Columbia COVID-19 Student Service Corps: Harnessing student skills and galvanizing the power of service learning

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Abstract
The COVID-19 pandemic in New York City led to the forced rapid transformation of the medical school curriculum as well as increased critical needs to the health system. In response, a group of faculty and student leaders at CUIMC developed the COVID-19 Student Service Corps (Columbia CSSC). The CSSC is an interprofessional service-learning organization that galvanizes the skills and expertise of faculty and students from over 12 schools and programs in the response to the COVID-19 pandemic, and is agile enough to shift and respond to future public health and medical emergencies. Since March 2020, over 30 projects have been developed and implemented supporting needs identified by the health system, providers, faculty, staff, and students as well as the larger community. The development of the CSSC also provided critical virtual educational opportunities in the form of service learning for students who were unable to have any in-person instruction. The CSSC model has been shared nationally and nine additional chapters have started at academic institutions across the country.

KEYWORDS
COVID-19, medical education, service learning
1 | OVERVIEW OF CSSC

The COVID-19 pandemic’s rapid spread in New York City (NYC) in early March 2020 not only caused disruption to hospital systems, but also to medical schools and medical students as well. NYC rapidly became the epicenter of the COVID-19 pandemic and resources were quickly stretched thin. On March 8, all educational programs, including the medical school, at the Columbia University Irving Medical Center moved to remote learning. On March 15, clinical students were pulled from any in-person clinical engagement. Our community faced a number of unprecedented hurdles including how to utilize limited remaining resources for an increasing number of unique and urgent health-care needs while simultaneously providing medical education and preparing to effectively engage the incoming class of students. Health professions students, while unable to be present in-person in the hospital system, sought to contribute to the pandemic response and immediately started exploring ways that they could use their time, education, and resources to help their educational, hospital, and local community. It was in these unique circumstances that the Columbia COVID-19 Student Service Corps (Columbia CSSC) was founded.

Figure 1 outlines the timeline of the creation and expansion of the Columbia CSSC. The original planning meeting of the Columbia CSSC took place on March 15 with a small group of medical students and medical school faculty and administration. A few days later the Mailman School of Public Health joined as a partner, establishing the essential interprofessional component of CSSC. Over the course of the next few months, over 12 Columbia University schools and programs would sign on as partners creating a network of over 2000 students and faculty, ranging from health science backgrounds to undergraduates, working together to fill critical gaps in our health-care system and larger community as a result of the pandemic.

Figure 2, the CSSC toolkit, outlines the organizational mission, guiding principles, and overall structure of the CSSC. The mission of the CSSC is to “support health systems facing the COVID-19 pandemic and their patients, workforce and communities through interprofessional student service-learning projects.” The five guiding principles of CSSC include:

1. Needs are identified by the health-care system and larger community. All of the CSSC projects are built around needs that were clearly identified and articulated by health-care workers in the hospital system, faculty working with students or programs, and/or individuals who have established relationships in the local community. This allowed projects to be built with a sustainable framework and ensured that students could work remotely and employ the resources of their collaborating partners.

2. A service-learning model is used, assuring that students and faculty move beyond volunteering and are active participants in their learning and growth through service.

Service learning has long been a model at the medical center campus, particularly through student-run clinics. The CSSC projects gave the students opportunities to learn and lead at a time when other clinical educational opportunities were not available. Additionally, CSSC allowed students to gain academic credit for their work and avoid falling behind in their educational requirements.

3. Students and faculty colead the organization and projects at each level.

Critical to the success of CSSC has been collaborative work with students and faculty at each level of the organization. The oversight leadership is a combination of students and faculty, and all projects have student and faculty leadership involved in training of volunteers and project management.

FIGURE 1  Columbia COVID-19 Student Service Corps timeline of development
This toolkit was shared nationally and adopted by nine additional academic centers. These nine national chapters include: University of Washington, UNC-Chapel Hill, UNC-Wilmington, University of Arizona, University of Florida, Oregon Health and Science University, George Mason University, University of Virginia, and the University of Richmond. The CSSC has provided a unique opportunity to partner with, learn from, and collaborate with academic centers across the country. Weekly national meetings are held with student leaders from each chapter where presentation and resources are shared. As the COVID-19 pandemic evolves, these partnerships have proven critical in helping academic institutions and hospital systems adapt innovations in clinical practice, medical education, and community-based interventions.

2 | SERVICE-LEARNING MODEL

CSSC was built as a service-learning organization, which follows the P.A.R.E. model. Preparation, action, reflection, and evaluation are vital components of a successful service-learning project and a meaningful experience for students.

2.1 | Preparation

All CSSC projects go through a project proposal phase. In this phase the person/people who identify the project are asked to outline the need to be addressed, the basic organization of the project, how many students and what expertise would be ideal, and any potential faculty and student leaders for the project. The CSSC Oversight committee, made up of faculty, students, and administrators, works with individuals proposing the project to solidify faculty and student leaders, develop processes and protocols, and assign students to the project.

Students are onboarded to teams by the faculty and student leaders of each project. This onboarding includes relevant training regarding the goals of the project, processes, and protocols. All patient-facing projects, for example, have strict and clear escalation procedures so that students know who to go to in the event that they encounter an unexpected event, question, or concerning patient situation.

2.2 | Action

The flexibility of the CSSC model allows for each project to create and identify the best processes to achieve the identified goals. There are multiple mechanisms in place to facilitate communication between project leaders so that best practices and problem-solving can be shared between projects. For example, the Columbia CSSC has weekly student and faculty leadership meetings that bring together the leaders of all projects to discuss their progress, successes, and challenges, and future directions. This allows for inter-project shared growth and resources while facilitating interprofessional learning. Students who received elective credit for their time with CSSC were required to participate in their service project for 15 h per week. Students who are now a part of CSSC through the first-year medical clerkship are required to contribute...
between 2 and 4 h per week on their service project. All hours are tracked through a centralized monitoring and evaluation survey that is sent to students weekly.

2.3 | Reflection

A key component of the service-learning model is reflection. Students are not simply volunteers, but are learners, and therefore, it is imperative for them to have the space and encouragement to reflect on the service they are providing, how it is impacting those the service is aimed toward, and how it is affecting their personal and professional development.

Reflection as part of CSSC is interdisciplinary and multifaceted. Students are encouraged to participate in discussion board posts as well as video conferencing reflection groups led by trained narrative medicine facilitators as part of the reflection component of CSSC. The discussion board prompts have ranged from questions like: “how are you responding to the pandemic so far, in terms of what you feel you can and cannot control?” to “write about an assumption you held that has been challenged during the pandemic and through your service.” These types of questions allowed students to reflect on their service and experience while also connecting and responding to their peers who may have different experiences, thoughts, and reflections. The video conferencing discussion groups are inter-project and interdisciplinary and asked students to reflect on artwork, quotes, and other prompts and allowed for a deeper level of engagement and reflection with peers and faculty that students might not usually have a chance to meet or interact with. The discussion groups also allow for community building as well as helping students see their work as part of a larger interprofessional effort that is sometimes difficult to see due to the remote nature of their work.

2.4 | Evaluation

The final piece of the P.A.R.E. model is evaluation and monitoring which are critical to ensure the success of the organization and to track student participation and outcomes. The evaluation plan includes two major components—student service-learning outcomes and project impact and outcomes. Student service-learning outcomes are tracked through a weekly distributed survey which asks questions about project assignment, number of hours worked, engagement in reflection, and general feedback.

Project-level impact and outcomes are tracked through a monthly distributed survey that is sent to project leaders for their individual projects. The CSSC Oversight committee in conjunction with the student leaders decide on a set of metrics that the project will track over time. These items are then collected monthly and stored in a centralized master data set with all project outcomes. Some example project metrics for completed projects can be seen in Table 1.

3 | OVERVIEW OF PROJECT AREAS AND COMPLETED PROJECTS

On March 15 when the CSSC began, there was a group of six core projects that had been identified as urgent. However, over the past 6 months the Columbia CSSC has developed over 30 projects. These projects fit into four major categories: patient-facing; system-facing; faculty, staff, and student-facing; and finally, community-facing. The patient-facing domain includes projects where students are directly interfacing with patients or family members in a number of diverse ways. These projects did not all require clinical experience and have been open to interdisciplinary students with proper training, preparation, and escalation procedures. The system-facing branch was created to support our hospital system and its staff members, in response to the significant strain that the pandemic placed on our health-care system, the CSSC created a branch specifically focused on supporting our hospital system and its staff members. The faculty, staff, and student-facing arm of the Columbia CSSC responds to health and well-being needs of faculty, staff, and students through a multitude of projects that address the isolation, anxiety, and information overload in populations ranging from frontline workers to students. Finally, the goal of the community-facing branch of the Columbia CSSC is to address the changing needs of our surrounding community throughout the COVID-19 pandemic. The development of this branch leveraged longstanding relationships between hospital programs and community-based organizations.

Table 1 outlines completed CSSC projects in each of these major categories of the Columbia CSSC. These projects are considered completed because they met the identified need, allowing resources to be shifted toward new projects in other domains. All completed projects have developed guides and clear records for re-implementing their projects again quickly if the needs arise. This allows the start-up time to be more expedient when being renewed. An example of this is the relaunching of the virtual tutoring program, Learning Together, with the new school year. Some of the social media posts that have been made by various Columbia CSSC projects can be seen in Figure 3.

Select metrics in Table 1 demonstrate the impact these teams and projects have made on our patients and health system, for the faculty, staff, and students on the CUIMC campus, and for our community in Northern Manhattan. Leaders of all projects have worked to increase the visibility of their projects and the impact they are having in order to increase student participation and to boost morale during challenging and isolating times.
| Project                                      | Description                                                                                                                                                                                                 | Key outcomes |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Patient-facing projects                     |                                                                                                                                                                                                            |              |
| COVID-19 community information hotline      | Medical and Nurse Practitioner students who met minimum clinical training requirements took over the staffing of the New York Presbyterian Hospital's COVID-19 community hotline when full-time employees were redeployed. The students provided full-time staffing support for the informational community hotline to answer community questions about COVID-19. | 6952 staffing hours | 5655 calls answered |
| Obstetrics antepartum outreach calls        | Medical and Public Health students partnered with the Obstetrics and Gynecology Department to conduct outreach to pregnant women from the clinic network and provide anticipatory public health guidance on COVID-19 and pregnancy, logistic details on clinic and policy changes, and reassurance as appropriate. Students followed predetermined algorithms to appropriately escalate clinical questions to supervising providers when indicated. | 876 patient conversations | 17 clinical escalations | 156 telehealth referrals |
| Obstetrics postpartum outreach calls        | Medical and Nurse Practitioner students who met minimum clinical training requirements partnered with the Obstetrics and Gynecology Department to call recently discharged women who delivered in the preceding 72 h. Students used a standardized script to review postpartum systems and conduct outreach and screenings for newborn well-being and maternal and neonatal care. | 562 patient conversations | 100+ clinical escalations |
| Remote patient monitoring                   | Medical and Nurse Practitioner students who met minimum clinical training requirements engaged in follow-up monitoring of discharged patients with COVID-19. Students received daily assignments of discharged patients referred by inpatient clinical teams via email or a newly instituted EMR order. These student volunteers conducted daily calls, typically for 7–14 days after discharge, to evaluate patients using a standardized questionnaire assessing clinical symptoms and key vital signs (for patients with at-home monitoring devices). Clinical supervision and escalation for further care was coordinated with licensed on-call providers. | 890 patients assigned to Telehealth Guides | 890 patients followed per protocol |
| Telehealth patient assist                    | Clinical and nonclinical students on the health sciences campus partnered with outpatient clinics to rapidly onboard patients onto institutional telehealth platforms. Students received EMR training and patient lists, and called patients to virtually assist with the sign up and use of telehealth applications. This project allowed for more efficient clinical flow and reduction of in-person encounters. | 3883 total patients contacted | 1882 patients successfully onboarded to telehealth platform |
| Workforce health and safety employee hotline| Students on the health sciences campus provided staffing support for the hospital service tasked with receiving calls regarding occupational health, including potential COVID-19 exposures and cases, procedural inquiries, return-to-work, and other related issues among staff and providers. | 3129 h worked |              |
| Faculty, staff, and student facing          |                                                                                                                                                                                                            |              |
| “Hero Meals”                                | Students engaged with donors, restaurants, and hospitals to provide free meals for hospital staff working at NYC hospitals. Funds covered food and labor costs of local restaurants, with a focus on Black-owned businesses, that agreed to make and individually package food at cost for health-care workers and hospital staff. They also coordinated in-kind donations of food and snacks to provide frontline workers staying in temporary housing. | $240,000 raised for meals | Provided 20,000 meals for 9 hospitals |
| Medical education                           | Senior medical students partnered with medical school faculty to act as teaching assistants for first-year students in the preclinical curriculum. This team of students worked to enhance the virtual curriculum to ensure high-quality ongoing curricular experiences as faculty were redeployed into clinical settings. | 72 class sessions held | 210 direct teaching hours completed |

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4 | MEETING IMMEDIATE CURRICULAR NEEDS AND TRANSFORMATION AND INTEGRATION INTO FIRST-YEAR CLERKSHIP

When clinical learning was discontinued, a principal question was how to provide medical students with meaningful educational opportunities in this shifting context. Hundreds of medical students had already signed up to be part of the CSSC, driven by the will to apply their newly developed skills to assist the health system and community where they learn and live. While not seeking academic credit for this work, students wanted to assure that they could complete their education and training on the same timeline to be able to join the workforce. The CSSC, in partnership with the administration, setup a system for utilizing CSSC involvement for elective curricular credit for those medical students graduating in 2020 and others who could benefit from receiving credit. April through June, 2020, 308 medical students received curricular credit through CSSC.

A key contribution to the immediate curricular needs of the medical school was the creation of the Medical Education group within CSSC. This team was comprised of senior
medical students who acted as teaching assistants for faculty to help rapidly transform their materials to a virtual format and help students adjust to a new mode of learning. A team of 58 medical students covered a total of six courses for first- and second-year medical students. These students held a total of 210 h of virtual individualized instruction, including class sessions, office hours, and workshops. This model of teaching assistants within the medical school was so successful that it is now being built out as a formal component of medical education.

Four months after its inception, CSSC was formally integrated into the structure of the medical school, formalizing the faculty and student leadership, and providing additional administrative support. At this time, the curricular structure of CSSC was also formalized for medical school students as part of the first-year medical student clerkship. For the fall 2020 semester, all first-year medical students at CUIMC are engaged in entirely remote learning for their first semester of medical school. The first-year students engage in a semester-long clerkship during their Foundations of Clinical Medicine course, which has now been adapted for remote learning. The semester-long clerkship portion of the course is made up of two 6-week sessions—the telemedicine clerkship and the CSSC clerkship. This structure ensures that students get both clinical experience through telemedicine clinical encounters and service-learning experience through CSSC project engagement.

The goal of the service-learning clerkship is twofold:

1. Align service with curricular objectives to better understand the impact of service on the community and how service contributes to one's own learning.
2. Interact with health system teams, community organizations, and community members in order to gain a deeper understanding of the context of care beyond the clinical encounter. This includes considering health systems, population health initiatives, patient outreach, teams that support patient care, and community organizations and services that aim to address social and structural determinants of health.

When rotating as part of their service-learning session, the clerkship students are assigned to one of six Columbia CSSC projects and are asked to commit about 2–4 h per week on their project, since they are also engaged in their coursework. Each project has clear goals and objectives that demonstrate how the project connects back to the larger service-learning goals outlined above. Students are able to continue their CSSC service-learning work even past their formal clerkship involvement if they choose. These projects range from those that include direct patient contact such as a Colorectal Screening project, to projects that interface with patient families such as the Virtual Neonatal Intensive Care Unit project and finally to community-facing projects such as Learning Together, a virtual tutoring project for students in our community. The six projects, their descriptions, goals, objectives, and current metrics are expanded upon in Table 2.

Over time we expect that the projects available for clerkship students will change as the needs of the community and medical system change and shift. However, the structure of the CSSC—its projects, creating and communicating clear goals and objectives, and operating within a service-learning framework—will remain.

5 | FUTURE DIRECTIONS OF CSSC

Although the Columbia CSSC began as a way to harness the strength and skills of students and faculty on the CUIMC campus during an emerging and continuing pandemic, it
| Clerkship project | Description                                                                 | Goals                                                                 | Objectives                                                                 |
|------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------|--------------------------------------------------------------------------|
| Friendly calls to seniors | Identifies at risk seniors in the community who would benefit from virtual companionship throughout this pandemic | 1. To support at risk seniors through wellness calls  
2. To evaluate the needs of seniors within the Northern Manhattan and Bronx communities  
3. To monitor seniors for adverse events and ensure proper follow-up for urgent and acute needs. | 1. Students will learn a risk assessment protocol for seniors  
2. Students will gain experience interacting with at risk patients. |
| Virtual neonatal intensive care unit project | Contacts parents of babies in the NICU to help them setup virtual visits while physical visiting is limited during the COVID-19 pandemic. | 1. To use a telehealth platform to connect parents with their children in the Neonatal Intensive Care Unit during the COVID pandemic | 1. Students will work with an interdisciplinary team in the NICU to learn how to connect parents with a way to see their babies  
2. Students will understand some of the important issues that arise for families with babies who are premature or ill. |
| Colorectal screening project | Addresses the gap in colorectal cancer screening during the COVID-19 pandemic. This project seeks to create a way for student volunteers to contact patients and connect them with screening options without requiring a visit to the doctor's office, thus, making it more convenient for patients to access care and also decreasing the burden on doctors. | 1. To continue preventative screening for colon cancer via telehealth. | 1. Students will learn the protocol to reach out to patients in need of colon cancer screening  
2. Students will gain experience interacting with patients by telephone and interfacing with their primary care clinic. |
| Pediatric psychosocial outreach | Addresses social determinants of health, psychosocial stressors, and mental health disorders within the pediatric population during the COVID-19 pandemic. Using a script, student volunteers make calls to families in order to screen for social determinants of health, psychosocial stressors, and mental health issues. Volunteers are then able to connect patients with resources centered around social service needs, mental health needs, school needs, or COVID-related needs/medical questions. | 1. To support families of children who screen positive on social needs screening  
2. To connect families and children with needed resources | 1. Students will learn a risk assessment protocol for families of children at risk  
2. Students will gain experience interacting with at-risk families; and students will work with an interdisciplinary team to connect families and patients with needed resources. |
| ANCHOR project | ANCHOR stands for Addressing the Needs of the Community through Holistic, Organizational Relationships. This project identifies and contacts Medicaid beneficiaries in the community to assess needs and connect them to resources. | 1. To identify the health-related social needs of Northern Manhattan/South Bronx Medicare and Medicaid beneficiaries  
2. To address identified needs through referrals to local community-based social service organizations. | 1. Students will gain experience interacting with patients by telephone and students will learn a risk assessment protocol for Medicaid beneficiaries and will connect families and patients with needed resources. |

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has transformed into a sustainable interprofessional service-learning organization embedded within the structure of the medical center. The national CSSC network may also evolve into a longer-term consortium for interprofessional service learning in the health professions. The CSSC is agile enough to adapt to changing circumstances and needs, both in terms of the evolution of the COVID-19 pandemic, as well as other public health and medical crises. For example, the Columbia CSSC was able to adapt existing projects to respond rapidly to recent events highlighting longstanding systemic racism, inequality, and police brutality in our society. The “Mask Check” project, explained further in Table 1, shifted from donating face masks to community organizations to procuring donations and distributing to protesters in NYC. The literature review team within the Information Services branch began compiling and consolidating published literature on systemic racism. Our webinar team brought in a speaker to address the impact and role of race within medicine.

It is the goal of the Columbia CSSC to expand its formal curricular relationships with additional programs on the medical center campus, while continuing to provide interdisciplinary service-learning opportunities as part of the medical school curriculum.

6 | IMPLICATIONS AND CONCLUSIONS

According to Lucey & Johnston 2020, COVID-19 can have transformational effects on medical education, and schools can collaborate in order to “establish the educational standard of designing student service learning to respond to urgent community-identified needs for support rather than focusing only on traditional strategies for service learning (eg, free clinics)”. The Columbia COVID-19 Student Service Corps demonstrates the power of interprofessional, service-learning models for medical education. In a time of complete upheaval, the medical school was able to adapt and provide fruitful service-learning opportunities to students which allowed them to use their skills, training, and expertise to assist in a time where those skills were greatly needed. The flexible yet sustainable model of the CSSC was shared with nine additional academic medical centers around the country, demonstrating the adaptability of the model to multiple settings. Not only can the model be applied to other geographic and administrative locations, but it is also versatile enough to respond to future public health and medical emergencies.

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CONFLICT OF INTEREST

The authors have no conflicts of interest to report.

AUTHOR CONTRIBUTION

All authors are members of the Columbia CSSC leadership team, helped to develop the CSSC, and wrote and edited this manuscript.

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