



Perspective

Novel Coronavirus and Old Lessons — Preparing the Health System for the Pandemic

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How sad that the people who remember the last major pandemic — influenza in 1968 — are the primary victims of today's. How sad that despite the many medical advances that

have been made since then — critical care, extracorporeal membrane oxygenation (ECMO), emergency medicine, and emergency medical services, to name a few — the treatments offered to many patients in areas where Covid-19 has exploded are the same ones they might have received in that era. Perhaps the lessons they remember, those of quarantine, isolation, and social distancing, are the ones that will save us again.

Modern medicine has so much, yet so little, to offer. Just-in-time staffing and supplies, “right-sizing,” and other competitive strategies for health care and the supply chain conspire against preparedness by reducing the number of hospital beds and ensuring that existing beds are kept as oc-

cupied as possible. During the second week of March, only 21 of more than 400 ICU beds were available in a typical U.S. metropolitan area. How will we cope with the thousands of Americans who will need care?

First, we need to work with our public health colleagues to ensure that population-based interventions — including social distancing, quarantine, and isolation actions — are taken promptly and prudently in order to flatten the epidemic curve.

Second, we can use the foundations of preparedness built over recent decades to respond to the challenges of a novel threat. None of us is an island; we must work with our health systems and local and regional partners though

health care coalitions and other constructs to share information and policies and to create a regional framework that supports a consistent level of care. The following actions are ones that we believe health care organizations must prioritize immediately so that we can do the most with what we have available.

To begin with, organizations need to establish incident command. Using well-developed principles of incident action planning and the concepts of crisis standards of care,¹ hospitals can plan for volume-based adjustments to care delivery in all services lines, balancing demand and focusing resources on acute care.² The pandemic is a long-term dynamic event that will require nearly constant proactive strategy development and problem solving.

In conjunction with public health efforts, hospitals can dramatically expand access to testing through commercial, hospital, and

public health laboratories. We cannot afford large numbers of persons seeking care at health care facilities and exposing each other as well as uninfected patients. Rapid testing to ensure appropriate sorting of inpatients into cohorts is required, as is testing of staff members who are ill, in order to define safe work practices. Public health officials must take a lead role in clearly communicating which patients truly need testing and who can safely stay home to prevent the medical care system from being overwhelmed.

In addition, understanding people's end-of-life wishes is of critical importance in a situation of potential resource scarcity in the face of an illness that can require prolonged aggressive interventions. Difficult questions need to be addressed, such as how to approach each person's desire for longer-term mechanical ventilation, dialysis, and continuation of aggressive measures if others are dying without them. If we don't ask these questions, we may not have the chance to honor wishes that could have saved another patient.

At the same time, we need to expand inpatient critical care. A staged plan to meet or exceed the 200% increase in critical care beds advised by the American College of Chest Physicians should be developed using expanded areas of cohort care for patients with Covid-19.³ Non-Covid-related services will need to be preserved as well, so hospitals should determine how staffing will be managed to accommodate surges in demand across a wide range of needs. They will have to plan for facility and regional processes for triage of resources, since there may be a shortage of "apex therapies" (therapies that prevent death and have no appropriate substi-

tute); in particular, it's important to agree on principles of initiation and withdrawal of ECMO and to use the processes dictated by crisis standards of care to make difficult decisions about other critical care resources, in keeping with published guidelines and evolving information about Covid-19 prognosis.^{4,5} A regional plan for critical care referrals may optimize consistency as well as efficiency of transfers.

Expansion of inpatient critical care also relies on long-term care, alternative systems of care (including alternative care sites), and home-based care to bear a greater burden of discharges; careful planning with long-term care providers is critical, since patients convalescing from Covid-19 should be discharged only to designated facilities or to those already caring for such patients.

Protecting health care workers is essential, and despite increases in production, we cannot avoid the reality that demand for N95 respirator masks and other personal protective equipment (PPE) will continue to exceed supply for the near future. We must conserve masks and other protective equipment now, so that clinicians can be protected later. We must also be strategic in our plans for PPE use and consider extraordinary strategies to extend our supply, including extended wear and reuse, as well as convalescent providers forgoing PPE while working with infected patients.

Even if we do our best at protection, maintaining an adequate health care workforce in the face of school closures and illness will be exceptionally difficult. Undertaking new assignments, practicing at "top of license," reducing documentation and other burdens, and using ancillary personnel,

family members, and convalescent community volunteers may help to support patient care. Working long shifts in social and physical isolation while wearing PPE, risking illness and even death, and working under great duress in new and demanding roles will harm our providers. Hospitals should be prepared to support them at work and at home to mitigate this stress, promoting resilience, providing appropriate rest, and rewarding their service. Educating staff now on their potential roles, challenges, use of PPE, and the expected adaptations to their practice can help empower them and anticipate their needs.

There are some opportunities for augmenting resources. Covid-19 seems to affect children at much lower rates than older adults, so many pediatric resources may be available for both outpatient and inpatient adult support. Specialty clinic and elective procedure volumes may decrease rapidly, owing to both patient preference and decisions to cancel procedures, which will free up providers, clinics, and operating rooms that can be leveraged for acute care. Ambulatory surgical centers, procedure centers, and other facilities may offer substantial capacity, as well as staff well versed in monitoring patients with complex conditions.

Tremendous expansion of care is possible with creative use of space, staff, and supplies. However, the health care response will still be dependent for the most part on what we have right now and the public health actions that will help to blunt (though probably prolong) the impact.

We applaud the \$8.5 billion in federal funding for Covid-19 and the state legislatures that are passing emergency funding bills,

but these steps are akin to ordering the best fire engine possible while your home burns. Why, in the years since the 2009 H1N1 influenza threat have we not developed artificial intelligence solutions integrated with our electronic health records that could be giving us real-time information on prognosis and treatment effectiveness? Why do we assume that a health care system that must run at maximal efficiency and full occupancy to survive will, without additional support, suddenly be able to meet the needs of all in a crisis? Why do we not have caches of inexpensive volume-cycled ventilators with basic alarm systems?

Because we fail to learn the lessons and dedicate the funding and planning efforts required. Because doing so is not prioritized by regulators, payers, or most hospital leaders. Because the need is

not understood by the public. Because you can't rely on private-sector infrastructure to take on a massive public responsibility in disasters without proper planning and resources.

No matter how severe the impact of Covid-19 is, the onus is on us all to do better next time, whether that outbreak is 1 year or 20 years hence. Let us clearly communicate our limitations and abilities and agree on where we want to be — with agreed-on thresholds, standards, and enterprise-wide capabilities that allow us to say we learned our lessons this time.

Disclosure forms provided by the authors are available at NEJM.org.

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