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Consequences of Rapid Telehealth Expansion in Nursing Homes: Promise and Pitfalls

Kimberly R. Powell[1] Gregory L. Alexander[2]

[1] Sinclair School of Nursing, University of Missouri, Columbia, Missouri, United States
[2] School of Nursing, Columbia University, New York, New York, United States

Address for correspondence Kimberly R. Powell, PhD, RN, Sinclair School of Nursing, University of Missouri, 115 Business Loop 70 West, Columbia, MO 65203, United States (e-mail: powellk@missouri.edu).

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Abstract

Background Expectations regarding use and potential benefits of telehealth (TH) in nursing homes (NHs) are high; however, unplanned and unexpected consequences can occur as a result of major policy and technological changes.

Objectives The goal of this study was to elicit stakeholder perspectives of consequences of rapid TH expansion in NHs.

Methods Using a qualitative descriptive design, we drew a sample based on findings from a national study examining trends in NH information and technology (IT) maturity, including TH use. We used maximum variation sampling to purposively select participants who (1) participated in our IT maturity survey for two consecutive years, (2) completed year 1 of the IT maturity survey prior to TH expansion (before March 6, 2020) and year 2 after TH expansion (after March 6, 2020), (3) represented a broad range of facility characteristics, and (4) were identified as an end user of TH or responsible for TH implementation. Using six questions from the IT maturity survey, we created a total TH score for each facility and selected participants representing a range of scores.

Results Interviews were conducted with ($n = 21$) NH administrators and clinicians from 16 facilities. We found similarities and differences in perceptions of TH expansion according to facility TH score, NH location, and participant role. Desirable consequences included four subthemes as follows: (1) benefits of avoiding travel for the NH resident, (2) TH saving organizational resources, (3) improved access to care, and (4) enhanced communication. Undesirable consequences include the following five subthemes: (1) preference for in-person encounters, (2) worsening social isolation, (3) difficulty for residents with cognitive impairment, (4) workflow and tech usability challenges, and (5) increased burden on NH staff/infrastructure. Participants from rural NHs perceived lack of training, poor video/sound quality, and internet/connectivity issues to be potential pitfalls.

Conclusion Clinicians and NH administrators should consider leveraging the desirable consequences of rapid TH expansion and implement mitigation strategies to address the undesirable/unanticipated consequences.

Keywords
- nursing home
- telehealth
- telemedicine
- technology
- qualitative methods

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Background and Significance

The novel coronavirus disease 2019 (COVID-19) pandemic has thrust telehealth (TH), the provision of health care resources, tools, and consultation via mobile digital technologies,[1] from a convenience to an imperative. The global effort to "flatten the curve," that is, to slow the spread of the virus and reduce stress on health care systems, promoted a historic move toward the authorization and expansion of TH services. The unprecedented and widespread shift to TH was made possible, in part, by modifying the Centers for Medicare and Medicaid Services (CMS) rules and regulations that expanded Medicare recipients' access to a broad range of TH services regardless of where they live.[2] Under the CARES act, the U.S. Department of Health and Human Services has distributed over $30 billion to provide financial relief to providers during the COVID-19 pandemic of which $5 billion was allocated to skilled nursing facilities.[3] Further, regulations were relaxed allowing Health Insurance Portability and Accountability Act of 1996 (HIPAA) covering providers to use telecommunication platforms and applications that are not fully HIPAA compliant—such as FaceTime, Zoom, and Skype—to provide TH services.[4] The extent to which TH will remain an integral part of health care depends largely on whether the legislative, regulatory, and payer changes that were temporarily put in place during the COVID-19 public health emergency declaration become permanent.

TH services are thought to be a critical access point to health care for vulnerable populations, including chronically ill nursing home (NH) residents.[5] A growing body of evidence suggests increased uptake and positive resident outcomes are associated with TH. For example, Grabowski and O'Mally[6] reported that among NHs engaged in after-hour telemedicine coverage, the monthly hospitalization rate declined by 8.4% relative to less-engaged NHs, representing an average savings of $151,000 per facility. Additional benefits of TH could include improved population health management, reduced wait times for specialty services, less time planning and expense for transportation services, reduced emergency department visits, and fewer clinical errors.[7] Before the COVID-19 pandemic, frequently reported barriers to using TH were related to cost and reimbursement, followed by technical issues such as suboptimal equipment and having incompatible documentation platforms including electronic health record systems.[8] It is unclear whether these barriers persist in lieu of the recent authorization and expansion of TH services.

TH uptake in NHs has increased rapidly following relaxation of regulations and expanded access to TH services under the CMS 1135 waiver authority and Coronavirus Preparedness and Response Supplemental Appropriations Act.[2] In a recent analysis, Alexander and colleagues[9] found, in post-TH expansion, NHs were 11.24 times more likely to use TH for resident evaluation compared with preexpansion rates. Similarly, Moore and colleagues reported a significant increase in telemedicine encounters from baseline <1 up to 29.2% during the initial COVID-19 peak.[10] User acceptability of TH services is also on the rise. Findings from a systematic review demonstrate evidence of feasibility (i.e., installation of equipment and use for routine visits) and stakeholder satisfaction for using TH to provide care for NH residents.[11] A May 2020 survey of the Medicare Advantage beneficiaries found that 91% of those who had used telemedicine had a good experience and that 78% would use it again.[12] While expectations regarding use and potential benefits of TH in NHs are high, experience shows unplanned and unexpected consequences have resulted from major policy and technological changes.[13]

The concept of "unintended consequences" refers to a set of outcomes resulting from the introduction of an innovation within an organization or a social system.[13] These consequences can be desirable, undesirable, anticipated, or unanticipated. In any case, they are not planned by the stakeholders when the implementation decision is made. The effects can be directly attributable to technology, or indirectly linked via a chain of events that causes such effects. Potential unintended consequences brought about by the accelerated expansion of technology are not novel, yet they can jeopardize successful implementation and sustainability. Researchers have identified and categorized unintended consequences that resulted from technologies including computerized provider order entry systems,[14,15] clinical decision support systems,[16,17] and barcode medication administration technology.[18] In regard to TH, previous research has identified unintended consequences including emergence of new service corridors that disturb existing ones, the need for frequent adjustments during the initial phases of implementation, and restrictive legislative and regulatory policies that fail to account for changes brought about by TH.[19] The dramatic changes in TH regulations and use, in response to the COVID-19 pandemic, have created an urgent need to reevaluate unintended consequences of rapid TH expansion in NHs.

Objective

The goal of this study was to elicit stakeholder (i.e., end user or person responsible for TH implementation at the NH) perspectives of the consequences of rapid TH expansion in NHs. Our research questions were as follows: (1) what are some anticipated and unanticipated consequences NHs have experienced as the result of rapid TH expansion; (2) are there differences in perceived consequences according to the total TH score of the NH?; and (3) What barriers exist (undesirable consequences) to maximizing TH use in NHs?

Methods

Using a qualitative, descriptive design, we drew a sample based on findings from an analysis of TH expansion in a national study examining trends in NH information technology (IT) maturity.[9] IT maturity is defined as a measure of growth of health IT capabilities, use, and integration in resident care, clinical support, and administrative activities over time. We used maximum variation sampling to purposively select participants who (1) were affiliated with an NH

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who participated in our IT maturity survey for two consecutive years, (2) completed year 1 of the IT maturity survey prior to TH expansion (before March 6, 2020) and year 2 after TH expansion (after March 6, 2020), and (3) represented a broad range of facility characteristics (e.g., location and bed size). Using six questions from the IT maturity survey, we created a total TH score for each facility. These six questions measure extent of use of TH applications, including those used to facilitate medical screenings, conduct follow-up visits and consultations, and perform medication management activities virtually. Survey respondents were asked to rate these items according to their TH extent of use using an 8-point scale ranging from 0 (not available) to 7 (extensively used). The sum of these six questions represents the NHs total TH score with a minimum score of 0 and maximum of 42. We first identified NHs with change in TH score from year 1 to year 2 in the bottom 20% (low TH score), middle 60% (middle TH score), and upper 20% (high TH score). Next, we contacted the NH administrator from those facilities and asked for the person responsible for TH implementation at the NH. We invited that person to participant in an interview and then used a snowball approach to identify other "end users" of TH. Administrators identified these end users as clinicians (physicians and/or nurses), therefore we invited those individuals to participate in the study.

An interview guide was used to ensure consistency among participants and all interviews were conducted using Zoom video conferencing. Each interview was transcribed verbatim by members of the research team with prior transcription experience. A second reviewer verified the transcripts with the audio recording to ensure accuracy. Data were analyzed using directed content analysis. The coding process began by highlighting exact words from the text that appeared to capture key thoughts or concepts. The preliminary codebook was iteratively refined as additional transcripts were analyzed. Preliminary codes were sorted into a priori categories based on the type of consequence. First, we grouped codes as desirable and undesirable and then further delineated each category into anticipated and unanticipated. Categories were eventually grouped according to subtheme resulting in the hierarchical structure of themes, subthemes, and categories. We began data analysis after the first six interviews to estimate saturation as described by Guest et al.[20] We continued the iterative process of data collection and analysis until the new information threshold reached zero (i.e., until no new information was collected from additional interviews).[20] Once the new information threshold reached zero, we recruited three additional NHs to ensure saturation was achieved. Dedoose qualitative software was used to help organize and visualize data. Proportional values (percentages) were calculated for each code according to TH score group, location of the NH, and role of the participant (clinician or NH administrator) by dividing the number codes by the number of participants. Using a normalization procedure, we calculated proportional values adjusting for the number of members in each group allowing for comparison of data from groups of different sizes.

Processes to ensure trustworthiness were maintained by ensuring credibility, dependability, confirmability, and transferability. To ensure credibility and dependability, interviews were audio recorded and transcribed verbatim for analysis. The transcripts were then compared with the audio files to ensure fidelity to the spoken words. All data were deidentified and clinician and administrator data were analyzed separately. Confirmability was strengthened by having two researchers independently code excerpts to ensure intercoder reliability. Transferability was addressed by purposely recruiting a broad a range of participants with respect to NH characteristics and THS score. This study was approved by the University of Missouri institutional review board project number 2009109.

Results

Semistructured interviews were completed with 21 participants representing 16 unique NHs. Participant demographics are presented in ►Table 1. Over the course of the analysis, 30 open codes were developed. These were combined into the following four broad themes: (1) desirable/anticipated consequences, (2) desirable/unanticipated consequences, (3) undesirable/anticipated consequences, and undesirable/unanticipated consequences. ►Fig. 1 shows the four themes and nine subthemes organized into a conceptual model. We found similarities and differences in perceptions regarding consequences of rapid TH expansion by participants according to their TH score, location of the NH, and role (clinician or administrator). In this section, we describe those perceptions

Table 1 Participant demographics ($n = 21$)

Participant title	*n* (%)
Administrator	15 (71.4)
Clinician (nurse or physician)	6 (28.6)
Number of years in current position	
Range (median)	1.5–24 years (3.5)
NH facility characteristics	
Change in telehealth score Years 1–2 (TH score group)	
Low	5 (23.8)
Middle	10 (47.6)
High	6 (28.6)
Bed size	
Small (<60)	4 (19.0)
Medium (60–120)	10 (47.7)
Large (>120)	7 (33.3)
Location	
Metro	12 (57.1)
Rural	9 (42.9)

Abbreviations: NH, nursing home; TH, telehealth.

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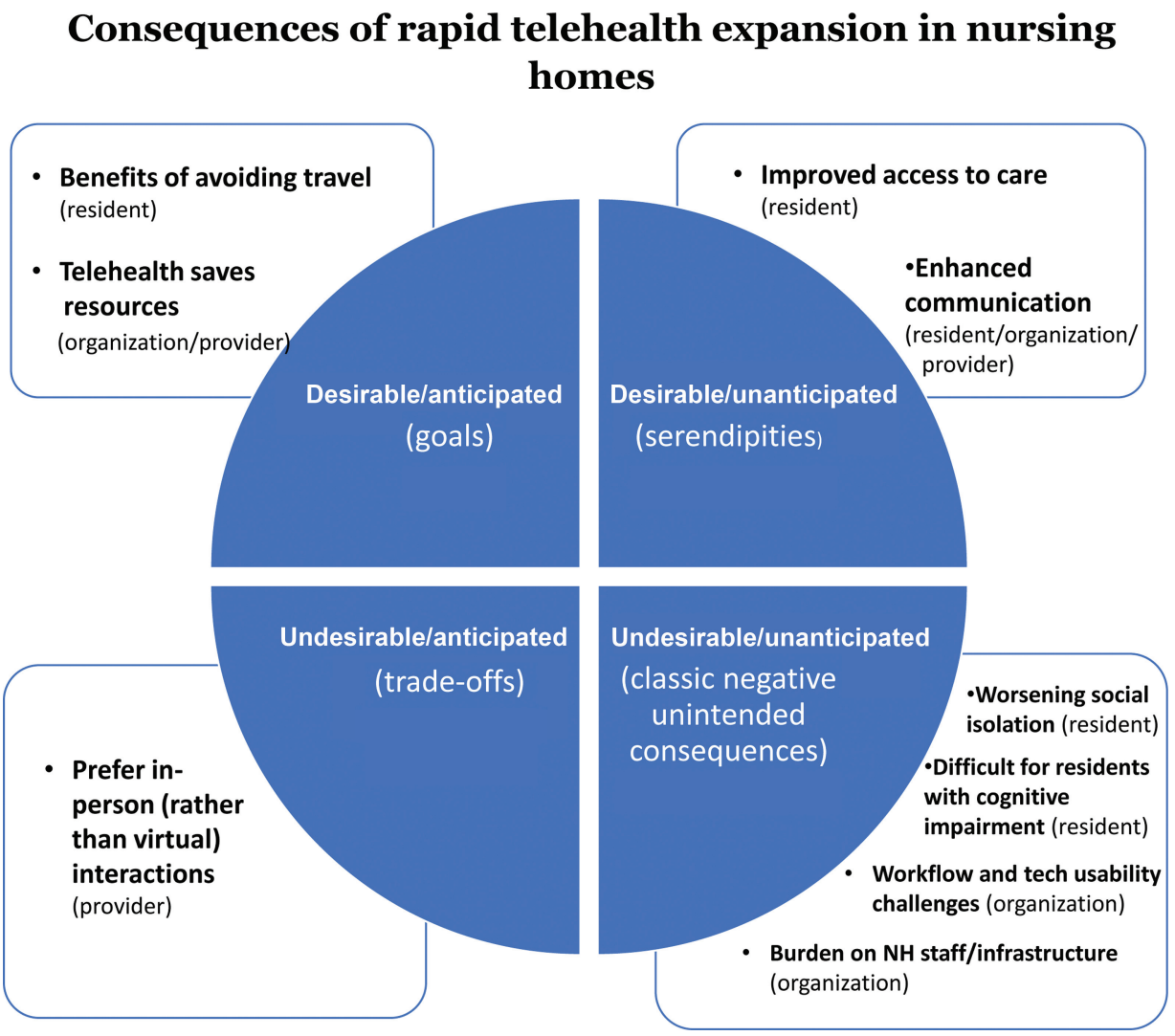

Fig. 1 Conceptual model of consequences of rapid telehealth expansion in nursing homes.

and provide examples. A summary of themes, subthemes, categories, illustrative quotes, and frequencies can be found in ►Table 2.

Desirable/Anticipated

The desirable/anticipated theme consists of two subthemes, benefits of avoiding travel for the NH resident and saving organizational resources. The first subtheme, benefits of avoiding travel for the NH resident, contains four categories: avoiding physical stress, avoiding exposure to infection, avoiding missing therapy/meds/meals, and NH residents being more comfortable with NH staff. Avoiding physical stress associated with leaving the NH and avoiding exposure to infection were the top categories among participants with high TH scores (35.7 and 43%, respectively). The second subtheme, saving organization resources, contains three categories: not having to send staff out of the NH to accompany residents to appointments, avoiding challenges associated with arranging resident transportation, and saving provider time. The benefit of not sending staff out was perceived to be highest (61.8%) among the middle TH score group. One NH administrator stated:

> "In some cases, it's enhanced the workflow because we're not having to pull a staff member from the floor to accompany a resident on a visit. That's been a plus."

Desirable/Unanticipated

The theme, desirable/unanticipated consequences include two subthemes, improved access to care and enhanced communication.

Improved access to care includes two categories, greater access to providers and opportunity for timely intervention. All three TH score groups, as well as clinicians (62.5%), perceived having the opportunity for timely intervention as one of their most desirable/unanticipated consequence. One NH administrator from a facility located in a rural area and in the low THS group stated:

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Table 2 Summary of themes, subthemes, categories, illustrative quotes, and proportional values

Main theme	Subtheme	Category	Exemplar	Total TH score group			Location		Role	
				Low ($n=5$)	Middle ($n=10$)	High ($n=6$)	Metro ($n=12$)	Rural ($n=9$)	Clinician ($n=6$)	Administrator ($n=15$)
Desirable/ anticipated	Benefit of avoiding travel for the NH resident	Avoid physical stress associated with leaving NH	"It's COVID-19 and it's winter time. And quite frankly, they're just old. It's just a hassle to have to leave and come back and it's stressful" (C.S., clinician)	20.0	44.3	35.7	52.9	47.1	38.5	61.5
		Avoid exposure to infection	"Less exposure to the world and COVID-19 right now. The less I have to send them out to get it into the general public, the greater possibility I have of keeping them safe." (C.M., clinician)	15.1	41.9	43.0	52.9	47.1	51.7	48.3
		Avoid missing appointments/therapy/meds/meals	"I absolutely see the advantage because anytime the resident has to leave the building, you know, a number of things can happen, you know, delay in medication, they might miss a meal." (T.I., administrator)	44.5	45.5	10.0	33.3	66.7	13.8	86.2
		Residents more comfortable with NH staff	"I think it's probably a comfort thing too. You know they're with our nursing staff 24/7. So that's who they know and I think they probably find comfort in having the nurses there with them." (C.S., administrator)	37.5	52.0	10.5	42.9	57.1	13.8	86.2
	TH saves organizational resources	Not sending staff out	"In some respects, then it helps us with staffing because we always send somebody, an employee with them when they go out and we don't have to do that. So that helps us from a staffing standpoint." (L.B., administrator)	22.3	61.8	15.9	50	50	50	50
		Avoiding transportation	"The biggest advantage is our transportation costs have significantly decreased because we're not, you know, paying so much for transportation. That has been the big one." (K.R., administrator)	24.4	40.7	34.9	51.2	48.8	18.5	81.5
		Saves provider time	"[Telehealth] should be more efficient in the long run. Right now, we have a lot of windshield time from going from home to home. Homes want my presence, every day, well, I can be there in person some days and virtually the others, you get a blend of both worlds." (C.C., clinician)	21.5	47.8	30.7	11.1	88.9	86.2	13.8
Desirable/ unanticipated	Improved access to care	Greater access to providers	"With mental health, it's meant more timely appointments, it's been more responsive. Prior, we'd have quarterly appointments and this way if she has a few minutes we can squeeze in an evaluation as needed." (K.K., administrator)	9.8	27.2	63.0	33.3	66.7	68.6	31.4
		Opportunity for timely intervention	"If there's a change of condition I think it's great because you've got a little more access quickly to the physician than you do have to wait for an appointment or waiting for someone to come to the phone, or whatever. I think it is better." (M.H., administrator)	36.7	30.5	32.8	33.3	66.7	62.5	37.5
	Enhanced communication	Improved communication with resident/family	"The daughter wanted to be present for the neurology visit and it worked well because she was able to talk to the doctor, able to ask the doctor direct questions about the mother and the visit went very well. So it could be the daughter, the nurse, the neurologist all on the call on a session." (A.D., clinician)	20.0	60.0	20.0	11.1	88.9	45.5	54.5

(*Continued*)

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Table 2 (*Continued*)

Main theme	Subtheme	Category	Exemplar	Total TH score group			Location		Role	
				Low ($n=5$)	Middle ($n=10$)	High ($n=6$)	Metro ($n=12$)	Rural ($n=9$)	Clinician ($n=6$)	Administrator ($n=15$)
		Improved communication with NH staff/provider	"One of the nice things is that they're able to have the conversation at their level with the physician or the nurse practitioner, as opposed to getting the information that is maybe written from the physician visit or having the daughter tell them "oh and also I asked them about this or that'. So absolutely that sharing of clinical information at a higher level is much clearer and cleaner telehealth wise." (S.S., administrator)	10.0	26.8	63.2	17.0	83.0	58.1	41.9
Undesirable/ anticipated	Prefer in-person	Difficult to build relationships via TH	"The million dollar question is, can I maintain the compassionate relationship with the patient? Something about being there, touching the patient's arm, glove on with PPE. And how receptive the patient is going to be seeing a doctor online." (D.C., clinician)	31.4	34.9	33.7	27.3	72.7	66.7	33.3
		Can't hear/see as well with TH	"We can do telehealth's all day long. And you can see that, but they still don't get to see the patient as a whole, right there on the spot. Visual is always better. You can only do so much visually through a television screen, you know, or a telehealth screen." (A.D., clinician)	44.3	42.2	13.5	18.1	81.9	35.7	64.3
		Reluctant clinicians	"We wanted more [telehealth] but we could not get a lot of buy-in from some of the physicians." (A.L., administrator)	36.8	23.8	39.4	56.8	43.2	35.7	64.3
		Lacking "the human touch"	"It's not like the human touch, nothing will replace that." (J.B., administrator)	28.6	35.7	35.7	47.8	52.2	38.5	61.5
Undesirable/ unanticipated	Worsening social isolation		"I also think right now it's nice for the residents to get out, you know it's one of the only reasons they do leave usually. Not very many people even go to out to family, usually family comes to them, so you know I think for someone's social wellbeing and mental wellbeing, it's good to get out a little bit, get some fresh air and get a change of scenery." (J.P., administrator)	63.7	10.3	26.0	27.3	72.7	13.8	86.2
	Difficulty for residents with cognitive impairment		"Honestly, that's really the biggest barrier is their comfort level, and especially if you have someone with dementia. You know, it can be extremely disconcerting, you know that someone is actually talking to them from the TV." (K.K., administrator)	49.2	27.3	23.5	62.3	37.7	36.6	63.4
	Workflow and tech usability challenges	Lack of available and integrated data	"For a lot of doctors, they have to end up charting in two systems, so we're charting in the hospital, health systems EHR and accessing the nursing home's EHR. I have to literally go into the EHR of the nursing home, pull up all the data and literally move it over myself, the vital signs, I look and see what nursing said." (C.C., clinician)	10.0	60.0	30.0	42.9	57.1	83.3	16.7
		Lack of TH training	"I haven't really seen that many telehealth training courses, or how do you do the best interview. We've been thinking about that, who should we pull in to teach us?" (D.C., clinician)	46.2	42.8	11.0	17.6	82.4	66.7	33.3
		Difficulty to schedule/document TH appointments	"Now they'll call and say, 'Hey, can I do this in 30 minutes? Hey, can somebody do this right now'? If they're looking at something and they want to see somebody, they're just like, 'Oh,	20.0	60.0	20.0	55.6	44.4	58.1	41.9

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Table 2 (*Continued*)

Main theme	Subtheme	Category	Exemplar	Total TH score group			Location		Role	
				Low ($n=5$)	Middle ($n=10$)	High ($n=6$)	Metro ($n=12$)	Rural ($n=9$)	Clinician ($n=6$)	Administrator ($n=15$)
			well, I can do that right now'. Well, they can, but it just means our nurses are like, oh, I might be already in the middle of doing one or hey, can you call back in a little bit to do this, so trying to reorganize structured scheduling has been a little bit more complicated." (L.B., administrator)							
		Internet/connectivity challenges	One of the main challenges, obviously, connectivity because of where we're located. We're in the middle of a very rural area and cell phone service isn't the greatest. (R.W., administrator)	45.3	35.3	19.4	39.6	60.4	38.5	61.5
		Different software/applications	It seems like different practices all have different platforms. (K.R., clinician)	19.5	59.6	20.9	69.2	30.8	36.6	63.4
	Burden on NH staff/infrastructure	Burden on NH staff	I haven't like added staff. I've just added to what the staff have to do. (M.C., administrator)	33.2	40.5	26.3	59.2	40.8	46.2	53.8
		Financial barriers	"Some of the nursing homes are not equipped to handle the high tech. They would have to invest a lot of money to get the program running and get it set up because the wiring in some of the buildings, even in this state, they came over with Noah's ark, so you know, there's a lot of expense." (M.H., administrator)	32.5	39.7	27.8	42.9	57.1	63.4	36.6

Abbreviations: NH, nursing home; TH, telehealth.
Note: TH group, location, and role each add up to 100%; all numbers are expressed as a percentage.

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"[Telehealth] has been a wonderful tool because we're actually able to get more timely appointments with the mental health provider then if she would have to come on-site."

The subtheme of enhanced communication includes two categories as follows: (1) improved communication between the NH staff and resident/family, and (2) improved communication between the NH staff and providers. Improved communication between NH staff and providers was the top category according to participants in the top TH score group (63.2%) and from NHs located in rural areas (83%). One clinician from the high TH score group stated:

"Nurses in the facilities are alone and they feel alone and they got someone who's sick and you know, holy mackerel. I don't want to be responsible for this sick person. Right? And now with this [telehealth], you're not alone. You've got a partner in crime, you've got someone that you're working with and that you connect with."

Undesirable/Anticipated

The undesirable/anticipated theme consists of one subtheme, preference for in-person encounters, and four categories: difficult to build relationships via TH, cannot see/hear as well with TH, reluctant clinicians, and lacking the "human touch." Participants from the low (44.3%) and middle TH score groups (42.2%) and those located in rural areas (81.9%) had more concerns about being able to see/hear using TH technology compared with those in the high TH score group (13.5%). One administrator from the low TH score group stated:

"I'm not quite sure how good they can see on their end with our technology. So that's always just a question of mine."

On the other hand, participants from the high TH score group (39.4%) and administrators (64.3%) had more concerns regarding reluctancy of the clinicians using TH. They described hesitancy of both providers (e.g., physicians and advanced practices registered nurses) and NH staff (e.g., nurses). One clinician stated:

"We did have some, I hate to classify this but, kind of old school nurses that were kind of like, nobody's seen them [nursing home resident], so I need to send them to the emergency room and I don't trust the telehealth and the nurse practitioner."

Undesirable/Unanticipated

The last theme, that is, undesirable/unanticipated consequences, describes perceptions of negative unintended consequences of rapid TH expansion in NHs. This theme contains four subthemes: worsening social isolation, difficulty for residents with cognitive impairment, workflow and tech usability challenges, and increased burden on NH staff/infrastructure. The subtheme worsening social isolation refers to comments made by participants that having TH visits rather than leaving the NH exacerbates the NH resident's social isolation. This was the top category for the low TH group (63.7%), rural NHs (72.7%), and among administrators (86.2%). For example, one administrator stated:

"We have some people where a trip out to the doctor is kind of their outing. It's their social thing, so they kind of look forward to it."

Difficulty for residents with cognitive impairment was another unintended consequence identified by participants in this study. One participant said:

"I think the advantages are certainly resident specific. A lot of our residents have cognitive impairments and they are afraid of telehealth. They don't understand why my doctors in that box."

The subtheme workflow and tech usability challenges includes five categories: lack of available and integrated data, lack of TH training, difficulty scheduling and documenting TH appointments, internet/connectivity challenges, and different software/applications. These workflow/usability challenges were described by participants from all three TH score groups but the most frequent were noted for the middle TH score group. Lack of TH training, was perceived most frequently for the low TH score group (46.2%), rurally located NHs (82.4%) and clinicians (66.7%).

Lastly, the subtheme of increased burden on NH staff/infrastructure was identified by all three groups as an undesirable/unanticipated consequence of rapid TH expansion. Participants from all groups (more frequently in the middle TH score group) described how increased use of TH in NHs had resulted in additional responsibility for NH staff. One administrator from the high TH score group stated:

"I'm a little concerned about more of the future with [the director of nursing] time. We don't have a telehealth department, it's [the director of nursing] you know. She does payroll, she coordinates all the admissions, she does a lot of customer service, she does a lot of the Medicare paperwork and I can listen another 20 things that she does. So I guess, one of my concerns, budget wise, is just the 10-15 hours a week that it takes from [the director of nursing] time to manage all of this [telehealth]."

Discussion

In this qualitative descriptive study, researchers interviewed NH administrators and clinicians about anticipated and unanticipated consequences of rapid TH expansion in NHs. Findings revealed desirable consequences including benefits of avoiding travel for the NH resident, saving resources, improved access to care, and enhanced communication.

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Negative unintended consequences identified in this study include worsening social isolation, difficulties for residents with cognitive impairment, workflow and tech usability challenges, and added burden on NH staff/infrastructure.

Improved communication with families and NH staff/providers was perceived as a desirable/unanticipated consequence according to participants from all three TH score groups and among participants located in rural NHs. Improving communication within and outside of the NH has been a priority for decades, as communication failures have been found to increase patient harm, resource use, caregiver dissatisfaction, and staff turnover.[21] Delayed communication is just as serious as the complete failure of communication. Delayed communication between clinicians significantly hampers medical progress and often results in decisions that do not reflect the preferences of patients and families.[22] The proper orchestration of multiple events by multiple individuals depends, first and foremost, on the timely transmission of information between the interdisciplinary team. As stakeholders consider sustained benefits of TH expansion, they should consider the value that this technology could add to improving timely communication.

Participants in this study described negative unintended consequences of TH expansion including worsening social isolation, difficulties for residents with cognitive impairment, workflow and tech usability challenges, and added burden on NH staff/infrastructure. The balance between safety and social isolation has been the topic of recent studies as restricting visitors was a key strategy used by NHs to protect residents from COVID-19.[23,24] While visitor restrictions were in place, residents had extremely limited contact with support staff and were unable to receive visits from family members and friends. This exaggerated social isolation, in addition to the threat of infection, is likely to contribute to physical, functional, cognitive, and mental health decline of NH residents.[25] Given the impact of worsening social isolation on morbidity and mortality of older adults, the potential pitfall of worsening social isolation as an unintended consequences of rapid TH expansion should be explored further.

Many participants in our study raised concerns over using TH for residents with cognitive impairment. While studies have reported effective use of TH for remote diagnosing and monitoring of persons with cognitive impairment, the emotional impact must be considered.[26] As we consider continued use of TH with specific NH populations, like those with cognitive impairment, more research is needed to ensure benefits outweigh risk. Despite concerns that NH residents might not be able to comprehend a virtual visit, potential benefits, such as improve safety by preventing wandering behaviors and falls, stimulating cognitive functions, prolonging autonomy, and reducing caregiver burden, offer promise.[27] Furthermore, NH administrators report difficulty accessing mental health professionals willing to provide care in the facility and costs to transport residents to external treatment centers may exceed Medicaid coverage rates in some states.[28] Research is needed to determine if TH services can improve this access issue.

Workflow and tech usability challenges were among the most frequently discussed unintended consequences for all TH score groups; however, there were some noteworthy differences between groups. While low TH score participants were concerned with basic workflow issues, like training and scheduling, high TH score participants were more concerned with data integration and financial barriers. One possible explanation for this is that NHs with higher TH scores may have invested more in TH technology including the use of specialized equipment allowing for better visualization and integration with other IT systems such as the electronic medical record. During the peak of the COVID-19 crisis, some acute care providers, like those affiliated with the University of Washington Health System, were able to make quick adjustments in training and data integration to support TH encounters.[29] As NH leaders continue to grapple with the long-term impacts of the pandemic and plan for the future, they should develop mitigation plans for unintended consequences, including lack of provider training and data integration. Based on our findings, we recommend adequate support for acquiring equipment, managing software licenses, and training on topics such as TH billing, documentation, and how to use the electronic health record in conjunction with the TH platform, for successful implementation of TH in NHs.

Lastly, we found some noteworthy differences in perceptions according to the location of the NH, that is, whether the facility was located in a rural or urban area. Participants in our study from NHs located in rural areas perceived lack of training, poor video/sound quality using TH, and issues with internet/connectivity to be the biggest potential pitfalls. However, they perceived promise from improved communication and saving the provider time. These findings may provide some insight as to why others have found rurality to be negatively associated with video- and audio-only TH visits.[30] As health systems and policy makers consider next steps, they should pay special attention to mitigating these barriers, as they could create further disparities in health care access.

In recent months, numerous pieces of federal legislation have been introduced potentially impacting sustainability of TH in NHs. Waivers, including the CMS 1135 waiver, that were foundational for expanded TH access during the pandemic require legislative action to continue past the public health emergency. The 117th congress has introduced more than 23 federal bills related to TH including the Creating Opportunities Now for Necessary and Effective Care Technologies (CONNECT) for Health Act of 2021 and the Telehealth Modernization Act. Both bills' address specific conditions and sites of care in an attempt to provide greater stability to the postpandemic TH landscape.[31] While our study offers some insight into the complexity and contingencies that emerge when technological tools, like TH, are rapidly implemented in real-world environments, future studies should focus on mitigating unintended consequences that arise as a result of human interaction with complex technology.

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Limitations

Our findings should be interpreted within the context of some limitations. First, NH administrators and clinicians who participated in the interviews and the IT maturity survey may differ from those who did not. However, to increase generalizability of our findings, we included participants from varying settings including variation in TH score. Second, although we took steps to ensure the trustworthiness of results, limited transferability could impact generalizability.

Conclusion

While the unprecedented increase in TH visits was spurred out of necessity during the height of the pandemic, its accelerated expansion has raised questions about unintended consequences and sustainability. In this study, we identified consequences of rapid TH expansion offering both promise and pitfalls. Participants described the promise of using TH to improve access to care, saving NH resources, and enhancing communication are encouraging. However, the unintended negative consequences including worsening social isolation, workflow/usability challenges, and increased burden on NH staff/infrastructure, without a mitigation plan in place, create potential pitfalls and threaten success and sustainability.

Clinical Relevance Statement

Clinicians using telehealth (TH) in nursing homes (NHs) should leverage the desirable consequences of rapid TH expansion including improved access to care and enhanced communication. Meanwhile, negative unintended consequences should be recognized and mitigated as much as possible. Minimizing social isolation, considering the needs of specific residents, especially those with cognitive impairment, and creating workflow solutions to enhance usability should be considered when using TH in NHs.

Multiple Choice Questions

1. How long will the Centers for Medicare and Medicaid Services (CMS) 1135 waiver which relaxed telehealth (TH) regulations and expanded access to TH services during the pandemic be in effect?
   a. Until the novel coronavirus disease 2019 (COVID-19) public health emergency declaration expires
   b. Until the COVID-19 pandemic has officially ended
   c. Until funding appropriated by the CARES act to nursing homes (NHs) runs out
   d. Until CMS terminates the 1135 waiver

   Correct Answer: The correct answer is option a. The CMS 1135 waiver which relaxed TH regulations and expanded access to TH services during the pandemic will expire when the COVID-19 public health emergency declaration expires. Several pieces of federal legislation have been introduced to expand these services after the public health emergency ends; however, they are pending as of the time of this publication.

2. What type of consequences pose the most threat to successful and sustained use of telehealth (TH) in nursing homes (NHs)?
   a. Unanticipated/undesirable
   b. Unanticipated/desirable
   c. Anticipated/undesirable
   d. Anticipated/undesirable

   Correct Answer: The correct answer is option a. Unanticipated/undesirable consequences are classic negative unintended consequences that are most troubling when no mitigation plan in in place. This study identified four subthemes of unanticipated/undesirable consequences as follows: worsening social isolation, difficulty for residents with cognitive impairment, workflow and tech usability challenges, and increased burden on NH staff/infrastructure. Stakeholders should consider strategies to mitigate these unintended consequences of accelerated TH use in NHs.

Protection of Human and Animal Subjects

The study was performed in compliance with the World Medical Association Declaration of Helsinki on Ethical Principles for Medical Research Involving Human Subjects and was reviewed by The University of Missouri Institutional Review Board.

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Conflict of Interest

G.L.A. and K.R.P. report grants from Agency for Healthcare Research and Quality during the conduct of the study.

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