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Access to Care: End-to-End Digital Response for Covid-19 Care Delivery

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Abstract

The coronavirus disease 2019 pandemic disrupted healthcare, requiring organizational leaders to act quickly to manage the health-related concerns of individuals and communities. The ability to offer a variety of digitally enabled telehealth services with 24/7 access to nurse practitioners and physician assistants allowed us to care for patients in their homes. It reduced the spread of the virus, protected our employees from further disease spread, and provided early interventions to those in need. The roles of nurse practitioner leaders, the enacted strategies, and patient outcomes demonstrate the impact of an innovative digital care delivery model on care across the continuum.

Keywords: digital health; telemedicine; Covid-19; nurse practitioner; physician assistant
Access to Care: End-to-End Digital Response for Covid-19 Care Delivery
Introduction

Healthcare leaders have been faced with a challenge unlike any other with the experience of the novel coronavirus disease 2019 (Covid-19) pandemic.\(^1\) Covid-19 has strained governmental preparedness, and economic, personal, and healthcare organizations’ capabilities.\(^2\) Prior to the pandemic, our healthcare system had already initiated a strategic emphasis on advancing digital health technology. In 2019, a dedicated digital health entity and leadership structure was developed to support population-based care in communities across OSF HealthCare system, which geographically expands over 500 miles and two states. The vice president (VP) of advanced practice role was expanded to include a new role as chief clinician executive (CCE) for digital health. Responsibilities for this new role included leadership and oversight for the opening of urgent care clinics within our system with nurse practitioners (NPs) and physician assistants (PAs) serving in the primary roles of provider. There were many opportunities to utilize NPs and PAs more effectively, with digital health as one. Our digital approach expanded and maximized resource utilization during the Covid-19 pandemic, which enabled us to deliver care to individuals where and when they need it. With a deliberate focus on disruptive innovation,\(^3\) agility, collaboration, and performance risk taking, we learned lessons very quickly.\(^4\)

Our integrated healthcare system services, both rural and urban populations in Illinois and Michigan, with more than 350 locations including 15 hospitals ranging in size from critical access to an academic medical center and 45 urgent care facilities, with 909,705 persons served. The needs of our 14 acute-care hospitals differed depending on their location and community positivity rates of Covid-19. The challenge of predicted surges in admissions, use of intensive care unit (ICU) beds, and access to care needed to be managed as proactively as possible. Like
other health systems across the nation, the pandemic stressed our financial operating margin tremendously because of decreased inpatient, outpatient, and surgical volumes. However, we were well poised to consider the effective use of NPs and PAs in virtual provider roles as part of the innovative strategies designed within our end-to-end Digital Response.

The specific aims of our Digital Response strategies were as follows: 1) provide at-home care for individuals with presumed mild Covid-19 symptoms, 2) deliver early and appropriate intervention to those in need, 3) protect our communities and employees from further disease spread and, 4) reduce the potential overwhelming of our hospitals and health care facilities. In the first 10 days of operation, 26,000 Covid-19-related chatbot conversations were completed and 12,500 phone calls were made to the dedicated Covid-19 RN hotline. As early as April 2, 2020, we integrated virtual visits with NPs, PAs, and physicians to provide care for symptomatic patients.

Methods

Leadership Roles

The chief medical officer (CMO) of innovation/digital health and the CMO of clinical innovation led the planning work for use of community health workers (CHW) within our system prior to the pandemic. This CHW framework was core to the transition to a pandemic health worker (PHW) program; however, few if any publications, discussed the rapid adaptation of CHW programs to pandemic needs and enablement of technology and clinicians to provide care in rural and urban settings. The senior VP for digital health, the VP of digital care, and the VP of advanced practice/CCE were accountable to lead the implementation of operational and clinical needs for the digital response efforts. Other physician and nursing leaders were assigned to lead specific programs and clinicians.
The director of advanced practice clinical education and fellowships was redeployed to serve as an interim clinical leader in collaboration with the director of education who served as operational leader for several of the newly designed digital platforms. This NP leader in collaboration with the VP of Advanced Practice/CCE put education, competencies, and NP/PA workforce provider roles into place for the digital Covid-19 response. Advanced practice leaders understand the role, educational background, required competencies, and methods needed to evaluate NP/PA performance. It was very evident that without a well-established advanced practice leadership structure, delays in identifying the best NPs and PAs to fulfill these roles would occur. In one week, 15 NPs and PAs were reallocated from other roles to serve in digital health roles that served a large community-based population. As a disruptive innovation, all programs were simultaneously in design phases with rapid successive deployment given the pandemic.

Program Design and Implementation

The journey for access to care (Supplementary Figure 1) started with a chatbot, followed by a texting solution, which connected patients to information regarding Covid-19. Digital end-to-end solutions were accelerated through partnerships with digital innovative disruptors. A dedicated call center was implemented within 72 hours from planning to start-up, and was staffed with registered nurses (RNs) to triage patients who may be “worried well” or have symptoms of Covid-19 to the appropriate level of care using structured algorithms. All callers were offered the digital programs based on their symptoms and residential area. If a caller needed a higher level of care, the RNs transferred the caller to a NP or PA for a virtual visit. The program remains operational at this time, with a potentially different focus post-pandemic.
Traditional electronic medical record (EMR) solutions were insufficient for the rapid standup of services. A team created a software layer with appropriate Health Insurance Portability and Accountability Act (HIPAA) provisions\textsuperscript{11} and other protections to facilitate intake interviews, enrollments, and screening for social determinants of health such as food insecurity, housing, or transportation needs. These data were used to appropriately characterize client needs and to deploy additional internal resources such as social workers and PHWs to mitigate barriers to Covid-19 management within our comprehensive response program.

A digital connection\textsuperscript{12} was offered to all callers and was available for 16 days for patients to use, with an option of program reenrollment as needed. The patients would input symptoms daily, and the program triaged them according to severity of illness; those with higher severity triggered a RN triage alert that was followed up with a RN call for evaluation and, if needed, a scheduled NP/PA virtual visit. Patients with comorbidities who were high risk for complications from Covid-19 were eligible for an intermediate-level remote monitoring by RNs and NPs. This program allows patients to remain at home while being remotely monitored by RNs and NPs/PAs from a centralized location. The program was active by April 2020 and was in line with the Centers for Medicaid and Medicare Services (CMS) \textit{Hospitals without Walls} regulatory changes, announced in March 2020.\textsuperscript{13} Monitoring equipment supplied by our healthcare system allowed for evaluation blood pressure, heart rate, and pulse oximetry three times daily. Patients enrolled in the acute home monitoring program who deteriorate are evaluated virtually by NPs and PAs, and those requiring a higher level of care are directed to local urgent care facilities or emergency departments (ED) by private car or ambulance, depending on provider evaluation of the patient. In most instances and communities, these facilities are located within our healthcare
system, allowing for an ongoing flow of health information through the EMR ensuring better continuity of care.

Another program launched and designed to care digitally for Covid-19 patients within the home environment is the Acute Covid at Home program. A NP leader who co-led and facilitated implementation of a similar transitional program for pediatric ventilated patients in late 2018 oversaw development and implementation of the program. The Acute Covid at Home program was in the planning phases when the pandemic ensued and was quickly operationalized to decompress our acute care facilities, providing throughput and capacity needed during the surge of patients. The Hospital at Home program operates through early hospital discharge of lower acuity patients to their homes in collaboration with home health nursing, digital remote monitoring equipment, and virtual visits by the medical team. The digital monitoring of patients post-discharge allows for evaluation of blood pressure, heart rate, pulse oximetry, and daily physical assessments by RNs in the patient’s home. This program, too, was well ahead of the CMS expansion of Acute Hospital Care at Home waiver. Objective patient data are monitored by RNs and addressed through daily virtual NP or PA visits, ensuring appropriate intervention to manage care safely or to arrange face-to-face contact with providers if necessary.

Program Evaluation

From the inception of the digital response program, metrics for utilization of the various care delivery models have been tracked and reported internally and externally to the state of Illinois, which reimburses for telehealth (Table 1). Enrollment remained steady from April 2020 through March 2021 enabling us to meet the needs of our communities with services provided to patients from 78 counties within the state. By March 31, 2021, we received over 179,304 calls to the RN hotline, 9,739 client enrollments in the Covid-19 response program, and delivered 38,622
virtual visits (NP [95%] PA [5%]), all surpassing our expectations. Hospitalization and ED utilization are also reported, which helps gauge the escalation of care for enrolled patients during the pandemic. Peak enrollment for the PHW program occurred in late November 2020, with 859 active patients. For the acute monitoring programs, peak enrollment occurred in January 2021, with 335 unique patients.

Demographic data for enrolled patients enabled us to see the diversity of participants (Table 2), which are similar between those elected to participate and those who declined, with a slightly higher percentage of males declining (42.3%).

Exit surveys provided patient satisfaction and engagement data as other important markers of success. Monthly survey completion rates for program participants averaged between 17% - 23%. Ninety-one percent of patients from the Covid-19 response programs reported that the program “helped them to know what to do next” and 96.7% of patients indicated they would recommend the program (agree/strongly agree). The most common reasons for non-participation in the PHW program were testing negative/waiting for results (25.1%); asymptomatic/condition improving (14.9%), or under provider care (9.2%).

Discussion

This end-to-end solution provided a viable approach to addressing community needs during the Covid-19 pandemic. Given the rising numbers of hospitalizations and emerging variants, Covid-19 still poses a formidable threat within the United States and globally; though it has helped to advance digital health forward in a significant way. The crisis served as the impetus for complete immersion into digitally driven care, including our primary care locations where virtual visits were used minimally in 2019.
Collaboration across the healthcare system was important but complex; this process changed how decisions were made and the leaders who made them. The traditional consensus and committee structure for decision-making was replaced with daily standup meetings and tight deadlines for implementation. The primary focus on disruptive innovation clearly tested the speed at which traditional healthcare organizations can move with regard to implementing change. We leveraged the skills and talents of our innovation and advanced practice leaders and provider workforce across the organization to move the work forward from merely ideas to operational programs. Requesting feedback from teams across our system allowed leaders and providers of virtual care to grow and develop as well as to build credibility within the organization.17

The delivery of safe, effective care in a virtual platform requires a competent and educated workforce.10 The advanced practice leaders in OSF HealthCare were able to strategize and determine the locations and models for the NPs and PAs to serve and quickly transition them to a new virtual model of care. Advanced practice leaders who are practitioners themselves play a critical role in organizations as change agents and advocates, while ensuring workforce optimization with scope of practice considerations that are maintained. The digital structure effectively managed our organization’s performance by increasing access to care and by contributing substantively to the type of clinical care delivery modalities and percentages of virtual visits, all while driving toward quality patient outcomes. Data demonstrated that a larger percentage of our patients referred to the programs by themselves or a provider required lower acuity monitoring through the PHW program, with 34% requiring remote patient monitoring assistance supported by NP/PA virtual visits. Improved patient outcomes through early
recognition of acute deterioration were noted, particularly with patients exhibiting hypoxia without respiratory distress.

Direct communication, rapid decision making in the absence of understanding all variables, and immediate, pointed feedback on performance prevailed as the interprofessional teams collaborated toward a common goal. The unpredictability of the virus spread influenced staffing and resources, causing a continuous fluctuation in process and modeling strategies, which required ingenuity and flexibility. Technology challenges were faced not only by our team but also by the patients themselves as some areas were impoverished or rural with limited internet connectivity, and others did not have a telephone or email account, and thus, were challenged to access and understand the digital solutions provided.

Conclusion

Healthcare leaders are starting to understand better the consumer demand of convenience and 24/7/365 access. Providing this level of service requires organizations to think and respond differently for the future. NPs and PAs have a critical role in digital health as part of the workforce of the future, helping to deliver end-to-end solutions for access to care. Their knowledge and clinical skills make them strong leaders for new models of care delivery. Our organization is currently in developmental stages with digital programs that have broader implications for addressing social determinants of health; these programs can be utilized by NPs/PAs who deliver population-based healthcare. Having dedicated advanced practice leadership ensures that NPs and PAs are utilized at top of license while developing and implementing new processes, programs, solutions, and evaluation methods within the NP and PA workforce. Research investigating the high utilization of virtual care delivery programs and
NP/PA roles is needed to examine patient centered outcomes more clearly and how they are improving the health and lives of individuals.

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Supplementary Figure 1 Caption

**Figure 1**

*OSF HealthCare End-to-End Solution Digital Led Response*

1. Legend:

Source: Certain images in Figure 1 sourced from Flaticon.com (19, 20, 21, 22) and Onlinewebfonts.com (23).
Table 1

Monthly Program Metrics, April 2020 through March 2021

| Monthly Metric                          | Apr. 2020 | May 2020 | Jun. 2020 | Jul. 2020 | Aug. 2020 | Sept. 2020 | Oct. 2020 | Nov. 2020 | Dec. 2020 | Jan. 2021 | Feb. 2021 | Mar. 2021 | Cumulative of All Months |
|----------------------------------------|-----------|----------|-----------|-----------|-----------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-------------------------|
| Hotline Volume                         | 17,370    | 15,448   | 5,347     | 14,495    | 20,384    | 16,319     | 20,607    | 33,869    | 13,625    | 10,637    | 7,335     | 3,868     | 179,304                |
| Covid-19 specific Chatbots Provider (APP/MD) | 4,784     | 3,032    | 1,972     | 3,131     | 3,462     | 3,003      | 5,310     | 10,163    | 4,716     | 3,968     | 2,970     | 1,989     | 45,800             |
| Virtual Visits Total                   | 2,230     | 1,906    | 679       | 2,623     | 3,900     | 4,113      | 5,489     | 3,217     | 5,356     | 5,898     | 2,313     | 898       | 38,622                |
| Cumulative Enrollment                  | 850       | 818      | 238       | 644       | 698       | 648        | 996       | 2,016     | 1,234     | 1,017     | 387       | 193       | 9,739                 |
| PHW Enrollment Only                    | 730       | 664      | 189       | 492       | 460       | 450        | 712       | 1290      | 559       | 344       | 155       | 120       | 6,165                 |
| Enrollment Acute Monitoring at Home Programs | 100       | 114      | 55        | 140       | 214       | 170        | 281       | 658       | 608       | 631       | 216       | 65        | 3,252                 |

| Hospital Utilization                  |           |          |           |           |           |            |           |           |           |           |           |           |                        |
| Admissions                             | 23        | 15       | 12        | 22        | 34        | 51          | 50        | 126       | 80        | 63        | 30        | 22        | 528                    |
| ER Visits                              | 64        | 76       | 35        | 46        | 88        | 84          | 131       | 266       | 215       | 149       | 76        | 45        | 1,275                |

Note. APP = Nurse Practitioner or Physician Assistant; ER= Emergency Room; MD= Physician; PHW= Pandemic Health Worker.
Table 2

*Demographic Characteristics of Participants in Covid-19 Response Programs*

| Characteristics            | Enrolled Participants |
|----------------------------|-----------------------|
| **Gender**                 |                       |
| Men                        | 3615 (37.1)           |
| Women                      | 6124 (62.9)           |
| **Age**                    |                       |
| <18 years                  | 5 (0.05)              |
| 18-24                      | 661 (6.8)             |
| 25-34                      | 1488 (15.3)           |
| 35-44                      | 1669 (17.1)           |
| 45-54                      | 1843 (18.9)           |
| 55-64                      | 1821 (18.7)           |
| 65+                        | 2252 (23.1)           |
| **Race/Ethnicity**         |                       |
| White                      | 7440 (76.4)           |
| Black or African American  | 941 (9.7)             |
| Hispanic or Latino         | 590 (6.1)             |
| Other                      | 155 (1.6)             |
| Asian                      | 107 (1.1)             |
| American Indian or Alaska Native | 18 (0.2) |
| Not Collected              | 488 (5.1)             |

*Note. n = 9,739.*
Highlights

- Human centered care and patient engagement can be achieved with digital platforms
- Nurse practitioners and physician assistants can effectively deliver telehealth
- Innovative digital solutions improve care with appropriate use of clinical expertise