Research Article

Cross-Disciplinary Narratives on COVID-19: Local Perspectives from Global Health Science Graduate Students

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Introduction

The COVID-19 pandemic has put the global health response to the test and virtually at the brink of exhaustion for supplies, protective equipment, health workers, and access to diagnostics and care. Never in modern history has the world witnessed a coordinated and collaborative response to combating a disease. Governments at all levels and health entities are collaborating to contain infection and mitigate contagion, but they have not been successful when acting alone. As mortality rates suggest, our best efforts have fallen short of meeting public health objectives. As we now experience a surge of viral transmission and fatality, there are lessons to be learned. Many, if not most, states have shown signs and risks of scarce resources and limited capacity to manage the challenges of another surge, despite a phased roll-out of vaccination [1]. Coupled with alarming predictions of new variants and outbreaks among school campuses, the threat of COVID-19 remains real and demands vigilance among all stakeholders, including those within the health science student community [2]. As students of global health science, we are a part of a broader community and recognize a unique opportunity to lend our voice and professional perspectives to advance the global health objective during the pandemic. In the war against COVID-19, our affiliations have intersected management, education, and clinical channels, with some of us shouldering an unprecedented burden that has blurred the lines between professional and personal lives.

Objective

Given our multi-disciplinary functions, we sought to document a range of personal perspectives from different national regions affected by the pandemic. Doctoral and Master's degree candidates across disciplines enrolled at the time in global health courses were invited to contribute. Students (n=21) were prompted to reflect on a series of questions (Table 1). These disciplines spanned clinicians (n=11), educators (n=4), and managers (n=6). Clinicians were defined as providers with direct patient contact or responsible for the care of a patient; educators were characterized as students whose primary profession was in the academic or research community; and managers were described as individuals whose chief professional role was non-clinical operations, personnel, or business functions. As one might expect, several respondents have multiple responsibilities that overlap among these functions. However, each respondent was assigned to a discipline characterized by their primary role.

Q1	How has the pandemic affected the life of Americans? – Work life – Health: mental, physical – Social: individual, community – Finances – Health professionals
Q2	What do you think should be the priorities in managing the pandemic for your local area?
Q3	What do you think should be the priorities managing the pandemic for the country?
Q4	What do you think should be the priorities managing the pandemic for the world?
Q5	What has the health system in your area done to plan and manage the pandemic?

Table 1: Prompts for student reflection.

This paper presents a reflection of these narratives, including observations and approaches that were employed as strategic response measures. Learnings are grouped into both positive and negative outcomes. Considering the emotional nature of experiences, we attempted to preserve the tone, language, and nuance of the narratives. Where it was necessary for clarity and flow, however, we adjusted language to ensure a more seamless integration among multiple perspectives. We provide a brief assessment of these emerging themes and conclude with timely priorities that may inform global health policy and decision-making to better prepare for and respond to the ongoing pandemic.

Positive Learnings

Three areas emerged as positive learnings: community response, employment of centralized systems, and transformation of patient care (Table 2). Stakeholders included local families, workers, local public health agencies, and first responders and volunteers. Respondents noted a greater sense of community and reliance on one another. Public safety and support efforts were most effective at the community level, supplemented by charity involvement. Examples of this include grocery delivery programs for the elderly and volunteerism through the National Guard and The Freedom Corps.

Focus	Stakeholders	Characteristics
Community Response	Local families, workers, and volunteers; local public health agencies; communities, first responders	• Greater sense of community and reliance on one another • Public safety and support efforts have been most effective at the community level • Charity involvement • Leadership from the Assistant Secretary for Preparedness and Response that is responsible for the Strategic National Stockpile, the Army National Guard and Air National Guard • Yearning to be human again • Renewal in fait • Grocery delivery programs for elderly • First responder and armed forces volunteerism
Centralized systems	Hospitals, government, health care workers, primary care settings	• Centralized locations to conserve PPE and decrease exposure to staff and patients; decreased the risk of transmission in primary care • Allocating treatment rooms, ordering supplies, and assigning specific facilities

Transition of Care	Clinicians, allied health, administrators, payers; children, students, parents, educators; allied health care workers; first responders	• Deployment of Health Care Workers • Training programs • Support from social, individual, and community level • PAs deployed to fill voids • Furloughed workers and volunteers to assist in hard-hit areas • Physical therapy practice transitioned outpatient caseload to telehealth • Inspired by nurses and camaraderie • Remote learning slowed virus transmission and reduce deaths

Table 2: Summary of positive learnings.

Use of centralized systems was characterized by integration of hospitals, government, health care workers, and primary care settings across a single channel of communication. A centralized point of contact was effective in conserving Personal Protective Equipment (PPE), allocating treatment rooms, supply ordering, and facility assignments. These tactics reduced transmission in primary care settings while mitigating exposure to staff and patients in hospital environments. Respondents recognized a marked shift in patient care, with greater reliance on allied health care workers and retired clinicians. Respondents, many of whom practice as physician's assistants (PA) experienced an increase in recruiting and deploying PAs to fill clinical voids. Furloughed workers and other medical workers returned as volunteers to assist in hard-hit areas, while physical therapy practices transitioned to an outpatient caseload leveraging telehealth and remote access.

Negative Learnings

It was not surprising to learn that respondents identified themes that arose from discrepancies in communications and access to care. Specifically, these themes emerged as injustice and health disparities, moral conflicts, and inconsistencies in clinical and treatment decision-making (Table 3). Many respondents cited awareness of significantly higher death rates among Black and Hispanic communities, indicated by inadequate supply in food banks and suboptimal standards for the most vulnerable, particularly the elderly and those living in nursing facilities. Families and individuals living in crowded areas, with co-morbidities, underlying medical conditions (e.g., diabetes) and limited resources comprise those that are most susceptible to infection and lack of access to care. Racial inequities are evident through poor advocacy and misrepresentation as well. Respondents observed that less than half of the states publicly report deaths for all patients.

Focus	Stakeholders	Characteristics
Injustice and health disparities	Minorities, low socioeconomic status, health illiterate, rural areas and poorer states elderly and frail	• Significantly higher death rates among Black and Hispanic communities • Inadequate stock in food banks • Poor care for the weak, sick, and the most vulnerable • Most susceptible live in crowded areas, have co-morbidities, elderly, and have few resources • Hispanics almost three times as likely to be uninsured; Blacks almost twice as likely • Vulnerable populations (e.g., skilled nursing facilities) reporting high incidence of infection • Gaps in advocacy; only 23 states publically report deaths • Poor infrastructure for centralized needs and delay in relaying critical data
Moral and psychological challenges	Clinicians, ethicists, educators, government and health entities; military, diplomats	• Treating patients with no clinical-based guidance and insufficient data • Futile mindset and pessimism among clinicians • Mental and physical burnout even among non-essentials • Fear of transmission • Transmission to family compromising patient care • Blame and conspiracy theories: WHO and CDC blamed for low testing rates and failure to act promptly • Threat to national security and armed forces • Threats to homeland personnel

Clinical inconsistency and discrepancies in priorities	Clinicians, hospitals, allied health workers	• Inconsistencies in policies for PPE allocation, low priorities in diagnostic testing • Shortages and damaged or expired PPE and equipment • Unfiltered protection; reusing disposable surgical masks over disposable N-95 masks; hydroxychloroquine misuse • Low early availability to test individuals and contact tracing • Interprofessional collaboration: poor and delayed communication

Table 3: Summary of negative learnings.

Moral conflict and psychological trauma was experienced across multiple disciplines, including those who represent clinical, academic, and government entities. With poor alignment and guidance across state institutions and discrepancies among clinical and policy guidelines, many providers convey professional and physical burnout. The inability to meet capacity and resources for patients have forced clinicians and administrators to shift patient care to outpatient settings, further burdening delivery of care in an already-taxed health care system. Accountability and responsibility resurface as a common theme, with reference to poor alignment between Centers for Disease Control and Prevention (CDC) and government entities, low testing rates, and failure to act promptly to control disease spread and transmission. For some respondents who are active in the military, such shortcomings represent a real threat to national security and to their personal lives at home. Inconsistent guidance and communication have been especially challenging for administrators and management at institutions who are responsible for decisions pertaining to PPE allocation, availability of diagnostics, supply shortages, and unapproved treatments. As one would expect, many of these narratives point to gaps in interprofessional collaboration and transparent communication.

Cross-Disciplinary Narratives: Management, Clinical, And Education

Perspectives on COVID-19 management and relief effort varied by respondents across disciplines and geographic regions within the United States. Despite experiencing common challenges and frustrations with medical and emergency response across regions, unique circumstances and challenges also emerge by discipline and state. These are summarized in (Table 4).

Health profession	Region	Reported Challenge
Management (n=6)	Massachusetts	Misuse of resources leading to increased risk for homeless, vulnerable, and mental illness populations
	Maryland	Immediate closure of in-person education sites
	Hawaii	Aggressive public access measures, with mandatory 14-day quarantine traveling to and from the state
	Illinois	Transition to remote employment across the state
Academia (n=4)	Massachusetts	Health disparities, food insecurity among children, and supply hoarding
	Connecticut	Immediate implementation of stay at home limited access to diagnostics and testing sites

Clinical (n=11)	Massachusetts	Statewide closure of non-essential business statewide, reinforced by community-specific orders
	Pennsylvania	Failure to implement early rapid testing, prompt contact tracing, and disproportionate deployment of National Guard
	New Hampshire	Despite expedited privileges for emergency and inpatient settings, inconsistencies in policies for personal protective equipment, lack of clinical reciprocity across state lines, and threats to long-term facilities
	North Carolina	Lack of resources for minorities and low socioeconomic status households
	Wisconsin	Re-organization of hospital staffing, processes, and clinical services

Table 4: Comparative challenges by discipline and geographic region (n=21).

Management Health Professions Narratives

New Jersey, Management. Pandemics are disease outbreaks that cripple human life around the globe. The severity of COVID-19 can be compared only to the Spanish flu of 1918. In the state of New Jersey, blacks make up 15% of the population and 22% have died of the virus. Hispanics on the other hand make up 20.6% of the state population and 17.20% have died of COVID-19 [3]. These numbers give a bird's-eye view of the devastating nature of this pandemic on the minority population in New Jersey. The uninsured are likely to face significant barriers to testing for COVID-19 and any care they may need [4]. There is evidence that minorities have limited access to care, hence the reason for higher rates of hospitalization and deaths from COVID-19 [5]. African Americans have existential chronic conditions like diabetes and hypertension. However, among other illnesses, the CDC has determined that those at risk for severe illness from COVID-19 include individuals with liver disease, chronic kidney disease, severe obesity and diabetes [6]. The risks of contracting COVID-19 and becoming severely ill or dying are greater among minorities than any other group. As a result, public health officials, state and local governments as well as community leaders must take immediate measures necessary to help prevent the continuous spread of this highly contagious virus. Addressing the needs requires that officials should (1) leverage such platforms to sensitize issues surrounding COVID-19 with the aim of containing the virus, (2) provide culturally tailored messages that are trustworthy, clear and easy to understand, (3) develop programs that empower community leaders to take charge in providing support systems for those laden with stress or mental health complications arising from COVID-19, and (4) ensure that basic healthcare needs are met for instance, protective gear, access to providers, testing and affordable medications.

Massachusetts, Management. I reside in Boston, steps away from the Boston Medical Center (BMC), and an area known as "Methadone Mile." Prior to the COVID-19 pandemic, this area was a concentrated cluster of facilities for those seeking health services and for those who continued to struggle with mental health, drug addiction, and homelessness. Since the pandemic began, there have been two waves of impact that have hit this already fragile neighborhood. The initial wave closed nearly all of the restaurants and stores in the area, and all of the state health service facilities, including methadone and suboxone clinics, comfort care locations, homeless shelters, and halfway houses were forced to reduce capacity. These closures left a majority of these vulnerable people on the streets. Without masks, social distancing, or sanitation facilities, a spike in COVID-19 infections was observed [7]. As the months progressed, the few remaining facilities across the state continued to close, and a second wave began as even more homeless and desperate people were forced to concentrate in the already overburdened neighborhood; since the pandemic, nearly 60% of those seeking services in this area are from outside of Boston [8].

This second wave brought with it a lack of access to health services, food, water, sanitation, and shelter, which in turn has caused a significant increase in human feces, used needles, trash, rodents, homeless encampments, and has escalated criminal activity including prostitution, illicit drug use, and violence. Sanitation issues lead to fecal transmission of many pathogens that are a major cause of morbidity and mortality [9]. Putting aside the health risks caused by increased violence, the most significant threat to the community continues to be the rampant human waste, illicit drug use, and prostitution that has created a perfect storm for the further spreading of a variety of infectious diseases. Some of the temporary housing solutions included leasing hotels and dorms in the area, but with schools reopening, these leases have expired and have forced people back on the streets [10]. With an infrastructure that is on the brink of collapse, local government, public, and private organizations must come together to activate change. Some of the recommendations that should be prioritized

include decentralizing and opening back up facilities across the state, opening up and bringing in more public restroom facilities, and supporting local agency action against criminal activities.

Massachusetts, Management. The most challenging aspect of this adjustment has been managing the balance between working and just being at home. I have had to create boundaries for myself and my team, where I logoff and shut my computer down at a certain time every night. Sometimes this is difficult when I do not have many competing personal priorities pulling me away from work, but I believe it is important to try to separate the two even while spending all my time at home. I am fortunate to live with a close friend who has stayed in the apartment during the pandemic. This has made me not feel as lonely as I imagine people who live alone may be feeling. Although I am missing my social circle outside of my roommate, I am thankful to have a living situation that is comfortable, familiar, and enjoyable.

Massachusetts, Management. The beginning of the pandemic was nerve-racking and caused a lot of uncertainty and anxiety for me as an essential employee. Nevertheless, after several weeks into it, we got a better grasp of what procedures to follow, and modifications were done accordingly to still allow workers to fulfill their responsibilities. On a personal level, a reduction in working hours and pay required some lifestyle changes and adjustments in finances to cope. However, I am grateful to still have a job and hope that this passes sooner rather than later. I am personally big on mental health, therefore, it required me blocking all COVID-19 news and outlets and instructing my friends and family to limit the spread of COVID news that was unfruitful and untrue. I had enough of COVID related activities at work so my sanity outside of work was paramount. I have been doing everything to keep sane. Other outlets to coping with this are by watching movies, reading my bible, praying, and meditating more. As well as joining zoom meetings that were unrelated to COVID but still added value to my life. I have also engaged in charity opportunities for those in need and used my social media outlets to spread laughter, positivity, and encouragement for everyone that is a part of my community. One concerning thing I have read that raises a red flag is the current disparity in COVID deaths across the country. People of ethnic backgrounds seem to be affected in different ways than other ethnicities and this may require a deeper look into the healthcare system to address this. When COVID is over, I hope we as a people, do better for all of humanity.

Maryland, Management. Mental and physical health for all members of my immediate family remains strong throughout the COVID-19 crisis. The school system where my son is a 4th grader, closed access to all schools on March 16, 2020, following Department of Health and Human Services recommendations. This translated into my wife and son working together on his distance learning throughout the day, while I completed work related to my business. Then after 5 p.m., we play soccer or garden in our backyard to remain engaged in physical activity. Doing these types of activities consistently has actually increased our overall health. To supplement my need for exercise, I also regularly run now on a treadmill that I have in my office. Since the start of COVID-19, there has been minimal social contact with anyone outside my immediate family. One family lives just across the street from my house, and they are essentially my extended family. However, since they are older, we have maintained very limited contact with them out of fear of exposing them to the COVID-19. This fear is a necessary reality because studies show that older people tend to experience greater difficulty with COVID-19 [11].

Hawaii, Management. The ongoing priorities for managing the COVID-19 pandemic in the State of Hawaii are limiting the spread of infection and managing the limited healthcare resources on each respective island. The Governor of Hawaii issued multiple statewide orders to "Stay at home, work from home" except for essential personnel. Additional proclamations from the Governor provided further restrictions of the movement of individuals, which have earned the state government praise as well as harsh criticism. Some of the more aggressive measures enacted by the Governor include a mandatory 14-day quarantine for all individuals traveling to Hawaii from outside the islands (Internationally and mainland) and the quarantine was later extended to also include those who fly inter-island.

To further prevent the spread of infection, the Governor issued a fifth supplementary proclamation to close all beaches, which have drawn much criticism from the local communities. Hawaii's Lieutenant Governor has been proactively communicating the number of tests, the rate of infections, hospital ICU bed census, ventilator use, and the number of deaths via social media. The Lieutenant Governor has been working with public health leaders and the Healthcare Association of Hawaii to identify shortages in healthcare resources to include PPE, ventilators, and COVID-19 testing resources. The proactive management of resources is critical since there are islands with only one hospital and no alternative to treat positive COVID-19 patients. The future challenge will be how to balance the continued spread of infection while slowly opening a devastated state economy that is heavily reliant on the tourism industry. From a federal government perspective, there needs to be leadership based on evidence-based science providing guidance to State Governors on how to safely and strategically re-open businesses and the economy without jeopardizing lives and burdening the healthcare systems. As the nation recovers from the COVID-19 pandemic, there needs to be greater support for and leadership from the Assistant Secretary for Preparedness and Response that is responsible for the Strategic National Stockpile.

Academic Health Professions Narratives

Illinois, Education. The global pandemic of 2020 has affected the lives of Americans in every aspect, from work life to overall health and well-being due to the new remote work model. Much of society today are beginning to utilize web 2.0 technologies to transition from in-office to a remote style of working. In 2017, remote full-time employment made up around 3% of the workforce, but due to the COVID-19 mandated national and state quarantines; the number of Americans working remotely has increased exponentially [12]. This has created extra stress on all persons living under the same residence, particularly if more than one person is working remotely. Consequentially, household demands are at an unprecedented high due to having to adapt to new living conditions and family needs. Americans are finding unconventional ways to balance both work, partners, and dependents needs in non-traditional ways. Thus, creating uncertainty and stress in an already uncertain time. Work hours are becoming unstructured and being online at unpredictable times has become the new norm. The new remote work model created an increase in demands while creating mental and physical burnout. Many essential workers are terrified of contracting the virus and risk passing it onto a loved one. Essential workers are electively choosing to relocate and isolate to limit unnecessary exposure while working through this pandemic. Individuals that are not choosing to self-isolate are living with fear of potentially exposing others. Overall, the health and wellbeing of every American has started to take a negative toll due to unpredictable variables, additional stress, and the restructuring of daily life. How Americans adapt after a global pandemic will truly be a testament to the American spirit.

Massachusetts, Education. Over the last several months millions of lives have been forever altered and the normal functions of society have been radically transformed. The pandemic has shed light on many issues that have been overlooked for years. A central issue being that health disparities are deeply rooted in our current societal structure. We have seen that children will go hungry because schools are closed, and those same children will be further disadvantaged because of virtual education. We see those who work in minimum wage jobs suffering; having no choice but to go to work or they will not be able to put food on the table or pay their rent. These two issues highlight the need to have a system that allows all of us to have a livable income. At the moment millions of Americans have awakened to the reality that our current structure does not support equity. People feel sorry for those children going hungry and feel bad for the employees at Wal-Mart who test positive. Many Americans are expressing empathy towards others and it is a great showing of the collective spirit. Yet, I wonder how long this empathy will last? Will it be enough to foster the development of new structures that support individuals and families? My fear as with so many tragic events is that as time goes by the collective memory fades and the empathy lessens until

for most it is just a small moment in their lives. For example, how many times have the American people felt moved by events like 9/11, the Boston Marathon bomber, and mass shootings? And of those times where people saw the fragility of life and became more emphatic did those people take action? While the pandemic is an unprecedented event in our history does its power to shed light on our societal failings prove strong enough to make lasting changes?

Massachusetts, Education. Many Americans have been furloughed or terminated from their jobs, while others are trying to work from home due to social distancing and stay at home orders. According to the US Department of Labor, as of the week ending on April 11, 2020, the level of seasonally adjusted insured unemployment has reached an all-time high. The overall unemployment rate is upwards of 11 percent and continues to climb.[1] Schools are implementing remote learning at all levels. This affects not only colleges and universities but also the K-12 population. This puts tremendous strain on resources at all levels. To assist with this initiative, the US Department of Education developed the Coronavirus Aid, Relief, and Economic Security (CARES) Act, allowing schools to repurpose existing K-12 education funds for technology infrastructure and teacher training on distance learning, among other flexibilities to move resources to areas of highest need during the national emergency. In Massachusetts, we have had one of the highest rates of COVID-19 in the country. Priorities of management include continuing to enforce social distancing measures. In my personal observations, the public is becoming lax with these regulations. Entire families with small children can be seen in big-box stores, many without facemasks despite the CDCs recommendation to wear a face covering when in public). Hospitals are facing strain of resources on PPE and are experiencing theft of PPE items such as masks and gloves. Hand sanitizer and sanitizing wipes are impossible to find in grocery or other stores. Measures need to be taken to stop the public from stealing or hoarding supplies.

Connecticut, Education. When addressing a pandemic, like COVID-19, principles of the Pandemic Intervals Framework (PIF) should be instituted to reduce the spread of the virus [13]. Priorities for managing the pandemic should be to stop the acceleration of the virus and prepare for future outbreaks. In Connecticut, our governor implemented stay at home orders in a timely manner to mitigate the acceleration of the virus. In March 2020, all non-essential businesses and schools were closed. This was earlier than other states in the New England area. Such types of measures have been shown to slow virus transmission and reduce deaths caused by the virus. Unfortunately, these early actions to social distance were not coupled with the early availability to test individuals who may have coronavirus and trace their respective contacts. Our state borders are not walls and do not stop people from performing their essential work functions. Individuals may bring the virus back into this part of the state where testing is limited. Efforts to

mitigate the transmission of the virus should also include contact tracing. Testing individuals and identifying who the infected individual may have been in contact is essential to controlling the virus' reach. Providing adequate testing sites and implementing a contact-tracing program are ways to be prepared for a second wave of the virus.

Clinical Health Professions Narratives

New York, Clinical. A COVID-19 pandemic is an unimaginable global event that has subjected the entire world to pandemonium. What started like child play in China quickly became severe health situations in different countries, counties, and communities across the globe. The mode of contact had been so remarkable that no one is sure of status even after testing negative. Different countries had devised various methods of combating the menace. While some countries initially adopted herd immunity, some other countries rely on the use of a ventilator. At the same time, hydroxychloroquine became an acceptable treatment option for few days. Even the suggestion of antibacterial Lysol was explored. For months now, the coronavirus pandemic had significantly disrupted the work-life of all Americans. In general, everyone had been affected one way or the other, throughout the world. Emerging daily life alteration includes: social distancing, self-isolation, quarantine, use of face-masks; restricted or essential travel only, restricted emergency visitation or hospitalization, cancellation of elective surgeries, close of non-essential workplaces and schools, anxiety for infection, and anxiety for spreading. Projected significant negative effects on America's economy cannot be overemphasized and overestimated. To worsen the associated loneliness that some people are experiencing, psychiatry management is not given frontline concerns. Some people who need psychiatry medications are lonely and not getting those meds, and this may result in complications. Although food banks are helping within the United States, outside the United States, people have resorted to stealing. Farmers are not able to work; thus, we are deleting food reserve, and we are not replenishing food supplies, which may cause famine in a few years. Government borrowing is taking resources away from critical issues. Authorities should focus on finding a vaccination through the CDC and private collaboration. The world should focus on intergovernmental cooperation that will ensure proper treatment and vaccination. Information sharing can be best done at this level.

New York, Clinical. I am an outpatient physical therapist that prior to the coronavirus pandemic only provided rehabilitation services face to face. Now, I provide predominantly telehealth services, through either telephone or video conferencing, utilizing an encrypted platform to ensure patient privacy and confidentiality. Personally, delivering care through a video platform is vastly different and takes away the physical component of the examination. However, it has also allowed my co-workers and myself to be creative, sharing ideas of how to have the patient perform certain special tests or other examination techniques, we would normally be able to perform on the patient. Even though most of my co-workers do not feel that the quality of care is the same using video compared with face-to-face interactions, the patients have responded positively. The patients enjoy being in their own home and have been more willing to try novel exercises. I also believe that receiving the telehealth services brings some sense of normalcy to their lives. Video conferencing also seems to make the patient more accountable for his or her own progress with performing the home exercise program. Objectively, patients are improving and subjectively patients are reporting that telehealth is working. On the acute care side of physical therapy, there have been some significant changes. I feel that the most important priority when providing acute care services is to protect the patients that come into the hospital for reasons other than the coronavirus. Our rehabilitation department has made this a priority with those therapists that have worked with patients with the coronavirus, or patients suspected to be infected with the disease, and will not treat other patients who have tested negative that day. I anticipate that this will be harder to do if we see an influx of positive coronavirus cases. There is a group of physical therapists creating a systematic plan, should this occur. The coronavirus pandemic has transformed physical therapy practice as we fully transitioned our outpatient caseload to telehealth and have had to approach the delivery of our acute care services in a novel way.

Massachusetts, Clinical. To be both a healthcare provider and a physician assistant doctoral student with an emphasis in global health during the unfolding global pandemic is a unique experience. I am trained to evaluate, diagnosis, and treat illness or injury. As a student studying global health, I am learning to synthesize knowledge and data and apply it to evidence-based practice. I rarely have felt this fearful of what the patients that I treat, may transmit to me and then to my husband or my children. I have never been asked to diagnosis and treat patients without sufficient data and evidence to guide my decisions. In emergency medicine, there is a degree of comfort with the reality of life and death, but never comfort in the widespread mortality caused by this novel disease. I certainly have never taken a class or listened to a lecture on how to cope with the uncertainty of a global, new normalcy. This pandemic, however, has unleashed the best of our humanness and people are aching to help, to be part of the solution, to be part of 'the something' that can conquer this new thing. In my experience, on the frontlines and as a community member, I think we have all learned through COVID-19 that we need one another. We are learning to be human again, in the purest form.

Massachusetts, Clinical. COVID-19 revealed both the value and necessity of a bottom-up approach to managing disaster. Early in the viral outbreak, Massachusetts was among a few states that were labelled as hot spots due to a high density of recorded diagnoses. The state quickly implemented social isolation policies

and the governor's office set executive orders for closure of non-essential businesses. The enactments were statewide and enforced by individual cities. On Cape Cod, however, public safety and support efforts have been most effective at the community level, particularly through the Cape Cod Medical Reserve Corps (CCMRC) [14]. Known officially as The Freedom Corps, the program serves three purposes: to respond to crisis, to rebuild communities, and to sharing compassion with the world. To ensure continued supply and replenishment of PPE, CCMRC recruited volunteers to safely transport home-made masks and protective gear to local facilities servicing providers and patients at the Cape Cod Healthcare system. Pickups and drop-offs were standard across the workweek. In the span of two months, these efforts maintained the safety of health workers and preventing unnecessary ER refusals and transfers. In addition to manufacturing and delivering PPE, CCMRC implemented a grocery delivery program aimed at nursing homes to support the elderly with no means to access daily provisions and home essentials. The community program at CCMRC developed a schedule to buy her provisions at the local market. Other initiatives have included Meals on Wheels, replenishing supplies in food pantries, skills matching for at-home manufacturing of PPE, and monitoring of needs from group homes and assisted living. The value of community outreach and medical volunteerism at the local level is undeniably critical and effective during times of crisis. Future policy and funding should be directed at strengthening the infrastructure and volunteer forces that are the bedrock of local communities.

Pennsylvania, Clinical. I am a trauma PA at a small community hospital with 220 beds. I "Moonlight" in the ICU at night. Everyone wants to do something. I need people to stop thanking me for being a "hero." I am not law enforcement and I am not military. I am a PA who comes to work every day to do my job and then goes home to my family. So as heavy as that seems, this is far worse: the physical, mental and sheer emotional exhaustion. Physically, all I have done is sleep, eat, work, eat, work, shower, sleep, and repeat. The logistical nightmare and physical stress is just the tip of the iceberg. Why can't we oxygenate COVID-positive patients? We have asked ourselves this over and over again. Is it the theory everyone is hypercoagulable? Is it this theory that patients are anemic or the virus displaces the heme from hemoglobin? Maybe. Is it a relation to the AT2 receptors? Who knows? Families do not get to come say goodbye. We cry with them and hold their loved ones hands and we run codes knowing it's really only a matter of time before we all contract it despite a LUCAS device to keep us hands off from compressions, and it's not enough. I have become that healthcare provider who looks at patient care from a very utilitarian standpoint. We must do the greatest good for the greatest number. I hate what COVID has done to me as a provider. Any of us could be the next 37-year old laying in that bed. Any of us could be told that we do not have the resources to invest in our elderly

family member's care. COVID does not discriminate and no one is safe. I will never look at healthcare, patient care or even my hospital administration the same again. I have been inspired by our nurses and found camaraderie in places I never expected.

Pennsylvania, Clinical. The virus has contributed to a crashing economy and broken health-care systems, filled hospital beds, and emptied public spaces. It has separated people from their workplaces, friends and family. Soon, most everyone in the United States will know someone who has been infected. Like World War II or the attacks on 9/11, this pandemic has already imprinted itself upon the nation's spirit. Many have mentioned that a global pandemic of this scale was inevitable. Now hypothetical became reality, "What if?" became "Now What?" No matter what, a virus like this one was going to test the resilience of even the most well-equipped health systems. More transmissible (and fatal) than the seasonal flu, the new coronavirus is stealthier, spreading from one host to another for several days before triggering obvious symptoms. To contain such a pathogen, nations must rapid test and use it to identify infected people, isolate them, and trace those they've had contact with. However, if the country could have accurately tracked the spread of the virus, hospitals could have executed their pandemic plans, preparing themselves by allocating treatment rooms, ordering plentiful supplies, or assigning specific facilities to deal with COVID-19 cases. I hope that government officials and health professionals in Florida are able to work together and develop a plan to promote testing early and prevent the spread by enforcing masks everywhere. As a public health professional who resided in Tampa, Florida during the start of the outbreak, it quickly became apparent how certain states differ on protecting Americans against COVID-19. There is extra fear and worry about the health of loved ones. Some techniques that have been helpful towards mental health is 1) maintaining a routine, especially now that we are isolated in the apartment and 2) taking a break from watching the news and scrolling social media.

Pennsylvania, Clinical. Without exception, COVID-19 has affected every individual living in America. My personal reflection will focus on the local military response in the hardest-hit areas. As a medical provider in the National Guard, my primary function is to provide care for other military members to ensure they are capable of carrying out their stated missions. However, there are times when the National Guard is relied upon to carry out humanitarian missions. Specialized medical units are trained to respond to homeland emergencies, such as natural disasters or terrorist attacks. This current pandemic is a unique threat because it affects all citizens at the same time. Therefore, not all resources can be diverted to one specific geographical area of impact. As New York became a hotspot for burgeoning COVID cases in March 2020, President Trump elected to activate the medical reserve components of the armed forces to bolster the efforts in that region,

and assist in efforts such as the US Navy hospital ship Comfort and the conversion of the Manhattan-based Javits Center into a functioning field hospital. Alternatively, the Army National Guard and Air National Guard are primarily state assets to be mobilized at the discretion of the governor, and rarely do Guard units cross state borders. With the majority of National Guard medical team members holding full-time civilian employment in the health sector, governors showed judicial prudence and were hesitant to pull providers from hospitals and outpatient clinics on the front lines of the COVID-19 fight. In Philadelphia, multiple mobile testing sites were set up in and around the city and staffed by National Guard medical personnel. Nursing homes and retirement communities also requested government assistance to attain COVID control. The initial manning was through the Homeland Response Force (HRF), but as these diagnostic COVID missions remained in operation for weeks and months, the HRF teams have slowly been reinforced and relieved by volunteer traditional guardsmen from the local guard bases within the state of Pennsylvania. As always, it is a delicate balance between federal needs, state sovereignty, and local ground-level community priorities.

New Hampshire, Clinical. Helping those who cannot help themselves is a priority. During this pandemic, the residents in long-term care facilities are suffering, and the hardworking staff is dealing with shortages of essential supplies to provide care. To address this critical need in New Hampshire, a new volunteer network with over 100 members formed to provide guidance and support for about 200 licensed senior care facilities. This volunteer network of physicians, nurses, PAs, healthcare students, business school graduates, and educators has interprofessional strength. The COVID-19 Policy Alliance Senior Support Team liaisons are providing daily communication to the growing list of over 40 facilities collecting data on their needs, providing curated resource information, and advocating for their specific needs. MIT Sloan School of Management and graduate students assisted in creating this organization [15]. National data analyzed by Chidambaram points out the gaps in advocating for this vulnerable population [16]. The nationwide data collection varies greatly, and is NH is not alone in having accessible data reported. The information gathered from other states shows the significant risk that residents and staff face in these facilities. It is now apparent that building the infrastructure to centralize needs and relay critical data is essential for long-term care facilities in a pandemic.

New Hampshire, Clinical. As a physician assistant in primary care medicine, I knew that that when my community hospital system called me to train in emergency medicine in the midst of COVID-19, that it was my duty to oblige. In times of disaster, PAs can be deployed to fill voids based on the needs of a community. In my hospital system, administration began giving providers expedited privileges to work in the emergency and inpatient settings. The transition of the Electronic Medical Record (EMR)

was simplified with the use of order panels for labs, imaging and medications that are frequently used in our emergency department. Providers were given shadowing opportunities in the ED, where we followed Emergency PAs and NPs during their shift, who oriented us to the flow, layout and procedures of the ED. However, in the beginning of the COVID-19 response in our system, there were inconsistencies in policies for personal protective equipment. At that time, there was a clear preference for N-95 masks by the CDC; however, primary care services did not have access to these masks. This caused confusion and resistance among healthcare providers when providing care to potential COVID-19 patients. Weeks later, decisions were made to have all potential COVID-19 patients go to one centralized location in our system, which helped to conserve PPE and decrease exposure of staff and other patients. This method of centralized care was highly effective at decreasing the risk of transmission in primary care offices and successfully conserved PPE as we waited for shipments. As for state regulations, our medical board in New Hampshire allowed for an exception of our physician supervision rules, which require specifically named physicians to be listed with the board of medicine during normal operation. However, this exception now allows for any PA licensed in the State of NH to practice in a different setting/facility as long as there is a physician for supervision. Therefore, PA practice is not limited by unnecessary paperwork during declarations of disaster. Though our state has not needed a large flux of healthcare providers, further preparations could be made to create rules for emergency reciprocity of healthcare providers who are licensed in other states. To further support rapid deployment of PAs, the United States government needs to address the barriers of deployment of our supply chain and create effective quality checks. Furthermore, Federal Emergency Management Agency (FEMA) should help to devise plans for full-scale national emergencies and not just disasters isolated to one state or region of the US. Lastly, there should be a system in place to help redeploy medical providers who may be furloughed and volunteer to assist in areas that are harder hit and need a flux of healthcare providers.

North Carolina, Clinical. Similar to the 1918-1919 influenza pandemic in the United States, COVID-19 has disproportionately affected those who are minorities, in poverty, live in crowded areas, have co-morbidities, are elderly, and those who have fewer resources [17]. According to the CDC, "Where we live, learn, work, and play affects our health [18]. As a minority in the medical field, this reality is particularly distressing to me. I consider a time when I was unsure where my next meal would come from. I was a single mother attending University and I often question if this pandemic would have come during that time in my life. Would I have ever recovered? Would I have missed my opportunity to liberate my family out of poverty? Would I have died because I did not have the resources or knowledge to protect myself? While I am a minority, I have more resources then many of us do, which is why I am less likely to succumb to COVID-19 [19]. While there

are multiple factors that make this virus particularly worrisome, protecting the most vulnerable populations must be our focus as we cannot ascribe monetary value to lives.

Wisconsin, Clinical. It is amazing that a virus that is 125 nanometers long can have such an impact and an influence on our entire world! Working in healthcare as a hospitalist for many years, I have never seen anything like this. I enjoy the great privilege of taking care of some the sickest patients I have ever seen, as well as supporting the families who are called to endure many hardships along with their hospitalized loved ones. I have held the hands of dying patients, tried to comfort grieving widows, given stickers to little children in the midst of a COVID crisis, and have done all of this with the amazing support of my precious wife and children, my family, my church, my employer, and my coworkers. While we have read about many pandemics of the past, we will be able to say that we lived through and helped serve numerous patients through this coronavirus worldwide impact. For me, personally, this has been a very purifying time. I love my family so dearly, and being forced to remain at home with my precious loved ones has caused me to be even more impressed with the importance that each of them play in my life. At our hospital, we have completely rearranged our staffing, our clinics, our personnel, our surgery scheduled, our hospital admission processes, our dress code, our hospital parking, even our interactions with patients. Being involved in making life-changing decisions for my patients is a responsibility I do not take lightly! My patients depend on me to be competent, compassionate, empathetic, and ethically and morally responsible to deliver the absolute best care I possibly know how. I am surrounded by an absolutely amazing team of clinicians who strive to put our patients and their issues paramount. One day, if medical textbooks continue to be written, I trust this COVID pandemic will be a thing of the past! I look forward to the day when the threat of worsening and deadly illnesses can be eliminated, and we can forge ahead in our medical advances, continuing to serve our patients one visit at a time.

Recommendations and Conclusion

The perspectives presented in this paper offers positive and negative learnings from local and community responses to COVID-19 during the initial months of the pandemic in the United States. While many respondents have applauded the efforts of government health authorities, allied health care workers and volunteers, they have also been tempered by challenges with inequities, poor enforcement of policies, and clinical discrepancies. Nevertheless, these narratives suggest considerations for improvements in disease mitigation and management as we face the inevitability of a surge in transmission. We characterize these priorities as 1) limiting spread of infection, 2) identifying and protecting populations at risk, and 3) consistent enforcement of policy across states.

- *Limiting spread of infection. Such* efforts include areas of congregation within communities and school systems. The need for re-opening must be balanced by the likelihood of spread risk and the increased burden on the health care system. We recommend that communications and messages are culturally tailored to empower community leaders to take charge and drive leadership

- *Identifying and protecting populations at risk.* As antigen-specific assays and diagnostics become increasingly accurate, priority should be given to areas most lacking in resources and burdened by health inequity. We advocate for public health leaders to work proactively with local community leaders to identify and document needs, including those with underlying risk factors and mental illness

- *Consistent enforcement of policy across states.* We recognize that travel orders vary by state, leaving a window that allows risk of infection due to re-entry, given that some policies are more lax or stringent than others. To narrow the gap of interstate risk of infection, we recommend that states form regional alliances with the objective to facilitate greater enforcement of travel policies, to ensure licensing reciprocity opportunities for healthcare providers and first responders, and to provide access to local testing centers. Such partnerships can serve as a positive model of intergovernmental cooperation, particularly as we progress toward the promise of disease eradication

Importantly, these narratives underscore the value and role of cross-disciplinary efforts to identify community needs during a natural disaster. Developing state-wide plans of action that integrate early academic, management, and clinical insights offers a more robust and effective strategy for addressing common challenges with future incidents

References

1. Alkuzweny M, Raj A, Mehta S (2020) Preparing for a COVID-19 surge. Eclinicalmedicine 23:100400.

2. Hopkins Tanne J (2020) Covid-19: US cases soar as Trump pushes for schools to open BMJ 370: m2803.

3. NJ COVID Hub (2020) New Jersey COVID-19 website.

4. Tolbert J (2020) What issues will uninsured people face with testing and treatment for COVID-19?

5. COVID-19 (2020) in racial and ethnic minority groups. Centers for Disease Control and Prevention website.

6. People who are at higher risk for severe illness (2020) Centers for Disease Control and Prevention website.

7. Daniel S (2020) South end cases remain high while downtown-area stay below average. The Boston Sun website.

8. Daniel T (2020) 25 Investigates: Boston's 'welcoming' reputation is contributing to worsening problems along Methadone Mile.

9. Sclar G.D, Penakalapati G, Amato HK, Garn JV, Alexander K, et al. (2016) Assessing the impact of sanitation on indicators of fecal exposure along principal transmission pathways: A systematic review. International Journal of Hygiene and Environmental Health. 2016;219(8):709–723.

10. Fiandaca C (2020) I-Team: Pine street inn to turn hotel near methadone mile into shelter.

11. Liu K, Chen Y, Lin R, Han K (2020) Clinical features of COVID-19 in elderly patients: A comparison with young and middle-aged patients. Journal of Infection 80: e14-e18.

12. Unemployment insurance weekly claims (2020) Department of Labor website.

13. Considerations for wearing masks (2020) Centers for Disease Control and Prevention website.

14. Cape Cod Medical Reserve Corps (2020) Barnstable County website.

15. MIT Sloan group releases tools and recommendations to prevent health system collapse (2020) MIT Sloan School of Management website.

16. Chidambaram P (2020) State reporting of cases and deaths due to COVID-19 in long-term care facilities.

17. Stern AM, Cetron MS, Markel H (2010) The 1918-1919 influenza pandemic in the United States: lessons learned and challenges exposed. Public Health Rep 125: 6-8.

18. Health equity considerations and racial and ethnic minority groups (2020) Centers for Disease Control and Prevention website.

19. Cossrow N, Falkner B (2004) Race/ethnic issues in obesity and obesity-related comorbidities. J Clin Endocrinol Metab 89: 2590-2594.