JAMDA 13 (2012) 651–656

JAMDA

journal homepage: www.jamda.com

Original Study

Reducing Potentially Preventable Hospital Transfers: Results from a Thirty Nursing Home Collaborative

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Keywords:
Nursing homes
hospitalization
quality improvement

A B S T R A C T

Background: Nursing home (NH) residents experience frequent hospital transfers, some potentially avoidable. The objective of this report is to describe a replication of the Interventions to Reduce Acute Care Transfers program among member facilities of a New York City area NH provider association (INTERACT NY) and estimate its effect on hospital transfers.

Methods: INTERACT is a program that provides tools and strategies to assist NH staff in early identification, communication, and documentation of changes in resident status. Funding was obtained from a New York State health workforce training grant to conduct 13 INTERACT education and training sessions in 2010–2011. INTERACT NY session topics included the implementation process; use of its simple standardized communication tools, advance care planning tools, care paths, and change in condition support tools; quality review of hospital transfers; exercises for refining clinical skills; teamwork; and lessons learned. Sessions engaged NH executives, department heads, front-line nursing staff and their labor union, and staff from NHs' partner hospitals. Pre-/post- INTERACT NY hospitalization rates per 1000-resident days were compared using paired *t*-tests, stratified by level of facility engagement with the program and by baseline hospitalization rates.

Results: All 100% of participating NHs were non-profit or public. Those with complete evaluation data had 377 beds on average. There were a total of 333 attendees of the program (mean 25.6 per session; mean 11.1 per facility over the course of the program; range 1–44 per facility). The most common attendees in order of frequency were (1) nurse administrators, (2) unit-based nurses, (3) medical directors and attending physicians, (4) nursing home administrators, (5) certified nursing assistants, and (6) case managers and social workers. Sixteen nursing homes implemented at least one INTERACT tool. Overall, there was a nonsignificant 10.6% reduction in hospital admissions from 4.07 to 3.64 per 1000 resident-days from pre- to post-INTERACT NY ($P = .332$). Among nursing homes with high engagement there was a nonsignificant 14.3% reduction in hospital admissions from 4.19 to 3.59 per 1000 resident-days ($P = 0.213$). Finally, among nursing homes in the highest tertile of baseline (pre-INTERACT NY) hospital admission rate, there was a nonsignificant 27.2% reduction in hospital admissions from 7.32 to 5.33 per 1000 resident-days ($P = .102$). Planning and implementation lessons from INTERACT NY leaders and participants are reported.

Conclusions: INTERACT NY, a novel collaborative training program, resulted in good uptake of the INTERACT tools and processes among its member nursing homes. Changes in hospitalization rates associated with INTERACT NY were similar to those observed in previous implementations of INTERACT. The program addresses a growing interest in reducing potentially preventable hospital admissions among nursing home residents and providing alternatives to hospital care through standardized approaches to communication, early identification of clinical issues, decision-support, and support for partnerships between acute and post-acute care providers.

Published by Elsevier Inc. on behalf of the American Medical Directors Association, Inc.

This project was supported by a New York State Workforce Training grant. One author was supported by the Greenwall Foundation.

The authors have no conflicts of interest to report.

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1525-8610/$ - see front matter Published by Elsevier Inc. on behalf of the American Medical Directors Association, Inc.
http://dx.doi.org/10.1016/j.jamda.2012.06.011

Interventions to Reduce Acute Care Transfers (INTERACT) is a nursing home quality improvement program designed to assist nursing homes in reducing potentially preventable transfers of residents to hospitals. Nursing homes participating in INTERACT are instructed on how to incorporate new evidence-based tools into practice, including communication and advance care planning tools, care paths, and quality improvement tools and techniques. INTERACT supports interdisciplinary nursing home managers and staff during planning and executing program implementation. The impact of this program was first examined among three nursing homes with relatively high transfer rates in Georgia[1] where INTERACT was associated with a 50% decreased hospitalization rate, and second among 30 nursing homes in Florida, Massachusetts, and New York, where the program was associated with a 17% reduction in hospitalization rate, with the magnitude of impact correlating with the degree of facility engagement with the program.[2] These results indicate promise for this program in reducing potentially preventable hospitalization rates among nursing home residents and demonstrate the value of high quality long term care to hospitals, health systems, and newly emerging integrated care organizations in a future where shared savings models are prevalent.[3]

There are compelling reasons for nursing homes to become engaged in reducing potentially preventable hospital transfers. From the health care system perspective, hospital care is much more expensive than nursing home care; therefore, if outcomes are equivalent or better for nursing home care for the same condition,[4] substantial savings may accrue.[5] Some or all of this savings can be put back into the system to improve health care services for nursing home-eligible individuals and/or to incentivize providers to further prevent avoidable hospital transfers, as is being done with Medicare Advantage capitated programs such as Evercare,[6] and value-based purchasing or pay-for-performance programs. From the patient perspective, nursing home care avoids the disruption of transitioning into and out of the hospital, may avoid iatrogenic complications of acute illness that occur in the hospital because of more aggressive interventions and less attention to the mobility and nutritional needs of disabled individuals,[7,8] and avoids the risk of losing one's residence after temporarily vacating a nursing home room.

In 2010 and 2011, the Continuing Care Leadership Coalition, a nursing home provider association in the New York City metropolitan area, initiated an INTERACT collaborative quality improvement program among its members with support from a New York State workforce training grant. Interventions to Reduce Preventable Acute Care Transfers NY (INTERACT NY) was implemented among 30 participating nursing facilities and some of their partner hospitals. The objective of this report is to describe the program, describe the participating nursing homes and their engagement with the program, examine the before-after change in hospitalization rate associated with the program, and explore factors that might have influenced the impact of the program.

Methods

Program

INTERACT NY consisted of a customized educational program for facility leadership and staff, print and internet INTERACT tool materials, hands-on implementation support, and data collection support for self-evaluation. Briefly, the INTERACT toolkit is made up of: (1) the Situation, Background, Assessment or Appearance, Request (SBAR) tool, designed to promote effective nurse-physician communication, (2) the Early Warning Tool (Stop and Watch), designed to promote early recognition and communication of significant change in resident status, (3) a hospital transfer review tool to guide retrospective review of cases of hospitalization and avoided hospitalization to identify potentially preventable causes, (4) a standardized patient transfer form and checklist to facilitate access to critical patient information at the time of inter-organizational transfer, (5) care paths to guide evaluation and treatment of common conditions that precipitate hospital transfer (eg, mental status change), and (6) advance care planning tools to guide decision-making and communication about end-of-life care. INTERACT tools are available for no charge at http://interact2.net and also are described in detail by Ouslander et al.[1]

All member facilities of Continuing Care Leadership Coalition (approximately 100) were invited to participate. Participants signed an INTERACT NY participation agreement in which they agreed (1) to implement clinical and operational strategies to promote quality improvement, (2) to name administrative and clinical co-champions to coordinate the training of facility staff, the implementation of INTERACT tools, data collection, and participation in scheduled learning sessions, (3) to roll out one or more INTERACT tools in at least one post-acute care unit and one long term care unit, (4) to allocate staff time (eg, 2 hours per week for the champion role) for attendance at program meetings, conference calls and other activities, (5) to measure INTERACT tool utilization to achieve performance benchmarks, and (6) to collect and submit program evaluation measures (eg, hospital transfer reports) and other facility data.

Following an extensive collaborative design process, educational sessions took place from October 2010 to October 2011 (Table 1) in which participants were provided an overview of the program, its tools, and the implementation process. Most sessions consisted of a didactic component followed by interactive peer-sharing of experiences and effective practices. A focus at each session was integration of INTERACT activities into each organization's quality improvement processes and standard operating procedures. Novel activities of INTERACT NY that were not part of previous INTERACT roll-outs included: (1) an in-person briefing for nursing home executives, (2) a session with a high-fidelity patient simulator which provided hands-on experience utilizing INTERACT tools, refining INTERACT skills and correcting mistakes through debriefing, (3) engagement of hospitals and health systems with the assistance of the affiliated hospital association (with hospital staff attending a mid-year learning session, the patient simulation and debriefing session, and the final learning session), (4) one session dedicated to the empowerment of frontline staff, and (5) engagement of a union representing frontline staff, which included the involvement of a joint staff-management project to advance person-centered care. The extent of training and skills development that subsequently occurred at each facility depended on the composition of the teams and varied among the 30 participating organizations; more than 2000 staff members were trained locally. As a quality improvement project, this project was determined to be exempt from human subjects review by the Jewish Home Lifecare Institutional Review Board.

Evaluation

The evaluation was a pre- and postintervention design; the primary outcome was reduction in hospital transfer rates. Nursing home administrators were asked to complete surveys in which they reported the number of hospital transfers and average daily census by month from July 2009 to June 2010 (pre-INTERACT NY) and April to September 2011 (last 6 months of INTERACT NY). To account for hospitalization rates that are often seasonal (there are increases in respiratory illnesses during winter months), pre-INTERACT NY data from October 2009 to March 2010 were excluded because there was no comparative post-INTERACT NY data for those months of the year. The average daily census for

Table 1
INTERACT NY Training Program

Date(s)	Activities
October 2010 and January 2011	Initial learning sessions * Overview of the program and its tools, and the implementation process.
February, 2011	* Focused on two of INTERACT's communication tools, the Situation, Background, Assessment or Appearance, Request (SBAR) and the Early Warning Tool (Stop and Watch). * Highlighted best practices around effective nurse-physician communication and early recognition of significant change in resident status.
March, 2011	* Discussed the Quality Improvement Tool for Review of Acute Care Transfers. * Presented pilot program findings. * Discussed issues of hospitalization avoidability, the tool's impact on performance improvement processes, and implementation successes and challenges. * Organizations shared best practices on retrospective review approaches for reducing preventable hospitalizations.
April, 2011	* Focused on essential elements of the standardized Transfer Form and outlined key expectations from hospitals. * Featured CCLC's work on the continuum of Care Improvement Through Information New York, a health information exchange initiative integrating the INTERACT Transfer form electronically while providing clinical decision support. * Peers noted best practices and interactions with Emergency Departments.
May, 2011	* Facilitated partnerships between long term care and acute care organizations in targeting the shared goal of reducing preventable hospitalizations and readmissions. * Discussed successful partnerships with use of INTERACT tools and related care transitions efforts.
June, 2011	* Discussed organizations' activities around use of Support Tools, including Care Paths and Change in Condition File Cards. * Targeted physicians, nurse practitioners, physician assistants, and other clinicians with interest in evidence-based care paths.
July, 2011	* Provided an opportunity for participants to use a high-fidelity patient simulator. The teaching and debriefing provided hands-on experience utilizing INTERACT tools, refined skills, and corrected mistakes.
August, 2011	* Conducted a session featuring a guest speaker from New York State Department of Health, which allowed participants to discuss Department of Health's expectations related to the new Palliative Care Acts. * Participants shared current approaches and best practices regarding palliative care and advance care planning.
September, 2011	* Held a learning session recognizing frontline staff who have demonstrated exemplary work as team members in organizations implementing INTERACT NY.
October, 2011	* Culmination session on lessons learned and next steps in integrating INTERACT NY into organizational goals and coordinating related care transitions activities with hospital partners.

CCLC, Continuing Care Leadership Coalition; INTERACT, Interventions to Reduce Acute Care Transfers.

each month was used to calculate the hospitalization rate per 1000 resident days to account for month-to-month, and facility-to-facility variations in census.

Nursing home administrator surveys also asked for information about staff turnover, payer mix, availability of primary care providers (physicians, nurse practitioners, and physician assistants), and access to tests and procedures. Consistent with the national nursing home quality improvement campaign, Advancing Excellence in America's Nursing Homes, annualized staff turnover rates were calculated as total number of staff terminated over the course of a year divided by the average number of staff employed (see http://www.nhqualitycampaign.org/). Participating NHs also were asked to report prevalence of hospice use and advance directives on one day at project inception and one day at project completion. Finally, each facility's level of engagement with the program was ascertained through a survey of tool implementation. Facilities that implemented at least one tool were classified as having "high" engagement, whereas facilities whose staff attended INTERACT NY sessions but did not implement any INTERACT tools were classified as having "low" engagement.

Descriptive analyses stratified INTERACT NY participating nursing homes by whether they provided complete hospitalization data for evaluation. Descriptive statistics were calculated for level of engagement with the program, including number of tools implemented and attendance at educational sessions. Outcome analyses included only those facilities ($n = 18$) that provided complete pre- and post-intervention hospitalization data for evaluation. For the primary outcome, post-INTERACT NY hospitalization rates per 1000-resident days were compared with pre-INTERACT NY rates using the paired *t*-test. Factors associated with change in hospitalization rates were examined using Pearson correlations. Stratified analyses were conducted to ascertain subgroups of facilities that had the greatest response to the program. All analyses were conducted with IBM SPSS (Armonk, NY).

Results

Facility Characteristics

Thirty nursing homes agreed to participate in the project and had staff who attended at least one INTERACT NY session. Characteristics of nursing homes with and without complete evaluation data are shown in Table 2. Those with complete evaluation data were 100% not-for-profit or public, had 377 beds on average, and had 79% and 13% of residents with Medicaid and Medicare as payer, respectively. There were no significant differences between nursing homes with and without complete evaluation data in medical staffing, staff turnover, medical services provided, and advance directives, with the exception that nursing homes with complete data had a higher average annual CNA turnover rate (Table 2).

Tool Implementation and Engagement

There were a total of 333 attendees to the 13 sessions of the program (mean 25.6 per session; mean 11.1 per facility over the course of the program; range 1-44 per facility). The most common staff attendees in order of frequency were (1) nurse administrators, (2) unit-based nurses, (3) medical directors and attending physicians, (4) nursing home administrators, (5) certified nursing assistants, and (6) case managers and social workers. Sixteen nursing homes implemented at least one INTERACT tool and were classified as having high engagement. The average number of tools implemented per facility with high engagement was 5.8. The most commonly implemented tools were: Early Warning Tool (Stop and Watch) in 13 nursing homes, SBAR in 12, hospital transfer review tool in nine, acute care transfer log in seven, care paths in four, and advance directive planning tools in three. Nursing homes with high engagement had greater average staff attendance at INTERACT NY sessions than nursing homes with low engagement or who did not provide

Table 2
Facility Characteristics

	NHs with complete evaluation data	NHs without complete evaluation data	*P* value
Demographics, number of respondents, n	18	12	
Not-for-profit n (%)	17 (94.4)	11 (91.7)	.089
Public municipality n (%)	1 (5.6)	1 (8.3)	—
Bedsize, average (SD)	376.8 (198.7)	262.8 (136.2)	.095
Medicare payer—average percent (SD)	12.7 (7.8)	20.9 (20.1)	.125
Medicaid payer—average percent (SD)	78.9 (12.2)	71.0 (22.7)	.224
Other payer—average percent (SD)	8.4 (6.7)	8.0 (4.9)	.878
Medical and nurse staffing, respondents, n	16	6	
Medical director hours per week (SD)	30.1 (9.8)	25.3 (13.7)	.371
Number of doctors (SD)	7.0 (2.9)	5.6 (2.7)	.357
Number of nurse practitioners (SD)	1.5 (1.7)	0.6 (0.9)	.269
Number of physician assistants (SD)	0.2 (0.5)	0 (0)	.458
Administrator changes past 3 years (SD)	0.6 (0.7)	0.5 (1.2)	.883
Nursing director changes past 3 years (SD)	0.5 (0.6)	0.7 (1.2)	.674
Medical director changes past 3 years (SD)	0.2 (0.4)	0.8 (1.2)	.061
Nurse turnover, respondents, n	12	5	
RN turnover* (SD)	12.4 (13.2)	30.4 (25.7)	.071
LPN turnover* (SD)	16.6 (16.1)	16.1 (6.4)	.941
CNA turnover* (SD)	12.7 (4.3)	7.1 (4.7)	.032
Services available, respondents, n	16	6	
Intravenous fluids n (%)	16 (100)	5 (83.3)	.273
Intravenous antibiotics n (%)	16 (100)	5 (83.3)	.273
Intravenous other drug n (%)	13 (81.3)	2 (33.3)	.054
Laboratory turnaround <4 hours — n (%)	8 (50.0)	3 (50.0)	1.000
Xray turnaround <4 hours — n (%)	7 (43.8)	3 (50.0)	.793
Medication turnaround <4 hours — n (%)	9 (56.3)	4 (66.7)	.658
Advance directives, respondents, n	14	4	
On hospice — average percent (SD)	1.9 (2.0)	1.0 (1.4)	.398
Power of Attorney — average percent (SD)	30.7 (25.1)	6.5 (4.5)	.129
Living will — average percent (SD)	6.2 (5.2)	3.1 (1.7)	.341
DNR — average percent (SD)	43.8 (19.3)	23.2 (12.2)	.065
DNH — average percent (SD)	7.9 (8.8)	3.0 (2.3)	.304

*Annualized turnover rate calculated as total number of staff terminated in 1 year divided by the average number of staff employed at a time (http://www.nhqualitycampaign.org/).

complete evaluation data (14.8 vs 6.9, $P = .008$). In bivariate analyses, high facility engagement was associated with having fewer number of residents with Medicare as payer (Pearson correlation coefficient −0.681), fewer number of residents on hospice (-0.677), and greater annual CNA turnover (0.622).

Hospitalizations

Overall, there was a 10.6% reduction in hospital admissions from 4.07 to 3.64 per 1000 resident-days from pre- to post-INTERACT NY that was non-significant ($P = .332$) (absolute change −0.43; 95% CI −1.33 to 0.47) (Table 3). Among nursing homes with high engagement there was a similar 14.3% reduction in hospital admissions from 4.19 to 3.59 per 1000 resident-days that was nonsignificant ($P = .213$) (absolute change −0.60; 95% CI −1.59 to 0.38). Finally, among nursing homes in the highest tertile of hospital admission rate pre-INTERACT NY (≥3.7 per 1000 resident-days), there was a 27.2% reduction in hospital admissions from 7.32 to 5.33 per 1000 resident-days that was non-significant ($P = .102$) (absolute change −1.99; 95% CI −4.56 to 0.57).

Factors Influencing Impact of Program

In bivariate analyses, greater pre- to post-INTERACT NY hospitalization reduction was associated with a higher pre-INTERACT NY hospital admission rate (Pearson correlation coefficient 0.929), but no other nursing home characteristic, including level of INTERACT NY engagement. In addition, number of medical director hours per week, but no other nursing home characteristic, was associated with lower rates of hospital admission pre-INTERACT NY: nursing homes with >34 medical director hours per week (the median) had a pre-INTERACT NY hospital admission rate of 3.12 per 1000 residents-days, compared with 5.80 among facilities with ≤34 hours ($P = .087$). Factors that might improve the program's effectiveness according to INTERACT NY leaders and participants include recommendations on planning, staff and stakeholder engagement,

Table 3
Hospitalization Rates Overall and for Selected Subgroups

Group (n)	Pre-INTERACT NY* (SD)	Post-INTERACT NY* (SD)	Absolute change* (95% CI)	*P* value	Percent change
All (18)	4.07 (3.51)	3.64 (1.95)	−0.43 (−1.33 to 0.47)	.332	−10.6%
Engagement					
High (16)	4.19 (3.72)	3.59 (2.07)	−0.60 (−1.59 to 0.38)	.213	−14.3%
Low (2)	3.07 (0.42)	4.05 (0.26)	+0.98 (−0.46 to 2.42)	.073	+31.9%
Baseline transfer rate by tertile					
High (6)	7.32 (4.59)	5.33 (2.38)	−1.99 (−4.56 to 0.57)	.102	−27.2%
Medium or low (12)	2.44 (0.93)	2.80 (0.98)	+0.36 (−0.03 to 0.74)	.067	+14.8%

*Hospitalization rates are per 1000 resident-days.

implementation, training, and sustainability, and are shown in Table 4.

Discussion

Results of INTERACT NY increase our knowledge of the impact of the INTERACT quality improvement program on reducing potentially preventable hospital transfers from nursing homes. As in previous implementations of INTERACT, INTERACT NY was associated with a modest reduction in hospital transfers (11%, consistent with 17% in INTERACT II[2]), and results suggested a greater reduction with greater engagement in the program (14% reduction in engaged facilities vs. no reduction in non-engaged facilities). However, the reductions observed in INTERACT NY were not statistically significant and may have been a result of chance or insufficient sample size (type II error), with only 18 facilities providing complete evaluation data.

The 30 facilities participating in INTERACT NY committed substantial time and effort to the program, sending staff to attend 11 sessions on average, and reporting that they trained >2000 staff in INTERACT materials locally. In addition, 16 facilities made efforts to change practice by implementing at least one INTERACT tool, tools that require active, thoughtful integration into the nursing home practice setting. This is a setting in which it is particularly difficult to implement new, optional tools because of substantial regulations and governmental oversight. Nursing homes' partner hospitals also sent staff to INTERACT NY sessions even though the INTERACT tools were not designed for the hospital setting.

This overall commitment to INTERACT NY underscores the interest and need among nursing homes and hospitals to reduce hospital transfers, especially transfers that could be classified as avoidable due to a condition that might have been safely cared for in the nursing home.[9] The availability of an "off-the-shelf," free toolkit and training program may empower nursing homes that otherwise may not do so to embark on an effort to reduce potentially preventable hospital transfers. For hospitals, interest in this program is driven by imminent reimbursement penalties for readmissions and for adverse preventable hospital-acquired conditions ("never-events"). For policymakers, this interest is driven by the fact that hospital care is much

Table 4
Implementation Lessons from INTERACT NY Leaders and Participants, and Resources Needed for Implementation.

Topic	Lessons and Strategies
Staff and stakeholder engagement	More than one champion should be identified, who will select a core team.
	Senior management must give direction, support, and follow up. Medical and nursing director involvement is vital, since INTERACT tools require nursing and medical knowledge and a familiarity with practice in the nursing home setting.
	Early engagement of frontline staff, office clinicians, hospital providers, managers, community members, patients, and family members is helpful.
	Partnerships with acute care facilities should be developed if not already present.
Planning	Plan measurable and realistic target outcomes, with short-term and long-term timelines, and clear processes for implementation and evaluation.
	Recognize that organizational change takes time. Such programs can take months to a full year to implement; INTERACT NY was implemented over 13 months.
	Over such a long time it is important to keep momentum going with regularly scheduled meetings (weekly or every other week during the planning period).
	Make sure INTERACT implementation is consistent with the facility's organizational policies and procedures and the way care is provided in the facility.
	Integrate INTERACT with the facility's quality improvement activities, since many of its tools and processes are concordant with quality improvement priorities
Implementation	Effective initial implementation of INTERACT is critical to its long-term sustainability. If it stagnates at the beginning it will not "take hold" and it will be difficult to build support for the program
	Take a gradual approach to implementation. Facilities should start with one or two pilot units, and then when successful, expand to additional units. Facilities should start with one tool and then when successful, expand to additional tools.
	Demonstrate the usefulness of the tools and make them visible in everyday practice in the facility. Memos and posters can be used to increase awareness of the overall project and for each tool where it is used.
	Advance care planning efforts are key: resident and family preferences, as well as ethnicity and culture, affect the hospital transfer decision.
	If necessary, facilities should modify INTERACT tools to suit organizational needs, while taking care to preserve the integrity of the tools.
	It may be effective to provide a "reward" to participating departments or units, especially a reward that reduces work burden. For every INTERACT process implemented, eliminate or streamline another task.
Training	Role playing with debriefing is an effective teaching method for using INTERACT tools while refining clinical skills and outcomes. Case simulation holds the interest of training participants more than didactic teaching.
	It is important to ensure that training and feedback are provided on all three shifts and for all disciplines that might use INTERACT tools.
	When appropriate use the INTERACT tools during staff education on other topics.
	"Close the loop" and provide updates on patient outcomes to involved staff members who used INTERACT tools.
	Because staff may naturally have an aversion to process changes, it is important to work with staff and discuss their "fears" or concerns about change.
Sustainability	The fact that this program provides opportunities for long term care facilities to assist hospitals and systems facing penalties from hospital readmissions will support the business case for sustaining INTERACT over time.
	Get regular feedback on implementation issues through informal brown bag lunches with floor staff and regularly scheduled meetings with managers.
	Measurement and evaluation are key to understanding the organization's successes and opportunities for improvement in implementing INTERACT.
	During INTERACT NY, even when residents could not be treated in the nursing home and were transferred to the hospital, INTERACT tools assisted in transfer of care via early identification, communication, and assessment of significant changes in a resident's status, which could be communicated to hospital providers.
	There is value to tracking residents at risk for hospital transfer who ultimately stay in the nursing home, in addition to tracking those who go out to the hospital.
	Make the program a key quality improvement initiative and incorporate INTERACT activities into facility policies and procedures. Program champions should be familiar with how INTERACT fits into national and state initiatives.

more expensive than nursing home care and substantial savings may be found with this approach. Finally, from the perspective of disabled individuals, remaining in the nursing home may be an effective way to avoid preventable iatrogenic complications and to avoid confusion and discomfort associated with transfer between environments.

The results of INTERACT NY suggest that the INTERACT program might have a greater impact in nursing homes with higher baseline hospital transfer rates, which in INTERACT NY showed a 27% reduction in hospital transfers from pre- to postimplementation (compared with no reduction in those with medium or low baseline transfer rates). This provides an opportunity to target facilities with high baseline hospitalization rates, which are most likely to benefit from the program. Our results also demonstrate that the INTERACT program could be effective in a sample of not-for-profit and public nursing homes that had 76% of residents with Medicaid as payer. Other differences between facilities participating in INTERACT NY and previous groups of facilities implementing INTERACT were that those in INTERACT NY had lower rates of nursing staff turnover, lower prevalence of do not resuscitate orders and other advance directives, and lower percentage with an X-ray turnaround time of <4 hours. Compared with nursing homes nationally, the average size of INTERACT NY nursing homes (331 average bedsize) was substantially larger than the average size nationally (~100 beds), fewer (0%) were for-profit than nationally (~75%), and they maintained lower nursing and CNA turnover rates in comparison to other nursing homes in New York State and the nation.

This study has limitations that could both overestimate and underestimate the impact of INTERACT. First, this study was a pre- and postimplementation design, without a comparison group of facilities. Such studies do not prove that the program caused an effect on hospitalization rate. There remains the possibility of co-intervention (ie, one or more other interventions occurring simultaneously with INTERACT that influenced the hospitalization rate), and the possibility of a pre-existing downward trend in hospital transfer rate with which INTERACT coincided. In fact, during INTERACT NY at least two of the facilities had an increase in post-acute care admissions during the intervention period that may have affected their overall hospitalization rate. Nevertheless, they both focused on integrating INTERACT's care paths and other tools into their practices and both had reductions in their hospitalization rates.

Results of INTERACT NY are also limited by the fact that (1) facilities self-reported hospitalization data, (2) 12 of 30 facilities did not provide complete evaluation data and were excluded from the evaluation analysis, (3) observed changes among facilities with high and low baseline hospitalization rates could be a result of "regression to the mean," and (4) the sample size was small and differences between facilities in comparison groups could not be completely controlled for. Of note, study findings may underestimate INTERACT's potential effect because participating facilities were asked to implement the tools on two selected units, not all units, in order to optimize the chance of initial success. Wider roll out over a sustained period of time could increase the potency and effect of the intervention. In addition, we know of INTERACT NY facilities that used the tools but did not return their evaluation or tools surveys, resulting in a potential lessening of reported effect.

Finally, results from a collaborative multi-facility program such as this one may not apply to a facility that implements the program separate from a collaborative. Reasons that a facility may not be able to participate in a collaborative include: competing priorities such as organization restructuring or implementing Minimum Data Set (MDS) 3.0, new leadership, a focus on other quality improvement efforts, limited resources in difficult economic times, inability to dedicate the time of a champion and of a core team, and a rapidly changing environment under New York State's Medicaid redesign. Regardless of whether INTERACT is used as part of a collaborative or not, implementation observations from INTERACT NY leaders and participants (Table 4) suggest that INTERACT is most effective when it is consistent with the facility's organizational policies and procedures and the way care is provided in the facility, and it is integrated with the facility's quality improvement activities.

Conclusion

The INTERACT program addresses a growing interest and need for nursing facilities to play a role in reducing potentially preventable hospital admissions and providing alternatives to hospital care for disabled individuals receiving long term care. The program is built on sound principles, with evidence to support the tools in the toolkit.[9,10] Two pre- and post-studies, including this one, demonstrated modest hospitalization reductions associated with the program in different nursing facility populations and with varied approaches to education and engagement. INTERACT may be particularly effective in facilities with high baseline transfer rates, although the INTERACT NY experience suggests that nursing facilities with any level of hospital transfer rates could benefit from the implementation of evidence-based tools, tracking hospital transfer rates, analyzing transfer experiences, and demonstrating their value to hospitals and other transfer partners. In this way, INTERACT NY illustrates important opportunities for the long term care sector to improve care, reduce potentially preventable hospitalizations and readmissions, and to provide solutions for creating efficiencies for the larger health care system, in particular to assist hospitals facing penalties as a result of hospital readmissions.

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