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The Mortality and Ethical Impacts of Hospital Strain: How Can Hospitals Prepare for Future Capacity Crises?

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Abstract: *The COVID-19 pandemic created significant strain on adult hospitals. Pediatric hospitals are now experiencing similar strain in the setting of an early spike in RSV cases. Hospitals use ambulance diversion and inpatient transfer restrictions to reduce flow to the hospital. However, there are mortality and ethical concerns related to these methods. Other methods that are frequently explored are confined to individual health systems despite the capacity strain typically being widespread, impacting multiple hospitals across a region at one time. In the setting of seeing more frequent hospital strain in both adult and pediatric populations, it is important to examine the options available and to plan for similar events in the future with cooperation across multiple health systems in an effort to provide the best possible outcomes for patients in a region while minimizing moral distress among patients and providers.*

INTRODUCTION

The COVID-19 pandemic brought issues of hospital and emergency department capacity to the forefront of the news media, discussing patient deaths while waiting on treatment for COVID-19 and for other illnesses. Adult hospitals have struggled with the strain of capacity issues throughout the pandemic in the setting of COVID-19 surges and in the setting of staffing shortages.[1] Now, with respiratory syncytial virus (RSV) and other respiratory viruses hitting pediatric patients hard in a post-masking and post-social distancing era, the media is relaying stories of pediatric hospitals that are at or above capacity while providers do their best to trudge through it on the frontline. The *New York Times* broke down the situation of this early RSV spike for laypeople in an article titled "'This Is Our March 2020': Children's Hospitals Are Overwhelmed by R.S.V.," painting the picture of the inverse of what we saw early in the COVID-19 pandemic – children's hospitals, previously well below capacity and helping care for adults during surges, are now scrambling to take on a surge of their own.[2]

This increase in those requiring hospital care leads to the question of what can be done if both adult and pediatric hospitals, which often have served as methods to decompress the other in surge planning, are both full and unable to accommodate their populations. Could the health system have been better prepared for these crises of capacity? How can hospital administrators learn from the last few years and prepare to avoid similar events in the future? How do hospitals protect patients from poor outcomes without the capacity or manpower to take on the volume of those who are ill?

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MORTALITY IMPLICATIONS OF EXCESS PATIENT CAPACITY

Much of what has been studied in the past regarding capacity and patient mortality has been related to ambulance diversion, as that is often used as a predictor of a hospital or emergency department crowding. What has not been studied as thoroughly is the impact of inpatient transfer restrictions, particularly in the setting of an overfull tertiary or quaternary care center or an overfull children's hospital. What is the resulting impact when the inpatient hospitals that provide specialized care are too full to accommodate patients for whom they are uniquely qualified to provide care? What are the ethical implications of turning away patients requiring specialized care due to lack of capacity to accommodate them?

Ambulance diversion was created as a mechanism for redistribution of patients when one emergency department cannot accommodate patients, typically due to crowding of the emergency department and/or the attached inpatient facility.[3] Publications have demonstrated reduced access to cardiac technology and increased mortality in acute myocardial infarction (acute MI) patients when impacted by ambulance diversion.[4,5] A study by Hsia et al. demonstrated that black patients with acute MI had significantly higher mortality than white patients when impacted by ambulance diversion.[6] The mortality effects can likely be extrapolated to other disease processes that have less clearly defined treatment metrics as time to reperfusion and, therefore, are less easily quantified. Further, study of hospitals throughout the state of California demonstrated that hospitals serving higher volumes of black patients were more likely to be on diversion status, leading to concerns of poorer access and increased mortality.[7]

Another, less discussed, impact of hospital crowding is patient transfer restrictions, whether at the emergency department level or the inpatient level. Often, in the setting of inpatient crowding, hospitals will restrict their providers from accepting transfers from other health care facilities. Though the effects of hospital strain on mortality secondary to emergency department and inpatient transfer restrictions has not been studied as thoroughly as ambulance diversion effects, likely because it is more difficult to track and quantify, much of the impacts related to delayed access to technology and delayed treatments likely occur with similar frequency in relation to inpatient transfer restrictions as with ambulance diversion. A measure of hospital capacity, other than ambulance diversion, is intensive care unit (ICU) bed occupancy. In a study on the impacts of hospital strain during the early COVID-19 pandemic in 2020-2021, there was a significant correlation between increase in ICU bed occupancy and excess patient deaths from all causes at 2, 4, and 6 weeks following that increase.[8] Further, as patients being referred for transfer are often being sent from a health center with less resources to a higher level of care, the disparities seen in black communities may be even more pronounced. This is an area that requires further study to understand the implications and address them directly.

Inability to accept patients who need specialized care to the facility where that care can be provided not only has potential adverse mortality outcomes for the patients, but it is distressing for patients, families, and providers. The ethical implications of this are felt by all involved. The moral distress of a physician taking a transfer call from another provider, typically in a remote or underserved area with limited resources, and declining to accept the transfer due to lack of capacity cannot be overstated. Nor can the distress of the physician and staff at the referring facility or the distress of the patient and family. The inability to provide a patient the care they need because the hospital doesn't have the capacity to accommodate them goes against a physician's oath, leading to morally fraught decisions that may lead to patient harm due to delays in care or lack of ability to provide appropriate care in the patient's current location. This problem can only be tackled with communication and cooperation across the health care system with the inclusion of stakeholders who provide care to adult and pediatric patients. Addressing hospital capacity and overwhelming patient numbers needs to be anticipatory and comprehensive – accounting for the public health, financial, and ethical impacts to all involved well before the time of crisis.

PLANNING FOR FUTURE INCIDENTS OF HOSPITAL STRAIN

It is difficult to create the infrastructure or protocols necessary to deal with impacts to the health care system during crisis. However there are many ways hospital strain is being addressed on the frontline currently. Diversion and transfer restrictions are only two of these methods. Continued masking in some health care institutions for the respiratory season protects the workforce from illness exposure to reduce staffing shortages. Findings ways to cohort patients with the same viruses can allow for flexing up of capacity to

meet demand as it leads to less blocked semi-private beds due to isolation needs. Virtual consults by specialists provided to other institutions are a key to providing patient care when the patient cannot be transferred to the appropriate facility immediately. None of this is enough to alleviate the ethical concerns of the providers caring for these patients, though. These methods are band-aids, stuck together, too small to cover the wounds from an exsanguinating health system while frontline providers try to provide the best care possible to an overwhelming number of patients.

The sharing of the patient load between adult and pediatric hospitals has also been a documented method for diffusion of the patient load throughout the pandemic mostly with pediatric hospitals taking on adult patients. However, now adult hospitals may be in the position to take on overflow from the pediatric hospitals, particularly older adolescents. This method only works if one age group is outpacing the other in terms of patients requiring admission. There are several mechanisms to accomplish this. If there is a bed shortage without a staff shortage, float pediatric staff to the adult floors caring for children. If there is a staff shortage, adult providers or outpatient providers can help, much like many pediatric and outpatient providers helped adult hospitalists and ICU providers during the COVID-19 surges. However, this is not an option if both adult and children's hospitals in a health system are reaching or exceeding capacity. When both adult and pediatric hospitals in a health system are strained, they cannot serve as the contingency plans for each other's crises.

Many surge plans, if made by a health system prior to anticipated crisis, are created in a vacuum and do not account for surges in capacity being a regional issue, with patients waiting in multiple hospitals over an area needing care. Contingency plans for future patient capacity issues should account for the differing capabilities of hospitals in an area. Pre-hospital triaging of patients and their needs can help determine the local hospital(s) that can care for a patient based on diagnosis and acuity level. Ambulance diversion can be reformed through this method. Diversion of lower acuity patients to community hospitals may leave more room for complex patients with specialty needs at tertiary and quaternary care centers, either arriving through the emergency department or through inpatient transfer. Another similar consideration is transferring patients from children's hospitals to other hospital pediatric units so that the children's hospital beds are reserved for the sickest or most specialized patients. The same could be done for the adult population, ensuring that those needing specialized care are at the proper hospital in an attempt to decrease overall mortality and moral distress related to large referral centers being closed to the patients who need them while under strain.

CONCLUSION

It is difficult to plan for or appropriately navigate the ethical implications of a crisis when already in crisis, as our health system has been for the past few years. While there are temporizing measures that can be put into play during hospital strain, cooperation and advanced planning are key to prevent current events from repeating themselves in the future.

The sharing of patient load among regions via communication and planning across health system administrations could have the potential to improve patient outcomes and diffuse adverse moral impacts to the health care workforce in future. Creating a pathway for regional adult and pediatric hospitals to come together to make plans to deal with surges of patients in either or both populations may lead to reduced moral dilemmas for providers and improved patient outcomes in the setting of high patient census. Medicine is a team effort, requiring cooperation and lacking ego. That is evident daily on the hospital floor – why is it not evident on the macroscopic level across the US health system? No providers or hospital administrators want bad patient outcomes related to poor planning on their conscious. It would benefit health systems and hospital administrators to work together, across regional institutions or across a broader scope, to plan for future crises that create strain on their hospitals and put their patients at risk.

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