

Preparedness and Unpreparedness: The Military vs. Medicine

May 7, 2020



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As the COVID-19 pandemic intensified in the spring of 2020, many Americans were shocked to see how quickly hospitals were overwhelmed in affected cities. Our medical and public health infrastructure was clearly not prepared, leading to problems with emergency medical services, acute care hospitals, nursing homes, access to adequate protective equipment, and mortuary capacity. How could this be? For several decades, the United States government has run pandemic simulations and this outcome—overwhelmed health care systems—has been identified as a possible scenario time and time again. Yet preparations for this eventuality were halting and inadequate at best. In this essay we review the historical and policy contexts of pandemic preparedness to understand why we have been caught off-guard by something we had repeatedly foreseen. We explore the reasons for our current predicament and whether alternative approaches ought to be pursued. It is not that preparedness is impossible: the federal government invests substantial resources in military preparedness, seemingly with good effect. The problem is specific to health care and bears the imprint of our fragmented systems of financing and government oversight. One problem is that responsibility for medical and public health preparedness is not clearly delineated, leading to a patchwork of federal, state, and private (e.g., hospital and other health care institutions) systems. Another is that our systems of hospital finance favor efficiency and optimization of capacity for routine conditions and elective procedures. Hospitals, most of which are private entities, have no incentive to invest in substantial reserve capacity, and in fact have incentives not to. Moreover, excess capacity could encourage low-value care in non-pandemic times with important consequences for long-run affordability in the most expensive health care system in the world. A third problem is the systematic under-funding of public health infrastructure that has left cities and states unable to do the testing and contact tracing needed to get the epidemic under control. Our systems were set up with an expectation of scarcity and rationing when stressed, and that is what we have experienced. We suggest a series of possible reforms that could be made to improve our preparedness for the inevitable future epidemics.

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Acknowledgements: The authors thank Michael Murphy and Eric Rosenbach for their feedback on this work.

01 Introduction

As the COVID-19 crisis intensified in March, many in the United States experienced shock as experts predicted that a surge of patients could overwhelm the health care system, not just in Wuhan or Milan, but in Seattle, New York City, and then throughout the country. Despite spending twice as much per capita on health care as most other wealthy countries, our hospitals might not have enough ICU beds, ventilators, or even masks to meet the demand. A workforce crisis has also emerged, as ambulance companies and hospitals alike lose a growing share of their personnel, whether to quarantine after exposure, isolation after a positive test or, tragically, to death. Experts in disaster medicine, however, have pointed out that the public's expectations were not realistic. As Drs. Hick and Biddinger recently asked "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?" (Hick and Biddinger 2020, 3). The problem, in their eyes, is that no one ever prioritized the creation of surge capacity. Lean management has been the goal: "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 occupied as possible" (ibid., 1). This has affected every aspect of the health care system, from the design of hospitals and clinical spaces to staffing and supply chain management. The pandemic has also brought into relief the inadequacies of our long-term care system (most notably nursing homes), including both chronic understaffing and inadequate structural and procedural capacity for infection control (Barnett and Grabowski 2020).

The COVID-19 crisis has revealed another problem as well. Most health care systems rely on the daily revenue they earn from office visits, diagnostic testing, and elective procedures. Those have now largely stopped, triggering a financial crisis in hospitals nationwide, even (especially) where COVID-19 has not yet struck. While hospitals in some regions are overwhelmed, many others are forced to furlough

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staff (Harris et al. 2020). Insurers will presumably start to lose revenue soon, as distressed employers (and individuals) default on insurance premium payments and millions of people lose employer-sponsored coverage by virtue of widespread layoffs. No one had prepared for this scenario.

Military planning provides a striking contrast. The United States invests substantial resources to maintain a military with substantial surge capacity. On any given day, the US uses only a fraction of its possible military power. Government leaders, however, rest assured knowing that they have it if they need it. Why do we take such divergent approaches to these two domains of preparedness? Could we actually take a different approach to medical preparedness such that surge capacity would already exist when epidemics or other disasters strike? The weaknesses exposed by COVID-19 will prompt many calls for reform so that we are better prepared for the next crisis. But we should stop first to explore the reasons for our current predicament and whether the alternative approaches ought to be pursued. Many of the possible solutions are, unfortunately, problematic in light of the way health care is financed and paid for in the United States.

The fundamental question here is one of responsibility for preparedness. Where in society might responsibility reside for ensuring that we have adequate institutions and policies in place to manage reasonably foreseeable disasters? Who should bear the cost of this state of preparedness? For the military, responsibility (and authority) is clearly assigned to the federal government; state-based National Guard forces now supplement this capability. For medicine, responsibility is not specified and, in the absence of this, a patchwork system has emerged, with different pieces of preparation taken up by private institutions (e.g., hospitals), states, and the federal government. The result is that we have an infrastructure designed for whatever happens to be the most reimbursable sectors of care at the moment, and for easily foreseeable and containable (in time and space) crises. The holes in this patchwork are now clear. We need to decide how best to address this.

02 Military Preparedness

Our investments in military capabilities reflect a remarkable commitment to surge capacity in military power. In 2017 the United States had 1.3 million active duty military personnel, with another 865,000 in reserve. It maintains a Navy with 11 aircraft carriers (the rest of the world together has 10) and 200 other ships. It has nearly 5,000 aircraft. The United States is prepared, in principle, to fight two major conflicts simultaneously (Lai et al. 2017). Only a tiny fraction of this capacity is used in combat operations on any given day. The United States also maintains substantial nuclear forces as a deterrent, in hopes that they will never be used. It keeps an arsenal of 3,800 nuclear warheads, with 1,750 actively deployed (down from over 30,000 in the 1960s). Yet the United States has not used a nuclear weapon since August 1945, and hopes never to have to. President Trump, meanwhile, has repeatedly called to expand military power and Congress has increased military spending each year since 2015. One national security consultant criticized the spending increases as “a budget in search of a strategy” (Erin M. Simpson, quoted in Lai et al. 2017).

It has not always been this way. The United States, dating back to its colonial roots, had long been suspicious of standing armies. Most of the British colonies had militia laws which required able-bodied men to enroll and receive minimal training so that they would be available for conscription in a time of emergency. These militias formed the core of the Continental Army during the American Revolution. The federal government quickly disbanded this army after the British surrender. The Constitution gave the federal government responsibility for national defense, but the federal government maintained only small regiments during peacetime to defend American ports and protect (or expand) the western frontier. When the country mobilized for war (e.g., War of 1812, the Mexican-American War, the Civil War), it recruited (mostly) volunteer armies and then demobilized them quickly. World War I required an unprecedented mobilization, with 3 million men inducted into service. This force was again largely disbanded after the armistice. World War II required another massive mobilization, this time bringing 10 million people into the military.

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It was only after World War II that the federal government decided to maintain a substantial military, a reflection of dramatically increased US military commitments throughout the globe. There are two crucial aspects of this. The first is maintaining the personnel and equipment needed for military operations on the scale that planners believe to be appropriate. The second is readiness, an operational stance in which a share of US forces stand ready to deploy on short notice as needed. Military preparedness requires both: capacity and responsiveness. The cost is certainly substantial: the US is on track to spend over \$900 billion in 2020 on defense. But much of this supports many sectors of the domestic economy.

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The medical situation provides informative parallels and divergences. As health economist R.G. Evans wrote in 1994, “The services of the health-care system, like those of the military, are not wanted for their own sake. When they are called on, they are needed, and the need may be a matter of life or death. While in both cases having the services when they are needed is much better than not having them, it is far better still not to need them at all” (Evans 1994, 21). Evans did not deny the need to invest in either “a health-care system or a defense establishment. Of course we should, and we will.” The question is “how large they should be and what they should do” (*ibid.*, 29). There is a clear risk: “overinvestment in activities which are not themselves directly valued—such as medicine and the military—could have negative effects on health through the ‘opportunity costs’ which they impose on the rest of the social environment” (*ibid.*, 34).

What would medical preparedness look like? It is important to separate out distinct tasks and responsibilities. One task is medical care, which requires “staff, stuff, space, and systems” (Farmer 2014); this includes the doctors, nurses, paramedics, clinics, hospitals, intensive care units, and the equipment and supplies (e.g., pharmaceuticals, reagents for diagnostic tests, etc.) that modern health care requires. Some patients also require longer-term care, whether in rehabilitation hospitals, skilled nursing facilities, or nursing homes. A second task is ensuring public health, which includes disease surveillance, diagnostic testing, systems to organize the flow of health information, plans and laws to implement quarantine, and stockpiling of essential supplies (e.g., vaccines and protective equipment). The U.S. Constitution does not explicitly establish a right to health or health care, nor does it specify a federal role in delivering medical care and public health stands—a marked contrast to its explicit discussions of the responsibilities of both Congress and the president for the military. As a result, the tasks of medical preparedness are distributed somewhat haphazardly in the United States across private, municipal, state, and federal institutions.

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Medical care in the United States began as a private affair with patients seeking care from doctors and arranging for payment as best that they could. Some governments did provide a safety net of sorts, with almshouses in the colonial period giving way to city hospitals in the nineteenth century. The Civil War drove a dramatic expansion of the hospital system in the United States. By the late nineteenth century most cities had many hospitals, whether private, public, or religious (Vogel 1980; Starr 1982; Rosner 1982; Rosenberg 1987). States also established their own hospital systems, especially for psychiatric care, and these expanded to include care for alcohol dependence, tuberculosis, and other chronic illnesses (Rothman 1971; Grob 1994).

The federal government engaged early on, but only on the margins, providing health care for specific groups. The first was the Marine Hospital Service, established by Congress in 1798. This system of hospitals in major ports provided health care for merchant seamen. It gained authority for quarantine in 1878, and then for health inspections of immigrants. Rechristened the Public Health Service in 1912, it remains the core of the federal public health system today (Kraut 1994; Gostin 2008). The next was care provided to military veterans. The federal government provided pensions to disabled veterans in 1776. In 1811 it opened residential homes, some of which provided medical care. These expanded, both in scope and in range of medical services, after the Civil War and then again after World War I and World War II. By 1948 the Veterans Administration operated 125 hospitals nationwide (Veterans Affairs 2018). The third was the Indian Health Service. Military physicians offered care to American Indians who lived near Army posts as early as 1802. Treaties often included a promise to provide health care and, by 1900, the federal government provided physicians on most Indian reservations and hospitals on several. Transferred to the Public Health Service in 1955, the Indian Health Service continues to provide medical care to many Indian communities (Kunitz 1996; Bergman et al. 1999). The federal government organized a brief experiment in rural health through the Farm Security Administration from 1935 to 1947. Ranging from prepayment plans with local physicians to dedicated clinics for farm work

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ers, these programs at their peak enrolled 2 million farm workers across 1,120 counties in the United States (Grey 1994). The military has also provided health care to its active duty personnel.

While the government has been involved in direct medical care for these select groups, its largest role by far has been as a payor for health care services. One valuable capacity-building intervention was the 1946 Hill-Burton Act, which provided substantial federal funding for construction of hospitals and other health care facilities. The act was primarily intended to address geographic maldistribution of hospital beds and thereby physicians while providing resources and incentives to upgrade the quality of institutions. This led to the establishment of many new community hospitals throughout the country. In fact, both because of Hill-Burton and broader economic development, hospital beds per capita increased by 24 percent between 1950 and 1970 and these increases were greater in areas that were previously underserved (Clark et al. 1980.) This trend has largely been reversed, however, due to consolidation and closures in the face of efforts to control costs in the subsequent decades.

The largest federal intervention in the health care system came with Medicare and Medicaid. Those programs, launched in 1965, allocate federal funds to pay (either directly or through managed care plans) private physicians, hospitals, and other providers to deliver health care for aged, poor, or disabled Americans (Starr 1982; Oberlander 2003). As a result of this arrangement, the federal government neither owns nor controls most of the health care facilities in the country. Instead, most hospitals and clinics are operated by the for-profit or not-for-profit institutions that control them, with an ever-shrinking number controlled by state or municipal governments. Moreover, while Medicare and Medicaid are important sources of health care financing—in 2018 they covered 34 percent of the population—55 percent of Americans have private insurance, while 9 percent remain uninsured (Kaiser Family Foundation 2020). This pluralistic system of financing may thwart policy solutions that rely on health care payment and coverage arrangements as part of pandemic preparedness and response, such as waiving

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copayments for viral testing or making it possible for telemedicine or care delivered by para-professionals to be reimbursed.

Given this history and fragmentation, where does responsibility for preparedness reside? What public or private entity might be responsible for investing resources to build the surge health care capacity that would be needed in a crisis? To a large extent, this is not a challenge that the private health care sector has taken on. Instead, this sector has focused on serving current and emerging health care needs, while pursuing financial sustainability through revenue generation and efficiency improvements. While the passage of Medicare led to an influx of resources into the health care system in the 1960s and 1970s, hospitals and clinics have been under increasing pressure since the 1980s to control costs. Efficiency has become the key to success. Hospitals want to run as close to full capacity as possible: any unused capacity on any given night is lost revenue and wasted costs. Well-run hospitals, especially after 9/11, do plan actively for disaster response, sometimes with good effect. Hospitals in Boston, for instance, were widely praised for their ability to respond to the mass casualties caused by the 2013 Boston Marathon bombing. However, most of this effort focuses on how to organize the response to deliver care as effectively and efficiently as possible. Systems that can respond well to a mass-casualty terrorist event are different from those needed for a prolonged public health emergency. Hospitals do not, as a matter of course, maintain a supply of empty wards and a cadre of underemployed physicians and nurses on call, so that they can expand their capacity as needed. Hospital planning also reflects reimbursement systems, with hospitals building capacity in certain highly reimbursed services (e.g., surgery, radiology), but not in routine, inpatient medical management. There is little sense that private hospitals have an obligation to their communities to maintain the ability to increase their capacity on demand in the case of a disaster. This presumption stands in contrast to the requirement enshrined most recently in the Emergency Medical Treatment and Active Labor Act (EMTALA) that hospitals have an obligation to stabilize patients in urgent need of care regardless of their ability to pay. Thus, as a

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society we have established the principle that private hospitals are responsible for managing individual crises but not population-level ones.

Meanwhile, there have been specific concerns that have steered health care institutions away from investments in excess capacity. As health care costs began to rise steeply in the early 1970s, health economists recognized the problem of supplier-induced demand. They demonstrated that demand for medical services was elastic and that any excess capacity would inevitably generate unnecessary medical care and costs. Policy analysts and decision makers thus understood that there were downsides to overinvesting in increased capacity (Evans 1974; Wennberg et al. 1982). In this logic, any kind of surge capacity was seen as a threat to the responsible stewardship of health care resources.

There has been some health care resource planning at the state level, though this has largely focused on a desire to serve immediate health care needs (e.g., expanding access to primary care and emergency services for stroke and heart attack patients) and control costs by ensuring that certain services are delivered at efficient and effective scale (e.g., coronary artery bypass grafts), while minimizing duplication of services (Melhado 2006). In the case of somewhat predictable phenomena, such as the annual surge in respiratory admissions each year due to influenza and influenza-like illnesses, state and local authorities may play a coordinating or data-sharing role, but capacity constraints are largely managed by individual hospitals and systems.

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When epidemics struck communities in the colonial period, responses by local governments were ad hoc. While cities had boards of health as early as the 1790s, these varied enormously in their efficacy. It was only during the nineteenth century, under pressure from repeated cholera epidemics and after the demonstration of the potential value of government power during the Civil War, that cities began to establish stable and effective public health authorities (Rosenberg 1962). In addition to organizing efforts for urban sanitation, public health authorities orchestrated basic disease surveillance (e.g., through systems of compulsory reporting of contagious diseases), quarantine, detention, and vaccination (Leavitt 1996; Willrich 2011). Such public health campaigns contributed to the dramatic increase in life expectancy enjoyed by many groups in the United States in the first half of the twentieth century. However, despite the tremendous success of public health programs, the United States—at federal, state, and local levels—underinvested in public health throughout the twentieth century, leaving these institutions relatively weakened (Brandt and Gardner 2000; Garrett 2001).

There were, however, two areas in which a logic of preparedness did emerge in public health. The first was preparations for civil defense in the setting of war. With the advent of strategic bombing during World War II, the federal government began to explore what the country could do in response. After the war, the Truman administration established the Federal Civil Defense Administration. Military and other government officials worked with the RAND Corporation to imagine possible futures, conduct war game scenarios, and strategize about preparedness and response (Lakoff 2007; Lakoff 2008; Lakoff 2017). The government, however, put most of the burden of preparation on individual citizens: since the government would not be able to help everyone in the event of a nuclear war, each person (or family) needed to be prepared to help themselves. As Joseph Masco has explained, “civil defense argued that citizens should be prepared every second of the day to deal with a potential nuclear attack. In doing so, the Civil Defense Program shifted responsibility for nuclear war from the state to its citizens by

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making public panic the enemy, not nuclear war itself. It was, in other words, up to citizens to take responsibility for their own survival in the nuclear age” (Masco 2008, 366). The government also sought to achieve “emotional inoculation” of the American public so that they would be familiar with a nuclear attack and able to respond without panic (ibid., 368). In 1955 the government built a replica of an American community in the Nevada desert and then blew it apart with an atomic bomb; 100,000,000 Americans watched the live broadcast (ibid., 372–74). This played out again in 1983, when half of the adult population of the United States tuned in to watch *The Day After*, a dramatized account of a nuclear strike on Lawrence, Kansas (ibid., 380–81).

Throughout all of this, however, there was a counter-discourse about the impossibility of preparedness. In 1962 a group of physicians based in Boston published a series of articles in the *New England Journal of Medicine* that sought to relay, in the rational language of clinical medicine, the consequences of a nuclear strike on an American city. In stark detail, the physicians described what radius beyond the blast would be completely destroyed, as well as the devastating impacts on the surrounding area. They also described the dire impact a strike would have on health care systems (e.g., with hospitals concentrated in urban centers that would be obliterated): survivors with burns and radiation poisoning would likely be unable to find any medical care (Erwin and others 1962; Sidel et al. 1962). This work gave rise to a broader advocacy movement, International Physicians for the Prevention of Nuclear War, which was awarded the Nobel Peace Prize in 1985.

As Cold War fears died down in the 1970s and 1980s, federal disaster planning turned to other problems. President Carter established the Federal Emergency Management Agency in 1979 with a mandate for “all-hazards planning,” especially natural disasters (Lakoff 2007, 262). Studies soon revealed the country’s overall lack of preparedness. A 1984 report, *America’s Hidden Vulnerabilities*, described the many steps that needed to be taken “to ensure the continued functioning of vital systems in the

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event of emergency, including improving system resilience, building in redundancy, stockpiling spare parts, performing risk analysis as a means of prioritizing resource allocation, and running scenario-based exercises” (ibid., 410).event of emergency, including improving system resilience, building in redundancy, stockpiling spare parts, performing risk analysis as a means of prioritizing resource allocation, and running scenario-based exercises” (ibid., 410).

The second area in which the government invested substantial efforts at preparedness was biological warfare and epidemic disease threats. During World War II, the federal government established a program to control malaria in war areas. This was rechristened the Communicable Disease Center in 1946. Its mandate quickly grew to include plague, venereal disease, tuberculosis, and immunizations. A key innovation was the Epidemic Intelligence Service, established in 1951 out of Korean War–era fears that either China or the Soviet Union would deploy biological weapons. The EIS trained rapid response teams that could investigate outbreaks and partner with local health care institutions as needed to treat any patients (Etheridge 1992; King 2004). The CDC was never tasked with developing its own capacity to deliver health care.

During the 1980s, fears of nuclear annihilation increasingly gave way to fears of a coming viral apocalypse. New diseases, from Ebola in the 1970s to AIDS in the 1980s, provided a stark reminder that human populations remained vulnerable to “new and emerging infections” (King 2004, 64). Virologists began a drumbeat of warnings. For instance, Rockefeller University’s Stephen Morse warned in 1989 that “As deforestation progresses worldwide, as human activities continue to alter the environment, as population influx into Third World cities continues unabated, as every part of the world becomes more accessible, one would expect disease emergence to accelerate” (Morse, quoted in King 2004, 65). Tabletop disaster simulations became popular, as they had for nuclear war. Planners, for example, ran an epidemic simulation at a 1989 tropical disease conference. Laurie Garrett described the outcome in

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her 1994 best-seller, *The Coming Plague*: “What the war games revealed was an appalling state of non readiness. Overall, the mood in Honolulu after five hours was grim, even nervous. The failings, weaknesses, and gaps in preparedness were enormous” (Garrett 1994, 594; Lakoff 2008, 412).

Many heard this call. In 1991 the Institute of Medicine published *Emerging Infections: Microbial Threats to Health in the United States* (Lederberg et al. 1992). The authors argued that after decades of funding cuts, governments needed new investments in public health to prepare, including research, training, surveillance, vaccine and drug development, and behavior change (King 2004, 67). Soon an international effort sought to draw attention to the threat of emerging disease. Scientists’ fears were amplified by the work of journalists (e.g., Garrett’s *The Coming Plague*), thrillers (e.g., Richard Preston’s *The Hot Zone* and *The Cobra Event*), and Hollywood blockbusters (e.g., *Outbreak*). Supposedly alarmed by Preston’s scenarios of viral havoc, President Clinton met with military and public health leaders and worked quickly to establish a National Pharmaceutical Stockpile in 1998. The CIA’s National Intelligence Council released its own report in January 2000, calling for a tighter linkage between public health and national security (Fidler 2003). Simulations remained central. In June 2001 “Dark Winter” played out over two days at Andrews Air Force base, with national security experts and government officials in key roles. Their efforts to respond to a simulated smallpox attack on Oklahoma City showed again the lack of preparedness, with vulnerabilities in many systems (Lakoff 2008, 414–17).

The terrorist attacks on 9/11 led to redoubled efforts to prepare on many fronts. The anthrax attacks later that fall focused attention again on the threat of infectious disease and biological warfare. The CDC established a new Office of Public Health Preparedness, led by Donald Henderson, a former EIS officer and leader of the smallpox eradication campaign (King 2004, 75; Lakoff 2008, 412–13; Lakoff 2017). President Bush expanded the National Pharmaceutical Stockpile into the National Strategic Stockpile; at its peak in 2006 it held over 100 million N95 masks (Manjoo 2020). Hurricane Katrina exposed the

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limits in US disaster preparation and response (Lakoff 2008, 418–19). Congress responded with The Pandemic and All-Hazards Preparedness Act of 2006. Congress sought to implement “a range of measures, from the reorganization of federal health administration, to funding for local and state health agencies, the training of epidemiological investigators, and a novel biomedical research initiative. A key issue the Act sought to address was how to create an integrated ‘system’ of biopreparedness, one that extended from disease detection to vaccine production to the relations among the various government agencies that would be charged with response” (ibid., 420).

Guided by frameworks established by the CDC, state and local public health agencies also developed policies and procedures for emergent public health threats after 9/11. Such efforts included maintaining an inventory of assets, identifying people and material, and establishing registries of vetted volunteers. After the emergence of H5N1 avian influenza in 2003 to 2005, influenza pandemic planning began in earnest in many jurisdictions. Surge capacity once again rose to prominence as a major concern for planners. In Massachusetts, for example, a Surge Committee was formed that met monthly and brought together public health and healthcare institution emergency preparedness specialists. One outcome of this work was the development of hierarchies of interventions and crisis standards of care that could guide responses depending on the expected severity of shortages of medical equipment and capacity. These were developed and disseminated by a related working group (Levin et al. 2009). Ultimately, the framework for planning became regional in Massachusetts. Health and Medical Coordinating Coalitions were established to provide a platform of communication and coordination for emergencies and disasters (Mass. Office of Preparedness 2020).

05 Unpreparedness for a Medical Surge

Despite the focus on many aspects of crisis response, there was little interest in building surge capacity into the health care system. For instance, amid fears of an impending influenza pandemic, the Homeland Security Council (created by President Bush shortly after 9/11, but merged into the National Security Council in 2009) produced a detailed pandemic preparedness plan in 2006 (Homeland Security Council 2006). The plan outlined many possible government actions, with specific guidance for schools, colleges, faith-based organizations, families, and hospitals. It focused on public health measures, calling specifically for stockpiling of vaccines and medications (which exist for influenza but not novel pathogens). When medical capacity was discussed, the focus was on medical providers, with hopes that the public health service corps and volunteers would meet any staffing needs (ibid., 9). The report assumed that hospital infrastructure would be overwhelmed: “Historical comparisons and recent severe seasonal influenza epidemics suggest that U.S. health care facilities would be overwhelmed with influenza patients during a pandemic. Extrapolating from the 1918 pandemic, a severe pandemic could result at its peak in the need for significantly more hospital and intensive care unit beds than the U.S. health care system currently supports” (ibid., 111). The Council did not advise building surge capacity in advance. Instead it emphasized the ad hoc health care facilities could be built, on demand, as needed: “establishing infirmaries in armories or other facilities of opportunity to supplement existing health care facilities is a reasonable consideration for those not critically ill.” The government also maintained a small supply of modular 250-bed hospitals that could be deployed quickly. Planners assumed that the pandemic would be recognized in advance and that appropriate action would be taken: “Suitable spaces can be identified in the pre-pandemic phase, medical materiel and supplies can be stockpiled prospectively, and actions to stand up the infirmary commenced in the early stages of an outbreak” (ibid., 111).

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However, these plans simply assumed that the government's response would not meet the demand. Triage and rationing were built into pandemic planning: "Given the strain that a pandemic would place on a community's medical system, it will be necessary for hospitals, medical providers, and oversight agencies to maximize hospital bed surge capacity, and triage and treat patients in a manner that affords each the best chance of survival and recovery within the limits of available resources" (Homeland Security Council 2006, 110). Since the goal was to save as many lives as possible, planning should "include thresholds for altering triage algorithms and otherwise optimizing the allocation of scarce resources" (ibid., 110). So while the report did call on hospitals to plan—"All health care facilities should develop and test infectious disease surge capacity plans that address challenges including increased demand for services, staff shortages, infectious disease isolation protocols, supply shortages, and security" (ibid., 117)—it did not expect that this plan would be able to maintain the standard of care during an epidemic.

Just as 9/11, Katrina, and fears of pandemic flu had motivated the Bush administration to plan, the West Africa Ebola epidemic in 2014/15 served as a wakeup call to the Obama administration. In 2016 it produced a comprehensive report on the epidemic that identified "significant successes and notable failings" in the country's capabilities and response (Kirchhoff 2016). The report repeated the warning that had been made for decades: "It is sobering to note the odds are increasing that the United States will be called upon again in the not too distant future to respond to another health crisis that threatens global security." President Obama responded by creating a pandemic response office within the National Security Office, led by physician Rear Admiral Timothy Zeimer. It prepared extensive briefings for the incoming Trump administration in January 2017, including an exercise on pandemic response (Sanger et al. 2020). The Obama administration did not, however, restock the National Strategic Stockpile's cache of N95 masks, over 100 million of which had been deployed against influenza in 2009 (Manjoo 2020).

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The Trump administration reorganized the National Security Council in 2018, folding a once independent Directorate for Global Security and Biodefense into a larger program that covered arms control, nonproliferation, biodefense, and global health. Experts disagree about whether this increased or decreased the profile of pandemic response (Kessler and Kelly 2020). The administration certainly did continue pandemic planning activities. The Pentagon released a detailed plan for an influenza pandemic in 2017, one that anticipated the scarcity of hospital beds, ventilators, and face masks (Klippenstein 2020). The Department of Health and Human Services ran an outbreak simulation, “Crimson Contagion,” from January through August 2019. In this episode, tourists returning home to the United States from China introduced a new strain of influenza. As the simulation played out, government officials exhibited confusion about the role and timing of social distancing and school closures; officials realized that they lacked adequate supplies of personal protective equipment and ventilators; there was significant friction between various government agencies; the country lacked capacity to build needed materials. A resulting draft report, produced in October 2019, was marked “do not distribute” (Department of Health and Human Services 2019). Congress was briefed in December, and this may have led to some modest, targeted, funding increases (Sanger et al. 2020).

But despite decades of preparedness planning and a series of high-level government simulations of epidemic outbreaks, COVID-19 has demonstrated the breadth of our lack of preparedness. Donald Trump claimed as late as March 19 that “Nobody knew there would be a pandemic or epidemic of this proportion. Nobody has ever seen anything like this before” (Trump, quoted in Sanger et al. 2020). Few things could be further from the truth. A major pandemic had been repeatedly predicted and simulated. The limitations of U.S. planning had repeatedly been identified with uncanny prescience. Expecting scarcity, officials advised hospitals to prepare for makeshift hospital beds and inevitable rationing. There was no investment in surge capacity. The Strategic National Stockpile was insufficiently supplied to address even a fraction of the demand for masks and other personal protective equipment (Mukherjee 2020).

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Instead there was an expectation that health care would fall short. Andrew Lakoff, a leading scholar of preparedness, has been surprisingly forgiving amid our current crisis: “One of the paradoxes of preparedness is that you have to constantly prepare for something that might or might not happen, and you might well prepare for the wrong thing,’ Lakoff says. ‘It’s highly likely that you won’t be ready for what actually unfolds” (Lewis 2020).

06 Policy Considerations

In the present moment, the lack of surge capacity in health care, alongside other aspects of preparedness (e.g., coordination mechanisms and robust supply chain management), seems like a catastrophic oversight. While it appears that the worst-case scenarios of excess demand for hospital beds and widespread ventilator rationing in U.S. hotspots are unlikely to come to pass, the lack of testing and protective equipment have had serious consequences for the spread of COVID-19, resulting in preventable morbidity, death, and health care costs. The same supply chain problems combined with understaffing and other quality problems have been nothing short of devastating in the long-term care context. According to publicly reported death data from twenty-three states, there were more than 10,000 deaths (including both residents and staff) due to COVID-19 in long-term care facilities as of late April 2020. Such deaths represented more than a quarter of all deaths in the reporting states and more than half of deaths in some states (Chidambaram 2020; Godfrey 2020).

Notwithstanding the fact that societies may rationally choose not to invest scarce resources in preparation for future scenarios that are both unlikely and hard to describe in terms of requirements, it is worth examining whether our health care policies should be modified to favor greater health system resilience in times of pandemic. We have noted that the federal role in U.S. health care has been not as a provider or even regulator of health care, but primarily as a payor (while the ACA regulates insurers, it does not directly regulate medical care; hospital oversight is delegated to Joint Commission on Accreditation of Healthcare Organizations and the states). If the federal government wanted to ensure health care capacity for a threat that has the national scope of COVID-19, it would likely have to take on a larger role as either a provider of health care services or as a planner with the capacity (and willingness) to provide incentives or mandates for private hospitals to expand specific service lines or technologies. There are precedents for Medicare payments to be used as a mechanism for supporting such private investments. For example, Medicare uses Disproportionate Share Hospital payments to encourage hospitals to

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provide care for uninsured and Medicaid patients. Similarly, hospitals that build and maintain surge capacity could be eligible for add-on payments. Notably, while payment incentives such as these are more politically palatable than mandates for achieving capacity goals in the U.S. context, they are also demonstrably distortionary (Duggan 2000).

The pandemic response unfolding at the time of our writing is also revealing options for expanding bed capacity for less severely ill (or post-acutely ill) patients including underutilized long-term care facilities, field hospitals built in convention centers (Yuan 2020), commercial airliners repurposed as intensive care units (Lea 2020), college dormitories (Diep 2020), and hotels (Krueger 2020). The feasibility and desirability of using these non-medical spaces to provide surge capacity will be better understood in the wake of the surge, but the emptying out of so many public gathering places due to stay-at-home orders provides an obvious rationale for considering such options.

However, the limits of this approach have already become clear. While built-on-demand facilities are useful for providing basic medical care, they often cannot provide the intensive care that COVID-19 or any other serious respiratory pathogen requires. Converted convention centers and mobile hospitals are not designed for aggressive infection control measures (e.g., negative pressure ventilation), ventilatory support, or other needed features. Ad-hoc personnel used to staff these facilities lack the training needed to practice safely (e.g., fastidious infection control). As a result, many of these spaces have been only partially utilized (Durkin 2020). Past precedents might have been misleading. Old photographs of the tent hospitals built during the influenza pandemic 1918 have been circulating widely as examples of how we could respond to COVID-19, but the capacity of medical care was quite different then. There were no ventilators or ICUs and the level of care that could be provided in a tent hospital in 1918 was not that different from what could have been provided then in a regular hospital ward. The particular needs of a respiratory pathogen have exposed the limits of planners' faith in pop-up hospitals.

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Even regular hospitals have struggled to meet the demands of COVID-19 care. Many hospitals have struggled to provide adequate PPE for their staff. Nurses in New York City have sued both hospitals and the state for failing to provide them with essential supplies (Eisenberg 2020). Hospitals have raced to retool existing floor plans to create new respiratory care units, but it has been difficult to build sufficient infection controls (e.g., anterooms for proper donning and doffing of PPE) into these spaces (MASS Design Group 2020).

While beds and equipment may be part of the surge capacity needed to address a health threat like COVID-19, they are of little benefit without the personnel to staff them. Some cities and hospital systems have had great success reshuffling their personnel to meet the demands of COVID-19, for instance taking people from services that are currently closed (e.g., elective surgery) and assigning them to new COVID-19 care roles (McCluskey 2020). What about longer-term solutions? Expanding and targeting federal workforce programs such as the National Health Service Corps might increase the numbers of trained professionals, but runs the risk of increasing low-value care via induced demand. Moreover, the literature (Chen et al. 2013; Pathman et al. 2004) has demonstrated that Graduate Medical Education subsidies and loan forgiveness programs have had mixed results in their ability to achieve workforce goals related to geographic and specialty distribution, particularly when looking at long-term results. It would appear that underlying forces such as the payment system for health care may be hard to overcome with relatively targeted short-run incentives; for example, we can offer loan forgiveness for medical students who choose to enter primary care but if their lifetime incomes are millions of dollars less than procedural specialists, the financial incentive to specialize remains substantial. Like beds, we cannot train up a surplus workforce and leave them unoccupied.

As a result, it might make more sense for policy solutions for the workforce capacity needed in a pandemic to focus on a more robust United States Public Health Service Commissioned Corps (PHSCC)

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or the creation of a new health care reserve force (Cosgrove and Driscoll 2020). To achieve a significant scale, the reserve could have the ability to redeploy licensed professionals who would not ordinarily provide the type of care needed in a pandemic (e.g., dentists and subspecialty NPs and PAs), as well as trained non-professionals (e.g., community health workers) to take on other important roles such as contact tracing or disseminating information, best practices, and personal protective equipment in their communities.

Meanwhile, health care policy trends may affect (and undermine) our future ability to respond to pandemics and other threats to health system stability. In the U.S., so-called value-based purchasing has taken hold among both government and private payors (Burwell 2015). Value-based purchasing programs combine incentives to reduce spending with those to improve care quality in order to reward health care providers for the effective use of resources. Global payments calculated for episodes of care or for populations are the primary vehicles for the leading edge of value-based purchasing. Because global payments attenuate the connection between volume and revenues (or eliminate it entirely if they are fully prospective), they would leave the health system in better financial health in the event of a precipitous decline in elective services like the one that resulted from COVID-19. Such payment models, however, put further downward pressure on costs and are intended to reduce the use of high-cost acute and post-acute care. These alternative payment models, if they succeed in achieving their goals, may further diminish surge capacity of the type a pandemic requires unless preparedness is explicitly rewarded.

Moreover, in part as a result of these and other changes to health care payment in the U.S., there has been substantial consolidation among health care providers, resulting in both horizontal and vertical integration (Dafny 2014). This consolidation, in theory, might generate valuable economies of scale for both communication and coordination. However, actual evidence of these benefits is lacking (Baker et

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al. 2017; Koch et al. 2017; Beaulieu et al. 2020). Meanwhile, horizontal consolidation in particular may result in further decreases in capacity.

In the months and years ahead, clinicians, scientists, and policy makers will draw out and debate the lessons learned from the COVID-19 pandemic. Unlike the situation with military defense, in the U.S. preparedness for a pandemic has not been approached as a purely public good or as a federal responsibility. Federal and state governments have underinvested in the physical capacity (including supplies) as well as the coordination mechanisms needed to react quickly and mount the scale of response needed. Even in the midst of the crisis, there is no public consensus on the appropriate role of the federal, state, local, and private sectors in either decision-making or bearing the costs of the virus and its economic sequelae. Among other factors, the fragmented and market-oriented model of health care financing and delivery contributed to the lack of surge capacity and the uncoordinated response to the immediate threat as it unfolded in early 2020. At a minimum, consideration should be given to providing hospitals and long-term care facilities incentives to build and maintain at least some surge capacity to respond to the next pandemic, perhaps through a modern replay of the Hill-Burton Act (Shah and Kocher 2020). It is also critically important to create more robust mechanisms to accomplish coordination—if not centralization—of the national response. Such measures could minimize the health and economic costs of future pandemics.

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