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The Impact of Incomplete Nursing Home Transfer Documentation on Emergency Department Care

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Abstract

Objectives: Emergency department (ED) clinicians rely on the accuracy of written communication when assessing needs of nursing home (NH) residents. This study aimed to review the completeness of NH transfer documentation according to expected core components, as guided by the INTERACT 4.0 quality improvement tool. We also describe the association between patient or facility characteristics and transfer documentation completeness, as well as establish whether information gaps in NH-ED transfer documentation were associated with hospital admission.

Design: Retrospective study using 2 abstractors blinded to the study aims.

Setting and Participants: 474 records from NH residents transferred to the 3 EDs of Rhode Island's largest health care system from September 2015 to September 2016.

Measures: NH-ED transfer documentation completeness was reviewed according to the expected core items of transfer documentation, guided by the INTERACT 4.0 quality improvement tool. We used multivariable linear regression with random effects to assess factors associated with NH-ED transfer documentation completion and logistic regression with random effects to assess the relation between information gaps and hospital admission.

Results: Of the 474 NH-ED transfer visits, mean patient age was 76 years; 43% were male, 14% were nonwhite, and 34% had dementia. NH-ED transfer documents were present for 97% of visits, and an average 11.9 of 15 INTERACT core items were complete. Usual mental status and reason for transfer were absent for 75% of patients, whereas functional status was absent for 80%. The multivariable model showed that a higher Charlson Comorbidity Index score (coefficient 0.08, standard error 0.04, $P = .03$) was associated with more complete documentation. More complete documentation was associated with greater likelihood of hospital admission (adjusted odds ratio = 1.09, 95% confidence interval = 1.01–1.18).

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The authors declare no conflicts of interest.

Conclusions/implications: Usual mental and functional status and the reason for transfer are often missing in NH-ED transfer documents and should be incorporated into standardized transfer forms.

Keywords

Transfer documentation; nursing home; emergency department; dementia

Nursing home (NH) residents account for more than 2.2 million US emergency department (ED) visits annually.¹ Incomplete information could adversely impact patient care and ED disposition decisions, especially for NH patients with dementia. Prior studies show that only 28% of NH patients are able to accurately state their reason for the ED visit,² and two-thirds of NH residents have cognitive impairment.³ Therefore, ED physicians often make management and admission decisions for patients based largely on written communication from NH staff.

Longer ED stays, medication errors, unnecessary resource utilization, and rehospitalization are known consequences of ineffective communication between NHs and EDs of NH transferred patients.^{1,2,4} The 2009 National Patient Safety Goal established by the Joint Commission made improving transitions of care (including NH-ED transfers) for older adults a major imperative.⁵ In addition, the National Plan to Address Alzheimer's Disease states that safe and effective transitions between care settings and systems are paramount to improving the quality of care for those with Alzheimer's disease.⁶ Efforts to improve and standardize NH-ED transfers include the adoption of the INTERACT (Interventions to Reduce Acute Care Transfers) form, which is the most widely accepted and studied tool to assist with care transitions for NH patients.^{7,8} In Rhode Island (RI), a statewide transfer form, known as the Continuity of Care form, is required for any transfers from NH facilities to hospitals. The use of this form is encouraged, but implementation and monitoring of the form's use is NH-dependent.

Studies are lacking that have evaluated the potential effect on ED clinicians' admission decisions of incomplete NH-ED transfer documentation. Several patient and NH factors could affect the completeness of NH-ED transfer documentation. We hypothesized that patients who were less critically ill (higher Emergency Severity Index [ESI]), those without dementia, and those with less serious comorbidities (as characterized by a lower Charlson Comorbidity Index score) would have less complicated medical complaints and subsequently more complete transfer forms. Additionally, we hypothesized that NHs with lower quality ratings, according to the Centers for Medicare and Medicaid Services (CMS) Five-Star Quality Rating System, and higher staffing ratios have less skilled staff and less time to assess patient needs, leading to less complete documentation. Furthermore, we hypothesized that ED providers would be more likely to admit NH patients to the hospital when information gaps were present on transfer forms.

Our specific objectives were to (1) review the completeness of NH-ED transfer documents according to the expected core items of transfer communication (guided by the INTERACT 4.0 quality improvement tool); (2) determine whether patient or facility characteristics are associated with less or more complete transfer documentation completeness; and (3)

establish whether information gaps in NH-ED transfer documentation are associated with greater likelihood of hospital admission.

Method

Study Design and Setting

We performed a retrospective study of a random sample of NH patients transferred to the 3 EDs of RI's largest health care system from September 2015 to September 2016. All 3 hospitals are affiliated with the same medical school, and include 1 tertiary care referral level I trauma center, 1 academic community hospital, and 1 community hospital. These 3 hospitals' EDs have a combined annual census of 211,000 visits. The study involved reviewing documents and the corresponding electronic health record (EHR) of ED visits by these patients. The hospitals' institutional review board approved the study protocol.

Participants

ED visits by NH-ED transferred patients were selected for potential study inclusion using random sampling stratified by ED. Samples were selected proportionally by NH-ED transfer volume. Patients were eligible for study inclusion if they were aged 18 years or older, residing at a NH within RI, and had been transferred to one of the 3 EDs within the study time frame. Patients transferred from assisted living, retirement communities, or independent living communities were excluded. We excluded patients who were transferred to another hospital after their ED visit and patients who left before care was complete. For patients with multiple ED visits within the study time frame, only the first visit was included because documentation from subsequent ED visits was likely to be affected by the first ED visit.

Sample Size

The sample size calculation for this study was based on several assumptions. The 3 study sites have a combined admission rate of 57% for adults aged 65 years and older. Prior literature using the INTERACT tool showed that improved transition of care documentation reduced admission rates between 6% and 24%.^{9,10} Assuming a 57% admission rate and assuming a 13% absolute reduction of admission with improved documentation, we determined a sample size of 456 participants would be necessary to show a significant difference. This was calculated using a statistical power of 80% and a significance level of 0.05. Sample size calculations were made using OpenEpi.¹¹

Data Collection and Processing

Study data were abstracted from the EHR. The EHR contained the record of the ED visit and NH-ED transfer documentation. Emergency Medical Services ambulance transport reports were excluded from data abstraction, since the primary focus of the study was to assess direct written communication from the NH to the ED. Two graduate students (Y.L. and S.L.), blinded to the study objectives, abstracted the data. Data were abstracted according to previously published chart review standards, including abstractor training, use of a study-specific user manual, a standardized abstraction form, and investigator-review of initial abstractions to ensure uniform data collection and accuracy.^{12,13} Discrepancies were

adjudicated by consensus of the lead investigators (C.G. and E.G.). A random sampling of a subset of 5 items from 50 NH-ED transfer visits not included in the study was reviewed for interrater reliability. Interrater reliability between abstractors was high, with agreement of 94% to 100% per item. The lowest Cohen kappa was 0.83 (95% confidence interval: 0.65–1.00).

Data elements abstracted from the EHR were age, gender, and race as well as ESI, ED length of stay, 72-hour revisits, and 30-day readmission. Charlson Comorbidity Index scores were calculated based on independent review of medical conditions listed in the EHR by 2 medical students (A.T. and N.P.) with discrepancies adjudicated by the lead investigators. Hospitalization was defined as any admission to the hospital, including admission to an observation unit. Participants were classified as having dementia based on NH-ED transfer documentation and EHR medical history.

The INTERACT Version 4.0 NH to hospital transfer form⁸ is used by trained NH staff to communicate critical information about the NH resident to the ED or other hospital staff. The INTERACT 4.0 tool contains items such as resuscitation status (eg, patient has a “do not resuscitate” order), reason for transfer, prior medical history, vital signs, mental status, functional status, allergies, and medications. From the standpoint of the ED clinician, these 15 core items are the most likely to guide clinical decision making in ED care and affect the patient’s disposition. Furthermore, the INTERACT form provides the ED provider with the NH resident’s name, language, date of birth, contact information (family and medical provider), devices and treatments, isolation precautions, risk alerts, and personal belongings.

Data abstractors reviewed NH-ED transfer documentation and determined if the predetermined core items were present and available to ED clinicians. We used publicly available data from CMS’ NH compare website to obtain NH ownership and quality measures for NHs in RI.¹⁴ CMS compiles data from several sources to come up with the overall quality or “star rating”: (1) health inspection domain, (2) quality of resident care measures, and (3) staffing domain. The ratings are adjusted for NH case-mix as residents may have different care needs across NHs. The quality measure domain is a composite measure addressing a broad range of health status indicators of residents, such as the percentage of residents whose need for help with activities of daily living has increased, the percentage of residents who self-report moderate to severe pain, the percentage of residents who have had an ED visit, and others.

Primary Data Analysis

Statistical analyses were performed using SAS 9.4 (SAS Institute, Cary, NC) and R (RCore Team, Vienna, Austria). Summary data were presented as means with standard deviations for normally distributed continuous variables, as medians and interquartile ranges for non-normally distributed continuous variables and as counts and proportions for categorical variables. *T* tests, Mann-Whitney *U*, and Pearson χ^2 tests were used to evaluate differences between continuous normal, continuous non-normal, and categorical variables, respectively.

We examined the association of both patient characteristics and facility-level factors with the number of items completed using linear regression and described results with both

standardized and unstandardized coefficients. Specifically, we examined the relationship of patient age, gender, race (minority vs nonminority), dementia status, and Charlson Comorbidity Index score with completion. We also examined the relationship between documentation completion and facility-level factors, including ownership, CMS ratings (overall, survey, quality, and staffing ratings), the total number of residents, the number of certified beds, and the percentage occupancy (the total number of residents divided by the number of beds) using both univariate and models adjusted for patient characteristics. For the adjusted models, we adjusted for age, gender, race, dementia, and Charlson Comorbidity Index score of the patient. All models were mixed-effects models with random intercepts for individual NHs to account for correlation in documentation practices within individual NHs. Sensitivity analyses of models' individual slopes did not improve model fit. Therefore, we did not use these in the final model. All other variables were treated as fixed effects.

We used mixed-effects logistic regression models, both univariate and multivariate, to examine the association between disposition and documentation completeness. Specifically, we examined the association between patient characteristics (age, gender, race, dementia status, Charlson Comorbidity Index score), number of core items completed, ED type, and ESI, and disposition. The 3 EDs in the study evaluate patients with different levels of acuity and thus have different rates of admission; ESI is also strongly linked to disposition, so these 3 were included in the model.¹⁵ As in the linear models, NHs were treated as random effects because admission may be dependent on the originating NH; the likelihood of admission is partially dependent on the resources available in a NH.

Additional Analyses for Patients With a Dementia Diagnosis

In recognition that patients with dementia might comprise a patient population for which NH-ED transfer documentation might be less likely to be complete, causing these patients to be at greater risk of being admitted to the hospital from the ED, we conducted additional analyses for this subpopulation. We compared the demographic characteristics, Charlson Comorbidity Index scores, NH characteristics, NH-ED transfer documentation completion, and hospital disposition between participants with and without dementia. For the analysis of differences in completion of individual INTERACT core items by dementia status, Agresti-Caffo confidence intervals were computed.

Results

Characteristics of Study Participants, Visit Outcomes, and Subsequent Health Care Utilization

As depicted in the study inclusion flow diagram, 1926 ED visits were eligible for inclusion in the study period (Figure 1). Of these, 475 were sampled and 474 included in the study, with 1 being excluded as this NH resident was transferred from a doctor's office. Of the 474 ED visits, the mean patient age was 76 years; 43% were male, 14% were nonwhite, and 34% had dementia as noted in the NH transfer documents or the EHR (Table 1). NH residents spent a median of 5.8 hours in the ED, and 70% were admitted (Table 1). NH characteristics can be viewed in Appendix Table 3.

How Complete Was the NH-ED Transfer Documentation?

NH-ED transfer documentation was present for 97% of ED patient visits and the state Department of Health-required Continuity of Care form was present for 71% of NH-ED patient transfers. Of the 15 INTERACT core items, a mean of 11.9 was included in NH-ED transfer documents. Resuscitation status, whether measures such as cardiopulmonary resuscitation or tracheal intubation should be performed in case of cardiopulmonary arrest, was present in 84% of documentation (Figure 2). Patient usual mental status, functional status, and reason for transfer were missing from the majority of NH-ED transfer documents.

What Patient or Facility Characteristics Were Associated With NH-ED Transfer Documentation Completion?

Charlson Comorbidity Index score and dementia status were the only patient characteristics associated with greater NH-ED transfer documentation completeness, as measured by the number of core items completed per the INTERACT tool (Table 2). NH factors, including quality ratings and staffing, were not associated with the number of INTERACT core items completed (in either univariate models or models adjusted for patient characteristics). NH size, both in terms of number of residents and number of certified beds and ownership type, was also not associated with documentation completion.

Were Completeness of NH-ED Transfer Documentation and Patient or Facility Factors Associated With Hospital Admission?

In a model adjusting for race, gender, age, and ED type and ESI, each additional INTERACT core item completed in the NH-ED transfer documentation was associated with a 9% greater odds of admission (Table 3). Patients with dementia were more likely to be discharged rather than admitted to the hospital. Each additional point of the Charlson Comorbidity Index score was associated with an 11% increase in the odds of admission. Gender, race, and age were not associated with hospital admission in the adjusted model.

How Do NH-ED Transferred Patients With Dementia Compare to Other NH-ED Transferred Patients in Terms of NH-ED Transfer Documentation Completeness and Hospital Admission?

Study participants with dementia were older and had higher Charlson Comorbidity Index scores, but had similar rates of ED revisits at 72 hours and 30-day unplanned readmissions (Appendix Table 1). NH patients with dementia were less likely to be admitted compared to patients without dementia (63% vs 73%; $P = .04$). Participants with dementia had approximately 1 more INTERACT core item complete in their NH-ED transfer documentation, as compared to those without dementia (Appendix Table 2). Documentation of usual mental status was absent for 72% and functional status was absent for 88% of this patient population. In 23% of the participants for whom the EHR listed dementia as a diagnosis, the NH-ED transfer documentation did not include a diagnosis of dementia.

Discussion

In this study of NH patients presenting to the 3 EDs of RI's largest health care system, we found that almost all NH patients arrived at the ED with NH-ED transfer documentation, but there was often missing documentation of dementia diagnosis (23%), usual mental (25%) and functional status (20%), and reason for transfer (25%). None of the NH quality measures were associated with greater NH-ED transfer documentation completion.

Contrary to our expectations and after adjustment for comorbidities, greater completion of NH-ED transfer documentation (per the INTERACT tool) was associated with higher likelihood of hospital admission. One explanation for this finding is that NH staff anticipated that "sicker" patients would require hospital admission, and subsequently provided more complete documentation. Furthermore, factors not included in the Charlson Comorbidity Index score and other factors not assessed in this analysis could influence admission decision making. Prior research results are congruent with our findings that NH-ED transfer documentation is often incomplete.^{16–20} However, although previous literature suggests that NHs that accept Medicaid provide less information to ED providers, none of the NH characteristics we evaluated were associated with improved documentation.²¹

Our data also indicate that although standardized forms are often used for NH-ED transfer documentation, those forms lack critical data for ED decision making, specifically patients' usual mental and functional status and reason for transfer. Approximately 10% of visits to EDs by NH residents are due to altered mental status, and in the absence of clear documentation of the patient's usual mental status, ED clinicians might miss a crucial diagnosis of delirium.^{20,22–24} Documentation of usual functional status is paramount because impairment in this domain often leads to poor health care outcomes, therefore often playing a key role in ED disposition decision making. Efforts to determine which patients are most likely to worsen after an ED visit have consistently shown that those with functional impairment are the most likely to deteriorate after their ED visit and require ED revisits.^{25,26} Usual functional status was not indicated in 4 of 5 ED-NH transfers in this study, and this could have led to errors in the assessment and disposition of these patients. Approximately three-quarters of NH patients in our study arrived in the ED without a documented reason for transfer. Without a reason for transfer, ED clinicians cannot target their diagnostic testing, which might result in poor resource utilization, including extensive testing, long ED stays, and hospitalization.

Existing Initiatives to Improve Care Transitions

In September 2012, CMS launched the Initiative to Reduce Avoidable Hospitalizations among Nursing Facility Residents that focused on clinical and educational interventions in NHs. The 7 organizations that participated in this initiative specifically addressed transitions to EDs and included training on standardized communication tools, advance care directive training, and medication reconciliation. The INTERACT tool was used to assist with transitions of care from NHs. Despite the use of this standardized transition of care tool and the provision of education to NH staff, there were no reductions in rehospitalization for most sites.²⁷ Many NH residents are frail, and therefore measures aside from hospitalizations may be more appropriate for assessing the quality of care transitions. Although our study results

showed admissions were not less frequent for those with more complete information, it is possible that other patient-centered outcomes, such as quality of life, rates of invasive testing, impairment-free days, or mortality are improved with better transitions of care.

Limitations

There are several limitations to our investigation. First, this analysis included ED visits of a large health system in 1 state. Although we included all NHs in the state and 3 different hospitals—representing both academic and community EDs—our results might not be generalizable to other states and health care systems. Although prior studies have shown that verbal communication between ED and NH staff is rare,²⁸ we do not know if ED and NH staff communicated verbally to address gaps in the transfer paperwork. Additionally, it is possible that additional transfer paperwork not included in the EHR was sent to the ED with the patient but was lost in the ambulance or at the receiving ED and therefore was not uploaded into the EHR. In addition, it was beyond the scope of this work to categorize patient's chief complaints as requiring admission or not. Prior work to evaluate whether hospital admissions are necessary or preventable based on ED diagnoses has been fraught with controversy, as NH patients are often complex and their care needs often exceed the capabilities of NH facilities.^{29,30}

Implications for Policy or Practice

We propose some key recommendations from the findings of this investigation. Standardization of NH-ED transfer documentation should be encouraged, because it allows for rapid ascertainment of critical patient information such as patient usual mental and functional status, care directives, reasons for transfer, and medications. Usual mental status should be included in transfer documentation because it is necessary in discerning between conditions and particularly avoiding a missed delirium diagnosis. Functional status is a key determinant of the need for admission and should be documented. As a result of this investigation, we convened NH and ED stakeholders in the state of RI to improve our current statewide standardized NH-ED transfer form. Our proposed form is in Appendix Form 1.

Improving NH-ED communication requires a multiple component approach and should involve standardized transfer forms or checklists, communication training, case managers, and multidisciplinary teams.³¹ Shared, interoperable EHRs to enable NH staff and ED clinicians to access important documents are important,^{32,33} and payment incentives might help overcome the key barrier to instituting these programs. Measures that adequately assess transitions of care on a more global scale, including NH to ED, ED to inpatient, and ED to outpatient are lacking. Further research is necessary to determine the effects (disposition, cost savings, recidivism) of individual interventions associated with specific NH-ED communication initiatives and to encourage effective measure development.

ED physicians determine the subsequent care trajectory of patients by making critically important decisions on not only the ED management of the patient but also whether the patient will be hospitalized or returned to his or her care facility. We can help ED physicians make the most informed decisions for patients, improve the safety of care, and decrease redundant and unnecessary testing by improving communication of NH-ED transfers.

Conclusions/Relevance

In conclusion, current NH-ED transfer documentation in the state of RI is often available at the ED visit, but typically does not contain key information ED physicians use to make management and disposition decisions. In particular, dementia diagnosis, usual mental and functional status, and reason for transfer are often missing in NH-ED transfer documentation. Standardized forms and payment incentives that support the creation of shared, interoperable EHRs may allow patients' vital health information and preferences to be known to the ED team.

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Appendix

RHODE ISLAND EMERGENCY TRANSFER FORM
Form for urgent / unplanned transfers - page 1 sending provider complete; page 2 is returned w/ patient v5.04/12/14

PROVIDER INFORMATION		PATIENT INFORMATION	
SENT TO: _____		LAST: _____ FIRST: _____ ML: _____	
SENT FROM: _____		DOB: ____/____/____ ☐ Male ☐ Female ☐ Other	
DATE: ____/____/____ UNIT: _____		PREFERRED LANGUAGE: ☐ English ☐ Other	

FACILITY CONTACTS		PATIENT / FAMILY EMERGENCY CONTACT	
NAME: _____ TITLE: _____		NAME: _____ RELATIONSHIP: _____	
NAME: _____ TITLE: _____		TELEPHONE 1: () • TELEPHONE 2: () •	
TELEPHONE: () • PAGER: () •		GUARDIAN: ☐ YES ☐ NO DPOA: ☐ YES ☐ NO	
TREATING PROVIDER		RESIDENT STATUS / LEVEL OF CARE	
NAME: _____ MD ☐ DO ☐ NP ☐ PA		☐ Short-Term / Rehab ☐ Long-Term Care ☐ Assisted Living	
TELEPHONE: () • PAGER: () •		Palliative Care: ☐ YES ☐ NO Hospice: ☐ YES ☐ NO	
PATIENT PSYCHIATRIC STATUS		ADVANCE CARE PLANNING (if all that apply & attach documentation)	
☐ Voluntary ☐ Involuntary ☐ Conservatorship ☐ Constant Observation		☐ Durable Power of Attorney ☐ Living Will ☐ MOLST	
CODE STATUS			
☐ NONE ☐ Do Not Hospitalize ☐ Do Not Intubate ☐ Do Not Resuscitate ☐ Comfort Measures Only ☐ Full Code			
REASON FOR TRANSFER (See SBAR form for more details)			
<div style="border: 1px solid black; padding: 5px;"> Baseline Change (Red flags) Main Concern </div>			
Last known normal (date/time): ____/____/____ AM/PM			
LIST OF DIAGNOSES:			
VITAL SIGNS: BP: _____ HR: _____ RR: _____ T: _____ pO ₂ : _____ FBS: _____ Glucose: _____ Time Taken: _____ AM/PM Allergies: _____ Influenza (date): ____/____/____ Pneumococcal (date): ____/____/____ Tetanus/TP/Tdap (date): ____/____/____			
BASILINE COGNITION		BASILINE PAIN	
Alert ☐ YES ☐ NO Oriented X3 ☐ YES ☐ NO Follow simple instruction ☐ YES ☐ NO		0 1 2 3 4 5 6 7 8 9 10 NO MODERATE SEVERE	
BASELINE AMBULATION		ISOLATION / PRECAUTION	
☐ Independent ☐ With assistance ☐ Not ambulatory		☐ C-Off ☐ MRSA ☐ TB ☐ ESBL ☐ Pressure Ulcers ☐ VRE Other: _____ Site: _____ Comment: _____	
DEVICES / SPECIAL TREATMENTS		AT RISK ALERTS	
☐ Foley Catheter ☐ Internal Defibrillator ☐ IV/PICC line ☐ Pacemaker ☐ TPN ☐ Other: _____		☐ None ☐ Falls ☐ Seizure ☐ Aspiration ☐ Elopement ☐ Meds (see list) ☐ Harm to self ☐ Harm to others ☐ Restraints ☐ Other: _____	
NURSING HOME CAPABILITIES FOR RESIDENT CARE			
☐ IVF therapy ☐ IV antibiotics ☐ CPAP ☐ Q shift monitoring by a RN ☐ MD/NP/PA follow up visit within 24 hours ☐ Other: _____			
NURSING HOME WOULD BE ABLE TO ACCEPT RESIDENT BACK UNDER THE FOLLOWING CONDITIONS:			
☐ ED determines diagnosis, and treatment can be done in NH ☐ Sending / receiving provider phone call ☐ VS stabilized and follow up plan can be done in NH ☐ Other: _____			
Attached Documentation & Personal Belongings: Shaded items required for all transfers others provided if relevant (check all that apply).			
☐ Face Sheet ☐ Current Medication List or MAR ☐ DPOA ☐ Living Will ☐ MOLST ☐ Wound Care Sheet ☐ Bed Hold Policy ☐ Recent H BP ☐ SBAR/Nurse Progress Notes ☐ Relevant Orders ☐ Relevant Labs ☐ Relevant X-rays ☐ Other ☐ Glasses ☐ Contacts ☐ Hearing Device: ☐ R/ ☐ L ☐ Walker ☐ Cane ☐ Dentures: ☐ U ☐ L ☐ Partial ☐ Prosthetic: _____			

Appendix Form 1.

Rhode Island nursing home to emergency department proposed transfer form

Appendix Table 1: Patient and Visit Characteristics by Dementia Status

Characteristics	Dementia (n = 161)	No Dementia (n = 313)	P Value
Age, mean (SD)	82.94(10.23)	72.92 (15.50)	<.001
Male	66 (41.0)	137 (43.8)	.63
Race			
Asian	2 (1.2)	1 (0.3)	.04
Black	14 (8.7)	22 (7.0)	
Other	14 (8.7)	11 (3.5)	
Unknown	1 (0.6)	0 (0.0)	
White	130 (80.7)	279 (89.1)	
Charlson Comorbidity Index, median (IQR)	3.00 (2.00, 4.00)	2.00 (0.00, 4.00)	<.001
ED type			

Characteristics	Dementia (n = 161)	No Dementia (n = 313)	P Value
Academic ED, level 1 trauma center	86 (53.4)	178 (56.9)	.74
Academic community ED	65 (40.4)	115 (36.7)	
Community ED	10 (6.2)	20 (6.4)	
Admitted	102 (63.4)	228 (72.8)	.04
ED length of stay, min, median (IQR)	355.50 (267.00, 449.00)	343.00 (271.25, 453.00)	.42
ESI of 3 or greater	74 (46.2)	116 (37.2)	
ED revisit within 72 h	10 (6.2)	17 (5.4)	.89
Readmission within 30 d	26 (16.1)	66 (21.1)	.24

ED, emergency department; ESI, Emergency Severity Index; IQR, interquartile range; SD, standard deviation. Values are n (%) unless otherwise noted.

Appendix Table 2: NH-ED Transfer Documentation Completion by Dementia Status

Characteristics	Dementia (n = 161)	No Dementia (n = 313)	Difference Between Dementia and No Dementia (95% CI)
Any correspondence from nursing home	158 (98.1)	302 (96.5)	1.6 (−1.8, 4.5)
RI DOH form present	122 (75.8)	216 (69)	6.8 (−1.8, 14.9)
Number of INTERACT core components complete, mean (SD)	12.4 (2.3)	11.7 (2.8)	0.6 (0.2, 1.1)
Individual INTERACT core components present			
Patient name	158 (98.1)	302 (96.5)	1.6 (−1.8, 4.5)
Patient date of birth	157 (97.5)	295 (94.2)	3.3 (−0.8, 6.7)
NH name	156 (96.9)	297 (94.9)	2 (−2.1, 5.5)
NH date of admission	145 (90.1)	276 (88.2)	1.9 (−4.3, 7.6)
NH clinician	153 (95)	288 (92)	3 (−1.9, 7.4)
NH contact information	148 (91.9)	270 (86.3)	5.6 (−0.4, 11.1)
Family contact information	155 (96.3)	279 (89.1)	7.2 (2.2, 11.5)
Medication allergies	145 (90.1)	279 (89.1)	1 (−5.2, 6.5)
Resuscitation status	142 (88.2)	256 (81.8)	6.4 (−0.5, 12.8)
Usual mental status	45 (28)	72 (23)	5 (−3.3, 13.4)
Usual functional status	35 (21.7)	60 (19.2)	2.5 (−5, 10.4)
Medications prescribed	149 (92.5)	284 (90.7)	1.8 (−3.7, 6.8)
Medical history	157 (97.5)	282 (90.1)	7.4 (2.8, 11.4)
Reason for transfer	37 (23)	82 (26.2)	−3.2 (−11.1, 5.1)
Most recent vital signs at NH	122 (75.8)	200 (63.9)	11.9 (3.2, 20.1)

CI, confidence interval; DOH, Department of Health; NH, nursing home; RI, Rhode Island. Values are n (%) unless otherwise noted.

Appendix Table 3: Nursing Home Characteristics

Characteristics	Nursing Homes (n = 62)
For-profit ownership	43 (69.4)
Overall rating	4 (2–4)
Survey rating	3 (2–4)
Quality rating	3.5 (3–5)
Staffing rating	4 (3–4)
RN staffing rating	5 (4–5)
Total residents, mean (SD)	102 (47.0)
Certified beds, mean (SD)	113 (43.0)
Occupancy percentage, mean (SD)	90.0 (8.4)

RN, registered nurse; SD, standard deviation.

Values are median (interquartile range) unless otherwise noted. No data were available for Veterans Affairs—operated Rhode Island Veterans Home.

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Key: NH—nursing home; ED—emergency department

Fig. 1.
Study inclusion flow diagram.

NH: Nursing home

Fig. 2.
Transfer documentation completion by core items.

Table 1**Patient and Visit Characteristics and Postindex ED Visit Health Care Utilization**

Characteristics	All Visits (n = 474)
Age, mean (SD)	76.32 (14.71)
Male	203 (42.8)
Race	
Asian	3 (0.6)
Black	36 (7.6)
Other	25 (5.3)
Not provided	1 (0.2)
White	409 (86.3)
Dementia	161 (34.0)
Charlson Comorbidity Index, median (IQR)	2.00 (1.00, 4.00)
ED type	
Academic ED, level 1 trauma center	264 (55.7)
Academic community ED	180 (38.0)
Community ED	30 (6.3)
ED length of stay, min, median (IQR)	349.00 (267.25, 450.75)
ESI of 3 or greater	190 (40.3)
ED Revisit within 72 hours	27 (5.7)
Readmission within 30 days	92 (19.4)

IQR, interquartile range.

Values are n (%) unless otherwise noted.

Table 2

Do Patient or Facility Characteristics Predict NH-ED Transfer Documentation Completion? Association Between Patient and Nursing Home Characteristics and Number of Core Items Completed

Characteristics	Univariable Models		Models Adjusted for Patient Characteristics	
	Coefficient (Standard Error)	Standardized Coefficient	Coefficient (Standard Error)	Standardized Coefficient
Patient characteristics				
Age (1-year increase)	0.01 (0.01)	0.07		
Male	0.06 (0.25)	0.02		
Race (nonwhite vs white)	0.49 (0.36)	0.18		
Dementia	0.63 (0.26) [*]	0.23		
Charlson Comorbidity Index (1-point increase)	0.11 (0.04) [†]	0.12		
NH characteristics				
For profit vs nonprofit ownership	0.09 (0.41)	0.01	0.12 (0.42)	0.02
Overall rating	0.05 (0.13)	0.02	0.03 (0.13)	0.02
Survey rating	0.03 (0.12)	0.02	0.02 (0.12)	0.01
Quality rating	-0.07 (0.14)	-0.03	-0.09 (0.14)	-0.04
Staffing rating	-0.12 (0.2)	-0.04	-0.07 (0.21)	-0.02
RN staffing rating	-0.33 (0.24)	-0.08	-0.3 (0.24)	-0.08
Total residents	0.01 (0.004)	0.11	0.01 (0.004)	0.10
Certified beds	0.01 (0.003)	0.10	0.01 (0.003)	0.09
Occupancy percentage	2.73 (2.47)	0.06	1.9 (2.48)	0.04

DOH, Department of Health; RN, registered nurse.

^{*} $P < .05$.

[†] $P < .01$.

Table 3

Does Greater NH-ED Transfer Documentation Completion Predict Hospital Admission? Odds of Hospital Admission by Patient and Hospital Factors and Number of INTERACT Core Components Completed

Characteristics	Univariable OR (95% CI)	Multivariable OR (95% CI)
Patient characteristics		
Age (1-year increase from the mean)	1.00 (0.99, 1.01)	1.01 (0.99, 1.03)
Male	1.23 (0.82, 1.86)	1.29 (0.82, 2.02)
Race (nonwhite vs white)	0.68 (0.38, 1.19)	0.67 (0.36, 1.24)
Dementia	0.65 (0.43, 0.98)	0.55 (0.34, 0.91)
Charlson Comorbidity Index	1.09(1.01, 1.18)	1.11 (1.02, 1.20)
Visit characteristics		
ESI (1-unit decrease from mean ESI)	3.56 (2.40, 5.27)	3.49 (2.33, 5.23)
NH-ED transfer documentation		
Each additional core item completed (from the mean number of items completed)	1.08 (1.00, 1.16)	1.09(1.01, 1.17)
ED type		
Academic community ED	Reference	Reference
Community ED	1.06 (0.44, 2.53)	1.53 (0.58, 4.06)
Academic ED, level 1 trauma center	1.85 (1.21, 2.83)	1.97 (1.24, 3.14)

CI, confidence interval.