



# Towards a more efficient healthcare system: Opportunities and challenges caused by hospital closures amid the COVID-19 pandemic

Soroush Saghafian<sup>1,2,3,4</sup> · Lina D. Song<sup>5</sup> · Ali S. Raja<sup>6,7</sup>

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## Abstract

A substantial number of United States (U.S.) hospitals have closed in recent years. The trend of closures has accelerated during the COVID-19 pandemic, as hospitals have experienced financial hardship from reduced patient volume and elective surgery cases, as well as the thin financial margins for treating patients with COVID-19. This trend of hospital closures is concerning for patients, healthcare providers, and policymakers. In this current opinion piece, we first describe the challenges caused by hospital closures and discuss what policymakers should know based on the existing research. We then discuss unique opportunities for researchers to inform policymakers by conducting careful studies that can shed light on different implications, trade-offs, and consequences of various strategies that can be followed.

**Keywords** Hospital Closure · Efficient Healthcare System · Public Policy

## 1 Introduction

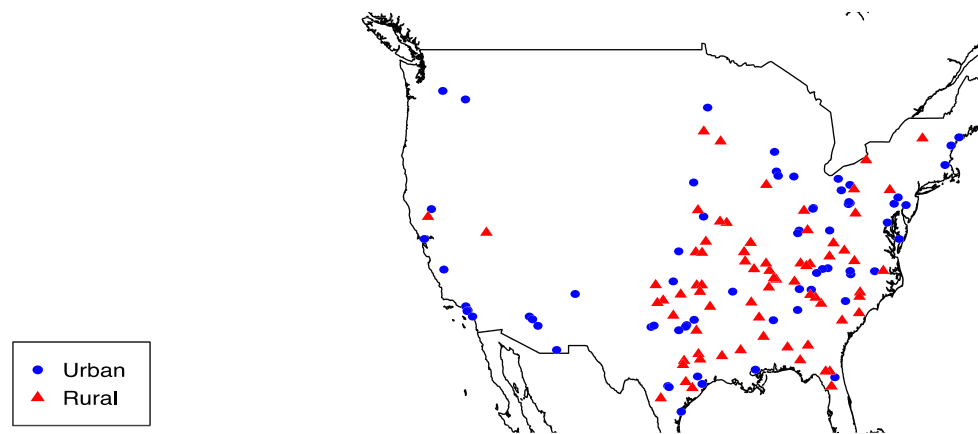
A substantial number of United States (U.S.) hospitals have closed in recent years, averaging 21 hospitals annually between 2010 and 2015, with 47 closures in 2019 alone [6]. Figure 1 depicts maps of U.S. hospital closures between 2015 and 2020. The trend of closures has accelerated as

hospitals have experienced financial hardship during the COVID-19 pandemic, and it is likely that even more hospitals will close in the near future [1]. To mitigate the negative impact of hospital closures, policymakers should carefully evaluate the impacts and prioritize funding to hospitals wisely.

Hospital closure trends are concerning for patients. When a local hospital closes, residents face barriers in accessing care (e.g., increases in travel distance) which can have negative health consequences [2, 4]. There are anecdotes of emergently ill patients suffering avoidable harm or even death due to the inability to receive care after their local hospital closed [13]. Hospital closures can also impact the financial health of some communities, as rural hospitals are often large employers in those communities [5]. Since hospital closures can have dire consequences, various policies have been established to keep financially struggling hospitals afloat. Some of these policies directly infuse money to prevent hospital bankruptcy. Support is also available in the form of indirectly strengthening hospitals' financial position through programs such as Medicaid expansion [7], or in the form of direct hospital payment policies from the Centers for Medicare & Medicaid Services that provide extra funding for hospitals in challenging circumstances. This latter type of support includes Disproportionate Share Hospital (DSH) payments

✉ Soroush Saghafian  
Soroush\_Saghafian@hks.harvard.edu

<sup>1</sup> Harvard Kennedy School, Harvard University, Mailbox 37, 79 JFK Street, Cambridge, MA 02138, USA  
<sup>2</sup> Harvard Center for Health Decision Science, Harvard T.H. Chan School of Public Health, Harvard University, Cambridge, MA, USA  
<sup>3</sup> Harvard Ariadne Labs, Harvard T.H. Chan School of Public Health and Brigham and Women Hospital, Harvard University, Cambridge, MA, USA  
<sup>4</sup> Harvard Mossavar-Rahmani Center for Business and Government, Harvard University, Cambridge, MA, USA  
<sup>5</sup> University College London School of Management, London, UK  
<sup>6</sup> Department of Emergency Medicine, Massachusetts General Hospital, Boston, MA, USA  
<sup>7</sup> Harvard Medical School, Harvard University, Boston, MA, USA



**Fig. 1 Hospital Closures in the U.S., 2015-2020.** Source: Our analysis of various data sources, including the UNC Sheps Center for Health Services Research and the Becker's Hospital Review [6]. A

hospital was defined as rural if its zip code based Rural-Urban Commuting Area code was greater than 4, or if it was designated as a Critical Access Hospital (CAH)

that supplement the cost of uncompensated care, and the Critical Access Hospital (CAH) program that covers the high fixed costs that rural hospitals face.

These funding mechanisms, however, have been widely criticized. For example, recent healthcare reforms have attempted to cut the DSH fund by \$35.1B between FY2017 and FY2024, and there have been various efforts to make the CAH program's eligibility stricter. The COVID-19 pandemic, however, forced the U.S. government to increase its support for struggling hospitals. Specifically, the government provided additional federal stimulus packages such as the Coronavirus Aid, Relief, and Economic Security (CARES) Act, which has earmarked \$175B for healthcare providers hit hard by the pandemic. The Department of Health and Human Services has also expanded the Medicare Accelerated and Advance Payment program—a loan program that helps hospitals with disruptions in cash flow. These funds have enabled struggling hospitals to acquire essential equipment, recoup lost revenues, and—most importantly—stay open. Nevertheless, funds are limited, and hence, how they are allocated and used will serve a critical role in determining the future operating status of many hospitals and the care of many patients.

But before deciding how these funds should be allocated, we need to understand hospital closure impacts. What would happen if struggling hospitals were not supported and, instead, close? What would be the impact on the overall quality of care and operational efficiency of the healthcare system? Various research efforts have assessed these issues. Here, we first summarize some key insights that can help policymakers. We then discuss what is at stake and what needs to be done. We also shed light on ways through which researchers can further assist policymakers.

## 2 Key insights

First, it is vital to understand that there are multiple dimensions to consider when evaluating hospital closure impacts. For example, although access to care has been a center of debate during the COVID-19 pandemic, the implications of hospital closures can go well beyond access. Notably, in some cases, hospital closures might improve the overall operational efficiency (i.e., the amount of output produced per input) of the healthcare system by routing patients to more efficient hospitals, or improving the efficiency of remaining hospitals [3]. There are also potential implications for care quality. Hospital closures may move patients who previously sought care at lower quality hospitals to higher quality ones, thereby improving the overall quality of the healthcare system.

While these effects may be heterogeneous, policymakers can take advantage of such heterogeneity. Specifically, when the negative consequences of closures to the community are not significant (e.g., in some urban areas with multiple alternative hospitals), the benefits of closures to efficiency and quality may outweigh the related losses (e.g., reduction in access). Conversely, when a rural hospital is an area's only provider, any gains from closure will likely be far outweighed by the adverse impacts of closure on the community.

There are distributional concerns as well. For example, the welfare gains described above may not be equitably shared, as improvements in efficiency and quality from closures tend to be distributed nationally (e.g., through savings in Medicare payments), whereas local communities tend to experience the welfare loss of their hospitals closing. This is especially concerning in rural areas characterized by limited options and long travel distances to

hospitals. Gathering large-scale empirical evidence on the heterogeneous impact of closure (or bailout) can significantly help policymakers adopt suitable targeting strategies in deciding where support is needed. Collecting such data might become easier in the near future, since U.S. lawmakers created a new category of “Rural Emergency Hospitals” to protect rural hospitals. Beginning in 2023, hospitals that qualify for this designation will be allowed to be paid by Medicare, regardless of whether or not they have patients in beds. Considering various efforts in the U.S. and around the world to collect and report hospital data, such as those in public reporting efforts [9, 10], we hope to see more use of data for the adoption of suitable targeting strategies.

Finally, it is also important to consider spillover effects of hospital closure on other surrounding locations. When a local hospital closes and patients find alternative care at other hospitals, changes in demand, patient mix, and payer mix experienced by the remaining hospitals can affect the way they deliver care. Insights from the service industry (e.g., call centers and banks) suggest that service durations and quality can be affected by spiked workload [8]. Recent evidence shows that this is also true for hospitals whose nearby hospital closes [12]. When faced with increased demand due to such closure, remaining hospitals in the market tend to respond by a “speed-up” behavior: they increase their service speed and spend less time per patient (on average), instead of accommodating the additional demand by reducing their bed idle times. Speed-up behavior can harm care quality, as it entails cutting some necessary and value-added care steps.

### 3 What is at stake and what needs to be done?

If not accurately accounted for by policymakers, these effects can intensify externality problems such as the rushed services and reduced quality of the neighboring hospitals, distributional inequity across geographic regions, and resource misallocations in the healthcare sector. To mitigate unintended consequences, policymakers should engage the remaining hospitals and other healthcare providers in the transition process. For example, imposing regulations on operational measures or providing incentives through innovative payment models such as pay-for-performance mechanisms can deter the speed-up response in the remaining hospitals and incentivize them to continue improving their processes. Similar logic can apply to the responses that affect access, such as patient selection and increased waiting time. Furthermore, close monitoring of market competition can also mitigate the adverse effects of hospital closure on the rest of the delivery system. This is especially

important in light of recent increases in vertical integration [11] and other similar activities that might negatively impact the healthcare sector. Importantly, however, policymakers should be aware of the complex nature of these policies, and note that enacting them may also result in unintended consequences such as hospitals being incentivized to reduce the system capacity.

Finally, in distributing CARES Act and other relief funds, in addition to current allocation rules that are typically based on past Medicare billings, we urge policymakers to carefully evaluate alternative methods (e.g., allocations based on patient volume), hospitals’ reliance on Medicaid funds, and both the access and quality dimensions of care delivery. These decisions will have a lasting impact on the healthcare system as a whole. To assist policymakers in acknowledging all the complex nature of the system and carefully designing evidence-based policies, researchers also have a unique opportunity to inform policymakers via careful studies that shed light on implications, trade-offs, and consequences of various strategies that can be followed. Hence, we urge researchers to grasp this opportunity, and we hope to see more cutting-edge research on these topics in the near future.

### Declarations

**Competing interests** The authors declare no competing interests.

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