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Providing support in a pandemic: A medical student telehealth service for ambulatory patients with COVID-19

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ABSTRACT
During the early months of the COVID-19 pandemic, when health systems were overwhelmed with surging hospitalizations and a novel virus, many ambulatory patients diagnosed with COVID-19 lacked guidance and support as they convalesced at home. This case report offers insight into the implementation of a telehealth service utilizing third- and fourth-year medical students to provide follow-up to ambulatory patients diagnosed with COVID-19. The service was evaluated using medical student surveys and retrospective chart review to assess the clinical and social needs of patients during the spring of 2020. Students assessed symptoms for 416 patients with COVID-19 from April 8 to May 20 and provided clinical information and resources. Eighteen percent of these patients sought higher levels of medical care, in part from student referrals. Three key implementation lessons from this experience that may be relevant for others include: 1) Vulnerable patient populations face unique stressors exacerbated by the pandemic and may benefit from intensive follow-up after COVID-19 diagnosis to address both medical and social needs; 2) Medical students can play value-added roles in providing patient education to prevent the spread of COVID-19, assisting patients with escalating care or resource connection, and providing emotional support to those who have lost loved ones; 3) Continuous re-assessment of the intervention was important to address evolving patient needs during the COVID-19 outbreak. Future work should focus on identifying high-risk patient populations and tailoring follow-up interventions to meet the unique needs of these patient populations.

1. Background
Since March 2020, the COVID-19 pandemic has overwhelmed health systems across America. While significant clinical and research efforts were directed early on to the care of hospitalized patients with COVID-19, epidemiologic data revealed that the majority of patients diagnosed with COVID-19 never require hospitalization.1 With social distancing policies and disruptions to in-person clinic visits, ambulatory patients with COVID-19 and their families have had new barriers to accessing healthcare on top of the unique psychosocial stressors of living through a pandemic. These stressors include unemployment or uncertainty regarding safe return to work, grief and fear engendered by the COVID-19 related death of loved ones, and food, financial, or housing insecurity in the context of a destabilized economy. These stressors have been shown to be particularly acute for minorities and individuals with low socioeconomic status and contribute to the growing health disparities in communities across the United States and abroad.2,4

At the same time, COVID-19 disrupted medical education. In mid-March, after guidance released by the Association of American Medical Colleges, medical students were pulled from clinical rotations due to concerns for student safety, limited personal protective equipment (PPE), and the quality of educational opportunities given the cancellation of elective procedures.3 In-person clinical experiences during this time were consequently shortened or eliminated.

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In response to these challenges, we designed a structured service-learning opportunity for third- and fourth-year medical students to provide clinical and social support for ambulatory patients diagnosed with COVID-19 through longitudinal telephone follow-up. This program highlights the role that high-intensity follow-up played in the management of complex clinical and social needs experienced by patients early on during the COVID-19 pandemic during a period of state-wide lockdown and limited access to care.

2. Organizational context

This program was implemented at an academic medical center located on the south side of Chicago. This academic medical center is an 811-bed tertiary care hospital with more than half a million outpatient visits, 75,000 adult emergency department visits, and 34,000 hospital admissions a year. The hospital cares for a predominantly underserved African American community that is disproportionately affected by chronic disease and socioeconomic inequality, including a sizable proportion of patients insured by Medicaid. Through the Urban Health Initiative, the hospital’s dedicated community health division, the institution aims to address structural health inequities that affect its surrounding community. Predictably, the pandemic has heightened the long-standing health disparities in cities across America. In Chicago, the rate of COVID-19 deaths has been two times greater for Blacks compared to Whites.

3. Personal context

Removed from in-person educational experiences, many medical students led grassroots efforts to assist the hospital and community. One such initiative grew out of collaboration with Infectious Disease faculty to provide support to ambulatory patients diagnosed with COVID-19. Initially, three student leaders volunteered to spearhead the development and execution of the program; a fourth student leader was added as the project expanded. Given their available time, dedication, and the clinical skills required to communicate effectively with newly diagnosed patients, third- and fourth-year medical students were offered the opportunity to participate in this service-learning initiative. Faculty from the Section of Infectious Diseases provided mentorship and guidance on COVID-19 health education, frequently evolving hospital testing guidelines, and knowledge on available clinical trials.

4. Problem

On March 9, the state of Illinois was declared a disaster area by the governor in response to COVID-19 outbreaks. By April 1, healthcare facilities in the state were ordered to cancel or postpone elective surgeries and procedures. A “stay-at-home” executive order was initiated less than a week later. As disease testing and contact tracing ramped up during this time, hospitals were focused on maintaining bed access, securing adequate PPE for staff, and ensuring access to equipment such as ventilators for critically ill patients. Due to limited testing supplies, guidance around who was eligible to be tested for the virus was frequently evolving. At the time of this project’s implementation on April 8, during the “first wave” of cases in the state, the number of daily new COVID-19 cases was over 1500 and would reach nearly 3000 at the wave’s peak. By mid-May, Cook County recorded the highest number of cumulative COVID-19 cases of any county in the US.

Prior to the implementation of this telephone follow-up program, a select group of providers in the Department of Medicine was tasked with notifying ambulatory patients of their positive test result via telephone. As cases surged, it quickly became clear that providers were unable to spend adequate time educating and providing support for patients over the phone. Many patients were overwhelmed by their diagnosis and unable to process additional information during a single phone call. Other patients continued to have questions about their disease even after the initial phone call. As much of the city ground to a halt during the stay-at-home order, many primary care clinics closed temporarily. For this and other reasons, patients had few resources they could turn to in these early months of the pandemic. Furthermore, little was known about the experience of ambulatory patients diagnosed with COVID-19 and the clinical trajectory of the disease at the time. Thus, it was important to closely monitor these patients and triage more severe cases in the emergency department (ED). Based on these initial experiences, it was clear that there was a need for more extended follow-up and support for ambulatory patients diagnosed with COVID-19.

The pandemic produced a series of unprecedented social stressors in our patient population, and many of these stressors were particularly acute for those who tested positive for COVID-19. In hard hit areas, surveys show higher rates of essential workers and others unable to work remotely. Frequently, workers faced uncertainty about how and when to safely return to work while others required documentation of their test result in order to return. Many lived in multigenerational homes or crowded living quarters that made social distancing impossible while others struggled with the social isolation brought on by the stay-at-home order. As the economy plummeted with record unemployment, many patients experienced financial challenges and food insecurity. Others faced housing insecurity, and some patients even lost housing as a direct result of their COVID-19 diagnosis.

Given these challenges, it became apparent that a new workforce was needed who could spend the necessary time with ambulatory patients who had tested positive for COVID-19 and address their needs. By developing a program to help track patient symptoms, disseminate information about the disease, and aid with various social needs, we hoped to address these challenges initially observed during the pandemic. Furloughed medical students, with the proper training and guidance, were identified as an ideal group to staff this project. Given the stay-at-home order, it was ideal to implement the program as a telehealth model, which was also aligned with educational priorities outlined by the American Medical Association.

Many of the student-run COVID-19 telephone initiatives published in the literature focus on interventions aimed at alleviating social isolation in seniors, and others discuss the role of medical students engaging in telehealth within established primary care infrastructures. Based on our review of the literature, we did not identify other medical student-run initiatives focused on symptom monitoring for patients who had tested positive for COVID-19.

5. Solution

5.1. Developing team structure

The program was urgently implemented and evolved extensively over the course of weekly rapid-cycle improvement meetings. Initially, three student leaders each directed a team of approximately 12 volunteers. Each team assigned patients to volunteers using a three-day rotating call schedule, excluding weekends. However, as the hospital increased its testing volume, this system was overwhelmed. As such, the service was expanded after two weeks to include four teams accepting patients on a four-day call schedule, including weekends. A total of 53 student volunteers and three faculty volunteers were involved in the program. A summary of the team structure is illustrated in Fig. 1.

Early on, we also considered organizing teams of on-call students working in shifts to call patients who required follow-up that day. However, consistent with literature demonstrating the value of longitudinal relationships, we ultimately decided to have volunteers follow the same patient for the duration of follow-up. In general, students made initial phone calls to patients one day after they were notified of their positive COVID-19 test result. Subsequent calls were made at the student’s discretion usually at one- or two-day intervals depending on the severity of the patient’s symptoms or concerns. Guidelines for discontinuing follow-up included mild symptoms and no further questions,
symptomatic improvement over two calls, requests for no further follow-up, or hospitalization. Volunteers continued to follow patients who presented to the ED but were not hospitalized. Students were given the flexibility to call patients on their own schedule, which provided significant logistical benefit to the program. Volunteers reported spending between five to 40 min per call (median call length was 18 min) with most volunteers calling two to four patients per day.

Support for volunteers included an initial online training delivered by student leaders and faculty mentors, written protocols updated frequently to reflect the project’s needs (see Supplemental Files 1 and 2), and an attending on-call available to answer questions. As the project developed, a patient navigator who assisted with coordinating primary care visits, a social worker, and several internal medicine residents were also recruited to provide support.

5.2. Identifying patients

Initially, patients who tested positive for COVID-19 in the ambulatory setting were notified of their positive result and identified for follow-up by an MD or advanced practice nurse working with the Section of Infectious Diseases. A patient was deemed appropriate for follow-up if they were found to be at high risk based on severity of symptoms or comorbid conditions, had unmet social needs, or required additional education or counseling regarding their diagnosis. This process for identifying patients for follow-up was later broadened to include all non-hospitalized patients diagnosed with COVID-19 either in the emergency department (ED) or at drive-through testing sites. Patients who lived in nursing facilities or other settings with structured medical care were excluded because their care was being managed by other providers.

5.3. Establishing goals of follow-up

During calls, volunteers assessed symptom severity and comorbidities; when appropriate, volunteers recommended patients seek emergency medical care or urgent outpatient follow-up with a primary care provider (PCP) after consultation with the attending on-call. After assessing for clinical stability, the next priority was to provide patient education on topics including safe self-isolation practices, “red flag” symptoms warranting an escalation of care, supportive care, return to work precautions, and COVID-19 testing for exposed family members. Emphasis was also placed on assessing patient psychosocial needs, providing emotional and mental health support over the phone, and referring patients to resources to address unmet housing, food, and other needs. Students also offered information regarding emerging clinical trials to patients who expressed interest. A summary of the process for identifying patients and follow-up is illustrated in Fig. 2.

5.4. Approaching program evaluation

After each initial call to a patient, volunteers logged the call in the electronic medical record using a standardized note template (see Supplementary File 3) and completed a REDCap survey documenting patient demographics, clinical information, and any challenges or other comments regarding the call. These survey data and anonymous comments were drawn upon at the weekly rapid-cycle improvement meetings with Infectious Disease faculty to identify aspects of the intervention that required further improvement. Programmatic changes decided upon at these meetings were then shared with volunteers in weekly emails and updated in shared online protocols. In addition, chart review was used to identify patients who presented to the ED or were hospitalized both during and after the follow-up period. Chart review was also used to identify the clinical and social resources volunteers provided during follow-up. Using these methods, we evaluated both the clinical and social needs of patients during the first six weeks of the program from April 8 through May 20, 2020. The project ended shortly after on May 31, 2020, with the return of medical students to clinical rotations.

5.5. Assessing clinical needs of patients

Of the 507 patients identified with COVID-19, 416 patients were contacted during the evaluation period and 91 patients were unable to be contacted. Patient demographics, comorbidities, and symptoms are presented in Table 1. The majority of patients were women (62%) and self-identified as Black/African American (68%). The most common comorbidities included obesity (40%), hypertension (33%), and diabetes mellitus (22%). The most common symptoms that patients reported at the time of volunteer follow-up included cough (46%), fatigue (25%), and altered taste and/or smell (24%).

Of the 416 contacted patients, only 24 (6%) were lost to follow-up. On average, volunteers followed patients for 4.5 days, with 41 (10%) patients requiring follow-up for greater than 10 days. Thirty-two (8%) were advised to go to the ED directly by volunteers and 5 (16%) presented to the ED for a COVID-19 related reason after follow-up was completed. The remaining 56% of patients who presented to the ED during the follow-up period received anticipatory guidance from volunteers on “red flag” symptoms and were thus, likely better attuned to
trials and primary care. Many patients lacked PCPs or reported challenges in communicating remotely with their PCPs. Volunteer-provided primary care resources included contact information for local free clinics and federally qualified health centers and direct referrals to a hospital clinic designated to serve COVID-19 patients. Volunteers provided work notes directly to 39 (9%) patients and instructed patients on how to obtain a work note later if desired. Four patients were referred to housing or shelter resources, one of whom was referred directly to isolation housing through the Chicago Department of Public Health. Additional resource referrals included local organizations providing financial assistance, unemployment resources, food banks, and grocery delivery programs. Many volunteers reported anxiety and grief counseling as key components of their follow-up calls and one patient was referred to grief support services.

5.6. Assessing social needs of patients

Volunteers also provided clinical and social resources during follow-up (Table 2). Patients frequently requested information about clinical trials and primary care. Many patients lacked PCPs or reported challenges in communicating remotely with their PCPs. Volunteer-provided primary care resources included contact information for local free clinics and federally qualified health centers and direct referrals to a hospital clinic designated to serve COVID-19 patients. Volunteers provided work notes directly to 39 (9%) patients and instructed patients on how to obtain a work note later if desired. Four patients were referred to housing or shelter resources, one of whom was referred directly to isolation housing through the Chicago Department of Public Health. Additional resource referrals included local organizations providing financial assistance, unemployment resources, food banks, and grocery delivery programs. Many volunteers reported anxiety and grief counseling as key components of their follow-up calls and one patient was referred to grief support services.

6. Unresolved questions and lessons for the field

While this was a time limited intervention given the need for medical students to resume their clinical education once conditions were appropriate, students made important contributions to supporting ambulatory patients with COVID-19: providing patient education to prevent the spread of disease, assisting patients with escalating care if needed, referring patients to vital resources such as food and housing, and providing emotional support to those who had lost loved ones. This reimagining of student involvement in health systems created value in both clinical and educational environments. In referring patients to primary care and assisting with symptom triage for patients who otherwise had limited to no guidance on their infection, this program helped to offload stress from other areas of the hospital. Removed from their clinical rotations, many medical students during this period had the bandwidth to build relationships with patients and gain their trust. This not only served the purpose of helping patients but also enabled medical students to develop important skills around clinical management, communication, self-efficacy, and telehealth during an unprecedented global health crisis. The implications of this program as a tool for medical education in the context of telehealth expansion is described by our group elsewhere.

As of the time of this writing, states in the US have faced repeated waves of COVID-19 infections, and high infection rates will likely perpetuate until vaccines and nonpharmaceutical interventions are widely adopted by the public. This next wave of infections is heavily impacting our patient population, which includes many individuals from historically disadvantaged neighborhoods in the city at high risk of hospitalization from COVID-19 due to underlying chronic disease such as obesity, hypertension, and diabetes. As virus outbreaks and resource constraints intensify, future interventions should continue to focus on identifying high-risk and underserved populations that could maximally benefit from follow-up services. Furthermore, future interventions must be tailored to specific populations. For example, although phone interpreter services were available as needed for our volunteers, the program would have been enhanced with additional bilingual providers to communicate more effectively with our limited-English proficient patients. While some hospitals have relied more heavily on patient health portals or cell phone apps to facilitate symptom monitoring and patient education, it is unknown how effective this type of intervention would be in communities where access to technology and health literacy is more limited. These follow-up calls can be performed by many healthcare providers, including medical students, nurse practitioners, physician assistants, and physicians. Robust, comprehensive training and support for providers on topics such as evolving public health
guidance, telehealth best practices, access to local resources, and preventing emotional exhaustion are critical for sustained engagement. Further, to tackle the long-standing health disparities exacerbated by the pandemic, hospitals and public health departments must come together to mobilize both medical and social resources especially in the most socioeconomically disadvantaged communities. In particular, future interventions should plan to address major unmet needs in housing, food security, and mental health resources among others.

In summary, the COVID-19 pandemic has upended the lives of patients and the healthcare system. Many furloughed medical students were eager and willing to apply their clinical skills to help combat the virus. Our program utilized this untapped source of human resources and enthusiasm to address the needs of ambulatory patients testing with COVID-19 in a vulnerable population who would have likely not received follow-up otherwise. The program provided a critical symptom monitoring service that provided support for patients who required a higher level of care. Further, this program identified clinical and psychosocial needs of patients and addressed many of these needs through patient education and resource referrals. As the COVID-19 pandemic continues, this intervention offers some insight into the challenges of how to assess and support patients recovering at home.

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### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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### Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.hjdsi.2022.100612.

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