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## When pandemic biology meets market forces – managing excessive demand for care during a national health emergency

Michael Nurok, MBChB, PhD<sup>a,\*</sup>, Michael K. Gusmano, PhD<sup>b</sup>, Joseph J. Fins, MD, MACP, FRCP<sup>c</sup>

<sup>a</sup> Director, Cardiac Surgery ICU, Department of Cardiac Surgery, Smidt Heart Institute, Cedars-Sinai Medical Center, 127 San Vicente Blvd., Suite 3100, Los Angeles, CA 90048, United States of America

<sup>b</sup> Professor and Dean of Academic Programs, College of Health, Lehigh University, HST Building, 124 East Morton Street, Bethlehem, PA 18015, United States of America

<sup>c</sup> The E. William Davis, Jr, MD Professor of, Medical Ethics & Professor of Medicine, Chief, Division of Medical Ethics, Weill Cornell Medical College, Visiting Professor of Law & Solomon Center Distinguished Scholar in Medicine, Bioethics and the Law, Yale Law School, Division of Medical Ethics, Weill Cornell Medical College, 435 East 70th St. Suite 4-J, NY, NY 10021, United States of America

The COVID-19 pandemic provided a natural experiment of global ability to match supply of resources to unprecedented demand. United States (US) healthcare is market based and decentralized. Individual hospital systems function as autonomous entities subject to limited regulation [1]. France also has a complex public-private delivery system with a stronger role for state planning than in the US [1]. An examination of how Intensive Care Unit (ICU) demand was addressed in the US compared to France, and analysis of total US ICU capacity, provides important lessons about resource allocation during a national emergency.<sup>1</sup>

Pandemics tax the capacity to provide care and expose patients to the potential for worse outcomes [2]. When France faced pandemic surges, patients in hard-hit areas were transferred to hospitals in regions with excess capacity [3]. This limited patient exposure to degraded care conditions, decreased demand in surge areas, and created more capacity in those regions to address patients with non-COVID-19 healthcare needs. While this approach takes patients far from families and support networks, in practice during surges, visitation is either restricted or prohibited. Most importantly, in France, patients who were transferred may have had better outcomes [4].

At the onset of the pandemic, insufficient beds, personal protective equipment (PPE), and ignorance of the disease and its temporal characteristics limited the ability to provide care [5]. Because the ability to supply care in the US could not be rapidly expanded, hospitals turned to allocation policies to determine who would receive limited resources

[6]. These “crises standards of care” (CSC) were imperfect and often designed for other diseases.<sup>2</sup> Nevertheless, they were all that were available and represented the best and most transparent mechanism that a utilitarian approach could offer in the absence of a coordinated healthcare system.

An important theme throughout all US surges is that wealthy hospitals had greater ability to outbid others in the purchase of personnel and materiel resources compared to hospitals in resource-poor settings.<sup>3</sup> At first this meant greater access to PPE and ventilators. In the absence of sufficient federal government coordination, hospitals and state governments competed to purchase these resources often driving up prices, effectively redistributing to wealthy hospitals, and likely driving a market for counterfeit products. In this biologic and market-driven panic, hospitals saw tragic scenes of triage.

While these materiel challenges were largely addressed after first wave events of the spring of 2020, during later events the ability to financially entice *locum* physicians, nurses, and respiratory therapists remained problematic [7]. These challenges were exacerbated during the second surge when the problem was national and not regional, and local healthcare workers were needed closer to home.

Wealthy hospitals and systems tend to serve wealthier areas, and it is known that healthcare disparities between these and underserved and economically vulnerable communities are pronounced. It remains an important research question to determine the extent to which outcomes from COVID-19 were influenced by pre-existing healthcare disparities compared to access to robust care resources [8–11].

Another seldomly discussed reality is that standards of care changed during surges even if allocation policies were seldom applied.<sup>4</sup> Ratios of

\* Corresponding author.

E-mail addresses: [michael.nurok@cshs.org](mailto:michael.nurok@cshs.org) (M. Nurok), [mig321@lehigh.edu](mailto:mig321@lehigh.edu) (M.K. Gusmano), [jjfins@med.cornell.edu](mailto:jjfins@med.cornell.edu) (J.J. Fins).

<sup>1</sup> We rely on comparison with France simply as an example of one approach that proved effective for allocation of resources. As noted in our conclusion, Europe lagged the US in early vaccine distribution, highlighting how the structure of any one healthcare system achieves some outcomes more easily than others. Indeed, France suffers from many of the equity challenges that US healthcare policy struggles to address. See for eg. Gusmano MK, Weisz D, Rodwin VG, Lang J, Qian M, Bocquier A, Moysan V, Verger P. Disparities in access to health care in three French regions. *Health Policy*. 2014 Jan;114(1):31–40. <https://doi.org/10.1016/j.healthpol.2013.07.011>. Epub 2013 Aug 5. PMID: 23927846.

<sup>2</sup> See, for example, the New York State Task Force on Life and the Law in its 2015 report on ventilator allocation written in anticipation of an avian flu pandemic, not COVID-19.

<sup>3</sup> It appears that wealthy hospitals may have disproportionately gained access to US federal funds aimed to bolster safety net hospitals caring for the country's most vulnerable populations. See, for example, Grogan CM, Lin YA, Gusmano MK. Health Equity and the Allocation of COVID-19 Provider Relief Funds. *Am J Public Health*. 2021 Apr;111(4):628–631. <https://doi.org/10.2105/AJPH.2020.306127>. Epub 2021 Feb 4. PMID: 33539183; PMCID: PMC7958051.

<sup>4</sup> The political will did not exist to do so: it was easier for politicians to speak of surge capacity than address transparently that scarcity was pressing.

physicians and nurses looking after patients were expanded. Given the urgency, junior house staff were given significantly greater responsibility. Clinicians with little or no experience in intensive care were deployed to care for ICU patients - often in non-traditional locations including field tents and operating rooms. While recognizing the extraordinary demands to expand access, it is hard to imagine that these conditions did not adversely affect outcomes. Simply put, amidst the crisis it was a utilitarian decision to maximize the possible good with available resources.

At often great personal cost, clinicians rose to extraordinary challenges. Yet, few would argue for the patchwork approach to allocation that was applied. Experts continue to believe that the United States has more ICU beds than are necessary [12]. Many available beds went unused because they were in regions of the country that were not experiencing a surge or because they could not be adequately staffed. The French example illustrates that this was likely avoidable. Because the U.S. is much larger than France, it may be possible that a regional, rather than single national approach, is required, nevertheless, the underlying principles of planning and regional coordination still apply.

How might these perspectives inform an ethically sound approach to ICU allocation in times of crises? Here, based on our analysis and using lessons that were demonstrated to be effective in France and elsewhere, we provide recommendations and a research agenda that is focused primarily on the US, but that can be applied in other settings.

First, we believe that governments have legitimate interests and duties to fairly allocate resources during a pandemic. In the US, the Defense Production Act (DPA) of 1950 (P.L. 81–774, 50 U.S.C. §§4501 et seq.), provides the President with a broad set of authorities to influence domestic industry in the interest of national defense and has already been invoked to address COVID-19. In the US, despite the aversion to federal control and oversight, there are good historical examples from the second world war of the federal government martialing resources that until then had been left to markets to regulate. Strikingly, the death toll for Americans from COVID-19 and that war are quite similar.

Second, mechanisms for tracking available ICU beds in real-time within and across regions should be researched, regularly tested, and fully operationalized. An at the ready system that identifies open beds diminishes the need to apply allocation policies in any one hospital. Examples of these already exist [4,13].

Third, there is the question of feasibility and safety of patient transport versus the movement of staff and materials. To address the optimal response to achieve a rational deployment of resources (both materiel and personnel) critical care patient transport services should be developed to ensure that all regions have the capacity to transfer patients from inundated hospitals to those with capacity. Such services exist on a limited scale both publicly, privately, and within the military. Mechanisms to coordinate these should be researched, tested, and operationalized.

Fourth, federal and state laws should address both regulatory and payment barriers to interstate transfer of patients under emergency conditions. Liability waivers should be considered when designated public authorities determine that care is operating under a CSC as usual standards cannot be operative during these conditions [14].

Fifth, licensing and credentialing laws and regulations should be comprehensively revised to limit barriers to healthcare personnel rapidly moving between states while also ensuring that caregivers meet basic standards of competence.

Sixth, research funds should be provided to explicitly address the extent to which COVID-19 outcomes were affected by pre-existing disparities compared to access to healthcare resources. In the former case, policies would be directed to addressing such disparities, in the latter case, policies would be directed to ensuring better resource allocation during future health emergencies.

Seven, crises allocation policies should be researched and developed at a federal or state level to ensure that standards through which

adverse decisions are made are fairly applied and to develop CSC that are situation specific based on the natural history of the pathogen, available treatments, and mitigation strategies.

While the US and its market driven approach to healthcare was challenged to match supply of care resources with demand, the US also created relatively effective distribution of vaccines to those who wanted them, compared to early distribution efforts of more centrally controlled European democracies. Global lessons like these can help policy-makers understand the ethical consequences of national healthcare structure and can be used within local contexts to equitably address healthcare for all citizens.

### Credit author statement

MN, MG, JF, all contributed equally to Conceptualization; Project administration; Supervision; Roles/Writing – original draft; Writing – review & editing of this manuscript.

### Declaration of Competing Interest

Michael Nurok reported receiving stock options for his role as an adviser to Avant-Garde Health Inc. The other authors have nothing to disclose.

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