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Proactively Connecting Residents in Underserved and Low Socioeconomic Status Communities with “Virtual Hospital” Telehealth Access in Response to the COVID-19 Pandemic

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Summary: This report from the field describes the uptake of a telemedicine outreach model among residents in under-resourced urban settings as a proactive response to the COVID-19 pandemic. We describe the methods and uptake of our telehealth virtual hospital program and implications for practice.

Key words: Underserved communities, health equity, telemedicine, minority health, COVID-19.

Background

Telehealth in the time of COVID-19. The rapid adoption of telemedicine and other telehealth-related services as a response to the novel coronavirus disease 2019 (COVID-19) has, in many ways, altered the United States health care delivery system.¹ As people across the nation adhered to stay-at-home guidelines, telehealth provided a platform to continue engaging in necessary health care services while reducing in-person clinic and hospital interactions.² *Telehealth* refers to a wide array of distant care delivery services that remove physical contact with the patient.¹ Provider-patient and provider-provider communication can occur both synchronously (videoconferencing and telephone) and asynchronously (electronic messages).¹ Federal and state officials have acknowledged the potential value of telehealth and have made unprecedented regulatory modifications to facilitate its use at a time when in-person contact carries significant risk. Prior constraints around reimbursement, privacy/cybersecurity, licensure, liability, and technology access have all been waived.² The influence of these

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changes can be measured in the recent percent increase of telehealth services in a variety of health care fields.^{2–4}

Telehealth and health equity. As health care systems rapidly adopt telehealth in response to COVID-19, it is imperative to understand how it may affect health and health access among racial and ethnic minority groups and other often-underserved communities. Health-related inequities during the COVID-19 pandemic have been highlighted in the disparate morbidity and mortality rates within the Black and Latinx communities across the United States.^{5–7} The literature has shown that the use of telehealth can improve continuity of care for chronic disease management and COVID-19-related health challenges for marginalized communities by removing previous barriers related to transportation, missed work, and limited childcare.⁸ This report from the field describes a telemedicine outreach model and its uptake in an under-resourced urban setting as a proactive response to the COVID-19 pandemic.

Program Description: Implementation of Telehealth

Setting. LifeBridge Health is one of the largest, most comprehensive providers of health services in central Maryland. LifeBridge includes Sinai Hospital of Baltimore, Northwest Hospital, Carroll Hospital, Levindale Hebrew Geriatric Center and Hospital, and Grace Medical Center, with 2,900 providers, and subsidiaries and affiliates spanning the care continuum. This initiative took place in West Baltimore, an area of the city that faces significant adverse health outcomes. On the whole, Baltimore City’s health outcomes are the poorest among Maryland’s 24 counties.⁹

Predominantly, residents in the West Baltimore ZIP codes where this initiative took place are Black and had an average life expectancy in 2015 of 64–68 years of age, compared with the U.S. large-city average of 79 years of age.¹⁰ Residents had a higher prevalence of COVID-19 vulnerability risk factors, including: diabetes (18.6–22% compared with a US large city average of 10%); hypertension (47–52% compared with a U.S. large-city average of 29.6%); and obesity (47–53% compared with a U.S. large-city average of 29.7%).¹⁰ The communities served by this program fall into some of the most disadvantaged block groups of the Area Deprivation Index, which maps neighborhood-level socioeconomic status disadvantage based on factors including income, education, employment, and housing quality.⁹

Program eligibility. With support from the Maryland Department of Health and Socially Determined, Inc., Maryland’s health information exchange (CRISP) published a COVID-19 Vulnerability Index for Medicare beneficiaries attributed to Maryland primary care practices (see Box 1). The index used social determinants of health and Medicare claims data to stratify Medicare beneficiaries by their estimated risk for complications if exposed to COVID-19. LifeBridge used the Vulnerability Index to proactively identify and contact residents in West Baltimore neighborhoods near Sinai Hospital and Grace Medical Center who were at highest risk of severe COVID-19 complications. Additional community residents were included in the initiative as knowledge spread by word of mouth. Funding for this six-week pilot was supplied by the LifeBridge Health system.

Procedure. Maryland’s COVID-19 Vulnerability Index was the starting point for

Box 1.**COVID-19 VULNERABILITY INDEX^a**

HCC Tier	COVID-19 Vulnerability Index *	Likelihood of Avoidable Hospital Events
Complex		62.69%
Complex	5	34.12%
Complex	5	29.72%
Complex	5	29.09%
Complex	4	19.86%
Complex		18.02%
Complex	3	15.19%
Complex	5	14.84%
Complex	5	14.75%
Complex	4	13.85%

Note

^aPortion of patient-level COVID-19 Vulnerability Index as displayed through Maryland's Health Information Exchange. The Index combines neighborhood-level social determinants factors and Medicare claims data to stratify patients by risk of complications if they contracted COVID-19.

LifeBridge to prioritize its highest-risk community members for outreach by location. LifeBridge determined the neighborhoods with the largest proportion of vulnerable residents and then organized a program to contact these individuals and schedule appointments to bring COVID-19 testing, screening for social determinants of health, and access to telemedicine services to their residences. This mobile health clinic (*mobile clinic*) consisted of two vans, each with a driver, a registered nurse, and a community health worker (CHW), all linked digitally to two advanced practice providers (physician assistants) at LifeBridge's *virtual hospital*, a flexible, provider-staffed electronic triage and care support arm of the health system.

During a telemedicine visit, the nurse was responsible for documenting the patient's vital signs, completing basic clinical health screenings, educating the patient about COVID-19 precautions, conducting COVID-19 testing, preparing the lab specimen, and linking the patient electronically via an iPad with an advanced practice provider at the virtual hospital to aid medical evaluation and help determine next steps. The program used the HIPPA [Health Information Privacy Protection Act]-compliant Zoom for Healthcare application (Zoom Video Communications, Inc., San Jose, Calif.), providing patients with a secure and video-enabled experience with a health care provider. With this tool, the advanced practice provider conducted the patient's telemedicine visit, determined their discharge disposition, and placed the COVID-19 order for processing. The televisit allowed the provider to speak with the patient and nurse and

collect medical information personally to increase accuracy and efficiency. The CHW used the iPad to conduct a social needs screening with each program participant and assess for food availability, housing needs, and financial situation. The CHW followed up with resources as needed and documented actions in Cerner, the health system’s primary electronic health record. Cerner is used for both inpatient and clinic visits, capturing patient demographic characteristics, ancillary services ordered and completed, and charges. At the end of the visit, program participants were advised to schedule follow-up appointments with their primary care providers to facilitate continuation of care. Individuals without a primary care provider were linked to LifeBridge’s care management team to assign them one.

Participants in the pilot totaled 316 out of an initial contact list of 720 eligible high-risk community residents. The program team faced difficulties reaching target individuals by phone as well as with appointment cancellations because many were fearful of potential COVID-19 transmission from allowing clinicians into their residences. After the pilot’s first four weeks in operation, awareness of the program soon spread through the community and prompted requests for visits. The program responded by shifting its format from in-home visits to arranging stationary screening tents at large senior residential complexes near Grace Medical Center. The tent format increased efficiency by reducing travel time for the staff and eliminating the concerns of the residents regarding the invitation of unfamiliar people into their homes.

Description of Outcomes

During the pilot’s six-week implementation in June and July 2020, 314 teleconsultations were provided in six ZIP codes in West Baltimore (see Figures 1 and 2). The highest proportion of telehealth *virtual hospital* visits occurred in ZIP code 21223 (43%) followed by ZIP codes 21215 (26%) and 21216 (16%) (Figure 2). Predominantly, individuals were African American (84%) and female (58%) (see Table 1). Many individuals reported

Figure 1. Telemedicine uptake: weekly count of unique patient who were seen during the 6-week implementation of the community mobile health clinic (n=316).

Figure 2. Percentage of residents served by the mobile clinic and telehealth “virtual hospital” by top zip codes (n=316).

chronic conditions that place them at greater risk of serious illness from COVID-19, including hypertension (70%), diabetes (34%), asthma (12%), and having more than three chronic conditions (46%) (Figure 3). Despite this, less than two-thirds reported seeing a primary care physician in the previous 12 months. Our intervention referred 249 individuals to primary care providers for follow-up. Of the 316 patients seen during the pilot, six tested positive for COVID-19. By week five of this initiative, when screening shifted largely to a tent format, the program experienced a 2.9-fold increase in telemedicine visits compared with week one.

Future Directions

The drastic effect of the COVID-19 pandemic on mortality and morbidity rates in the United States has changed the way our country’s health care system evaluates and delivers care to patients.^{2,11} Epidemiological data indicate that COVID-19 poses the greatest risk to those living with pre-existing chronic conditions.¹² Our pilot program found that approximately 46% of participants suffered from more than three chronic diseases, with 70% suffering from hypertension (see Table 1 and Figure 3). Such a population needs rapid identification and better coordination of medical and social services to mitigate adverse consequences of delayed primary and preventive health services, as well as assistance to decrease the sustained exposure to social determinants of health.¹³ Our telehealth-equipped mobile clinic and virtual hospital were able to respond to the emergent need and increase COVID-19 testing and enhance health care access in an under-resourced urban setting, where a large proportion of the residents is African American. Our descriptive results suggest the feasibility and success of this model to reach individuals remotely. Embedding telemedicine technology and processes within health equity strategies can help mitigate the many health inequities that

Table 1.
DESCRIPTIVE DATA ON TELEHEALTH “VIRTUAL HOSPITAL”
(N=316)^a

	N(%)
Gender	
Male	91 (28.8)
Female	184 (58.2)
Race	
White	5 (1.6)
Black or African American	265 (83.9)
Declined to Answer	5 (1.6)
Pt Has >3 Chronic Conditions	
Yes	146 (46.2)
Seen PCP in past 12 months	
Yes	203 (64.2)
COVID-19 Test result	
Positive	6 (1.9)

Note:
^a12.9% missing for gender and race.
Pt = Patient

Figure 3. Percentage of patients with stratified chronic diseases (n=316).

disproportionally affect marginalized communities and that can contribute to adverse COVID-19 outcomes.

Implications for practice. The United States spends more on health care compared with its counterpart high-income countries and yet, paradoxically, the U.S. has the highest COVID-19 morbidity and mortality rates across the globe.^{14,15} Furthermore, the COVID-19 infection poses greater risk for members of racial and ethnic minority groups in the U.S., individuals with chronic diseases, and older adults.⁸ Targeted mobile community screening and telehealth visits are a feasible option to connect to care people living in underserved neighborhoods who are at high risk for COVID-19 complications, the neighborhoods themselves being at high risk for enhanced community spread. This pilot demonstrated both the need and the opportunity for new models of health care delivery. A telehealth-enabled mobile clinic and virtual hospital can efficiently connect patients in underserved and low socioeconomic status communities to medical services, not only during a pandemic, but going forward. Because social determinants of health are intricately interwoven into the health outcomes of individual neighborhoods, investing solely in clinical care will not eradicate excess morbidity and mortality. As shown by previous literature, approximately 80% of an individual's health is linked to their economic status, physical environment, education, and food security, with only 20% associated with clinical care.¹⁸

This initiative's main goals were to assess the community's demographic characteristics and needs, as well as the program's processes, associated costs, and results. Although associated costs were not explored in this article, we can report that a positive return on investment was not achieved. However, much was learned to inform future iterations of LifeBridge Health's community mobile clinic, including the benefits of stationary, community-situated screening sites and new ways to link individuals with chronic conditions to needed resources. Based on this pilot's results, LifeBridge has allocated internal funding to continue the mobile clinic model. Grant funding is being sought to expand the mobile clinic's outreach to other populations in Baltimore's traditionally underserved communities. Near-term plans for the mobile clinic include support to improve adult chronic disease management, increase childhood immunization rates, and enhance COVID-19 screening and care coordination at post-acute care facilities.

Conclusion. As we live with the ongoing threat of COVID-19 transmission, telemedicine, combined with mobile outreach, can be a valuable tool to reach underserved communities and begin to address the social determinants of health that place certain communities at elevated risk of adverse outcomes relating to this pandemic.^{16,17} However, telehealth is not without its challenges surrounding equity. Members of racial/ethnic minority groups, older adults, and those with low incomes face barriers to accessing telehealth services that include limited digital and health literacy and poor English proficiency.¹⁹ This further supports the need to meet patients where they are. To realize telehealth's potential and address challenges facing racial/ethnic minority groups and other marginalized communities, models of care delivery should consider incorporating proactive, mobile outreach and building mechanisms to identify and address social barriers to health.

Increasingly, there is a need to integrate telehealth and electronic health records to share data across health care systems and facilitate communication among health care

providers. Improving health outcomes within impoverished and vulnerable communities will require more than increasing access to quality care. It necessitates a cross-sector approach that integrates medical, behavioral, and social services while also addressing the wide array of social determinants of health.¹⁸ The role of telehealth within these efforts to eliminate health inequities seems promising as hospitals and health systems test innovative strategies to meet the needs of communities.

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