A Quality Improvement Program to Enhance After-Hours Telephone Communication Between Nurses and Physicians in a Long-Term Care Facility

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OBJECTIVES: To determine whether satisfaction of on-site nurses with after-hours telephone communication with off-site physicians improved in one long-term care (LTC) facility after a nurse-oriented intervention.

DESIGN: Longitudinal quality improvement study.

SETTING: Extended Care and Rehabilitation Center (ECRC), Durham Veterans Affairs Medical Center.

PARTICIPANTS: Eighteen registered nurses.

INTERVENTION: Communicating Health Assessments by Telephone (Project CHAT), a program of individualized training sessions and decision support tools to aid LTC nurses with symptom assessment and communication of health information over the telephone.

MEASUREMENTS: Nurses completed six satisfaction surveys (three surveys in the 3 months before Project CHAT and three surveys in the 3 months after Project CHAT).

RESULTS: The nurses' average satisfaction scores increased on several items, including those that assessed whether the nurse was pretty sure what pieces of information the physician was going to ask for ($P = .04$), felt that the amount of patient information the physician asked for seemed reasonable ($P = .03$), felt prepared to answer the questions the physician asked ($P = .01$), and felt that the process of gathering patient information for the physician was easy ($P = .01$). The percentage of calls that resulted in immediate evaluation by a physician (on-site or in the emergency department) increased from 2.0% in the period before Project CHAT to 8.6% in the period after Project CHAT ($P = .01$).

CONCLUSION: Nurses' satisfaction with several aspects of after-hours telephone medicine improved after an inexpensive, education-based intervention in one LTC facility.

Further research is needed to determine how similar interventions might affect other quality measures, including patient outcomes. **J Am Geriatr Soc 56:1080–1086, 2008.**

Key words: nurse–physician relations; telephone medicine; quality improvement; long-term care

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In most long-term care (LTC) facilities, a crucial aspect of care delivery is telephone communication between an on-site facility nurse and an off-site physician.[1] The off-site physician lacks physical access to the patient and may be unfamiliar with the patient's clinical history. Thus, the information provided by the on-site nurse strongly influences patient treatment. Such telephone interactions occur frequently in LTC. Skilled nursing facilities generate an average of 49.5 calls per patient per year to physicians.[2] The majority of calls report a new sign or symptom or a change in a patient's condition.[1,3] In one study, more than 80% of nurse-to-physician calls from LTC facilities resulted in orders being given over the telephone.[1]

Despite the frequency and importance of telephone encounters in LTC, nurses and physicians express dissatisfaction with this aspect of patient care.[4–7] In response to concerns raised by nurses at one facility, the authors designed Communicating Health Assessments by Telephone (Project CHAT). Project CHAT consisted of a series of training sessions and decision support tools that assist LTC nurses in assessing patient complaints and communicating the health information effectively to the physician. The primary aim of this study was to determine whether measurable changes occurred in nurse satisfaction with telephone medicine after Project CHAT. A secondary aim was to assess whether the volume of calls or the outcome of calls differed in the months before and after Project CHAT.

METHODS

Setting

The Extended Care and Rehabilitation Center (ECRC) of the Durham Veterans Affairs (VA) Medical Center is a two-story, 120-bed LTC facility for veterans. Six to eight certified nursing assistants (CNAs), two licensed practical nurses (LPNs), and at least one registered nurse (RN) typically staff each floor of the ECRC. The RN is responsible for all after-hours telephone communication with off-site physicians; thus Project CHAT was directed to RNs. The facility employs 21 RNs who participate directly in after-hours patient care. During the work week (Monday through Friday 8 a.m.–4:30 p.m.), nurse practitioners and medical doctors are on site, and telephone medicine does not occur, but during weekends, evenings, nights, and holidays (hereafter referred to as "after-hours"), RNs assess clinical problems and page the on-call doctor as needed.

Quality Improvement Initiative

In the summer of 2004, ECRC nurses and physicians participated in interdisciplinary focus groups to address dissatisfaction with after-hours telephone medicine.[7] RNs reported that they were frequently unable to predict the questions that an on-call physician would ask about a patient. Consequently, the nurses had to interrupt the telephone call and return to the patient or the chart to collect the requested information. Both disciplines felt that this process delayed care and wasted time. Nurses described unsatisfying telephone encounters in which they struggled to raise the on-call physician's level of concern about a patient. Thus, the focus group participants put forth a goal to standardize RNs' initial assessment of common clinical problems and to improve the effective communication of those assessments to the on-call doctor. Project CHAT was designed to address this specific quality improvement goal. The focus groups suggested additional quality improvement goals involving physician training and system changes. A discussion of those goals and the planned initiatives to address them are outside the scope of this brief report. None of those initiatives were introduced concurrently with Project CHAT, and thus they do not affect satisfaction scores reported here.

Study Design

This longitudinal study compares RN satisfaction and telephone call outcomes before and after the Project CHAT program, which was implemented during January and February 2006. Data before the intervention were collected in October, November, and December 2005, and data after the intervention were collected in March, April, and May 2006. The Durham VA institutional review board approved the study.

Intervention: Project CHAT

Project CHAT is an education-based intervention consisting of point-of-care decision support tools and individualized training sessions with RNs.

Decision Support Tools

The investigators deliberately designed job aids that were integrated with established processes of care in the ECRC and were compatible with the role of the RN. To accomplish this, the investigators consulted with one quality improvement nurse, one clinical nurse specialist, one nurse member of the clinical practice committee, three nursing administrators, and three RNs who were directly involved in after-hours patient care. The first decision support tool is a laminated booklet that includes recommended history and physical examination items for the initial assessment of 16 common clinical problems in LTC (Figure 1). The investigators adapted the recommendations in the booklet from American Medical Director's Association (AMDA) 2004 protocols.[8] Each RN received a pocket-sized booklet, and larger versions were fastened to medication carts and portable sphygmomanometers. The second decision support tool is a template in the VA's computerized patient record system (CPRS), where VA nurses are required to document changes of condition. After the RN selects a reason for the call, the template prompts for the same problem-specific history and examination items detailed in the Project CHAT booklets. Additionally, the template imports key information from the electronic chart, such as allergies and medication list. This tool is time efficient because it combines decision support and information retrieval with a necessary documentation step.

Individualized Training Sessions

Between January and February 2006, two investigators (one nurse (ESM) and one physician (HEW)) conducted individual training sessions with 21 RNs involved in after-hours patient care in the ECRC. Each training session lasted 15 to 30 minutes and occurred at the nurses' station in the ECRC at the time of nursing shift changes. The investigators created a slideshow to standardize the general content of the training sessions, although each session was individualized, and the format was flexible. The sessions highlighted nurses' critical role in after-hours patient assessment and provided specific instruction about the new booklets and CPRS template. A mock patient scenario was used to introduce these decision support tools. Then the nurse was asked to recall a previous after-hours telephone call for which the tools might have been useful and demonstrate how he or she would use the tools for that clinical problem. A CPRS test medical record was used to create mock notes with the new electronic template. Finally, the mnemonic "CHAT" was used to suggest a strategy for presenting pertinent patient information to the on-call physician quickly and efficiently during a telephone call. The mnemonic and a flow-chart that illustrates use of the Project CHAT materials were included in the booklet (Figure 2). At the conclusion of the training session, the RN was given a pocket-sized Project CHAT booklet and a chocolate bar from the Project CHAT team.

Implementation

The ECRC Quality Improvement Committee commissioned Project CHAT, the clinical practice committee endorsed it, and the nurse managers adopted it as an official care protocol. Thus, at the end of the training period, all RNs in the ECRC were instructed to use the Project CHAT

Diarrhea

History

Has the patient been on antibiotics within the last 2 weeks?

Is the patient on laxatives or stool softeners?

Other symptoms today:

□ Fever?

□ Is diarrhea bloody?

□ Nausea?

□ Vomiting?

□ Pain?

Exam

Current vital signs

Is the patient's mental status altered from baseline?

Other pertinent information may include signs of dehydration (dry mucous membranes, decreased urine output), and abdominal exam

Fall

History

Is the patient having new pain anywhere since the fall?

Did the patient hit his/her head?

Any loss of consciousness before or after the fall?

Exam

Can the patient ambulate as well as he/she could before the fall?

Any obvious injuries (lacerations, deformities)?

Blood pressure and pulse (sitting and standing)

Other pertinent information may include joint assessment for range of motion, assessment of mental status (level of consciousness, orientation, speech), blood glucose if the patient is diabetic

Figure 1. Sample of decision support cards contained within the Communicating Health Assessments by Telephone (Project CHAT) pocket-sized guide. The Project CHAT guides were spiral-bound, pocket-sized books with separate laminated decision support cards for 16 common clinical problems in long-term care: abdominal pain; agitation, confusion, or altered mental status; high blood pressure; low blood pressure; chest pain; constipation; diarrhea; dizziness or unsteadiness; dyspnea or shortness of breath; fall; fever; hyperglycemia; hypoglycemia; musculoskeletal complaint; nausea or vomiting; and urinary complaints or positive urinalysis. The information and format was adapted from published American Medical Directors Association guidelines.[8] Two cards from the Project CHAT guide are illustrated here as an example. Larger versions of the books were attached to medication carts and portable sphygmomanometers. Nurses were trained to consult the book for aid in assessing the patient and gathering pertinent information before paging the on-call physician.

decision support tools before communicating with on-call physicians. Whenever an after-hours telephone call merited documentation in the medical record, RNs were expected to use the new CPRS template. A quality improvement nurse, who gave periodic feedback to RNs regarding their use of the template, monitored use of the electronic template. E-mails and posted signs reminded RNs to use the decision support tools for patient assessments before paging an on-call physician. Booster training sessions were held 6 weeks after initial project implementation to encourage consistent use of the materials. In accordance with Diffusion of Innovation theory,[9] the investigators identified "opinion leaders" among the RNs and encouraged these individuals to serve as peer champions for the Project CHAT materials.

Measurements of Satisfaction

To assess nursing satisfaction with after-hours telephone medicine, 20 ECRC RNs who frequently work after-hours shifts were enrolled as study participants. Each participant was asked to complete the same satisfaction survey at six timepoints: three times during the 3 months before Project CHAT (October, November, December 2005) and three times during the 3 months after Project CHAT implementation (March, April, May 2006). Data from two nurses were excluded, because their job descriptions changed during the study such that they were not involved in after-hours

telephone medicine in the ECRC at any time after Project CHAT.

The investigators designed the surveys to assess nurses' perception of aspects of after-hours telephone medicine that focus groups had indicated were strong determinants of satisfaction. The surveys included 10 statements, such as "When I spoke to a physician after hours, the physician was professional and courteous." Nurses were asked to consider their experience with after-hours telephone medicine in the previous 2 weeks and indicate agreement with each statement on a 5-point scale (1 = almost never satisfied, 3 = satisfied about 50% of the time, 5 = almost always satisfied). The surveys were anonymous and confidential. Each participant was assigned a study number; no other identifying information appeared on the survey. The Project CHAT investigators were not involved in job supervision or performance evaluation of the nurses enrolled in the study.

Data on After-Hours Telephone Calls

During the 2005/06 academic year, ECRC on-call physicians (who were geriatrics fellows) were required to record data on every after-hours telephone call in an electronic database called Tracking After-hours Calls (TrAC), which has been described previously.[10] The physicians' TrAC database was used to determine the volume and outcome of after-hours telephone calls from the ECRC during the 3 months before and the 3 months after Project CHAT. Physicians indicated the outcome of each call by checking one
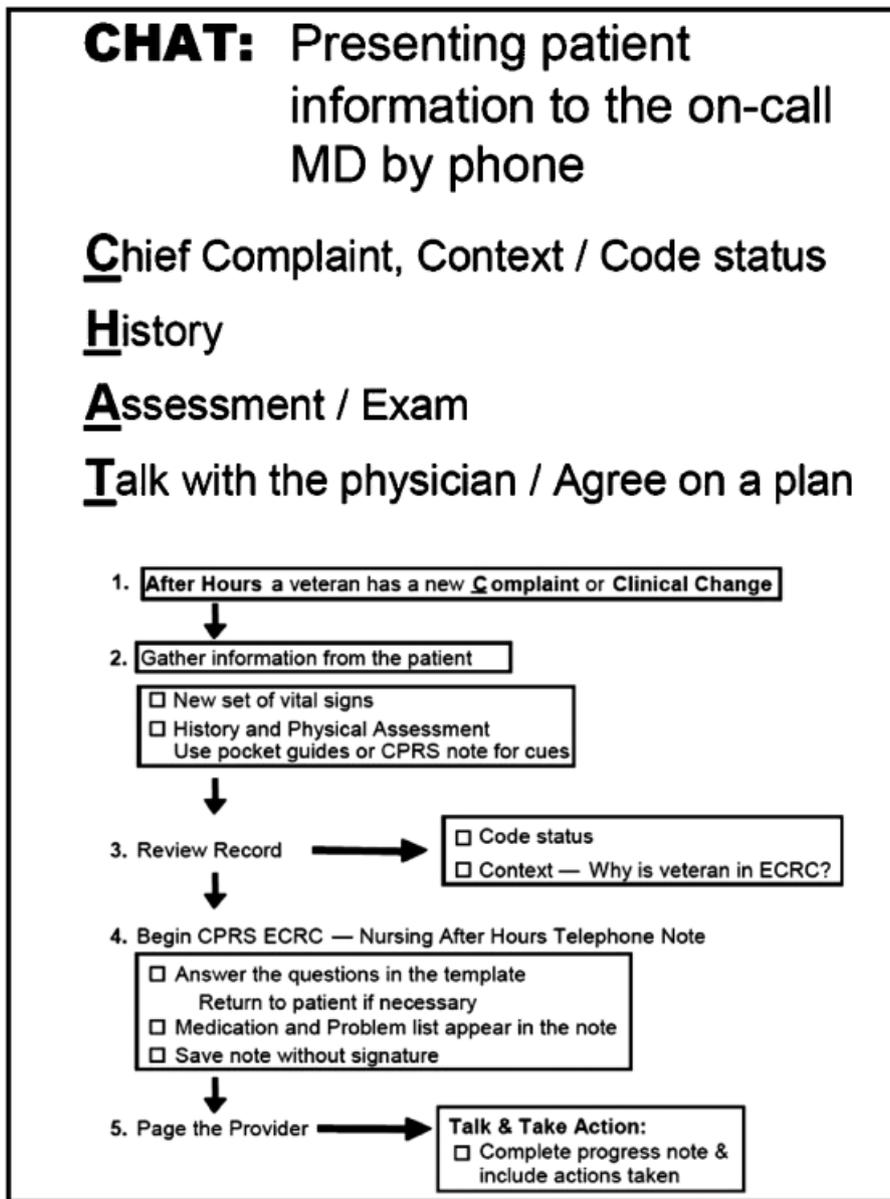
CHAT: Presenting patient information to the on-call MD by phone

Chief Complaint, Context / Code status

History

Assessment / Exam

Talk with the physician / Agree on a plan

1. After Hours a veteran has a new **C**omplaint or **C**linical Change

2. Gather information from the patient
   - ☐ New set of vital signs
   - ☐ History and Physical Assessment
     Use pocket guides or CPRS note for cues

3. Review Record
   - ☐ Code status
   - ☐ Context — Why is veteran in ECRC?

4. Begin CPRS ECRC — Nursing After Hours Telephone Note
   - ☐ Answer the questions in the template
     Return to patient if necessary
   - ☐ Medication and Problem list appear in the note
   - ☐ Save note without signature

5. Page the Provider
   Talk & Take Action:
   - ☐ Complete progress note & include actions taken

Figure 2. Communicating Health Assessments by Telephone (Project CHAT) guide to communicating health information to the on-call physician by telephone. The figure illustrates the final page of the Project CHAT pocket-sized guidebook. During training sessions, nurses were shown this figure, and the mnemonic "CHAT" was used to suggest a framework for conveying important clinical information to the on-call physician by telephone. For example, the nurse was instructed that he or she might say "I'm calling about Mr. M who is having shortness of breath [Chief complaint]. He is a palliative care patient with lymphoma, and he is DNR/DNI [Context/code status]. His shortness of breath started this afternoon, and he does not have cough or chest pain, but he does report edema in his legs [History items suggested in the Project CHAT guidebook]. His vitals are temp 98.6, pulse 88, blood pressure 122/74, respirations 22, oxygen saturation 90% on room air. When I listen to his lungs, I hear rales about halfway up, and he appears somewhat uncomfortable even at rest [Assessment items suggested in the Project CHAT guidebook]." In the final step, the nurse is encouraged to Talk with the physician, providing additional information as needed and ultimately agreeing on a plan of action. The flowchart provides a step-by-step system for integrating the Project CHAT tools into the usual process of after-hours patient assessment and communication with an on-call physician.

or more of the following: orders given for medication or treatment, orders given for laboratory or X-ray, orders given for observation, discussion with patient's family, transfer of patient to emergency department, went to facility to evaluate patient, and no action taken.

Analysis

Nursing satisfaction surveys contained 10 items rated on a 5-point scale. The analysis for this study is restricted to seven items that investigators hypothesized that the Project CHAT intervention might influence. Scores from these individual items were compared before and after the intervention. Scores are expressed as continuous variables (mean scores and standard deviations for each item) and dichotomous data (percentage of responses receiving a score of 4 or 5).

All analyses were conducted with SAS software, version 9.1 (SAS Institute, Inc., Cary, NC). The continuous

Table 1. Comparison of Items in the 3 Months Before and the 3 Months After Communicating Health Assessments by Telephone (Project CHAT)

Item	Before[*]	After[†]	P-Value
Individual items on nurses' satisfaction surveys[‡]			
"I was pretty sure what pieces of information the physician was going to ask for,"			
Score, mean ± SD	4.38 ± 0.80	4.64 ± 0.53	.04
Percentage scoring 4 or 5	80.8	97.6	.02
"The amount of patient information the physician asked for seemed reasonable,"			
Score, mean ± SD	4.52 ± 0.64	4.76 ± 0.43	.03
Percentage scoring 4 or 5	92.3	100.0	.12
"I felt prepared to answer the questions the physician asked about the patient's history or condition,"			
Score, mean ± SD	4.54 ± 0.58	4.81 ± 0.40	.01
Percentage scoring 4 or 5	96.2	100.0	.50
"I felt that the process of gathering patient information for the physician was easy,"			
Score, mean ± SD	4.42 ± 0.72	4.74 ± 0.45	.01
Percentage scoring 4 or 5	90.4	100.0	.06
"I felt the total amount of my time consumed by the phone call was reasonable,"			
Score, mean ± SD	4.40 ± 0.72	4.62 ± 0.70	.14
Percentage scoring 4 or 5	90.4	92.9	.72
"I felt the process of documenting my after-hours phone calls was efficient,"			
Score, mean ± SD	4.50 ± 0.75	4.66 ± 0.82	.37
Percentage scoring 4 or 5	94.2	95.2	.83
"I was satisfied overall with after-hours telephone medicine,"			
Score, mean ± SD	4.48 ± 0.64	4.80 ± 0.67	.02
Percentage scoring 4 or 5	96.1	97.6	.69
Process of care items related to after hours telephone calls			
Total number of after-hours calls	157	152	
Percentage of calls resulting in after-hours evaluation by a physician[§]	2.0	8.6	.01
Percentage of calls resulting in orders for medication, treatment, laboratory, or X-ray	54.1	56.6	.70
Percentage of calls resulting in no action or orders for observation	40.1	35.5	.26

Note: Percentages do not sum to 100 because other outcomes were possible (including a category for other), and providers could record more than one outcome per call.

[*] Data before Project CHAT was collected in October, November, and December 2005.

[†] Data after Project CHAT was collected in March, April, and May 2006.

[‡] Nurses completed three surveys during the "before" period and three surveys during the "after" period.

[§] On-call physician went to facility or requested transfer of the patient to the emergency department.

SD = Standard deviation.

satisfaction measures were analyzed using mixed-models repeated measures, because each nurse could have from one to three assessments before and after the intervention. The parallel binary satisfaction analyses, for which the continuous satisfaction outcome was dichotomized (4&5 vs 1,2,3), was modeled using generalized estimating equations to account for correlated observations.

The total number of after-hours calls before and after Project CHAT was determined from the TrAC database. The proportion of calls that resulted in various outcomes before and after Project CHAT was compared using the Fisher exact test.

RESULTS

Eighteen RNs contributed satisfaction data before and after Project CHAT. Survey collection was 96.3% complete before Project CHAT and 79.6% complete after Project CHAT, with 17 of the nurses completing at least four of six surveys. Reasons for missing surveys included sick leave, vacation, no involvement in after-hours telephone medicine in the previous 2 weeks, and termination of employment at the ECRC. Nurses indicated a high frequency of agreement with most satisfaction statements on the surveys, even before the intervention. Before Project CHAT, 92.3% of all survey items received a score of 4 or 5, and 59.2% received a score of 5. Despite the high baseline satisfaction scores, the mean score increased significantly on five of the seven individual satisfaction items potentially affected by Project CHAT (Table 1). Satisfaction scores did not change significantly on two items, which were both related to the time efficiency of placing and documenting after-hours telephone calls.

The volume of after-hours nurse-to-physician calls remained stable after Project CHAT. In the 3 months before Project CHAT, the TrAC database documented 157 calls from the ECRC, with 152 calls documented in the 3 months after Project CHAT, although a difference was observed in the percentage of after-hours calls that resulted in immediate evaluation of the patient by a physician (Table 1). After

Project CHAT, 8.6% (13/152) of the nurse-to-physician telephone calls resulted in immediate evaluation of the patient by the on-call geriatrics fellow or in the emergency department, compared with 2.0% (3/157) of the calls before Project CHAT ($P = .01$). In the 3 months before and after Project CHAT, 85 and 87 after-hours telephone encounters, respectively, pertained to clinical problems specifically addressed in the Project CHAT decision support materials. Of these after-hours telephone encounters, after Project CHAT, 14.9% (13/87) resulted in immediate physician evaluation, compared with 3.5% (3/85) before Project CHAT ($P = .02$). No significant differences were observed in the percentage of after-hours calls that resulted in over-the-telephone orders for intervention or observation.

DISCUSSION

In a VA nursing home care unit, increased nurse satisfaction accompanied an intervention aimed at enhancing the quality of clinical information exchange between RNs and physicians during after-hours telephone encounters. Concurrently, a change was observed in telephone care practice, such that the on-call physicians were more likely to transfer the patient to the emergency department or come in to evaluate the patient on-site.

Effective telephone communication between physicians and nurses is an essential component of LTC practice, influencing patient morbidity, mortality, and nurse staff turnover.[5,10–12] Furthermore, the Institute of Medicine and the Joint Commission on the Accreditation of Healthcare Organizations have identified faulty communication between care team members as a major contributor to medical error.[13] Aspects of Project CHAT are similar to the Situation-Background-Assessment-Recommendation (SBAR) technique of clinical reporting, which has been implemented in Kaiser Permanante and other health systems nationwide.[14] The authors were not aware of SBAR during the development of Project CHAT; thus, the commonalities highlight the notion that effective communication begins with a standardized framework of expectations for the presentation and receipt of information. It is encouraging that this inexpensive, easily implemented program was associated with measurable increases in nurse satisfaction.

In the Durham ECRC, satisfaction increased despite high baseline satisfaction scores. Satisfaction scores may have been favorable before the intervention partly because Project CHAT was designed after a series of focus groups, which might themselves have resulted in improved employee satisfaction. Additionally, VA LTC units are, on average, relatively resource rich with respect to nursing personnel, and this particular facility was associated with a geriatric medicine training program. Despite access to a resource-rich setting, RNs were able to benefit from structured guidance in telephone medicine, suggesting that in a less resource-rich environment, a similar intervention might have an even greater effect.

The quality-enhancing program did not appear to negatively affect the nurses' perception of efficiency or time demands associated with after-hours communication with physicians. Nurses reported similar satisfaction with these aspects of telephone medicine before and after Project CHAT. The investigators made a deliberate effort to integrate Project CHAT with workflow, and this may have been a key aspect of its success. In an environment heavily burdened with paperwork and regulations, a quality-enhancing program that is perceived as time intensive may be difficult to implement.

In the months after Project CHAT, a higher percentage of telephone calls resulted in immediate physician involvement. The study does not reveal *why* this occurred or whether the change was associated with better care or improved patient outcomes. One possibility is that the nurses' enhanced assessment and communication skills increased their ability to convey concerns effectively to the physicians; before Project CHAT, nurses in this facility had reported frustrating encounters when they were worried that a patient's condition was urgent but sensed that the on-call physician did not share their level of concern.

Several limitations of this study may affect the interpretation of the results. First, the longitudinal pre–post design is inferior to a controlled comparison. The changes observed after Project CHAT may be due to temporal fluctuations, or employee satisfaction might increase because of the opportunity to express opinions through surveys, although repeated measurements over fairly extended time periods (3 months) diminish the magnitude of such effects. Second, to minimize the employee burden associated with this quality improvement initiative, detailed information was not collected about utilization, although during the 3 months after Project CHAT, 51 notes were created using the electronic template, suggesting a favorable degree of participation. Finally, this quality improvement project was launched in a single facility, and the results are drawn from a small number of participants. In addition, the VA nursing home setting differs significantly from LTC facilities in the private setting, with greater use of RNs functioning in charge nurse roles and more frequent on-site medical coverage.

Despite these limitations, the Project CHAT quality improvement elements and decision support tools hold great promise for enhancing nurse–physician telephone encounters in LTC settings, possibly leading to better clinical decision-making and quality of care. In LTC settings where there is limited on-site medical coverage and wider use of LPNs, the magnitude of improvement in the information exchange may be even greater. Future programs replicating Project CHAT in private sector nursing homes may yield new information about improving these telephone encounters through education innovations customized according to the practice context. Further research is needed to explore how similar interventions affect other important outcomes, such as cost, guideline adherence, and clinical endpoints.

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