

Virtual Team Rounding: A Cross-Specialty Inpatient Care Staffing Program to Manage COVID-19 Surges

Nora V. Becker, MD, PhD, Salina Bakshi, MD, MPH, Kate L. Martin, PA-C, Amina Bougrine, MD, Jonathan Andrade, MS, PA-C, Paul R. Massey, MD, Jesse P. Hirner, MD, Julie Eccleston, PA-C, Niteesh K. Choudhry, MD, PhD, Kathryn A. Britton, MD, MPH, Adam B. Landman, MD, Adam M. Licurse, MD, MHS, Narath Carlile, MD, MPH, and Mallika L. Mendu, MD, MBA

Abstract

Problem

The SARS-CoV-2 (COVID-19) pandemic presented numerous challenges to inpatient care, including overtaxed inpatient medicine services, surges in patient censuses, disrupted patient care and educational activities for trainees, underused providers in certain specialties, and personal protective equipment shortages and new requirements for physical distancing. In March 2020, as the COVID-19 surge began, an interdisciplinary group of administrators, providers, and trainees at Brigham and Women's Hospital created an inpatient virtual staffing model called the Virtual Team Rounding Program (VTRP).

Approach

The conceptual framework guiding VTRP development was rapid-cycle

innovation. The VTRP was designed iteratively using feedback from residents, physician assistants, attendings, and administrators from March to June 2020. The VTRP trained and deployed a diverse set of providers across specialties as "virtual rounders" to support inpatient teams by joining and participating in rounds via videoconference and completing documentation tasks during and after rounds. The program was rapidly scaled up from March to June 2020.

Outcomes

In a survey of inpatient providers at the end of the pilot phase, 10/10 (100%) respondents reported they were getting either "a lot" or "a little" benefit from the VTRP and did not find the addition

of the virtual rounder burdensome. During the scaling phase, the program grew to support 24 teams. In a survey at the end of the contraction phase, 117/187 (62.6%) inpatient providers who worked with a virtual rounder felt the rounder saved them time. VTRP leadership collaboratively and iteratively developed best practices for challenges encountered during implementation.

Next Steps

Virtual rounding provides a valuable extension of inpatient teams to manage COVID-19 surges. Future work will quantitatively and qualitatively assess the impact of the VTRP on inpatient provider satisfaction and well-being, virtual rounders' experiences, and patient care outcomes.

Problem

The SARS-CoV-2 (COVID-19) pandemic has resulted in a need for inpatient care innovation. In March 2020, as the COVID-19 surge began, an interdisciplinary group of administrators, providers, and trainees at Brigham and Women's Hospital created an inpatient virtual staffing model called the Virtual Team Rounding Program (VTRP).

There were multiple motivating challenges that led to the development of

Please see the end of this article for information about the authors.

Correspondence should be addressed to Nora V. Becker, Division of General Internal Medicine, University of Michigan, 2800 Plymouth Rd., Building 16, Room 430W, Ann Arbor, MI 48109-2800; telephone: (734) 936-5216; email: beckernv@med.umich.edu; Twitter: @NoraBeckerMD.

Acad Med. 2021;96:1717-1721.

First published online June 15, 2021

doi: 10.1097/ACM.0000000000004208

Copyright © 2021 by the Association of American Medical Colleges

the VTRP, some of which are listed here (see List 1 for the corresponding goals of the VTRP). First, certain specialties—for example, hospital medicine and critical care—became high-demand specialties. These inpatient providers faced both additional psychological stress and higher workloads. Second, the surge strained inpatient censuses and posed a risk to the overall quality of patient care. Third, trainees at all levels faced disruption of educational and patient care activities: medical students were pulled from rotations, some residents and fellows were unable to provide direct patient care because of increased health risks, and residents and fellows in many specialties had clinical activities halted entirely. Fourth, as the hospital canceled elective procedures and appointments, many specialists had reduced clinical workloads and sought other ways to provide patient care. Finally, hospitals faced personal protective equipment shortages and challenges in enabling the appropriate physical distancing.

The VTRP is a unique virtual inpatient staffing program developed during the COVID-19 crisis in response to these challenges. The following sections provide background on similar programs, an overview of the key features of the VTRP, its preliminary outcomes, and challenges and future directions.

Approach

This project was determined to be exempt from institutional review board review by the Mass General Brigham Institutional Review Board.

Background on inpatient virtual care models

Before the COVID-19 pandemic, some programs employed virtual staffing (hospitalist or specialty support) to reduce the number of interhospital transfers for complex, high-acuity care,^{1,2} while others trialed virtual scribes in outpatient settings.³ During the pandemic, virtual technology has

List 1

Goals of the Virtual Team Rounding Program, Brigham and Women's Hospital, Created in March 2020

- Support high-demand inpatient teams by saving time and minimizing burnout
- Ensure high-quality patient care during periods of high COVID-19 census
- Ensure trainee participation in patient care and facilitate education
- Redeploy underused clinical staff
- Enable in-hospital physical distancing and conserve personal protective equipment

been employed in numerous contexts, including facilitating inpatient palliative care consultation,⁴ integrating medical students into bedside rounds remotely,⁵ and performing pediatric rounds.⁶ Similar to many of these programs, the VTRP leveraged the use of iPads, Microsoft Teams videoconferencing, and virtual staff. However, to our knowledge, prior and concurrent virtual programs have been limited to within-team or within-specialty support. That is, no other program has trained and deployed cross-specialty providers to provide virtual support for surges in patient censuses.

Programmatic framework

The conceptual framework guiding VTRP development was rapid-cycle innovation, a process of experimentation, feedback, adjustment, and expansion used by health care organizations.⁷ The VTRP was designed iteratively using feedback from residents, physician assistants (PAs), attendings, and administrators from March to June 2020. VTRP leadership (N.V.B., S.B., K.L.M., N.K.C., K.A.B., A.B.L., A.M.L., N.C., M.L.M.) solicited frequent informal feedback and performed frequent check-ins with stakeholders at all phases of implementation. Formal feedback was obtained from inpatient providers and virtual rounders via rapid response surveys.

VTRP overview

The VTRP trained and deployed a diverse set of providers across specialties as “virtual rounders” to support inpatient teams by joining and participating in rounds via videoconference and completing documentation tasks during and after rounds. The program was rapidly scaled up from March to June 2020 to include 24 inpatient teams at its peak.

Technology. The VTRP leveraged videoconference technology, with a virtual rounder at home using a personal computer and a configured iPad for the inpatient team. The iPad could be

stationary during sit-down rounds or secured to a mobile workstation to facilitate walking rounds. The virtual rounder videoconferenced with the team during rounds, listening, participating, and accessing the electronic health record (EHR).

Functions and responsibilities. The virtual rounders' primary tasks included EHR-based documentation, such as drafting progress notes, tracking tasks, and preparing discharge summaries. However, multiple extensions to this set of responsibilities were explored as well.

Training and staffing. Virtual rounders came to the program as a result of a variety of circumstances. For example, all in-person medical student activities had been canceled, so fourth-year medical students were invited to volunteer for the program. Internal medicine residents with high-risk conditions or high-risk family members were given the opportunity to opt-out of face-to-face patient care to reduce their exposure risk and instead assisted the residency in a variety of virtual work, including the VTRP. Other subspecialist PAs, fellows, and faculty whose typical patient care activities had been canceled or severely curtailed were given the opportunity to volunteer for the VTRP, with the support of their home departments (e.g., dermatology, radiology, radiation oncology, cardiac surgery, and orthopedic surgery).

To train the subspecialty providers and medical students, the VTRP housestaff leader (N.V.B.) created a training process using an apprenticeship model. New subspecialty provider and medical student virtual rounders were assigned to apprentice with internal medicine residents serving as virtual rounders and their knowledge of the EHR and internal medicine content was assessed. Their training consisted of learning EHR

configuration and workflows, reviewing inpatient medicine training materials, and observing their trainer. The virtual rounder trainee gradually took on these tasks themselves under the supervision of their trainer. Before transitioning to an independent role, the trainee would serve as the lead rounder for the team, with their trainer observing and providing guidance. After approximately 1–2 weeks of training, the virtual rounder would be deployed to support their own team.

Outcomes

There were 3 phases of program development and implementation for the VTRP from March 26 to June 7, 2020, with separate outcomes for each phase (Figure 1).

Pilot phase

During the pilot phase (March 26–April 6), the program began with 5 pilot teams. Feasibility and acceptability were the primary aims of the program, and to this end, rapid feedback was obtained from inpatient team members and virtual rounders. In a preliminary survey of inpatient providers at the end of the pilot phase (10/21 invited providers responded, response rate: 47.6%), 10/10 (100%) respondents reported that they were getting either “a lot” or “a little” benefit from the VTRP and that they did not find the addition of the virtual rounder burdensome.

A key activity during the pilot phase was garnering support among hospital leadership, medicine residency leadership, medical school leadership, IT support, and subspecialty departments to commit staff and students to the program for weeks at a time. Eight departments (medicine, dermatology, radiology, radiation oncology, orthopedic surgery, cardiac surgery, quality and safety, information systems) and Harvard Medical School lent staff to the effort. In total over the entire period of the program, 39 individuals spent at least 2 weeks each working as rounders: 16 residents, 5 fellows, 6 attendings, 6 PAs, and 6 fourth-year medical students.

Scaling phase

During the scaling phase (April 7–April 27), the program grew rapidly to support 24 teams at peak COVID-19 census, with

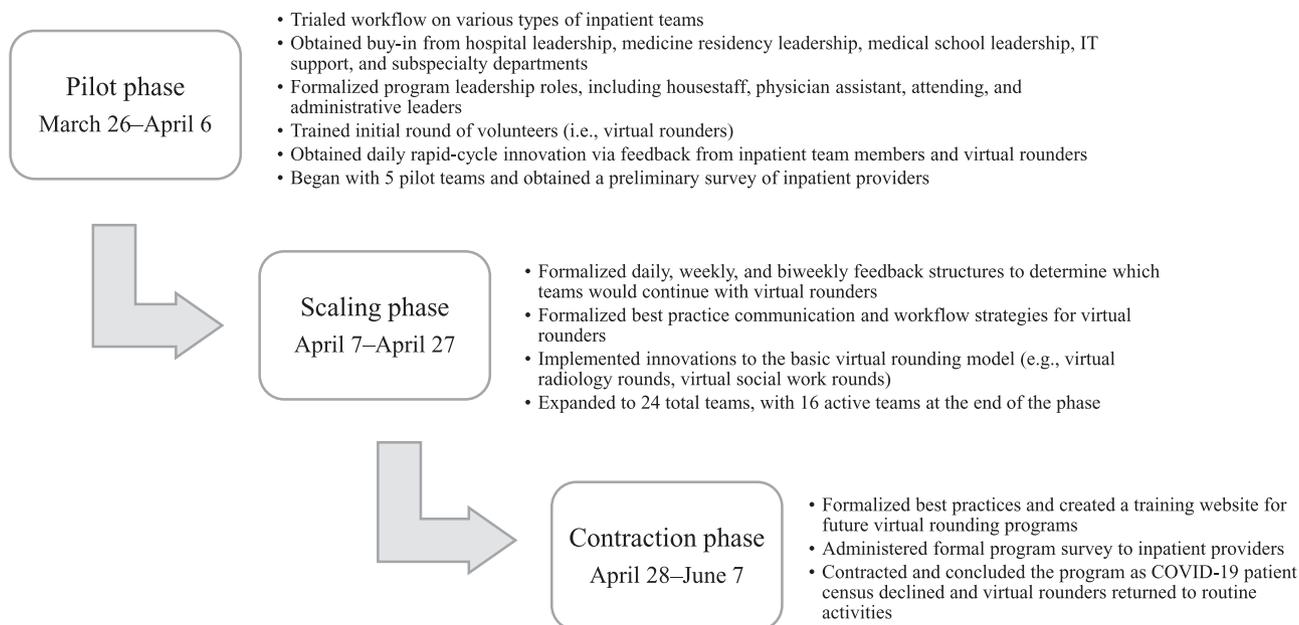


Figure 1 Overview of the development and implementation timeline and outcomes for the Virtual Team Rounding Program across the pilot, scaling, and contraction phases, Brigham and Women's Hospital, March 26 to June 7, 2020. Abbreviation: IT, information technology.

16 active teams at the end of the phase. The number of teams fluctuated week-to-week based primarily on COVID-19 census and rarely disinterest by inpatient providers. The key aim during this phase was expansion to the greatest number of teams possible and conducting frequent feedback with existing teams to ensure they wished to continue with the program. Over the entire period of the program, the types of teams supported with virtual rounders included housestaff floor teams (7), housestaff intensive care unit teams (3), PA floor teams (8), and hospitalist-only floor teams (6).

Additionally, teams incorporated several innovations to the basic virtual rounding model, including virtual radiology rounds (i.e., a radiologist joining the videoconference to review imaging) and virtual social work rounds. Housestaff virtual rounders—all of whom were unable to physically work in the hospital—took on resident-level responsibilities as well, thus continuing their training and education.

Contraction phase

In the contraction phase (April 28–June 7), the VTRP reduced the number of teams as the COVID-19 patient census declined and virtual rounders returned to routine activities, and further evaluation of the program was conducted. The key aim during this phase was determining whether inpatient providers felt the

program saved time, the primary goal of the program. Internal medicine housestaff, internal medicine attendings, and inpatient PAs (777 providers) were surveyed at the end of the contraction phase and 333 responses (response rate: 42.9%) were received. Of the respondents, 187 (56.2%) had worked with a virtual rounder, and of these respondents, 117 (62.6%) indicated that the rounder had saved time, 48 (25.7%) felt the virtual rounder had not saved them time, 16 (8.6%) wrote a free-text response (with most indicating that they sometimes found the rounder helpful), and 6 (3.2%) did not respond. The program is currently conducting a comprehensive mixed-methods study to examine inpatient provider experience with the program.

Qualitative outcomes for virtual rounders were assessed during the contraction phase for the purpose of process improvement through interviews with 5 of the nonhousestaff virtual rounders (A.B., J.A., P.R.M., J.P.H., and J.E.), who discussed their experiences among themselves and with VTRP leadership. As a group, they felt they experienced benefits from participating in the program. These benefits included increased purpose from directly supporting frontline workers; mitigation of the psychological effects of social distancing; reduced risk of exposure; enhanced knowledge in internal medicine; augmented EHR

and videoconferencing proficiency; and improved interpersonal skills such as communication, teamwork, and flexibility. These rounders felt that internal medicine subject matter knowledge did not pose a serious obstacle to their participation and that the skills acquired during their experience prepared them to provide direct care to COVID-19 patients and gave them tools that could be repurposed for telemedicine within their specialties.

Challenges and best practices

VTRP leadership collaboratively and iteratively developed best practices for challenges encountered during implementation for the purpose of process improvement. Challenges were classified into 4 primary domains: administrative, technological, team engagement, and training (Table 1).

Turnover and at times discordant schedules among diverse virtual rounders and inpatient team members made tracking and deploying virtual staff challenging. Virtual rounders entered and exited the program at varied times, while new inpatient teams were formed and discontinued based on fluctuating patient censuses. The VTRP therefore designated housestaff, PA, attending, and administrative leaders (N.V.B., K.L.M., S.B., M.L.M., respectively), who were familiar with inpatient schedules, as scheduling managers for the program.

Table 1

Challenges to and Best Practices of the Virtual Team Rounding Program, Brigham and Women’s Hospital, March–June 2020

Challenges	Best practices
<p>Administrative</p> <ul style="list-style-type: none"> • Frequent staff turnover • Discordant schedules among diverse virtual rounders and inpatient team members 	<ul style="list-style-type: none"> • Identify scheduling managers familiar with inpatient schedules • Check in daily with virtual rounders on team call
<p>Technological</p> <ul style="list-style-type: none"> • Sound quality • Tracking and maintenance of equipment • Ad hoc IT challenges (e.g., trouble charging iPads) 	<ul style="list-style-type: none"> • Implement closed-loop communication on rounds (e.g., pause between patients for team to summarize and for virtual rounder to ask questions) • Include IT leadership team on daily team calls • Assign IT staff to deliver, track, and pick up iPads • Provide on-site IT support during rounds
<p>Team engagement</p> <ul style="list-style-type: none"> • Concerns about virtual rounder skill level given novelty of program • Changes in inpatient workflow 	<ul style="list-style-type: none"> • Standardize introductions and set expectations • Collect iterative feedback and adjust workflow quickly based on feedback • Build relationships between inpatient teams and virtual rounders • Prioritize continuity between inpatient teams and individual virtual rounders (e.g., avoid switching virtual rounders unnecessarily)
<p>Training</p> <ul style="list-style-type: none"> • Rounders’ unfamiliarity with the EHR • Rounders’ unfamiliarity with internal medicine content 	<ul style="list-style-type: none"> • Assess each virtual rounder’s knowledge of the EHR and internal medicine content • Use internal medicine resident virtual rounders to train and supervise non-internal medicine resident rounders in hands-on apprenticeship model

Abbreviations: IT, information technology; EHR, electronic health record.

During a daily team call, the scheduling managers would review the schedule for the upcoming days with the virtual rounders and notify inpatient teams of subsequent changes. They also leveraged preexisting professional relationships to obtain feedback from the inpatient teams.

Technological challenges included variable sound quality, tracking and maintenance of equipment, and ad hoc information technology challenges. To mitigate sound quality issues, the program implemented closed-loop communication strategies, dedicating time after each patient for the team to summarize and for the virtual rounder to ask clarifying questions. Information technology support was responsible for delivering, tracking, and picking up iPads and for providing on-site support during rounds for technical issues. Information technology leadership was included on the daily team calls.

A third challenge involved ensuring engagement from inpatient teams, particularly at the onset of the surge. Given the novelty of the program, some inpatient team members were concerned that the virtual rounders would not have the necessary skills to perform the expected tasks. Implementation required workflow adaptation to incorporate the virtual rounder and iPad into rounds. To maximize engagement, the program emphasized virtual rounders’

flexibility and the need for clear communication and feedback between the rounders and teams. When joining a new team, rounders contacted the team to introduce themselves, outline their duties, and describe their comfort level with EHR documentation and clinical tasks to set expectations and build relationships and trust. VTRP leadership also prioritized continuity whenever possible, avoiding switching virtual rounders unnecessarily. In most instances, workflow concerns dissipated after adoption; however, a few teams discontinued their participation in the VTRP because of disinterest. The scheduling managers for the VTRP instituted weekly check-ins with the nonhousestaff teams and biweekly check-ins with internal medicine leadership to determine which teams would continue with virtual rounders from week to week and to adjust workflows quickly based on feedback.

Ensuring adequate training of rounders was vital. Virtual rounders came from a variety of specialties and had varying familiarity with the EHR format and inpatient medicine content. Before team assignment, each rounder’s background as a provider and comfort level with the EHR were assessed. The apprenticeship training model used (see above) allowed trainees hands-on time as apprentices to ask questions, learn closed-loop communication strategies, and understand

how to efficiently use the EHR. A training toolkit was developed for future virtual rounding programs (virtualrounding.org).

Next Steps

Telehealth integration in inpatient care has taken several forms, including direct virtual inpatient care delivery, on-demand remote coverage of staffing, and virtual specialty consultations.^{1,2,8–10} The technology used and tasks performed by the VTRP were not novel, but they provide numerous opportunities to manage new challenges presented by the COVID-19 pandemic. This innovative program allowed for a solution that met the unique needs of the moment.

As the pandemic continues, many hospitals face a “new normal,” including the possibility of secondary surges. Virtual rounding provides a valuable extension of inpatient clinical teams in this context. It is a powerful tool to maintain a smaller on-site provider presence while maintaining staffing flexibility, allowing for the use of clinical staff who otherwise would have been furloughed and for the rapid expansion of team capacity during surge periods. Finally, virtual rounding has the potential to positively impact provider wellness through alleviating demands on inpatient team members and allowing for the flexibility of working remotely for high-risk team members.

From an educational perspective, the VTRP enabled medical students and residents who could not provide in-person patient care to continue to remain involved as inpatient team members. It also provided valuable training opportunities for non-internal medicine subspecialty trainees and attendings to learn about the care of COVID-19 patients. The VTRP was able to incorporate explicit teaching time into rounds on select teams; future iterations could include virtual rounders preparing didactic teaching sessions for their inpatient teams.

The VTRP's primary goal was to support frontline clinical teams during the initial COVID-19 surge. The program demonstrated that this approach can be rapidly deployed and scaled, with quick adoption by inpatient team members at Brigham and Women's Hospital. Given positive preliminary outcomes, future work will quantitatively and qualitatively assess the impact of the VTRP on inpatient provider satisfaction and well-being, virtual rounders' experiences, and patient care outcomes such as length of stay and patient satisfaction. As hospitals adapt to a new post-COVID-19 reality, quickly and flexibly creating, studying, and improving new virtual inpatient care programs will be an urgent need.

Acknowledgments: The authors would like to acknowledge the hard work and dedication of 39 physician assistants, medical students, housestaff, fellows, and attendings who worked as virtual rounders at Brigham and Women's Hospital (BWH) in Boston, Massachusetts, during the surge of COVID-19 patients in the spring of 2020. They also thank the leadership of BWH for their support of the Virtual Team Rounding Program (VTRP).

Funding/Support: None reported.

Other disclosures: All of the authors worked as virtual rounders, served as members of the leadership team for the VTRP, or both.

Ethical approval: The project was determined to be exempt from institutional review board review by the Mass General Brigham Institutional Review Board.

Data: All data presented in the paper were internally collected by the VTRP.

N.V. Becker is assistant professor, Division of General Internal Medicine, Department of Medicine, University of Michigan, Ann Arbor, Michigan.

S. Bakshi is instructor, Harvard Medical School, and primary care physician and associate medical director for primary care, Brigham and Women's Hospital, Boston, Massachusetts.

K.L. Martin is senior physician assistant, Department of Radiation Oncology, Brigham and Women's Hospital, Harvard Medical School, Boston, Massachusetts; ORCID: <https://orcid.org/0000-0001-5230-221X>.

A. Bougrine is a fellow, Department of Dermatology, Brigham and Women's Hospital, Harvard Medical School, Boston, Massachusetts.

J. Andrade is physician assistant, Department of Orthopedic Surgery, Brigham and Women's Hospital, Harvard Medical School, Boston, Massachusetts.

P.R. Massey is a fellow, Department of Dermatology, Brigham and Women's Hospital, Harvard Medical School, Boston, Massachusetts.

J.P. Hirner is dermatologist, Department of Dermatology, Brigham and Women's Hospital, Harvard Medical School, Boston, Massachusetts.

J. Eccleston is physician assistant, Department of Cardiac Surgery, Brigham and Women's Hospital, Harvard Medical School, Boston, Massachusetts.

N.K. Choudhry is professor, Harvard Medical School, and executive director, Center for Healthcare Delivery Sciences, Brigham and Women's Hospital, Boston, Massachusetts; ORCID: <https://orcid.org/0000-0001-7719-2248>.

K.A. Britton is instructor in medicine, Harvard Medical School, and associate chief medical officer and vice president of medical affairs, Brigham and Women's Hospital, Boston, Massachusetts.

A.B. Landman is associate physician, Department of Emergency Medicine, Brigham and Women's Hospital, and associate professor of emergency medicine, Harvard Medical School, Boston, Massachusetts; ORCID: <https://orcid.org/0000-0002-2166-0521>.

A.M. Licurse is assistant professor, Department of Medicine, Harvard Medical School, Boston, Massachusetts.

N. Carlile is technology, education and clinical health informatics lead, Brigham Educational Institute, director of innovation, Internal Medicine Residency, Brigham and Women's Hospital, and instructor, Harvard Medical School, Boston, Massachusetts; ORCID: <https://orcid.org/0000-0002-6601-6035>.

M.L. Mendu is assistant professor, Renal Division, Department of Medicine, and executive medical director of clinical operations, Brigham and Women's Hospital, Harvard Medical School, Boston, Massachusetts.

References

- 1 Kuperman EF, Linson EL, Klefstad K, Perry E, Glenn K. The virtual hospitalist: A single-site implementation bringing hospitalist coverage to critical access hospitals. *J Hosp Med.* 2018;13:759–763.
- 2 Monkowski D, Rhodes LV, Templer S, et al. A retrospective cohort study to assess the impact of an inpatient infectious disease telemedicine consultation service on hospital and patient outcomes. *Clin Infect Dis.* 2020;70:763–770.
- 3 Benko S, Idarraga AJ, Bohl DD, Hamid KS. Virtual scribe services decrease documentation burden without affecting patient satisfaction: A randomized controlled trial [published online ahead of print August 26, 2020]. *Foot Ankle Spec.* doi:10.1177/1938640020950544.
- 4 Humphreys J, Schoenherr L, Elia G, et al. Rapid implementation of inpatient telepalliative medicine consultations during COVID-19 pandemic. *J Pain Symptom Manage.* 2020;60:e54–e59.
- 5 Hofmann H, Harding C, Youm J, Wiechmann W. Virtual bedside teaching rounds with patients with COVID-19. *Med Educ.* 2020;54:959–960.
- 6 Siwicki B. Health system pieces together 'virtual rounding' to cope with pandemic. *Healthcare IT News.* <https://www.healthcareitnews.com/news/health-system-pieces-together-virtual-rounding-cope-pandemic>. Published April 23, 2020. Accessed May 18, 2021.
- 7 Shrank W. The Center for Medicare and Medicaid Innovation's blueprint for rapid-cycle evaluation of new care and payment models. *Health Aff (Millwood).* 2013;32:807–812.
- 8 Oh CK, Kim KH, Jeong W, Han WK, Rha KH, Ahn B. Research on patient satisfaction of robotic telerounding: A pilot study in a Korean population. *Urology.* 2019;130:205–208.
- 9 Ellison LM, Pinto PA, Kim F, et al. Telerounding and patient satisfaction after surgery. *J Am Coll Surg.* 2004;199:523–530.
- 10 Fefferman NR, Strubel NA, Prithiani C, Chakravarti S, Caprio M, Recht MP. Virtual radiology rounds: Adding value in the digital era. *Pediatr Radiol.* 2016;46:1645–1650.