



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.

Maximizing Efficiency of Telemedicine in the Skilled Nursing Facility during the Coronavirus Disease 2019 Pandemic



Sabrina P. Jen DO^{a,*}, Albert Bui MD^a, Susan D. Leonard MD^b

^a Presbyterian Intercommunity Hospital (PIH) Health Hospital, Whittier, CA, USA

^b Division of Geriatric Medicine, Department of Medicine, University of California Los Angeles (UCLA) Health, Los Angeles, CA, USA

ABSTRACT

Telemedicine has rapidly become a significant component of healthcare during the coronavirus disease 2019 pandemic, and is particularly beneficial in delivering care to vulnerable populations in skilled nursing facilities (SNFs). To limit coronavirus disease 2019 exposure, our team developed a quality improvement (QI) project to identify common telemedicine-related disruptions and their solutions, and created a streamlined protocol to maximize the efficiency of virtual rounding in the SNF. Through 9 Plan-Do-Study-Act cycles, we revised our protocol to decrease the percentage of rounding time spent troubleshooting telemedicine-related problems (“nonclinical care time”) and were able to demonstrate repeatability at three checkpoints. Our QI project offers a framework for SNF providers and staff to deliver telemedicine-driven patient care.

© 2021 AMDA – The Society for Post-Acute and Long-Term Care Medicine.

Keywords: SNF, telemedicine, telehealth, COVID-19

As the coronavirus disease 2019 (COVID-19) spreads worldwide, healthcare systems adopted telemedicine to supplement and, when necessary, replace traditional face-to-face encounters. Consequently, telemedicine usage under COVID-19 increased from 11% percent in 2019 to 46%¹ during the pandemic. In nursing home care, although telemedicine has been used for decades,^{2,3} it has rarely been the gold standard. Rather, care provision has commonly been a combination of telephonic and in-person visits,⁴ and limited partly by Medicare restrictions on payment for telemedicine in nursing homes.⁵ However, the COVID-19 pandemic has brought changes to these reimbursement policies, offering more opportunities to utilize telemedicine. Although telemedicine in nursing homes has been shown to be feasible for older patients, particularly those with moderate to severe disability,⁶ it should not supersede the preference for in-person visits. Unfortunately, the pandemic has disproportionately affected nursing home residents, with a higher number of COVID-19-related deaths compared with the general US population.⁷ Consequently, this has prompted providers to reconsider telehealth as an option to enhance clinical care. In a time when the workforce is strained due to limited resources, streamlining the telemedicine process in nursing homes is vital in providing high quality healthcare to vulnerable populations. Therefore, this quality improvement (QI) project aimed to maximize the efficiency of virtual rounding by identifying common telemedicine-related communication and care barriers, while reducing inefficiencies and nonclinical time spent with patients.

Innovation

Our QI project was conducted at 2 skilled nursing facilities (SNFs) in Los Angeles, California with a total of 413 telemedicine encounters

from April 2020 to January 2021. The patient panel included 66 patients, comprised of 15 (22.7%) long-term custodial and 51 (77.3%) post-acute skilled patients. Both SNFs experienced COVID-19 outbreaks during this study. The project was performed in 2 phases: phase 1 involved identifying disruptions during telemedicine rounds over a 2-week period, performing a traditional Plan-Do-Study-Act (PDSA)⁸ approach to modify our workflow, and assessing if inefficient rounding was reduced with each new adjustment to the rounding process. A summary of the causes of inefficient rounds and their solutions is delineated in [Table 1](#). In phase 2, we used our optimized workflow ([Supplementary Figure 1](#)) and spot-checked telemedicine rounds over the following 9 months, repeating efficiency measures to assess sustainability of best practices.

Implementation

This QI project incorporated 2 teams: the medicine team, which was comprised of 1 geriatrician, 2 resident physicians, and 2 nurse practitioners as well as the SNF team, which consisted of administrative leadership, case managers, nursing staff representatives, licensed vocational nurses, and certified nursing assistants. Telemedicine rounding was coordinated between the medicine team at a remote clinic connected via video conferencing application to the SNF team physically at the nursing facilities.

During phase 1, the medicine team created a cause-and-effect diagram,⁹ also known as the fishbone or Ishikawa diagram, to identify root causes of delays and interruptions in telemedicine rounds (ie, causes of “inefficient” telemedicine rounds). Special attention was paid to the impact of COVID-19 outbreaks that reduced staffing numbers and other resources. This diagram ([Supplementary Figure 2](#)) was presented to the SNF team and their input was incorporated. Effective solutions, described in [Table 1](#), were adopted into our standard practice via the PDSA model.

The “inefficiency” of each virtual rounding session was quantified by the percentage of time spent troubleshooting telemedicine-related

The authors declare no conflicts of interest.

* Address correspondence to Sabrina P. Jen, DO and Albert Bui, MD, 12522 E Lambert Rd, Whittier, CA 90606, USA.

E-mail address: jen.sabrina@gmail.com (S.P. Jen).

Table 1
Summary of the Causes of and Solutions for Inefficient Telemedicine Rounds

Causes of Inefficient Rounds	Solutions
Lack of clear communication between the medical team and SNF staff	<ol style="list-style-type: none"> 1. Rounding time: Agree on a televideo meeting time so that both patient and staff are available. Be mindful of patient shower times, medication passes, therapy sessions, and other potential meeting conflicts. 2. Expectations: Provide a list of expectations (verbal or written) to SNF staff on items needed during rounds. For example, any equipment needed, such as a walker to assess gait, or having the treating nurse prepared with pertinent patient clinical updates were expected during rounds. 3. Staff ratio: Ideally, 2 staff members are needed, one to operate the camera and the other to perform pertinent examinations. For COVID-19 positive cases, only 1 staff is needed to limit exposure and preserve PPE. 4. Noise: Bedside alarms, televisions, and radios should be turned off during visit.
Technology troubleshooting	<ol style="list-style-type: none"> 1. Video device operation: Train and designate specific staff to operate and position the camera during examinations. Familiarity leads to more consistent operation. 2. WiFi: Optimize WiFi bandwidth (see further discussion in Evaluation section). 3. Video device: A laptop or tablet with camera capabilities is required. For examinations that require higher resolution camera, such as a skin or wound examination, devices with a front and back camera lens offers superior picture quality. 4. Video platform: Video platforms must be HIPAA compliant.
Patient, family, and caregivers	<ol style="list-style-type: none"> 1. Language barrier: Have a language translator available during visits. 2. Call family ahead of time and instruct how to join televideo rounds. Family may optimize WiFi connectivity by sitting closer to their router and deactivate other devices in the home to improve bandwidth.
History and physical examinations	<ol style="list-style-type: none"> 1. Televideo vs Telephone: Given staff shortages during the pandemic, televideo should focus on initial introductions and physical examinations. Longer conversations, such as reviewing patient histories or discussing goals of care should be switched over to telephone to allow staff to continue their workflow.

HIPPA, Health Insurance Portability and Accountability Act; PPE, personal protective equipment.

delays (hereinafter known as “nonclinical care time”) in each round-session.

$$\text{Percentage of nonclinical time} = \frac{\text{Time spent troubleshooting}}{\text{Total rounding time}} \times 100\%$$

Evaluation

Supplementary Figure 3A demonstrates the overall decrease in nonclinical care time throughout phase 1’s 9 PDSA cycles, from 40%–50% to 0%, and the repeatability of the protocol’s results in phase 2’s checkpoints. Supplementary Figure 3B details the minutes spent performing clinical care, nonclinical care, and the increase in percentage of clinical care time per rounding session. Of note, we observed an increase in nonclinical care time at checkpoint 2 that was attributed to WiFi connectivity problems. Once corrected, subsequent nonclinical care time encounters improved.

Our QI project identified many telemedicine-related disruptions that led to inefficient virtual rounding in the nursing home, and demonstrated protocols that minimize these barriers to carry out efficient telemedicine visits. The most common causes of delay were SNF staff’s lack of familiarity with the technology, not having the necessary equipment or staff at bedside during rounds, and WiFi connectivity issues. Below is a summary of our recommendations, described in Table 1, for maximizing the efficiency of telehealth rounding.

Recommendations and Checklist for Efficient Telehealth Rounds

- (1) Meet with the nursing home administrative and clinical team to determine feasibility and establish protocols.
- (2) Technology:
 - a. Use a Health Insurance Portability and Accountability Act (HIPAA)-compliant video platform.
 - b. Have information technology department adjust WiFi bandwidth to prioritize to the televideo platform.
 - c. Choose a device with large screen: a device with front and back facing cameras are ideal for skin and wound examinations.
- (3) Coordinate a rounding time with nursing home staff work schedules.

- (4) Designate and educate one staff member to operate the tele-video device who can train other staff members assisting virtual rounds.
- (5) Designate a clinical staff member to perform any necessary physical examination maneuvers.
- (6) Be aware of potential communication barriers such as language, vision, or hearing impairments and coordinate appropriately.
- (7) Prerounding:
 - a. Inform SNF staff in advance which patients will be seen.
 - b. Inform SNF staff of any special accommodations that may be needed during virtual rounds, such as a stethoscope, pulse oximeter, language translator, a walker to evaluate gait, etc.
- (8) Rounding: During televideo rounds, priority should be given towards any urgent clinical matters and performing the physical examinations. For most nonurgent and/or longer discussions, switching to telephone allowed clinicians to continue patient care in a more relaxed and private setting, and spared staff resources to continue their own duties.

Comment

Telemedicine offers clinicians a powerful tool to connect to and care for our patients and their families while mitigating disease spread during the COVID-19 pandemic. In previous studies, telemedicine was used to assess change in condition of SNF patients, thus, reducing unnecessary hospitalization.^{3,4} Our study implemented telemedicine for routine rounding to minimize unnecessary exposures. In addition, with staff shortages and limited resources, it is paramount to have a structured, organized, and streamlined protocol to optimize efficiency.

We recognize that although our project defined efficiency by measuring telemedicine-related disruptions, this was only 1 data point and would not necessarily measure quality or translate to better care. Our revised rounding process relied heavily on cooperation from the nursing facilities and their staff. Given the current minimum requirements for staffing ratios set forth by the Nursing Home Reform Act of 1987, the ability to enact similar protocols in other nursing homes may be challenging. Optimistically, our hope is that the streamlined system will help enhance resources available.

Although imperfect, telemedicine is here to stay, with some studies showing 23%¹⁰ of patients reporting they plan to continue to participate in telemedicine even after the pandemic has passed. In fact, more than one-half of those surveyed with chronic conditions felt telemedicine offered a similar or better experience compared to in-person visits.

In conclusion, our QI project identified common telemedicine-related delays and disruptions that led to SNF rounding inefficiencies, and provided possible solutions to these barriers. When optimized, telemedicine provides a valuable tool in delivering nursing home care during a pandemic crisis.

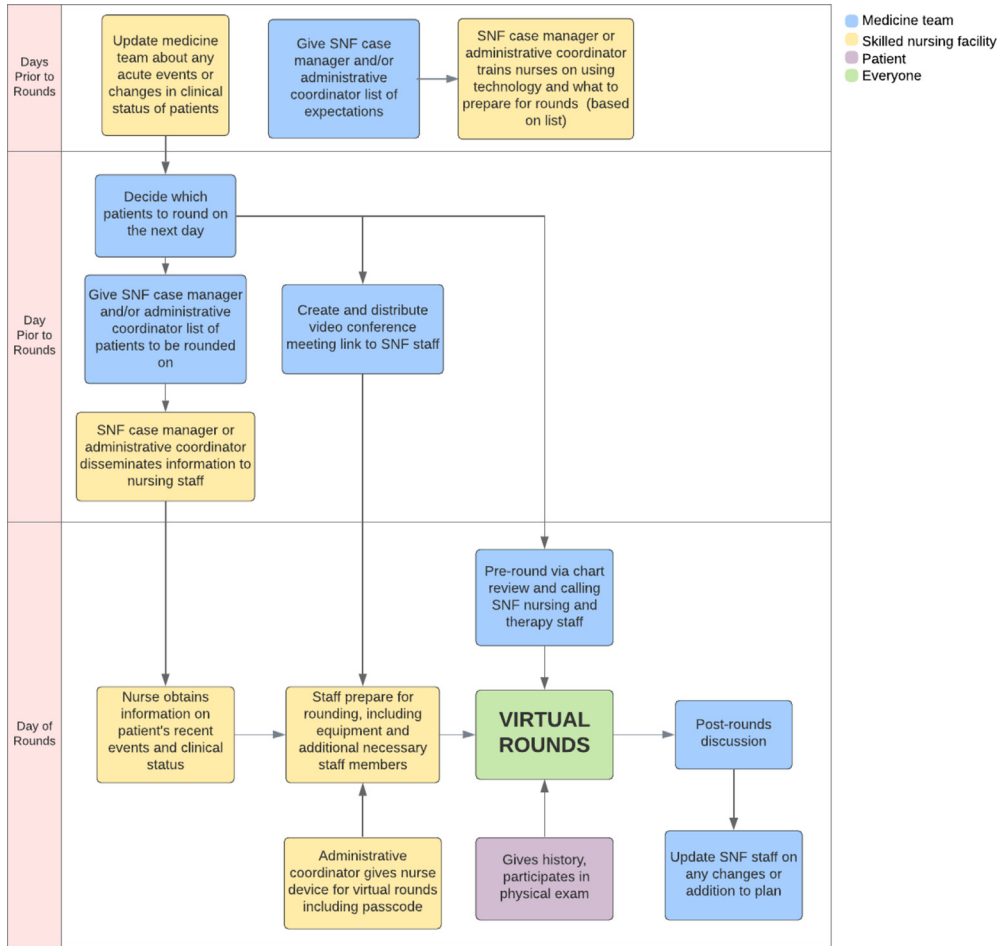
Acknowledgments

We acknowledge Janelle Patriarca, NP-C and Charlene Patriarca, NP-C for their help in collecting the data for this QI project and communicating with the nursing staff at the SNF.

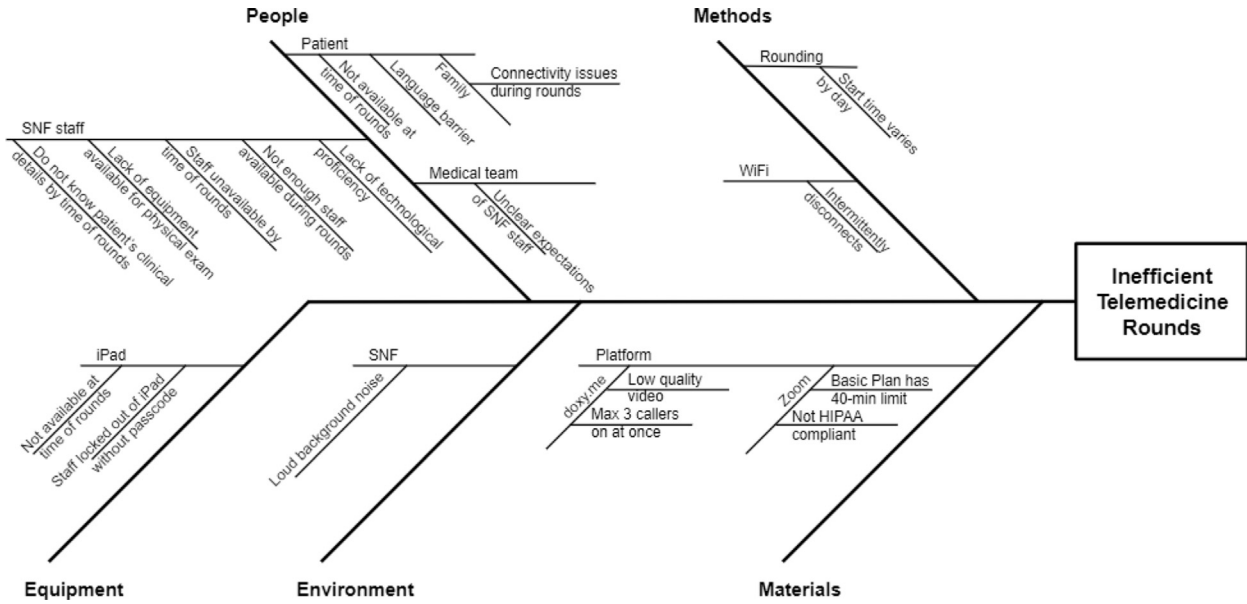
References

1. McKinsey and Company. COVID-19 Consumer Survey. April 27; 2020.
2. Hui E, Woo J, Hjelm M, et al. Telemedicine: A pilot study in nursing home residents. *Gerontology* 2001;47:82–87.
3. Grabowski DC, O'Malley AJ. Use of telemedicine can reduce hospitalizations of nursing home residents and generate savings for Medicare. *Health Aff (Millwood)* 2014;33:244–250.
4. Gillespie SM, Moser AL, Gokula M, et al. Standards for the use of telemedicine for evaluation and management of resident change of condition in the nursing home. *J Am Med Dir Assoc* 2019;20:115–122.
5. Gillespie SM, Handler SM, Bardakh A. Innovation through regulation: COVID-19 and the evolving utility of telemedicine. *J Am Med Dir Assoc* 2020;21:1007–1009.
6. Low JA, Toh HJ, Tan LLC, et al. The nuts and bolts of utilizing telemedicine in nursing homes: The GeriCare@North Experience. *J Am Med Dir Assoc* 2020;21:1073–1078.
7. Chidambaram P. Kaiser Family Foundation issue brief: State reporting of cases and deaths due to COVID-19 in long-term care facilities, 2020, Kaiser Family Foundation. Available at: <https://www.kff.org/coronavirus-covid-19/issue-brief/state-reporting-of-cases-and-deaths-due-to-covid-19-in-long-term-care-facilities>. Accessed April 26, 2020.
8. Plan-Do-Study-Act (PDSA) Worksheet. Institute for Healthcare Improvement. Available at: <http://www.ihf.org/resources/Pages/Tools/PlanDoStudyActWorksheet.aspx>. Accessed April 26, 2020.
9. Cause and Effect Diagram. Institute for Healthcare Improvement. Accessed April 29, 2020. Doximity (Sept 2020). 2020 State of Telemedicine Report; Examining Patient Perspectives and Physician Adoption of Telemedicine Since the COVID-19 Pandemic. [Doximity.com](https://www.doximity.com).
10. Doximity (Sept 2020). 2020 State of Telemedicine Report; Examining Patient Perspectives and Physician Adoption of Telemedicine since the COVID-19 Pandemic. [Doximity.com](https://www.doximity.com).

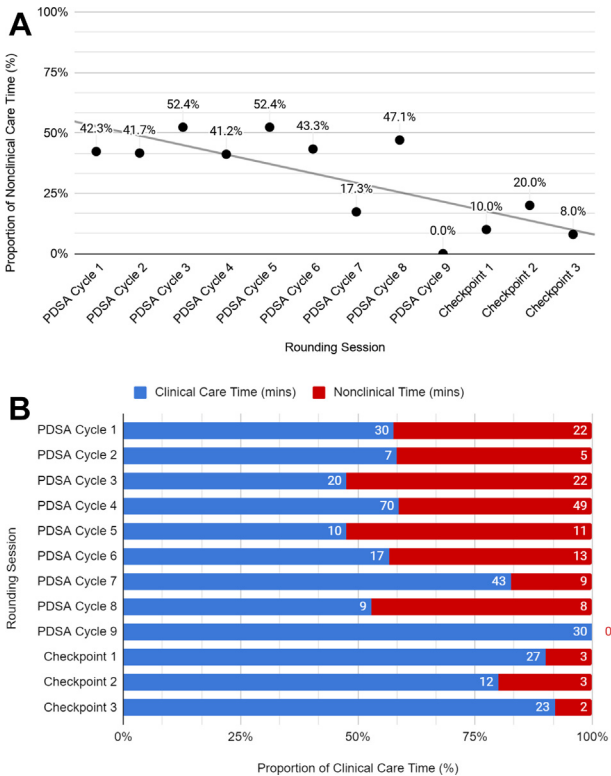
The pragmatic innovation described in this article may need to be modified for use by others; in addition, strong evidence does not yet exist regarding efficacy or effectiveness. Therefore, successful implementation and outcomes cannot be assured. When necessary, administrative and legal review conducted with due diligence may be appropriate before implementing a pragmatic innovation.



Supplementary Fig. 1. Process map of optimized workflow for virtual rounding after phase 1 which was used in phase 2.



Supplementary Fig. 2. Ishikawa fishbone diagram of causes of inefficient telemedicine rounds.



Supplementary Fig. 3. Data of each telemedicine rounding cycle in phase 1 and phase 2. (A) Proportion of nonclinical care time reduced throughout the study, therefore, increasing the percentage of clinical care time as demonstrated in (B).