

Brief Communications

Rapid development of telehealth capabilities within pediatric patient portal infrastructure for COVID-19 care: barriers, solutions, results

Pious D. Patel ¹, Jared Cobb,² Deidre Wright,² Robert W. Turer,^{3,4} Tiffany Jordan,² Amber Humphrey,² Adrienne L. Kepner,² Gaye Smith,² and S. Trent Rosenbloom^{1,4}

¹Vanderbilt University School of Medicine, Nashville, Tennessee, USA, ²Vanderbilt University Medical Center, Nashville, Tennessee, USA, ³Department of Emergency Medicine, Vanderbilt University Medical Center, Nashville, Tennessee, USA, and ⁴Department of Biomedical Informatics, Vanderbilt University Medical Center, Nashville, Tennessee, USA

Corresponding Author: Pious D. Patel, BA, Vanderbilt University School of Medicine, 1161 21st Ave S # D3300, Nashville, TN 37232, USA; piou.s.d.patel@vanderbilt.edu.

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ABSTRACT

The COVID-19 national emergency has led to surging care demand and the need for unprecedented telehealth expansion. Rapid telehealth expansion can be especially complex for pediatric patients. From the experience of a large academic medical center, this report describes a pathway for efficiently increasing capacity of remote pediatric enrollment for telehealth while fulfilling privacy, security, and convenience concerns.

The design and implementation of the process took 2 days. Five process requirements were identified: efficient enrollment, remote ability to establish parentage, minimal additional work for application processing, compliance with guidelines for adolescent autonomy, and compliance with institutional privacy and security policies.

Weekly enrollment subsequently increased 10-fold for children (age 0–12 years) and 1.2-fold for adolescents (age 13–17 years). Weekly telehealth visits increased 200-fold for children and 90-fold for adolescents.

The obstacles and solutions presented in this report can provide guidance to health systems for similar challenges during the COVID-19 response and future disasters.

Key words: telehealth, COVID-19, SARS-CoV-2, consumer health informatics, policy, patient portals

INTRODUCTION

The SARS-CoV-2 novel coronavirus (and associated disease, COVID-19) became a World Health Organization-declared global pandemic in March 2020, 3 months after its initial identification in December 2019.^{1–4} On March 13, the United States federal government declared a national emergency and authorized the secretary of the Department of Health and Human Services to temporarily modify or waive certain requirements of the Health Insurance Portability and Accountability Act's (HIPAA) privacy rule and of safety net insurance policies to prepare for surging care demand.⁵ In response, the Office for Civil Rights at Department of Health and Human Services announced it would exercise its enforcement discretion and

“not impose penalties for noncompliance with the regulatory requirements under the HIPAA rules against covered healthcare providers in connection with the good faith provision of telehealth during the COVID-19 nationwide public health emergency.”⁶ Governmental and social guidelines encouraged “social distancing” to reduce viral spread.^{7,8} Similar guidelines, including those outlined in Tennessee Executive Orders 18 and 25, pushed for health systems to reduce nonurgent, in-person healthcare visits and scheduled elective procedures.^{9–11}

To comply with these recommendations, many health systems have rapidly expanded telehealth offerings.^{12–14} Virtual clinic visits can help manage routine clinical care and surging demand in the set-

ting of outpatient clinic closures during medical disasters, as documented during the rapid medical response following Hurricane Maria (Puerto Rico, 2017).¹⁵ During the COVID-19 pandemic, virtual visits can also connect patients to testing resources while honoring self-quarantine requirements.^{12,15–17} While telehealth holds great promise, its rapid expansion has created new challenges that may overwhelm existing infrastructure.¹²

Vanderbilt University Medical Center (VUMC) is a large, private, nonprofit, academic medical center with telehealth capabilities integrated into its patient portal, My Health at Vanderbilt (MHAV). MHAV was first deployed in 2004 to support secure messaging between provider and patient, appointment scheduling, billing management, access to laboratory results, and access to other electronic health record data.^{18,19} VUMC previously implemented direct-to-patient telehealth through MHAV to streamline the patient and provider experience. By integrating telehealth within MHAV, patients benefit from using a familiar application, lowering the barrier for entry into telehealth. Patient portal-based telehealth builds on existing clinical relationships and guides their conversion to a telehealth relationship. In addition, patient portal integration allows clinicians the additional benefit of harnessing existing workflows, which facilitates access to the complete medical record while documenting, scheduling, and communicating with patients.

Like other institutions, VUMC has experienced unprecedented need for telehealth visits during the pandemic. This led to new enrollment and customer support challenges, especially since patient portal activation is required for telehealth participation. Virtual identity verification of new patients using telehealth tools scaled smoothly for adults, but was more complicated for pediatric and adolescent patients. MHAV serves patients of all ages and, prior to the pandemic, had robust policies and procedures in place to support in-person enrollment for children and adolescents.¹⁸ In the existing MHAV policy framework, families with children (0–12 years) and adolescents (13–17 years) had to enroll in-person to verify identity and, in the case of adolescent patients, to ensure patient consent has been given for parental access to the patient's medical record. However, social distancing measures make in-person MHAV enrollment infeasible and create a need for remote enrollment for MHAV to enable telehealth visits.

To facilitate urgent and high-volume remote MHAV enrollment for pediatric patients, we defined 5 process requirements:

1. Efficient patient portal enrollment for new or existing pediatric patients
2. Remote ability to establish patient parentage
3. Minimal additional work for application processing team
4. Compliance with legal and ethical guidelines for adolescent autonomy and assent
5. Compliance with institutional privacy and security policies surrounding protected information collection and patient/parent identity confirmation.

This report describes our experience incorporating these requirements into the design and implementation of a process for rapid expansion of child and adolescent patient enrollment for telehealth visits during the COVID-19 pandemic.

MATERIAL AND METHODS

MHAV was developed at VUMC as a homegrown patient portal system in 2004. In November 2017, MHAV migrated to Epic's MyChart platform (Epic Systems Corporation, Verona, WI). Over-

all, MHAV has more than 550 000 users who have accessed their patient portal in the past 2 years, representing 61% of all clinical encounters seen at VUMC in the 6 months prior to the COVID-19 outbreak. This included 26.8% of all pediatric encounters.

VUMC has policies governing patient portal enrollment for children aged 0–12 years and for adolescents aged 13–17 years. For children, caregivers can create accounts for their child after verifying their identity as parents, guardians, or conservators. For adolescents, both the caregiver and adolescent must mutually agree to joint access to the portal with biological parent, guardian, or conservator (in addition to the identity verification step used for children under 13). This separate process for adolescent patients was instituted at VUMC to safeguard adolescents' right to confidentiality.

HIPAA does not allow parents the right to access a minor's medical record for care episodes where the minor can consent unilaterally according to state law. State laws, in turn, have considerable variance in defining applicable care episodes for the adolescent right to confidentiality, with particular attention to the "sensitive areas" of emergency care, sexual health, substance use, and mental health.²⁰ In Tennessee specifically, minors aged 16–17 are legally allowed to consent to substance use and mental health treatment without parental consent.²¹ In practice, this enrollment process was historically conducted during in-person clinic visits to confirm capacity and consent for personal health information use within the MHAV portal, as well as to confirm identity.

While being mindful of HIPAA restrictions,¹⁴ we developed and implemented a novel process to support remote enrollment. For return patients 0–12 years old who had biological parents, the updated policies allowed enrollment to be performed over the phone because the necessary supporting information was minimal and identification had been confirmed during prior standard clinical intake. For new patients, the lack of existing supporting information and identification confirmation required an alternative process. Further, for patients 13–17 years old, the additional step of confirming adolescent assent required an alternative process (Tables 1 and 2). This process needed to be accessible for patients while respecting information security (eg, e-mail is not considered secure, and secure fax-based approaches are not accessible to most families).

To fill this need, we created 2 electronic forms using the secure REDCap platform (REDCap Consortium, Nashville, TN): 1 for new patients 0–12 years old and 1 for all patients 13–17 years old (see Supplementary Material Table 1 for form components).²² Patients with nonbiological parents, guardians, or conservators required an additional process for legal representatives to submit appropriate paperwork demonstrating guardianship. This need was incorporated into the electronic REDCap forms using an additional link. As such, nonbiological parents, guardians, and conservators were required to use the electronic signup process (Table 2). After families completed the REDCap applications, support staff used two-way video to verify identities through a government-issued ID.

Due to this step not being a clinical encounter, allowable video conferencing applications included Zoom, Apple FaceTime, Facebook Messenger video chat, Google Hangouts video, WhatsApp video chat, or Skype, all of which have been temporarily allowed by the Office for Civil Rights.⁶ Each of these video calling options, however, has varying levels of security/encryption. Of these options, only Apple FaceTime and WhatsApp video chat offer end-to-end encryption of video calls.^{23,24} Others, such as Zoom, may offer end-to-end encryption depending on the specific version used.

With the surging demand of new telehealth visits and, by extension, new MHAV enrollments, the combined burden of application

Table 1. My Health at Vanderbilt (MHAV) patient portal enrollment process, before versus after changes allowing remote enrollment in response to the COVID-19 pandemic

	Before COVID-19	After COVID-19
Return patient age 0–12	MHAV account may be created during clinic visit with biological parent’s consent.	MHAV account may be created by clinic staff via phone call to biological parent.
New patient age 0–12	MHAV account may be created during clinic visit with biological parent’s consent.	Electronic application is sent via REDCap for the biological parent/legal guardian to complete and sign electronically.
Return patient age 13–17	MHAV account may be created during clinic visit with both parent’s AND teen patient’s consent, and a paper-based form completed and signed by both.	Electronic application is sent via REDCap for BOTH parent and teen patient to complete and sign electronically.
New patient age 13–17	MHAV account may be created during clinic visit with both parent’s AND teen patient’s consent, and a paper-based form completed and signed by both.	Electronic application is sent via REDCap for BOTH parent and teen patient to complete and sign electronically.

If electronic REDCap application is received from this process, next steps include:

- HealthIT team organizes video call to confirm identity of parent and patient (if patient is 13–17 years of age).
- After identity confirmation, electronic applications are indexed into the electronic health record and processed by HealthIT team to activate MHAV access.
- After MHAV account is created, telehealth visits are able to be scheduled by clinics.

Table 2. Special considerations with solutions for remote patient portal enrollment process

Special consideration	Solution
If non-biological parent, guardian, or conservator	Electronic application via REDCap must be completed and legal representative must provide relevant paperwork linked from REDCap application.
If teen patient does not have decision-making capacity or speech/language-related inability to fill out form	Parent can unilaterally submit form if provider has officially mentioned the lack of capacity in the chart and the parent cites the name of provider and (if available) date of clinic visit.

processing and video identity confirmation falling under a single HealthIT team proved to be a significant bottleneck. To alleviate this burden, the process was modified to allow clinic staff to verify identity via two-way video for patients 0–12 years when the parent is a biological parent and, therefore, does not require additional paperwork. These new MHAV enrollment processes underwent an expedited, temporary approval by the VUMC Office of Legal Affairs and Privacy Office by citing emergent telehealth needs and were launched on March 16, 2020.

Summary statistics are presented for each age group (0–12 years and 13–17 years). Reported statistics include the weekly rates of new pediatric enrollments and weekly number of telehealth visits before and after the March 16th launch of remote telehealth enrollment.

RESULTS

In response to social distancing guidelines and efforts to reduce in-person routine clinical visits, VUMC put in place novel methods to allow remote patient portal enrollment of pediatric patients through clinic-based phone calls and electronic REDCap forms. Developing the new methods consisted of developing consensus among key institutional stakeholders, building electronic applications, testing the applications, and creating documentation to train others on how to

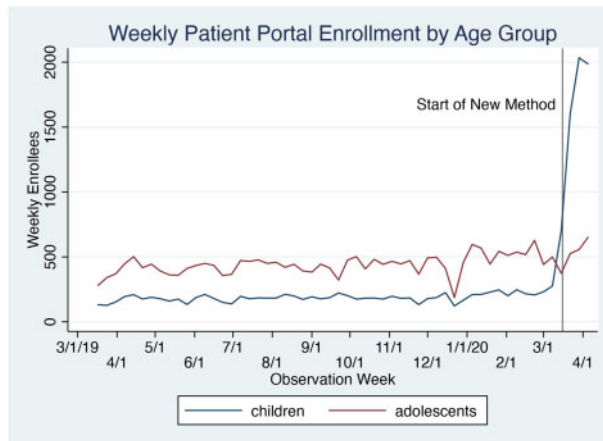


Figure 1. Weekly pediatric patient enrollments for My Health at Vanderbilt patient portal from March 1, 2019 until April 12, 2020. Start of new enrollment method was on March 16, 2020. “Children” were defined as age 0–12 years. “Adolescents” were defined as age 13–17 years.

process applications. We were able to make these changes quickly, and the entire process took 2 days.

In the weeks before the March 16 launch of the new enrollment method, a mean of 152.0 (SD 43.4) patients/week age 0–12 years and 418.5 (SD 82.0) patients/week age 13–17 years were enrolled. After March 16, weekly patient enrollment increased to a mean of 1581.7 (SD 615.8) patients/week for age 0–12 years and 527.0 (SD 115.0) patients/week for age 13–17 years (Figure 1). Before March 16, a mean of 3.9 (SD 3.4) telehealth visits/week for age 0–12 years and 2.5 (SD 1.4) telehealth visits/week for age 13–17 years were performed. After March 16, weekly telehealth visits increased to a mean of 794.5 (SD 564.9) telehealth visits/week for age 0–12 years and 220.3 (SD 145.4) telehealth visits/week for age 13–17 years (Figure 2).

DISCUSSION

The COVID-19 pandemic has generated unprecedented demand for telehealth-based clinical services, which creates new challenges re-

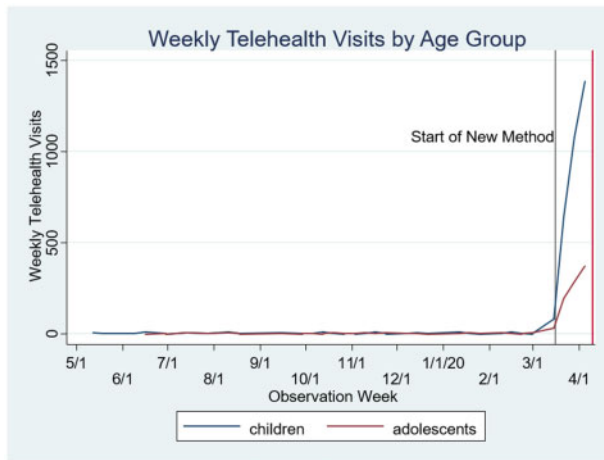


Figure 2. Weekly pediatric patient telehealth visits from May 12, 2019 until April 12, 2020. Start of new enrollment method was on March 16, 2020. “Children” were defined as age 0–12 years. “Adolescents” were defined as age 13–17 years.

lated to patient portal enrollment. These challenges can be especially complex for pediatric and adolescent patients who require identity verification, parentage documentation, and adolescent assent for enrollment. We describe a pathway for rapidly increasing capacity of remote pediatric and adolescent patient portal enrollment that fulfills privacy, security, and convenience concerns.

After launching our remote enrollment method, weekly pediatric patient portal enrollments experienced a roughly 10-fold increase for ages 0–12 years and 1.2-fold increase for ages 13–17 years. Weekly telehealth visits increased by roughly 200-fold for ages 0–12 years and 90-fold for ages 13–17 years.

CONCLUSION

As the healthcare community prepares for future disasters, it will be critical to extract successful strategies from the COVID-19 response. Our experience with the rapid conversion of a patient enrollment process can provide guidance for telehealth surge management in the future. In addition to efficiently enrolling patients, other barriers to rapidly increasing telehealth volume may include reimbursement policies, socioeconomic disparities in patient technology access, staffing shortages, creation of telehealth-enabled clinical workflows, and broadband infrastructure.²⁵ In addition to recent temporary measures by the Centers for Medicare and Medicaid Services that broaden telehealth reimbursements,²⁶ collaborative policies at the federal, state, and organizational level will be necessary to ensure continued funding and development of telehealth capacity.

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AUTHOR CONTRIBUTIONS

All authors contributed to this work in 1 or more of the following ways: design or implementation of presented enrollment process, literature search, study design, data analysis, data interpretation, writing, and critical revision.

SUPPLEMENTARY MATERIAL

Supplementary material is available at *Journal of the American Medical Informatics Association* online.

CONFLICT OF INTEREST STATEMENT

None declared.

REFERENCES

- Zhu N, Zhang D, Wang W, *et al.* A novel coronavirus from patients with pneumonia in China, 2019. *N Engl J Med* 2020; 382 (8): 727–33.
- Wu Z, McGoogan JM. Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in china: summary of a report of 72,314 cases from the Chinese Center for Disease Control and Prevention. *JAMA* 2020; 323 (13): 1239.
- Wu JT, Leung K, Leung GM. Nowcasting and forecasting the potential domestic and international spread of the 2019-nCoV outbreak originating in Wuhan, China: a modelling study. *Lancet* 2020; 395 (10225): 689–97.
- World Health Organization. *Responding to Community Spread of COVID-19: Interim Guidance*. Geneva: World Health Organization; 2020.
- Trump DJ. Proclamation on declaring a national emergency concerning the novel coronavirus disease (COVID-19) outbreak. The White House; 2020. <https://www.whitehouse.gov/presidential-actions/proclamation-declaring-national-emergency-concerning-novel-coronavirus-disease-covid-19-outbreak/>.
- OCR. *Notification of Enforcement Discretion for Telehealth Remote Communications During the COVID-19 Nationwide Public Health Emergency*. Washington, DC: Office for Civil Rights; 2020. <https://www.hhs.gov/hipaa/for-professionals/special-topics/emergency-preparedness/notification-enforcement-discretion-telehealth/index.html> Accessed April 10, 2020.
- Wilder-Smith A, Freedman DO. Isolation, quarantine, social distancing and community containment: pivotal role for old-style public health measures in the novel coronavirus (2019-nCoV) outbreak. *J Travel Med* 2020; 27 (2).
- Thomas RF, Christopher TL. Identifying and interrupting superspreading events—implications for control of severe acute respiratory syndrome coronavirus 2. *Emerg Infect Dis J* 2020; 26 (6). [published Online First: Epub Date].
- Lee B. *Executive Order 18: An Order to Reduce the Spread of Covid-19 by Limiting Nonemergency Health Care Procedures*. Tennessee: Tennessee Governor’s Office; 2020.
- Lee B. *Executive Order 25: An Order to Reduce the Spread of Covid-19 by Limiting Nonemergency Healthcare Procedures*. Tennessee: Tennessee Governor’s Office; 2020.
- CDC. *Interim Guidance for Healthcare Facilities: Preparing for Community Transmission of COVID-19 in the United States*. Bethesda, MD: National Institutes of Health; 2020. <https://www.nih.gov/health-information/coronavirus> Accessed April 10, 2020.
- Hollander JE, Carr BG. Virtually perfect? Telemedicine for COVID-19. *N Engl J Med* 2020; 382 (18): 1679–81.
- Landi H. UPMC among health systems fast-tracking tech, telehealth projects for COVID-19. *FierceHealthc* 2020. <https://www.fiercehealthcare.com/tech/health-system-cios-covid-19-response-we-ve-never-experienced-anything-like> Accessed April 10, 2020.
- HHS. *February 2020 Bulletin: HIPAA Privacy and Novel Coronavirus*. Washington, DC: Office for Civil Rights, US Department of Health and Human Services; 2020.
- Lurie N, Carr BG. The role of telehealth in the medical response to disasters. *JAMA Intern Med* 2018; 178 (6): 745–6.
- Langabeer JR, Gonzalez M, Alqusairi D, *et al.* Telehealth-enabled emergency medical services program reduces ambulance transport to urban emergency departments. *WestJEM* 2016; 17 (6): 713–20.

17. Joshi AU, Randolph FT, Chang AM, *et al.* Impact of emergency department tele-intake on left without being seen and throughput metrics. *Acad Emerg Med* 2020; 27 (2): 139–47.
18. Steitz BD, Wong JIS, Cobb JG, Carlson B, Smith G, Rosenbloom ST. Policies and procedures governing patient portal use at an Academic Medical Center. *JAMIA Open* 2019; 2 (4): 479–88.
19. Osborn CY, Rosenbloom ST, Stenner SP, *et al.* MyHealthAtVanderbilt: policies and procedures governing patient portal functionality. *J Am Med Inform Assoc* 2011; 18(Supplement 1): i18–23.
20. Pathak PR, Chou A. Confidential care for adolescents in the U.S. Health Care System. *J Patient Cent Res Rev* 2019; 6 (1): 46–50.
21. Kerwin ME, Kirby KC, Speziali D, *et al.* What can parents do? A review of state laws regarding decision making for adolescent drug abuse and mental health treatment. *J Child Adolesc Subst Abuse* 2015; 24 (3): 166–76.
22. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap)—a metadata-driven methodology and workflow process for providing translational research informatics support. *J Biomed Inform* 2009; 42 (2): 377–81.
23. Apple. Privacy Features. Secondary Privacy Features; 2020. <https://www.apple.com/privacy/features/> Accessed April 10, 2020.
24. WhatsApp. WhatsApp Security. Secondary WhatsApp Security; 2020. <https://www.whatsapp.com/security/> Accessed April 10, 2020.
25. Lin C-CC, Dievler A, Robbins C, Sripipatana A, Quinn M, Nair S. Telehealth in health centers: key adoption factors, barriers, and opportunities. *Health Aff* 2018; 37 (12): 1967–74.
26. CMS. *Medicare Telemedicine Health Care Provider Fact Sheet*. Woodlawn, MD: Centers for Medicare and Medicaid Services; 2020.