To combat the Covid-19 crisis, health systems leaders need a clear, systematic approach to quickly evaluate critical needs and identify areas of weakness. In addition, to flatten the curve of the rates of infection and hospitalization, health systems need to proactively deploy a robust preparedness strategy. This compilation of best practices for Covid-19 preparedness is based on established guidelines and firsthand experiences on the front lines of the Covid-19 pandemic. The cornerstones of an effective Covid-19 preparedness plan for a health system are: (1) mitigating local transmission; (2) conserving, supporting, and protecting staff; (3) eliminating nonurgent strains on the system; and (4) coordinating communication. Health systems should not wait until they face a surge in Covid-19 cases to implement a comprehensive response. By acting early, health systems may avoid being crippled by crisis and continue to be operational and provide critically important care.

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Introduction

In times of crisis, health systems leaders need a clear, systematic approach that will enable them to quickly evaluate critical needs, identify areas of weakness, and develop a strategic plan of attack. Given the rapidly evolving Covid-19 pandemic and the speed of its spread, health care organizations across the nation are frantically deciding which steps are needed to prepare for Covid-19 while continuing usual health care delivery operations.

We provide a compilation of best practices for Covid-19 preparedness that will allow health systems leaders to rapidly identify key areas to address. Recommendations are based on established guidelines and frontline experiences from a national collaboration of 18 providers with collective expertise in quality improvement, patient safety, health care administration, and clinical care on the front lines of the pandemic. All collaborators are Presidential Leadership Scholars, Aspen Institute Health Innovators, or Eisenhower Fellows, and their teams.

The cornerstone of a health system’s Covid-19 preparedness plan needs to address the following critical elements: (1) mitigating local transmission; (2) conserving, supporting, and protecting staff; (3) eliminating nonurgent strains on the system; and (4) coordinating communication.

Mitigating Local Transmission

Hospitals and clinics are hubs for the spread of Covid-19. Three core strategies should be taken to minimize unnecessary exposure and transmission of Covid-19: (1) limit those entering the health care facility; (2) reduce staff to essential personnel; and (3) screen all people entering the facility.

Limit Those Entering the Health Care Facility

Limiting the number of individuals who enter the hospital and clinic is essential to help protect patients and health care workers from Covid-19 exposure and to mitigate local transmission. In addition, patients are at risk for exposure to Covid-19 in transit to — and during — their visit.

Patients should remain at home unless they require urgent or emergent medical care. Instead, telemedicine should be utilized as the default approach. Telemedicine allows continued care while reducing unneeded exposure to patients and health care workers. Although reimbursement and policy barriers have prevented widespread adoption of telemedicine, legislation as of March 6, 2020, reduced such barriers by allowing Medicare fee-for-service billing for telemedicine services. In addition, restrictions surrounding patients and physicians being in different states have been relaxed. The United States Veteran Affairs Department issued a policy statement on March 18, 2020, stating any platform of video communication, including FaceTime, Google Hangouts, Skype, and others, are allowed for telemedicine. Furthermore, the U.S. Centers for Medicare & Medicaid Services (CMS) has waived penalties for HIPAA violations when serving patients in good faith through these modes of communication.

Visitors and vendors should be limited or excluded altogether, as they could be potential vectors of spreading infection. While some hospitals employ passive strategies to deter visitors, implementing
strict visitation policies at health care facilities is essential. Though many facilities have chosen to exclude all visitors, some are allowing visitors only in extenuating circumstances. In those instances, any visitor should remain in the room of the person they are visiting. Patients who need to be accompanied (such as minors, those with cognitive or developmental delays, behavioral concerns, obstetric patients needing support, or patients undergoing a procedure) should be allowed no more than one person with them. Patients at the end of life or those in hospice care may need more lenient guidelines. Elderly or immunocompromised visitors should be strongly discouraged from visiting facilities in order to protect themselves. Confirmed Covid-19 patients, and Patients Under Investigation (PUIs) should not be allowed to have visitors in their room.

Reduce Staff to Essential Personnel

To limit hospital and clinic staff foot traffic, non-frontline health care workers, defined as those not involved in direct patient care, should be deemed nonessential personnel and asked to work from home, if possible.

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This goal can be accomplished by canceling and rescheduling any nonurgent procedures (discussed more below), converting in-person meetings to virtual meetings, and implementing mechanisms for telework and telehealth. Paring down in-person staff to only essential personnel (including physicians, advanced practice providers, nurses, technicians, engineering and environmental management workers, and food service workers) will not only mitigate local transmission, but also provide for staff conservation and protection. Students have been removed from clinical clerkships at many hospitals, not only to limit foot traffic, but also for their own protection.

Among essential health care workers, foot traffic with PUIs and confirmed Covid-19 cases should be minimized to every degree possible. Any procedures for PUIs or confirmed Covid-19 cases should be performed by the attending physician to limit exposure to trainees who may require more than one attempt in procedures such as intubations or bronchoscopies. Such strategies will also minimize the use of essential supplies, a vital component of crisis-management strategies for Covid-19.

Measures to reduce nonessential foot traffic among non-PUIs should also be enforced to minimize cross-infection. These measures include rounding on patients using fragmented teams (e.g., if on a team with two residents, rounding on one resident’s patients, then separately rounding on the other resident’s patients), communicating with other patient care team members (e.g., consult services, social work, etc.) via phone instead of face-to-face, and minimizing coincidental congregation in patient rooms (e.g., waiting until the nurse is finished taking vital signs and exiting the room before the primary health care team enters the room to examine the patient).
Screen All People Entering the Facility

Anyone entering the health care facility (patients, staff, visitors, and vendors) should be screened outside the point of entry for Covid-19 risk. Screening may be through active means (assessing fever, asking about known or presumed exposure, symptoms, and recent travel), but if that is not possible, at the very minimum, passive screening (signage at every entrance with screening questions, directing self-identified at-risk individuals to a triage area) should be enacted (Figure 1).

### FIGURE 1

**Covid-19 Active Screening Template**

1. Do you have a fever, chills, new or worsening cough, shortness of breath, sore throat, myalgias, gastrointestinal symptoms or other flu-like symptoms?
   
   ____ Yes  ____ No

2. Have you traveled to any countries or regions with positive cases of Covid-19 in the last 14 days?
   
   ____ Yes  ____ No

3. Have you been in close contact with anyone, including health care workers, confirmed to have Covid-19?
   
   ____ Yes  ____ No

   **Screen Positive_____  Screen Negative_____**

Source: The authors

NEJM Catalyst (catalyst.nejm.org) © Massachusetts Medical Society

If a patient screens positive and is stable, they should be given a mask and sent to a triage area for further evaluation by staff in full personal protective equipment (PPE). If symptoms are mild and they are stable, they could be sent home with anticipatory guidance for self-care, when to seek emergency care, and instructions for self-isolation. If the patient screens positive and exhibits respiratory compromise, including hypoxia or respiratory distress, they should be admitted for further diagnostic workup and management. If patients screen negative, they should be allowed entry as normal. For health care workers, if they screen positive, but appear medically stable, they should be sent home for self-quarantine, per the Centers for Disease Control and Prevention.
(CDC). If possible, two separate screening stations should be established — one for patients and visitors and a separate one for health care workers — to minimize congregation in screening areas and decrease risks of cross-infection.

Facilities may also consider implementing drive-through screenings in parking garages or other spaces outside the facility, thereby preventing patients and visitors with an infection risk from entering the hospital. Additionally, facilities should encourage patients and visitors to call into the hospital or clinic ahead of time if they feel poorly or have presumptive Covid-19 symptoms to ensure they go to triage stations and further reduce exposing others at screening stations.

**Pitfalls regarding screening:** Despite proactive outreach, patients are still likely to present to outpatient clinics for nonurgent care. In resource-poor communities, many patients lack stable housing, phones, or Internet access and can be difficult to reach. In addition, patients, after visualizing the bottleneck upon entry to the hospital or clinic, may mischaracterize their subjective symptoms during mandatory screening to gain entry faster, only later to reveal they have concerning symptoms of Covid-19. Given that pulmonary pathology can be an early sign of Covid-19, auscultating the lungs in addition to temperature check may help identify PUIs.

**Conserving, Protecting, and Supporting Staff**

Health care systems must rapidly evolve staffing protocols to keep their health workforce strong enough to treat rising volumes of patients. In China, as of March 12, 2020, an estimated 3,000 health care workers had been infected and 22 died. In Vacaville, California, one case of Covid-19 — the first documented instance of community spread in the United States — resulted in 200 hospital workers being quarantined and unable to work for weeks. As community transmission of Covid-19 explodes in the United States, health care systems must be flexible with staffing, paying key attention to conserving, supporting, and protecting frontline staff. Strategic workforce planning should be developed and preemptively implemented well before the number of Covid-19 infections surges locally.

Health care facilities should also rotate staff in high-risk settings to minimize exposure, consider maintaining minimal staffing levels in house, and keep other colleagues at home for back-up and to deliver telehealth services and run virtual clinics. It is imperative that health care facilities postpone elective procedures. This approach will protect staff from unnecessary exposure to Covid-19; preserve PPE equipment, especially surgical masks, eye protection, and gowns; release anesthesiologists to provide ICU care; and conserve back-up staff for when in-house staff become incapacitated. Delaying elective surgeries will cause financial strain for hospitals and health systems. Rural hospitals are particularly precarious and risk closure due to revenue loss. Congress has responded with $100 billion in hospital funds through the CARES Act.
The cornerstone of a health system’s Covid-19 preparedness plan needs to address the following critical elements: (1) mitigating local transmission; (2) conserving, supporting, and protecting staff; (3) eliminating nonurgent strains on the system; and (4) coordinating communication.

Supporting frontline clinical and administrative staff is paramount. Expanding the essential clinical workforce will be instrumental in doing so. The governors of New York, California, and Colorado, among others, have asked retired doctors and nurses to reenter clinical care to create a reserve pool of health care professionals to replace frontline staff who become ill or need respite.

Revising approaches to clinical training and utilization of resources can contribute to supporting essential staff. Traditionally, attending physicians round on patients with a large team of trainees and advanced care providers; during Covid-19, only a skeleton crew should visit patients confirmed or suspected to have the disease. Instead of PUI consults being seen by the student, intern, chief resident, and ultimately the attending, much of the hierarchical redundancy must be cut to promote safety and efficiency and preserve PPE.

As states enact more stringent social distancing measures and order nonessential businesses to close, health care workers struggle to find adequate childcare while schools and daycare centers temporarily cease operations or convert to distance learning. Although some employers provide paid leave to their health care staff, this is not universal, and there are other ways to support frontline staff. Nonessential staff and trainees, including medical students and some residents who are barred from working at the hospital during the outbreak, may be able to fill in this gap by assisting physicians, nurses, and other essential staff with childcare and other needs. University of Minnesota medical students have assisted more than 160 providers in caring for their children.

Protecting Frontline Employees Using Personal Protective Equipment

The use of PPE for health care personnel on the front lines is vital for the safety of caregivers. Currently, the CDC recommends the use of PPE in all known or suspected cases of Covid-19, including: (1) face mask or respirator, (2) eye protection, (3) non-sterile gloves, and (4) isolation gowns. For aerosol-generating procedures (such as sputum collection), N95 respirators or Powered Air Purifying Respirators (PAPRs) are recommended. These CDC recommendations are widely accepted, currently mirroring the inpatient PPE care recommendations from the World Health Organization, the Surviving Sepsis Campaign on the Management of Critically Ill Adults with Covid-19 from the Society of Critical Care Medicine, and the European Society of Intensive Care Medicine.

All health care personnel caring for suspected or confirmed Covid-19 patients should be instructed in the proper donning and doffing of PPE, as well as how to properly dispose or disinfect used PPE. Refresher training should be offered. N95 respirators must be fit-tested to the individual, and PAPR education needs to be provided for those utilizing respirators.
Pitfalls regarding supplies: Despite recommendations to use strict PPE protocols when seeing PUIs and confirmed Covid-19 cases, there are critical shortages of essential equipment and services, including PPE, lab tests, and imaging. Hospitals must balance rationing resources to meet public health needs with the ethical dilemmas that come with doing so.\textsuperscript{18} Forward-thinking and creative solutions for both conserving and obtaining additional resources through alternate supply chains can help mitigate shortages, as can ensuring hospital staff have up-to-date information on PPE guidelines and recommended practices (Table 1).

### Eliminating Nonurgent Strains on the System

The Covid-19 pandemic does not change the need for the operating room, the gastrointestinal suite, or the dental clinic for many patients. However, we must minimize stress on systems during this crisis. To do this, facilities need to postpone elective procedures. This approach has a significant financial impact on hospitals because elective procedures are a major source of revenue. However, reducing cross-infection risks and conserving resources must be the first priority. Furthermore, cancellation of elective procedures has been recommended by CMS and multiple state licensing boards and health departments.\textsuperscript{19} Reducing procedure volume in this way will minimize PPE consumption, decrease unnecessary Covid-19 exposure, save valuable critical care and floor rooms, conserve medications and blood products (which are already thinning with the millions of Americans self-isolating), open procedure rooms for more emergent cases, and provide the opportunity to move health care workers and equipment (e.g., ventilators, infusion pumps, monitors) where they are urgently needed.

However, there is not broad agreement on a standard definition of \textit{elective}. As a result, there is wide variation in how hospital systems and group practices have adopted, or in some cases, not adopted these recommendations during the Covid-19 crisis.\textsuperscript{20} The American College of Surgeons (ACS) published guidelines\textsuperscript{21} establishing a triage system that allows providers to objectively assess the urgency of surgical cases (Table 2). These have now been also adopted by CMS. Different surgical specialty societies have put forth field-specific guidelines.

| Table 1. Practices to Conserve Resources During the Covid-19 Pandemic |
|--------------------------|------------------------------------------------------------------|
| **Resource**             | **Conservation Practice**                                        |
| Covid-19 tests           | • Only use tests for those who need it, or when determining public health ramifications (e.g., testing a sick health care worker who was recently in contact with other immunocompromised patients)  
                          | • Consider whether the test will change management and decision-making processes prior to using a test kit  
                          | • Work toward transitioning from CDC testing to in-house testing capabilities |
| PPE                     | • Reschedule elective procedures and surgeries  
                          | • Keep PPE in secure locations to deter unnecessary use and theft  
                          | • Reuse PPE (e.g., goggles that can be cleaned and reused, wear N95 masks until visibly soiled or torn or disinfected, keep single-use gowns in the room of patient)  
                          | • Limit number of staff who enter each patient’s room  
                          | • Find ways to make or manufacture PPE (e.g., 3-D printing, sewing patterns) |
| Equipment               | • Reschedule elective procedures and surgeries to conserve resources for critically ill patients  
                          | • Borrow from areas (e.g., operating rooms), outpatient centers, other hospitals that have equipment that is not in use |
| Hospital beds           | • Reschedule elective procedures and surgeries that would require a hospital bed  
                          | • Use phone services to triage sick patients and keep low-acuity patients at home to self-quarantine  
                          | • Utilize telemedicine services |

Notes: *PPE = Personal Protective Equipment; CDC = Centers for Disease Control and Prevention. Source: The authors.
However, patients may feel their medical needs are deemed less important when told their procedures will be postponed. Thus, while upholding ACS guidelines, comfort and assurance should be provided, along with allowing opportunity for shared decision-making. This is essential, as health care professionals can provide calm and reason during this pandemic.

Coordinating Communication

With daily changes in the Covid-19 crisis, communication between senior leadership and frontline health care staff on a regular basis is essential. Effectively carrying out this communication requires (1) establishing a centralized Covid-19 response team; (2) disseminating daily staff-wide information; and (3) hosting virtual town halls or broader virtual staff forums at least twice per week, which should be recorded and available asynchronously for those who cannot be spared from clinical duties during the forums.

"Health systems should not wait until they are at a crisis point in the midst of a surge in Covid-19 infections."

The centralized Covid-19 response team should include supervisors of each of the clinical and administrative departments and should meet every morning to review the latest developments, develop a cohesive plan for the day, and coordinate among departments. Nightly update emails should be sent to all staff to communicate amendments in clinical and operational protocols; staff should be required to review these communications regularly. In addition, a single shared intranet site for the latest information minimizes the risk of staff using outdated protocols or documents.

Finally, virtual town hall meetings will allow every staff member an opportunity to be part of the discussion. These can be effectively led by a clinical lead, such as the chief medical officer or chief
of staff. There should also be a system to allow staff to report issues to leadership, with the option for the report to be anonymous.

Coordinating communication with patients before they come to the facility, during their stay, and as they leave the hospital is also important. Clinical training on communication with patients on quarantine instructions should be implemented, as well as active evaluation for vulnerabilities (e.g., a patient’s housing situation). As patients leave the hospital or clinic, this general information should be given both in oral and written form.

**Essential Considerations**

During the Covid-19 crisis, health system leaders need a concise, systematic approach to quickly evaluate critical needs, identify areas of weakness, and develop a strategic plan of attack. This compilation of best practices for health system preparedness for Covid-19 is based on firsthand experiences on the front lines of the Covid-19 pandemic. There are many other important considerations not discussed here, such as treatment for Covid-19–infected staff and patients, special populations including low-income, pediatric, and transplant patients, and how to obtain additional PPE. However, these are the cornerstones of any effective Covid-19 preparedness plan for a health system: (1) mitigation of local transmission; (2) staff conservation, support, and protection; (3) eliminating nonurgent strains on the system; and (4) coordinating communication.

Health systems should not wait until they are at a crisis point in the midst of a surge in Covid-19 infections. Instead, action needs to be taken proactively. Through early implementation of a strategic preventive plan, health systems may avoid being crippled by these challenges, and be able to continue to be operational and provide critically important care.

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