., flexing surge capacity). For your top management team, quickly clarify new responsibilities and responsibilities that are paused given the context of this pandemic (see Appendix).

**Looking Ahead**

As providers face Covid-19, there are many known unknowns. This includes the trajectory of continued infection rates, effectiveness of society-wide physical distancing, the length of the crisis, when the peak will hit, if and when subsequent waves of infection may hit, and which members of society will be hit the hardest. In addition, since the pandemic began, a few unknowns have come to light. These include protests demanding governors reopen the economy, the 38% decrease of STEMI events in high-volume cardiac labs, and the higher rates of black Americans contracting Covid-19 while also being less able to access testing. Tactical and coordinated action can mitigate the most devastating scenarios and should be an immediate and ongoing priority for health systems.

Given the financial risk due to the Covid-19–related demand shock and economic downturn, providers are beginning to develop resiliency plans to be able to serve their patients and communities in the medium term. To better understand risk, we suggest providers build stress-test scenario models to help forecast and prepare for changes in cash flow as a result of the drop in elective cases, rise in lower-margin ED/ICU cases, shift in payer mix, increased workforce/external spend costs, delayed payments, etc. Providers should also identify potential near-term and long-term impacts of financial losses (e.g., investment income, near-term liquidity/solvency, and long-term losses due to potential economic downturn). Lastly, they should develop a comprehensive road map to meet non-emergent needs that had been deferred (referral/physician pipeline management, capacity planning for recovering demand for non-emergent procedures).

The next normal is on the horizon. Each day offers an opportunity for providers to build strategies where we hope for the best, but prepare for the worst.

**Pooja Kumar, MD**  
Partner, McKinsey & Co.

**Omar Kattan, MD**  
Engagement Manager, McKinsey & Co. Staff Physician, UCLA Health
Bede Broome, MD, PhD
Partner, McKinsey & Co.

Shubham Singhal, MBA
Senior Partner, McKinsey & Co.

Checklist Exhibits 1–6.

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