

Implementation and Evaluation of a Nursing Home Fall Management Program

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(See editorial comments by Drs. Magaziner, Miller, and Resnick on pp 464–466.)

OBJECTIVES: To evaluate the feasibility and effectiveness of a falls management program (FMP) for nursing homes (NHs).

DESIGN: A quality improvement project with data collection throughout FMP implementation.

SETTING: NHs in Georgia owned and operated by a single nonprofit organization.

PARTICIPANTS: All residents of participating NHs.

INTERVENTION: A convenience sample of 19 NHs implemented the FMP. The FMP is a multifaceted quality improvement and culture change intervention. Key components included organizational leadership buy-in and support, a designated facility-based falls coordinator and interdisciplinary team, intensive education and training, and ongoing consultation and oversight by advanced practice nurses with expertise in falls management.

MEASUREMENTS: Process-of-care documentation using a detailed 24-item audit tool and fall and physical restraint use rates derived from quality improvement software currently used in all Georgia NHs (MyInnerView).

RESULTS: Care process documentation related to the assessment and management of fall risk improved significantly during implementation of the FMP. Restraint use decreased substantially during the project period, from 7.9% to 4.4% in the intervention NHs (a relative reduction of 44%), and decreased in the nonintervention NHs from 7.0% to 4.9% (a relative reduction of 30%). Fall rates remained stable in the intervention NHs (17.3 falls/100 resi-

dents per month at start and 16.4 falls/100 residents per month at end), whereas fall rates increased 26% in the NHs not implementing the FMP (from 15.0 falls/100 residents per month to 18.9 falls/100 residents per month).

CONCLUSION: Implementation was associated with significantly improved care process documentation and a stable fall rate during a period of substantial reduction in the use of physical restraints. In contrast, fall rates increased in NHs owned by the same organization that did not implement the FMP. The FMP may be a helpful tool for NHs to manage fall risk while attempting to reduce physical restraint use in response to the Centers for Medicare and Medicaid Services quality initiatives. *J Am Geriatr Soc* 55:342–349, 2007.

Key words: falls; nursing homes; restraints

Approximately half of the 1.6 million nursing home (NH) residents in the United States fall each year.^{1–3} Of these, 30% to 40% fall two or more times, and 11% sustain serious injury as a result of the fall.⁴ The high fall rate in frail elderly NH residents poses many challenges for NH providers and is a major source of morbidity and healthcare expenditure in NHs. Falls can result in painful and costly injuries, fear of falling, decreased participation in activities, and reduced quality of life for NH residents.^{5–8} Falls and related incidents result in added staff time due to increased levels of care and paperwork, as well as fear of litigation and settlement costs for fall-related injuries.^{9,10} In addition, safeguarding residents from falls and fall-related injury is the most commonly reported reason for physical restraint use.^{11,12} National target setting for physical restraint elimination in NHs by the Centers for Medicare and Medicaid Services (CMS) in its 8th Scope of Work makes use of effective falls management strategies for high-risk residents a high priority.¹³

Programs designed to reduce falls in NHs are generally multifaceted, using an interdisciplinary team approach to address intrinsic and extrinsic risk factors in high-risk

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residents. Once a resident is identified as high risk, usually according to the Minimum Data Set (MDS) or other structured assessment, management strategies can be implemented following specific recommendations outlined by clinical resources such as the MDS Resident Assessment Protocol (RAP) for falls and the American Medical Directors Association clinical practice guideline for falls management. Interventions related to gait and mobility, environment, equipment, protective gear, and medication use are most common.¹⁴⁻¹⁸

Although this general approach is more or less standard across U.S. NHs, the success of such programs has been variable at best. For falls management programs to succeed, a number of elements in addition to relevant clinical processes must be in place. Staff training, organizational commitment, buy-in and support of administrative and clinical leadership, and assistance from external consultants or advanced practice nurses (APNs) are considered essential factors for successful implementation of evidence-based practices in the long-term care environment.¹⁹⁻²³ Absent these factors, it is difficult for NH staff, even with intensive training and support, to sustain the degree of effort necessary to result in an improvement in outcomes related to falls.²⁴⁻²⁶

This article describes an evaluation of the Emory/Ethica Falls Management Program (FMP) in 19 NHs in Georgia. The FMP is based on work at the Vanderbilt University School of Medicine. Over the last 13 years, there have been several field applications of various iterations of the program involving more than 250 facilities, including two clinical trials, two projects in multi-NH chains, and two state quality improvement organization initiatives to reduce falls and physical restraint use.^{26,27} The Emory/Ethica FMP is based on these experiences, a pilot project in four NHs, feedback from participating facilities, and input from national leaders in the field.

This article focuses on two key outcome measures: process of care documentation and trends in fall rates. Changes in physical restraint use were also monitored, because FMP implementation occurred during state and corporate-wide initiatives to reduce physical restraint use to 7% or less linked to the CMS 7th Scope of Work. The FMP was fully integrated into this corporate restraint reduction initiative, with appropriate didactic materials on restraint reduction included in the facility workshops in conjunction with case-based problem solving.

METHODS

Overview

The FMP was implemented as a quality improvement project in a convenience sample of 19 NHs owned and operated by one nonprofit organization in Georgia (Ethica Health and Retirement Communities) between September 2004 and September 2005. Implementation was initially begun in nine homes, and an additional 10 homes began the implementation process 4 months later. The organizational leadership selected them for initial or delayed implementation based on distance from a training center, physician preference, length of time the organization had owned each NH, and presence of a seasoned director of nursing at project inception. The initial and delayed implementation

homes were matched for size, region within the state of Georgia, and falls rate as reflected by the MDS quality indicator. Data (available on request) showed that there were no significant differences in baseline resident characteristics or fall-related outcomes between the two groups. After study inception, but before FMP implementation, the organization acquired an additional 20 NHs. These homes were not candidates for the FMP implementation, because the organization acquired them just before implementation. Thus, data presented in this article evaluate FMP implementation for 19 homes and compare the key outcomes of falls and physical restraint use in these homes to the 23 other NHs owned and operated by the same organization.

Emory University's institutional review board reviewed and approved the project as a quality improvement project, with a full Health Insurance Portability and Accountability Act waiver. Hence, informed consent from individual NH residents was not obtained, and confidentiality of all individually identifiable medical record data was maintained.

The FMP

The FMP, along with examples of all of the necessary forms, are described in detail in the full program manual, which can be downloaded from a CMS-supported Website (www.medqic.org; click on NHs, then Restraints, then Tools). Key aspects of the program and its implementation are described below.

Rationale

Previous field experience has demonstrated that the majority of NHs require a multilayered approach with intensive support to incorporate best practices into daily routines.^{20,24-26} This project used a three-phase intervention: development of organizational support and facility preparation, intensive training of appointed falls teams and provision of quality improvement tools, and APN support during the implementation phase.

Organizational Support and Facility Preparation

The project team met with corporate officers of the multifacility chain to explain the FMP and discuss required activities for enrolling facilities. Experience during an earlier collaboration between the project team and this organization facilitated mutual credibility and acceptance of the FMP. An introductory conference with regional nurses was followed by a full workshop for regional and corporate leadership, clinical leadership from participating facilities, and an officer from the affiliated rehabilitation company to clarify program components and develop support. Discussion included methods to develop a culture of safety through organizational commitment, administrative leadership, communication, team function, and the use of data. During this initial period, the corporate and regional staff exhibited strong support for the program by requiring each facility to commit staff and resources and by participating in the training programs. Two corporate officers, along with the regional nurses, were assigned one or more facilities to supervise during the project. Each facility was asked to select an interdisciplinary falls team including a physical or occupational therapist, two to four certified nursing assistants, a member of the maintenance staff to serve as the "falls engineer," and the director of nursing. A "falls nurse

coordinator” was appointed as the leader of the team and clinical champion of the program within each facility. Each falls team completed a self-assessment that inventoried primary components of a multifaceted falls management program to identify weaknesses and prioritize areas of focus during the intervention. As part of this assessment, the team answered questions about how well fall-related care processes were documented in a sample of five medical records.

Intensive Training and Provision of Quality Improvement Tools

Falls teams attended a full-day workshop covering core program components and a second workshop approximately 1 month later to address support modules and arising challenges. Each team received a 69-page manual and companion Living Space Inspection notebook including details of program implementation, a videotape for staff training, and laminated brochures for unit staff that summarized the program and outlined basic strategies to reduce fall risk. Appendices to the manual included all forms necessary for implementation, a case history with examples of program application, and a list of resources. During these workshops, particular emphasis was placed on the team's development of problem solving skills for weekly monitoring and selection of new interventions for recurrent fallers. Separate modules on physical restraint reduction and behavior management were used during the second workshop to illustrate specific strategies for the management of challenging residents.

Falls data collection and analysis were performed using the Tracking Record for Improving Patient Safety (TRIPS) and a companion Web-based software program. This incident report form and method of generating monthly reports were based on an earlier model tested in a sample of four NHs.²⁸ Revision was a collaborative effort between Emory and the organization to integrate the form into their existing report systems. The TRIPS requires a comprehensive investigation at the time of the fall including descriptive data such as shift, time, location, cause, and day of week of the fall, as well as resident outcomes. In addition to replacing and standardizing incident reports, TRIPS data can later be analyzed to determine patterns of fall occurrence.

Formal tools for communicating with primary care providers were designed to increase participation of physicians, physician assistants, and geriatric nurse practitioners during assessment and care planning. Communication tools included facsimile forms for notifying providers of residents' falls and each resident's total falls within the previous 180 days, results of the FMP Falls Assessment, and an order sheet with suggested recommendations for further assessment and management. Physicians at nine of the 19 facilities chose not to use the facsimile system, instead relying upon previously established telephone communication or weekly visits. The fall and process outcomes that were measured did not rely upon physician reported data, so lack of physician participation with facsimile communication did not affect the availability of outcomes data.

All nurses were instructed to follow an eight-step fall response (Figure 1) for immediate resident evaluation and response, thorough investigation, appropriate documentation, assessment, and care planning. Once staff were comfortable using the TRIPS form and the eight-step fall

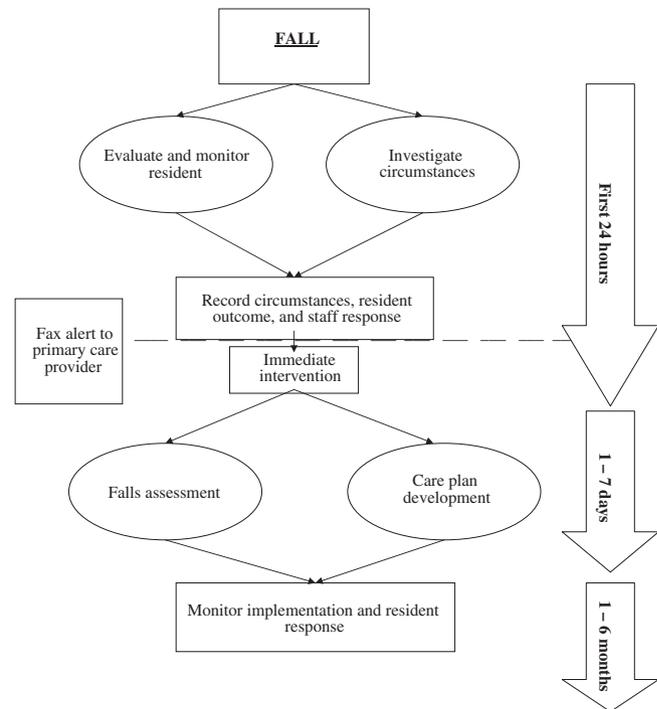


Figure 1. Eight-step fall response used as the central paradigm for educating participating staff and implementing the Fall Management Program.

response for residents who fell, they were instructed to screen all new admissions and residents who triggered the MDS Falls RAP for entry into the FMP. The FMP Falls Assessment targets five common risk factors (medications, gait and mobility, vision, orthostatic hypotension, unsafe behavior) and leads to a Fall Interventions Plan that includes a list of common interventions related to each of the five target areas. A Fall Interventions Monitor is used to assess application of the interventions by unit staff as well as resident response to them. A flow chart guides staff through the process, from entering a resident into the FMP through follow-up assessments whose length and frequency depend upon fall history and outcomes.

APN Support

As part of the research team, two APNs, a geriatric nurse practitioner, and a nurse educator experienced in long-term care conducted the workshops and led discussions during monthly teleconferences for facilities. In alternate months, initial and delayed implementation homes reported successes and barriers to program implementation. They were also asked to send monthly totals of falls, serious injuries, and physical restraint use to the APNs. The APNs were available to consult with regional and corporate staff by telephone throughout the intervention phase and conducted a final workshop for review of progress and remaining challenges at the end of the intervention phase. Based on feedback from the facility teams, APNs worked with corporate staff to revise three forms to streamline processes and eliminate duplication with existing corporate policies. Patient At Risk materials used in each facility were also revised to reflect the FMP and reduce repetitive and lengthy documentation.

Measures

Care Process Documentation

The project team developed a 24-item care process audit tool based on extensive review of the literature and on falls clinical practice guidelines published by the American Medical Directors Association¹⁷ and the American Geriatrics Society.^{15,16} The project team and local faculty members with expertise in geriatrics and NH care reviewed the initial draft, and a revised version was circulated for comment to several nationally recognized experts in geriatric falls and NH care. Based on this input, a final version of the audit tool was developed and refined through pilot testing. One of the APNs who participated in the workshops and a second APN were trained to use the audit tool. Interrater reliability was established with agreement on at least 80% of the items. Because of logistical and resource constraints, chart audits could be done in only 14 of the 19 participating homes. Because of their involvement in project implementation, the APNs were not blind to the intervention status of the facilities. Audits were conducted within 1 month of initial program implementation and were repeated during the sixth month of program implementation in each facility. The goal was to perform audits on the records of 10 residents who had fallen two or more times in the 6 months before intervention and on 10 residents who fell two or more times during the 6-month evaluation period. A total of 137 records, selected on the basis of criteria just described, were audited at each data collection point (i.e., pre- and postintervention). Facility staff had selected five of the 10 preintervention charts that were audited as part of an earlier self-assessment process, and the APN selected the other five at random from the facility quality indicator (QI) list of resident falls. The APN randomly selected all 10 postintervention charts from the facility QI list of resident falls. It is possible that an individual resident fell twice in the time period before the intervention and again during the intervention and thus was eligible for both chart audits. The audits were conducted independently to capture a representative sample of current residents, so no attempt was made to include or exclude residents that had been sampled earlier.

Falls

Data on falls were obtained from MyInnerView quality improvement software, which is in use by all NHs in Georgia. A description of MyInnerView can be found at www.myinnerview.com. Use of these data enabled parallel data on falls to be examined for each of the 19 participating NHs as well as for the other 23 NHs owned and operated by the parent organization while the FMP was being implemented. To generate MyInnerView data, the participating organizations use a standard definition for falls based on the Minimum Data Set recommendations, which defines a fall as an unintentional change in position coming to rest on the ground or onto the next lower surface (e.g., onto a bed, chair, or bedside mat). The fall may be witnessed, reported by the resident or an observer, or identified when a resident is found on the floor or ground.²⁹ MyInnerView defines minor injury as falls that require only on-site first aid treatment such as a dressing, ice pack, or pain medication and serious injury as falls that result in sutures, immobilization,

emergency department assessment or treatment, surgery, or hospitalization. Each facility assessed monthly data on falls on the last Friday of the month.

Restraint Use

Data on restraint use were also obtained from MyInnerView. The percentage of residents with physical restraints on the last Friday of the month was recorded. Facilities were trained to classify restraints based on the MDS recommendations: "Physical restraints are defined as any manual method or physical or mechanical device, material, or equipment attached or adjacent to the resident's body that the individual cannot remove easily which restricts freedom of movement or normal access to one's body."³⁰

RESULTS

Characteristics of residents in the 19 intervention NHs as well as the 23 facilities not participating in the intervention are shown in Table 1. Data were drawn from monthly facility characteristic reports sent to the state for the 6-month period of May 1, 2004, to October 31, 2004. The average census in the 19 intervention facilities during the intervention period was 85 (range 34–170). Age, sex, and payment source characteristics were similar between the groups. The 19 intervention homes did have a higher proportion of residents with little or no discharge potential. Table 1 presents state QI report items related to fall risk for the same period. Although there were a few differences on some indicators, no consistent pattern of differential performance emerged between intervention and nonintervention homes. Intervention homes had a marginally higher proportion of residents with behavioral symptoms, whereas nonintervention homes had marginally higher proportions of residents taking nine or more medications and taking antianxiety or hypnotic medications.

Table 2 illustrates changes in care process documentation associated with FMP implementation. Several key areas of documentation regarding assessment and management of fall risk factors improved dramatically; all except two were statistically significant. Notable improvements that were likely to directly affect recurrent falls included better assessment of risk factors for falls, interventions to reduce both falls risk and the likelihood of injury, and correction of environmental and equipment hazards.

Figure 2 illustrates month-by-month trends for falls and restraint use. Using monthly NH census as the denominator, all data were converted into a rate per 100 residents. For the 12 months of available data, each rate was averaged separately across all intervention homes and across all nonintervention homes. Least squares lines were then plotted for each rate and the slopes tested with the null hypothesis that the slope = 0 (i.e., there was no change). From data not shown here, the null hypothesis for the census data was accepted for both the intervention and nonintervention groups, meaning that the census for both groups of homes was relatively flat for the 12 months and should have no effect on fall rates. Because of the staggered implementation, the dashed line represents the average fall and restraint uses rates for nine intervention homes between October 2004 and April 2005 and for 19 intervention homes

Table 1. Resident Characteristics of Intervention (n = 19) and Nonintervention (n = 23) Nursing Homes

Characteristic	Intervention	Nonintervention	P-value
	Average %		
Female, %	72.7	74.1	.65
Age			
<65	9.9	10.1	.94
65–84	47.9	49.9	
≥85	42.2	40.0	
Payment source			
Medicaid per diem	71.2	64.5	.23
Medicare per diem	17.1	24.8	.12
Psychiatric diagnosis	12.4	12.8	.87
Conditions make resident unstable	32.8	24.1	.35
No discharge potential	90.1	83.0	.03
State quality indicator report item			
Prevalence of behavioral symptoms	26.8	20.9	.10
Prevalence of symptoms of depression	19.7	14.0	.16
Use of ≥9 medications	55.4	61.4	.07
Incidence of cognitive impairment	18.7	15.6	.40
Prevalence of bladder or bowel incontinence	62.0	65.0	.25
Prevalence of bedfast residents	8.8	9.7	.60
Incidence of decline in late loss of activities of daily living	14.7	13.4	.40
Incidence of decline in range of motion	7.6	7.8	.91
Prevalence of antipsychotic use in absence of psychotic condition	28.0	26.9	.66
Prevalence of antianxiety or hypnotic use	15.5	19.8	.08
Prevalence of hypnotic use more than two times in 7 days	2.5	4.4	.07
Prevalence of stage 1–4 pressure ulcers	9.4	11.5	.16

between May and September 2005. The dotted line shows the average fall and restraint rates for 33 homes not implementing the intervention between October 2004 and April 2005 and for 23 nonintervention homes between May and September 2005. A test of linear trend in fall rates was not significantly different from zero for the intervention homes ($P = .92$) and was significantly positive ($P = .008$) for the nonintervention homes. Restraint use dropped across all homes, and the test of linear trend was significantly negative for intervention ($P < .001$) and nonintervention homes ($P < .001$).

Quarterly data on the incidence of falls, serious injury falls, and restraint use are shown in Table 3. There was considerable intra- and interfacility variation in fall and restraint rates during the course of FMP implementation, with some homes reporting fall rates five to 10 times the lowest facility rates. The mean for each quarter shows that intervention homes started with a higher fall rate of 17.3 per 100 residents per month (range 6.0–29.3) that remained stable at 16.4 falls per 100 residents per month in the final quarter. Nonintervention homes began with an initially lower fall rate of 15.0 per 100 residents per month (range 2.4–40.6), but here the rate steadily climbed to 18.9 falls per 100 residents per month over the intervention period, an increase of 26%. Results were similar for falls associated with minor injuries, but there were no significant trends in the rate of serious injuries, likely because of the small number of events. Restraint use decreased substantially during the project period, from 7.9% to 4.4% in the intervention NHs (a relative reduction of 44%) and

from 7.0% to 4.9% in the nonintervention NHs (a relative reduction of 30%).

DISCUSSION

Successful implementation of the FMP was associated with important improvements in care in participating NHs. Significant improvements were seen in the documentation of recommended care processes related to fall prevention. Concurrent with a significant drop in restraint use, fall rates remained stable in intervention homes while rising significantly in nonintervention homes.

Improved documentation of fall risk and falls management is critical not only to avoid preventable falls, but also for clearly documenting the assessment and management of residents at high risk of falls. This facilitates review by federal and state surveyors, as well as a response to litigation if a lawsuit results from an injurious fall.

The participating homes also had a substantial reduction in restraint use, consistent with the federal emphasis on minimizing the use of these devices. Although there is no evidence that physical restraints are an effective method of preventing falls,^{15,31} some studies have demonstrated an increase in falls upon restraint removal.^{32,33} Studies that demonstrate no increase in falls with restraint removal have implemented careful individualized care planning to reduce risk.^{34–36} The fact that fall rates increased in nonparticipating homes during this restraint reduction initiative is encouraging, but not definitive evidence that the FMP may have prevented some falls in these facilities.

Table 2. Results of Care Process Chart Audits for 14 of the 19 Participating Nursing Homes at Baseline (Preintervention) and Follow-Up (6 Months Postintervention)

Summary	Baseline	Follow-Up	P-value
	% Yes		
Patient screened for fall risk on admission, readmission, or last full Minimum Data Set?	79.6	94.9	<.001
History of falls documented in the medical record?	54.4	73.0	.002
Comprehensive falls assessment completed for those identified at high risk?	0.0	14.6	<.001
Falls assessment reflects a multidisciplinary approach addressing risk factors? (% with $\geq 3/4$ of 9 items)	1.5	51.1	<.001
Assessment of all risk factors complete and documented?	0	14.6	<.001
Orders from primary care provider, therapist, and other professionals added to care plan?	63.5	91.9	<.001
Treatment of underlying medical conditions in care plan?	80.3	97.8	<.001
For patients with changes in high-risk medication, does care plan include sleep measures and behavior management interventions? (n = 112 baseline; n = 123 follow-up)	25.9	49.6	<.001
For patients with unsafe behaviors, does care plan include management strategies to reduce risk of injury? (% with $\geq 3/4$ of 4 items) (n = 127 baseline; n = 119 follow-up)	21.3	52.1	<.001
Does care plan include interventions to minimize falls risk? (% with $\geq 3/4$ of 4 items)	58.4	82.5	<.001
For patients in wheelchairs, does care plan provide interventions to improve positioning and comfort? (n = 85 baseline; n = 81 follow-up)	22.4	67.9	<.001
For patients with poor vision, does care plan include low-vision precautions? (n = 105 baseline; n = 124 follow-up)	34.3	57.3	.001
Have environmental and equipment hazards been corrected?	37.8	95.6	<.001
Interim plan of care implemented while falls assessment and care plan are completed?	17.5	21.3	.448
New intervention added within 24 hours of each fall?	27.5	54.9	<.001
Monitoring of success or failure of interventions documented in the notes?	6.6	31.9	<.001
Review of interventions and revision of care plan by falls team?	27.0	85.9	<.001
Data collected after each fall? (% with $\geq 3/4$ of 12 items)	6.7	38.5	<.001
Does primary care physician refer to patient's fall or risk factors in first progress note after fall?	15.4	22.0	.210
Care plan revision with new interventions added based on data collection at time of fall?	26.9	69.4	<.001
Nurse's notes reference fall and show increased monitoring for 24–72 hours after fall?	53.4	67.7	.023

Note: Unless otherwise noted, the denominator for the baseline and follow up measures is 137 residents.

Successful translation of research into clinical practice guidelines that improve NH care is complex and requires a multifaceted strategy. Only one of two earlier trials conducted by investigators at Vanderbilt using the original version of this program produced positive outcomes. That trial included an intensive intervention delivered by a university-based consultation team that assessed residents, trained staff, developed individualized care plans, and corrected safety hazards. The second, less-intensive trial of 112 homes included a two-day training workshop with telephone follow-up for 12 months; it showed no effect on serious fall-related injuries.^{26,27} Institutional support during the education and training phases, as well as support for the falls coordinator and falls team during implementation, indicated strong leadership buy-in. There was also a commitment to a revised and standardized incident reporting system and to embedding it in a relational database for use in quality improvement. The results in terms of actual

reduction in fall rates in this study despite major corporate and institutional commitment illustrates how difficult it can be to change existing practices in NHs to improve outcomes in this patient population.

There were many challenges during implementation, which will be described in detail in a separate report. Among them were turnover of facility-based leadership, variability in the skills and time commitment of the falls coordinator, limited clinical decision-making skills of nurses, increasing resource constraints due to reductions in Medicaid reimbursement, and in many cases lack of interest and even resistance to the program from primary care physicians and medical directors. In addition, regional supervision was uneven because of changes in regional personnel as well as their involvement in other corporate initiatives such as acquisition of additional NHs during the project.

Results of this project should be interpreted cautiously, with recognition that this was not a randomized, controlled

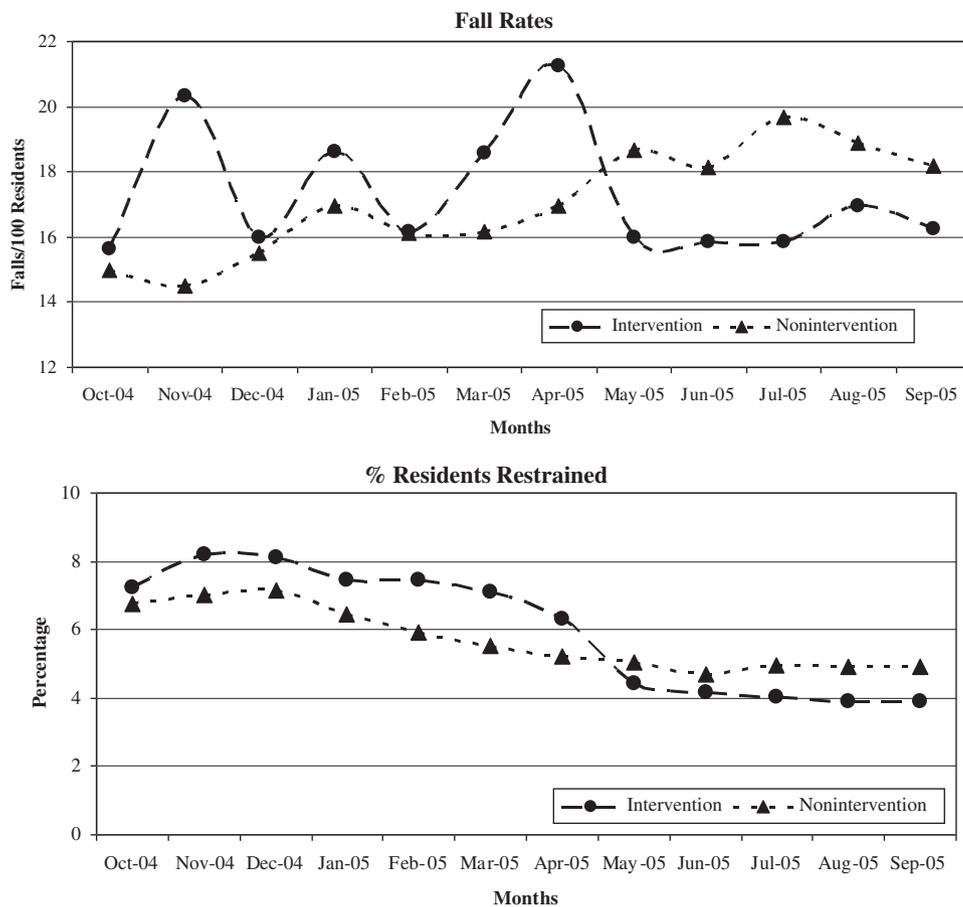


Figure 2. Incidence of falls (top) and restraint use (bottom) during implementation of the Fall Management Program (FMP). Top—illustration of month-by-month fall rates per 100 resident months. The fall rate in the 19 intervention homes was approximately the same at the end of the intervention period as it was before the intervention was initiated (17.3 falls/100 residents per month at start and 16.4 falls/100 residents per month at end), with substantial month-to-month variability. Fall rates increased 26% in the NHs not implementing the FMP (from 15.0 falls/100 residents per month to 18.9 falls/100 residents per month). The increase in the non-intervention homes was statistically significant (see text). Bottom—illustration of restraint use, measured on 1 day per month in the intervention and nonintervention homes. Although the absolute reduction was small (~3%), it was statistically significant (see text).

clinical trial, but an attempt to implement a complex intervention as a quality improvement initiative. In such a paradigm, it is impossible to control for all potential confounders. For example, results of chart reviews must be interpreted with some caution because neither facility staff nor the APNs conducting the reviews were blind to the

timing and content of the intervention. Nevertheless, NH staff were not aware a priori that postintervention chart reviews would be conducted. Corporate and regional nurses supervised facilities in the intervention and nonintervention groups during the study. Although staff in the nonintervention facilities were trained after project completion,

Table 3. Key Outcomes Associated with Implementation of the Fall Management Program

Measure/100 Residents	Quarter 1	Quarter 2	Quarter 3	Quarter 4	P-value
	Mean (Range)				
Falls					
FMP	17.3 (6.0–29.3)	17.8 (6.7–48.7)	17.7 (5.4–36.8)	16.4 (2.7–31.5)	.59
Control	15.0 (2.4–40.6)	16.4 (2.8–47.1)	17.9 (2.6–42.0)	18.9 (2.4–45.7)	.02
Serious injuries					
FMP	0.8 (0.0–4.9)	0.6 (0.0–3.0)	1.0 (0.0–3.2)	0.7 (0.0–4.2)	.79
Control	1.0 (0.0–6.8)	0.9 (0.0–4.9)	0.9 (0.0–7.2)	0.6 (0.0–3.1)	.30
Restraints					
FMP	7.9 (0.0–15.0)	7.3 (0.0–19.0)	5.8 (0.0–12.0)	4.4 (0.0–9.0)	< .001
Control	7.0 (0.0–20.0)	6.0 (0.0–17.0)	5.0 (0.0–13.0)	4.9 (0.0–14.0)	.002

Note: Data shown are for all 19 facilities that participated in the Fall Management Program (FMP) and the 23 facilities not participating (Control).

personal influence from supervisors may have led to contamination of nonintervention sites during the project.

Despite limitations in the project design and generalizability of the results, the FMP may be a helpful tool for NHs attempting to reduce physical restraint use in response to CMS and other quality initiatives. Further work is needed to adapt the FMP to the resource limitations of the long-term care environment to make it more feasible to implement in large numbers of NHs. Technological innovations—for example, use of a secure Web-based quality improvement program—may be helpful in this regard. Concerted efforts to develop a culture of patient safety for NHs are necessary if practices are to be embedded in daily routines rather than reprioritized based on prevailing problems. In addition, further large-scale research is necessary to document that a program such as the FMP can be cost-effective in practice by improving the documentation of care processes and reducing costs of injurious falls while improving quality of life for NH residents and the staff caring for them.

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