Contributions of Health Professions Students to Health System Needs During the COVID-19 Pandemic: Potential Strategies and Process for U.S. Medical Schools

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Abstract

The COVID-19 pandemic poses an unprecedented challenge to U.S. health systems, particularly academic health centers (AHCs) that lead in providing advanced clinical care and medical education. No phase of AHC efforts is untouched by the crisis, and medical schools, prioritizing learner welfare, are in the throes of adjusting to suspended clinical activities and virtual classrooms. While health professions students are currently limited in their contributions to direct clinical care, they remain the same smart, innovative, and motivated individuals who chose a career in health care and who are passionate about contributing to the needs of people in troubled times. The groundwork for operationalizing their commitment has already been established through the identification of value-added, participatory roles that support learning and professional development in health systems science (HSS) and clinical skills. This pandemic, with rapidly expanding workforce and patient care needs, has prompted a new look at how students can contribute. At the Penn State College of Medicine, staff and student leaders formed the COVID-19 Response Team to prioritize and align student work with health system needs. Starting in mid-March 2020, the authors used qualitative methods and content analysis of data collated from several sources to identify 4 categories for student contributions: the community, the health care delivery system, the workforce, and the medical school. The authors describe a nimble coproduction process that brings together all stakeholders to facilitate work. The learning agenda for these roles maps to HSS competencies, an evolving requirement for all students. The COVID-19 pandemic has provided a unique opportunity to harness the capability of students to improve health.

Coronavirus disease 2019 (COVID-19) is a global pandemic, threatening individuals and disrupting communities and economies. The impact on all U.S. health systems continues to escalate, and health systems are undergoing rapid operational change to meet the demands. As leaders in complex care, research, and medical education, U.S. academic health centers (AHCs) are in many ways at the epicenter of this storm, which means that our medical students are fellow travelers, and their professional pathways are profoundly affected.

No aspect of the tripartite mission of AHCs—clinical care, education, and research—has been untouched by the crisis. Clinical operations are pivoting to COVID-19 preparation; research labs are closing as part of mitigation efforts; and medical schools, prioritizing learner welfare, are in the throes of adjusting to suspended clinical activities and remote learning. The overall impact on medical education programs is unprecedented and rapidly evolving. But while normal learning activities are disrupted and schools are scrambling to adjust, the passion of our students to contribute to the needs of people and health systems in this crisis remains very much alive and well.

Although many faculty find teaching to be rewarding and validating, traditional curricular designs have not used medical students’ potential to cocreate and offer value to the health system. As a result, faculty often consider teaching medical students in the first few years of their curriculum as extra work, added time, and decreased efficiency. Substantive learner contributions are often viewed as coming in year 4 or during residency. Recent advances in medical education, however, have focused on developing the concept of value-added medical education. This is defined as “experiential roles that have the potential to positively impact individuals and population health outcomes, cost of care, or other processes within the healthcare system, while also enhancing student knowledge, attitudes, and skills in the Clinical or Health Systems Sciences.” Examples of value-added roles include student patient navigators, clinical care extenders, advocates, and resource managers. Necessity is the mother of invention, and currently, U.S. AHCs have the unique opportunity to operationalize the concept of value-added medical education in this escalating crisis, exploring how medical and other health professions students can contribute to the acute and overwhelming needs of health systems and the populations they serve.

In the face of the evolving COVID-19 pandemic, our team used qualitative methods and a content analysis of data collated from several sources—a literature review, a modified crowdsourcing method used to gather student perspectives, discussions with health system leaders, and
communication with frontline physician educators—to develop strategies for leveraging student capabilities and contributions. In this article, we (1) articulate 4 categories in which medical students can contribute to the work of U.S. AHCs and the wellness of their communities; (2) describe the educational benefits for learners and the alignment with health systems science (HSS) competencies; and (3) highlight a process for coproduction between students, medical schools, and the health system. Our goal is to develop an operational framework that other AHCs can use in this crisis and to provide a blueprint for responding to future challenges that disrupt our systems of education and health care.

Context and Methods

In mid-March 2020, anticipating the arrival of the COVID-19 pandemic in south central Pennsylvania, education and student leaders from the Penn State College of Medicine (PSCOM) collaborated with Penn State Health system leaders on a process for strategically identifying avenues for meaningful student contributions to meeting workforce needs. Primed by a well-established curriculum in patient navigation and HSS and encouraged by an invested faculty, over 400 students (primarily medical students with contributions from students in public health [MPH and DrPH], nurse practitioner, and physician assistant programs) made commitments to contribute to the pandemic within the first 6 weeks. The initial planning phase, which was rapid and nimble, was guided by the goal of safely integrating students into supervised interprofessional work projects that would contribute directly to the needs of Penn State Health and the community, while also providing educational benefits. A COVID-19 Response Team was quickly established with student codirectors. To capture the energy of the moment, several early projects were piloted while a framework for coproduction between students, medical schools, and the health system. Our goal is to develop an operational framework that other AHCs can use in this crisis and to provide a blueprint for responding to future challenges that disrupt our systems of education and health care.

Our team employed a modified crowdsourcing method, which included soliciting open-ended suggestions for activities from all PSCOM medical students in Google Docs, on social media platforms, and via personal email communications. Simultaneously, we asked both administrative leaders and clinical faculty within our health system to identify vital system needs. A lead author (J.D.G.) also personally contacted physician educators at several U.S. AHCs to explore their perspectives on possible needs. Lastly, we reviewed information on social media platforms to gather ideas from other medical schools. Using this dataset, we performed a content analysis, collapsed ideas into similar roles, and grouped all tasks into overarching categories. Our underlying assumptions were that students bring maturity and commitment, medical and health care delivery awareness, technological competency, creativity in problem solving, and community understanding to the current challenge, making them uniquely positioned to provide valuable contributions.

Comprehensive List of Projects and Tasks

On the basis of our analysis, we identified 4 categories of projects for our health professions students. Below we describe each of these 4 categories, and Table 1 lists potential and active tasks (N = 38) with descriptions for each.

Category 1. Contributions to the public and community welfare

We identified various roles in which students could contribute to increasing the understanding of the pandemic in the neighborhoods and communities in the region surrounding PSCOM. These roles leverage students’ knowledge of the communities’ strengths and weaknesses to promote large-scale awareness and strategies to remain safe and flatten the curve of the pandemic (e.g., social distancing, handwashing, etc.).

Category 2. Contributions to the health care delivery system

Several projects and tasks focus on expanding the workforce for emerging pandemic-specific needs (e.g., telehealth encounters, follow-up check-ins, patient rescheduling, etc.) as well as the ongoing work of caring for non–COVID-19 patients (discharge navigation, etc.). In addition, health system leadership identified the need for an evidence-based medicine team to assist them in answering questions. This team creates daily succinct summaries of emerging information regarding COVID-19 from a breadth of perspectives to facilitate strategic and clinical decision making within the AHC.

Category 3. Contributions to the workforce

We identified several projects and tasks that allow students to support the needs of caregivers and staff—the workforce of the health system. Ensuring frontline clinicians and staff can remain in their jobs requires assisting them in their life responsibilities outside of work, including childcare, maintaining a food supply, running errands, and attending to personal well-being.

Category 4. Contributions to the college of medicine

The modification of clerkships and in-person educational experiences has forced medical schools into uncharted territory. The curriculum has transitioned exclusively to an online format. Some traditional activities can be replicated or approximated, but many will require creative and innovative changes that necessitate active student engagement. The students are key stakeholders and contributors, offering technological expertise and piloting innovative ideas for curriculum development and implementation.

Work Process Between Students, Medical School, and Health System

After identifying a comprehensive list of projects and tasks, we developed a process for prioritizing activities by working with students and medical school and health system leadership. Our first action was to collaborate with the legal department to ensure appropriate safety and regulatory steps, based on principles that the medical school and health system leadership had created and agreed upon, were in place. Most notably, it was evident that activities students engaged in would need to be accomplished remotely, without direct patient or team contact, and under adequate supervision of Penn State faculty or staff. In addition,
Table 1
Contributions That Medical Students Can Make to Their Communities and to the Health Care Delivery System During the COVID-19 Pandemic, by Category and Taska

| Tasks by category | Key features | Remote capability | Aligned with system need | Education valueb |
|-------------------|--------------|-------------------|--------------------------|-----------------|
| **Category 1—Contributions to the public and community welfare** | | | | |
| Contact tracer process: Assist health system (in discussions with Department of Health) in mapping direct exposure and quarantine for patient casesc | ● | ● | ● |
| Health care volunteer check-ins: Provide communication and support for health system volunteers with low access to meals or social interactionc | ● | ● | ● |
| Community outreach: Contribute to health system’s REACH (Racial and Ethnic Approaches to Community Health) program to meet patient’s needsc | ● | ● | ● |
| Nursing home/long-term care facility navigation: Communicate with facilities to educate about isolation and best practicesc | ● | ● | ● |
| Educational campaign: Develop/disseminate evidence-based health information to health system and community (e.g., antihoarding campaign) | ● | ● | ● |
| Educational hotline: Assist health system with incoming phone calls from community members with nonclinical questions related to COVID-19 | ● | ● | ● |
| Elder community care: Support high-risk elders in social isolation or in facilities through medication reconciliation, support, and deliveries | ● | ● | ● |
| System-wide educators: Disseminate evidence-based best practices (e.g. handwashing, use of masks, social distancing) for COVID-19 to local units and entrances to the health system | ● | ● | ● |
| United Way hotline: Answer calls from community members and link to volunteer opportunities and community resources | ● | | ● |
| Community-wide educators: Disseminate evidence-based best practices to public at grocery stores, pharmacies, community centers, etc. | ● | ● | ● |
| Portable handwashing machines: Create and distribute portable handwashing machines/sanitizers in public settings | ● | | |
| **Category 2—Contributions to the health care delivery system** | | | | |
| On-demand virtual COVID-19 screening: Perform supervised virtual COVID-19 screening visits using a standardized protocol | ● | ● | ● |
| On-demand telehealth visits: Make supervised telehealth visits, present case to faculty, assist in documentation and shared decision makingc | ● | ● | ● |
| Evidence-based medicine curators/consultants: Perform evidence-based literature searches/information consolidation for system-level questionsc | ● | ● | ● |
| Health product engineering: Collaborate with internal engineering team to design, develop, and produce health care products that are neededc | ● | ● | ● |
| Patient navigator discharge follow-up: Perform phone/video follow-up for patients recently discharged without a diagnosis of COVID-19 to coordinate carec | ● | ● | ● |
| Telehealth implementation group: Act as telehealth superusers to train faculty, patients, and fellow students on platform and process | ● | ● | ● |
| COVID-19 outpatient follow-up: Assist in calling patients diagnosed with COVID-19, but discharged to home, to assess needsd | ● | ● | ● |
| COVID-19 complex patient clinical extender: Assist hospitalists with clinical questions and transition planning for patients diagnosed with COVID-19d | ● | ● | ● |
| Blood bank/Drives: Facilitate creation of campaigns to increase blood/serum donations in collaboration with health system and local blood banksd | ● | ● | ● |
| Health policy design: Contribute to policy development and health system stance on rapidly evolving state and federal COVID-19 policiesd | ● | ● | ● |
| COVID-19 clinical informatics: Assist general internal medicine clinic in analyzing trends in patients diagnosed with COVID-19 to inform work processes in outpatient clinicsd | ● | ● | ● |
| On-demand urgent care visits: Make supervised telehealth urgent care visits (non–COVID-19 screenings), assist in documentation/triage | ● | ● | ● |
| Outpatient clinic rescheduling: Work in specialty areas to reschedule non–acute appointments and perform patient check-ins | ● | ● | ● |
| Medical scribes: Provide remote scribing services to frontline clinicians with less time to document clinically | ● | ● | ● |

(Table continues)
Since the creation of the task forces at the Penn State College of Medicine in mid-March 2020, the number of students involved in task forces has been dynamic. Six weeks into the program (mid- to late April), the total number of students on task forces or awaiting placement = 418; students onboarded to functioning task forces = 348 (medical students = 323, public health students = 13, nurse practitioner students = 8, physician assistant students = 4). At that date, the breakdown by category was as follows: Category 1 = 167 (contact tracing = 106), Category 2 = 144 (patient navigator discharge = 37), Category 3 = 0, Category 4 = 37 (medical school and logistics planning = 33). Priorities were assigned to the task forces on the basis of how many of the 3 key features (3 right-hand columns) they have.

Educational value relates to learning in systems-based practice/health systems science (e.g., identification of health system gaps and improvement processes, application of core systems principles to the pandemic, contribution to system needs), interpersonal and communication skills, interprofessional collaboration, knowledge for practice, and professionalism.

An important distinction emerged between efforts that students developed independently and operated outside of our health system, such as regional blood banking programs, and efforts that the health system solicited from students and cocrated with them by using their ongoing feedback and input (e.g., COVID-19 follow-up calls, contact tracing, etc.). While participation in all activities is completely voluntary, projects officially approved by the health system and medical school require a standard of recognition that adheres to the guiding principles and includes either curricular credit or monetary compensation. Regardless of training year, each student participating in a task force is enrolled for a time-variable elective credit (e.g., 1 credit for each 10 hours, maximum 4 credits), which can fulfill 1 elective requirement for postclerkship students; the associate dean for health systems education (J.D.G.) provides formal oversight for all electives. See Table 1 for a description of projects and designation of key features.

We quickly learned the importance of a formal organizational structure featuring coproduction, well-defined roles, clear workflow, and regular communication. Figure 1 depicts our COVID-19 Response Team, the relationship of students to PSCOM and Penn State Health leadership, and a workflow designed to consider student and faculty ideas while ensuring collaboration and prioritized task force assignments. With a rapidly evolving landscape of system and patient needs, student efforts must be channeled thoughtfully to maximize value and safety. This structure was established to ensure that new tasks and ideas continue to meet legal requirements and are free

### Table 1 (Continued)

| Tasks by category                                                                 | Key features                                      |
|----------------------------------------------------------------------------------|---------------------------------------------------|
|                                                                                   | Remote capability | Aligned with system need | Education value            |
| Medical translation: Develop and/or extend translation services for patients needing assistance, especially through phone or telehealth | ●                  | ●                        | ●                        |
| Consultation assistance for specialty services: Assist inpatient consultation teams in collating information for decision making | ●                  | ●                        | ●                        |
| Employee health screenings: Assist health system in performing screenings of employee who have symptoms/concerns about COVID-19 | ●                  | ●                        | ●                        |
| Laboratory assistants: Work in chemistry and microbiology laboratory since staff may be redistributed to other clinical areas | ●                  | ●                        | ●                        |
| Phlebotomy assistants: Work on phlebotomy teams in hospitals/clinics to extend work of hospital teams on which staff shortages are anticipated | ●                  | ●                        | ●                        |
| Personal protective equipment (PPE) resource team: Assist in the development or acquisition of new/alternative methods for PPE | ●                  | ●                        | ●                        |
| Supply chain support: Collaborate with supply chain team in hospital to allocate resources to different clinical areas | ●                  | ●                        | ●                        |
| COVID-19 testing telephone calls: Place calls with long wait times to agencies (e.g., Department of Health) to arrange COVID-19 tests | ●                  | ●                        | ●                        |
| Category 3—Contributions to the workforce                                          |                                                          |
| Errand teams: Assist frontline system employees needing help with errands (e.g., groceries, home pet services, etc.) | ●                  | ●                        | ●                        |
| Childcare services: Provide childcare services to clinicians and staff in need (including in-home education) | ●                  | ●                        | ●                        |
| Safe food distributors: Create methods of safe food delivery for clinicians/staff while on shift (e.g., clean food boxes, wrapped protein bars, etc.) | ●                  | ●                        | ●                        |
| Category 4—Contributions to the college of medicine                                 |                                                          |
| Medical school curricular and logistics planning: Assist in and development and implementation of new online courses | ●                  | ●                        | ●                        |
| Information technology consultants: Assist with implementation and design of and communication about new technology platforms for medical education | ●                  | ●                        | ●                        |

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Task forces developed and launched within the first month of the program (N = 17), i.e., by the end of April 2020.
Figure 1 Depiction of the COVID-19 Response Team workflow in identifying, prioritizing, and establishing task forces for student contributions during the pandemic. Ideas from the health system, medical school, and students are reviewed and prioritized by the COVID-19 Response Team, composed of health system leadership (executive vice president/chief clinical officer and/or his or her designee) and medical school leadership (vice dean for educational affairs, associate dean), and 5 student leaders. The COVID-19 Response Team chooses ideas for task forces that meet legal guidelines, are deemed of high need to the health system, and are of educational value (see Table 1). The COVID-19 Response Team establishes each task force by designating a student and a faculty leader, who work together to create goals, collaborate with entities needed for specific tasks (e.g., Department of Health), and oversee the recruitment/preparedness of students. Faculty leaders include a diverse group of physicians (e.g., surgery, internal medicine, family and community medicine), nurse practitioners, and social workers. Once a process has been developed and the number of students needed has been determined, students are onboarded via voluntary sign-ups and formally enrolled in the elective. The faculty member and student lead ensure appropriate training for each task and assist with assessing student progress, logging of hours, compliance, and contributions to the task force. Huddle groups between various levels of the COVID-19 Response Team allow for collaboration and feedback to ensure the dynamic needs of the task forces, health system, and medical school are met.

of ethical or coercive conflicts, formally approved by PSCOM, and systematically address the most pressing needs of the health system.

Task Forces and Prioritization of Work
A developmental cascade starting with principles and workflow allowed for further clarification and prioritization of potential opportunities (see Table 1). Many of these tasks were variations of roles that had already existed in our curriculum (e.g., students as patient navigators), and others emerged from system needs (e.g., evidence-based medicine consultants, telehealth extenders, etc.).12–16 Several tasks were proposed by faculty members who were shifting their research and clinical work to meet the needs of the pandemic and sought collaboration to extend the workforce to perform these tasks (e.g., an internal medicine physician leading contact tracing, a geriatrician leading long-term care facility outreach). The willingness of leaders and faculty to invest time and energy in this system highlights the value-added nature of the task forces. In mid- to late April 2020, within 1 month of discussion and planning, we launched 17 task forces, and the work has substantially benefitted our health system and community. For example, by the end of April, the contact tracing task force has onboarded 100+ students who have called over 900 patients with COVID-19 and their contacts to inform and educate them on infection control measures. We fully anticipate the work of these task forces will change, blend
with other groups, or phase out as the pandemic continues to evolve and affect our communities as well as our personal and professional lives. However, this coproduction process can provide the longitudinal and sustainable methods for work through the pandemic, even as health systems face unprecedented adaptations. This model for the development and implementation of task forces with interprofessional stakeholders provides an efficient and effective process to adapt and respond to changing health care needs, even if legal parameters and hospital policies change. Such changes may include the most extreme hypotheticals, such as having students rejoin the workforce on the frontlines.20

Key Considerations in Developing Value-Added Roles During the COVID-19 Pandemic

We learned the following lessons, which other medical schools may want to consider.

Medical education: Advancing the characteristics and professional opportunities of HSS

HSS, with roots in George Engel’s biopsychosocial model and the systems-based practice competency domain of the Accreditation Council for Graduate Medical Education, has emerged as a major focus in medical education and includes competencies in health care delivery, social determinants of health, high-value care, change management, and systems thinking.21–24 This growth has mirrored an increased recognition of the importance of HSS in the care of patients and populations and reflects the needs of health systems that are undergoing transformation. Educators and students increasingly understand how the contexts of our patients and care environments are critical to learning and health. At the same time, health system leaders are increasingly looking for the HSS perspective and skill set in their workforce.25 Seven years ago, PSCOM began a comprehensive curricular program of classroom and experiential learning in HSS.26 Those students who developed an evolved skill set—serving as patient navigators for individuals in need, obtaining White and Yellow Belt certifications in Operational Excellence,27 and honing a nascent systems-based perspective toward health care practice—are the same students who have been organizing themselves to perform similar and additional roles during the COVID-19 pandemic. Their formal studies have been interrupted, but their professional path, the way they see themselves as collaborators and contributors in health care, is thriving. At the same time that education and experience in HSS have primed our students to contribute in this pandemic, the crisis is setting up a unique opportunity for students to deepen and extend their learning in HSS, as well as interpersonal communication, knowledge for practice, and professionalism. Recognizing this, our medical school has been able to accelerate the approval of a Health Systems and COVID-19 Response elective for students across all phases of the curriculum. In line with an outcomes-based educational model, task force activities and reflection assignments map to our HSS competencies, and continual feedback ensures a growth mindset for all parties involved (formal course proposal available upon request).

We believe the COVID-19 pandemic is an ideal opportunity for students to contribute to the needs of the health system while also helping them develop systems-based competencies and the mindset necessary for forming an evolved professional identity.30–33 “Systems citizens” are physicians who not only care for individual patients but also know how to perform in developing systems of care, embodying the motivation to grow and contribute to the evolution of the health care system itself. Continually improving our systems of care—in response to pandemics and beyond—will require all physicians to have this skill set and professional identity.34–37

Coproduction between students, medical school, and health system

The convergence of education and system needs around HSS described above has created a unique opportunity to realize coproduction between key stakeholders.28 While the potential for this collaboration has been present for some time, there has been no urgent motivation to make it happen. There have been important initiatives, but there has also been a tendency for stakeholders on all sides to function independently. The COVID-19 pandemic has upended many business-as-usual perspectives and activities and has vividly and tragically brought the potential for coproduction into high relief. The table has been set by health systems and education programs, and now we have passionate, skilled students sitting at the table with a wide range of stakeholders and leaders to think and plan together. Coproduction is no longer just a possibility or an idea; it is playing out in our programs and likely in medical centers all over the country.

Discussion and Conclusions

The COVID-19 pandemic is challenging our AHCs and our local, national, and global communities in tragic and unprecedented ways. Confronting this crisis is prompting widespread reexamination of what we thought we knew, how we act, and how we respond to adversity. As we are distracted by events and responses, we are also opening to new opportunities. It has been easy to talk about students as our junior colleagues and the future of our profession, but those words do not always translate into what we do and how we do it. It is comfortable to envision a steady progression of professional development through incremental biomedical coursework, clinical training, and responsibility. But the reality is that for several years, HSS and associated added-value roles have been opening up a distinct, equally important thread within students’ professional development. The feasibility, validity, and impact of these approaches have been well documented and widely disseminated.12–16 And we know that health systems value and very much need an HSS professional development pathway for their future workforce. Many educators and system leaders have recognized this need, but work toward achieving the goals of authentic codevelopment of roles and the invitation to contribute has been slow. In this tragic time of COVID-19, nothing is slow. Many things, too many bad but some good, have been brought into stark relief. One that stands out clearly on the positive side is how we can come together—the health system and education leaders, faculty and staff, and students—to make a difference. Our hope is that the program of aligning missions and employing coproduction to create value-added participatory roles for students can serve as a blueprint for other medical schools as we continue to navigate these uncharted waters.
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