

Reducing preventable patient transfers from long-term care facilities to emergency departments: a scoping review

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CLINICIAN'S CAPSULE

What is known about the topic?

Preventable transfers from long-term care facilities to emergency departments (EDs) contribute to ED crowding, a major health systems problem.

What did this study ask?

What interventions are most effective at reducing preventable transfers from long-term care facilities to EDs?

What did this study find?

Interventions using multi-disciplinary care teams, and/or regularly scheduled visits from care providers were the most effective.

Why does this study matter to clinicians?

Local implementation of the most effective interventions types could lessen preventable transfers, and thus reduce ED crowding.

then completed. This study adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis Extension for Scoping Reviews (PRISMA-ScR) guidelines.

Results: A total of 26 studies were included (Cohen's $k=0.68$). One was of low quality (Cohen's $k=0.58$). Studies were summarized into five themes based on intervention type: Telemedicine, Outreach Teams, Interdisciplinary Care, Integrated Approaches, and Other. Effective interventions reported reductions in ED transfer rates post intervention ranging from 10 to 70%. Interdisciplinary health care teams staffed within long-term care facilities were the most effective interventions.

Conclusion: There are several promising interventions that have successfully reduced the number of preventable transfers from long-term care facilities to EDs in a variety of health care settings. Widespread implementation of these interventions has the potential to reduce ED crowding in Canada.

ABSTRACT

Background: In Canada, there were over 60,000 long-term care facility patient transfers to emergency departments (EDs) in 2014, with up to a quarter of them being potentially preventable. Each preventable transfer exposes the patient to transport- and hospital-related complications, contributes to ED crowding, and adds significant costs to the health care system. There have been many proposed and studied interventions aimed at alleviating the issue, but few attempts to assess and evaluate different interventions across institutions.

Methods: A systematic search of MEDLINE, CINAHL, and EMBASE for studies describing the impact of interventions aimed at reducing preventable transfers from long-term care facilities to EDs on ED transfer rate. Two independent reviewers screened the studies for inclusion and completed a quality assessment. A tabular and narrative synthesis was

RÉSUMÉ

Contexte: Plus de 60 000 transferts de patients, d'établissements de soins de longue durée vers des services des urgences (SU), ont été effectués au Canada, en 2014, et environ le quart d'entre eux étaient potentiellement évitables. Chacune des mutations évitables expose les patients à des complications liées au transport ou à l'hôpital, aggrave l'encombrement des SU et ajoute des coûts importants au système de soins de santé. De nombreuses interventions visant à atténuer le problème ont été proposées et soumises à des études, mais peu d'évaluations ont porté sur la comparaison de différents types d'interventions mises en œuvre dans différents établissements.

Méthode: Une recherche méthodique d'études sur l'incidence des interventions visant à réduire le nombre de transferts évitables de patients, d'établissements de soins de longue durée vers des SU, sur le taux de transfert vers ces derniers, a été

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effectuée dans les bases de données MEDLINE, CINAHL et EMBASE. Deux examinateurs indépendants ont procédé, chacun de leur côté, à un tri préliminaire d'études susceptibles de sélection, et rempli un formulaire d'évaluation de la qualité. Ont suivi une synthèse narrative et une synthèse sous forme de tableaux. L'étude a été réalisée conformément aux lignes directrices des Preferred Reporting Items for Systematic Reviews and Meta-Analysis Extension for Scoping Reviews (PRISMA-ScR).

Résultats: Au total, 26 études ont été retenues (valeur k de Cohen : 0,68), et l'une d'entre elles a été jugée de piètre qualité (k : 0,58). Les études ont été divisées en cinq grands thèmes, selon le type d'intervention : la télémédecine, les équipes mobiles, les soins interdisciplinaires, l'approche globale et autres mesures. Les interventions efficaces ont été

associées à des réductions de taux de transfert vers les SU variant de 10 à 70%. Les équipes de soins interdisciplinaires intégrées au personnel dans les établissements de soins de longue durée se sont révélées les interventions les plus efficaces.

Conclusion: Plusieurs interventions ont permis de réduire le nombre de transferts évitables de patients, d'établissements de soins de longue durée vers des SU, dans divers milieux de soins de santé, et offrent une voie prometteuse. Une application généralisée de ce type d'interventions pourrait se traduire par une réduction de l'encombrement des SU, au Canada.

Keywords: Crowding, emergency medicine, long-term care facilities, patient transfers

INTRODUCTION

Emergency department (ED) crowding is an international health system issue that is worsening.¹ Crowding manifests as prolonged patient wait times and ED lengths of stay, and increased patient mortality and morbidity.² One major contributor is preventable transfers from long-term care facilities. The term long-term care facility encapsulates facilities otherwise referred to as nursing homes, long-term care homes, or residential care facilities.

Typically, long-term care facility patients are transferred to EDs when they suffer complications or medical emergencies that exceeds the facility's care capacity.³ In Canada, there were over 60,000 long-term care facility patient transfers to the ED in 2014. However, nearly a quarter of them were due to "potentially preventable conditions" as defined by the Canadian Institute of Health Information, with infection, and fall-related injuries being the most common reported causes.⁴ These preventable transfers, or transfers that could have been avoided by implementing specific interventions within the long-term care facility, may compromise quality patient care, and increase ED crowding and healthcare costs.^{5,6} A significant portion of these patients are admitted, placing further strain on the patient and their family, and increasing the patient's risk of hospital-acquired complications.⁷ The strain on EDs from these preventable transfers will only increase as our population continues to age with more complex health care needs.⁸ Reducing ED overcrowding by preventing these transfers may also alleviate "Hallway Medicine," identified as one of the most significant health care challenges currently facing Canadians.

Initiatives aimed at reducing these preventable transfers have been shown to improve patient care and ED crowding.^{9,10} There have been many interventions and care pathways to reduce transfers, but these strategies have considerable variation in design and efficacy. Some of these interventions include fall-prevention programs, improving patients transitions *into* the long-term care facility, and multifaced quality improvement programs. This study's objective is to review, categorize, and evaluate interventions to reduce preventable long-term care facility transfers to EDs.

METHODS

A scoping review was used to synthesize existing studies. While a systematic review methodology was considered, it did not sufficiently address the range of interventions and the heterogeneity in study design and outcomes. The scoping review provided a comprehensive description of the existing evidence and facilitated more focused areas of research.

Eligibility criteria

Studies were included if they were an original research article describing interventions to reduce preventable transfers from long-term care facilities to EDs. Studies needed to have a comparison group and report key outcomes, such as the number of ED transfers. Exclusion criteria were studies published only as abstracts, non-English studies, non-comparative

descriptive studies, and home-care- or rehabilitation care-focused studies.

Search strategy

Searches were carried out in Medline (by means of Ovid, 1946 to March 22, 2019), EMBASE (by means of Ovid 1974 to March 22, 2019), and CINAHL (by means of EBSCO, 1982 to March 22, 2019), without the use of filters. The search was designed based on three concepts: the setting (ED and long-term care facilities), the outcomes (ED transfers), and the study type.¹¹ The search strategies included both free text terms and subject headings where available. This study adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis Extension for Scoping Reviews (PRISMA-Scr) guidelines.¹²

Screening and data extraction

Two reviewers (K.G. and D.L.) independently screened the titles and abstracts for all studies. Disagreements were resolved by consensus, or if needed, by a third independent reviewer. Inter-rater reliability was assessed with the Cohen K statistic. All remaining studies underwent full text review to confirm they met inclusion criteria. Data from the remaining studies were extracted using a prespecified data extraction sheet, which included the study title, authors, date of publication, design, primary outcome measures, and the results.

Quality assessment

The National Heart, Lung, and Blood Institute (NHLBI) quality assessment tools were used to assess the included studies.¹³ All studies were assessed by two independent reviewers. Disagreements were resolved by consensus, or if needed, by a third independent reviewer.

Data analysis

A tabular summary of all included papers was completed, detailing the study title, authors, date of publication, design, primary outcomes. In both the table and narrative synthesis, the studies were summarized into five themes based on the characteristics of the intervention: Telemedicine, Outreach Teams, Interdisciplinary Care, Integrated Approaches, and Other.

RESULTS

Literature search

Of the 884 studies returned from search, 39 met inclusion criteria after screening the titles and abstracts. The 12 discrepancies in decisions between the two independent reviewers were resolved by consensus (Cohen's $k = 0.68$). Twelve additional studies were returned from reference chaining during the full text review.

On full-text review, 23 studies were excluded (Figure 1). Seven studies were excluded because they described alternate care pathways that bypassed the ED entirely, or reported transfers only for patients admitted to hospital. Seventeen studies were excluded because they were only published as abstracts.

Description of studies

The 26 studies included were divided into five themes based on the characteristics of the interventions: Telemedicine, Outreach Teams, Interdisciplinary Care, Integrated Approaches, and Other. Telemedicine included studies that used telephone or virtual conferencing technologies to connect remote providers to long-term care facilities. Outreach Teams included studies where provider groups operating out of a central hub, travelled to long-term care facilities for patient assessment as-needed, or at regular intervals. Interdisciplinary Care included interventions where multidisciplinary care teams (nurses, primary care physicians, geriatricians, physiotherapists) were formed within the long-term care facilities. Integrated Approaches incorporated multiple interventions aimed at reducing ED transfers. Studies that did not fit into the above four themes were categorized as Other.

Eighteen of the 26 studies occurred in public long-term care facilities in urban settings. One study was conducted in a public rural long-term care facility, and one study was conducted in public long-term care facilities across a mixture of urban and rural environments. Six studies were conducted in private, urban long-term care facilities (Table 1).

Telemedicine

Three studies introduced telemedicine and connected long-term care facility patients and staff to off-site health care providers. Results ranged from a non-significant

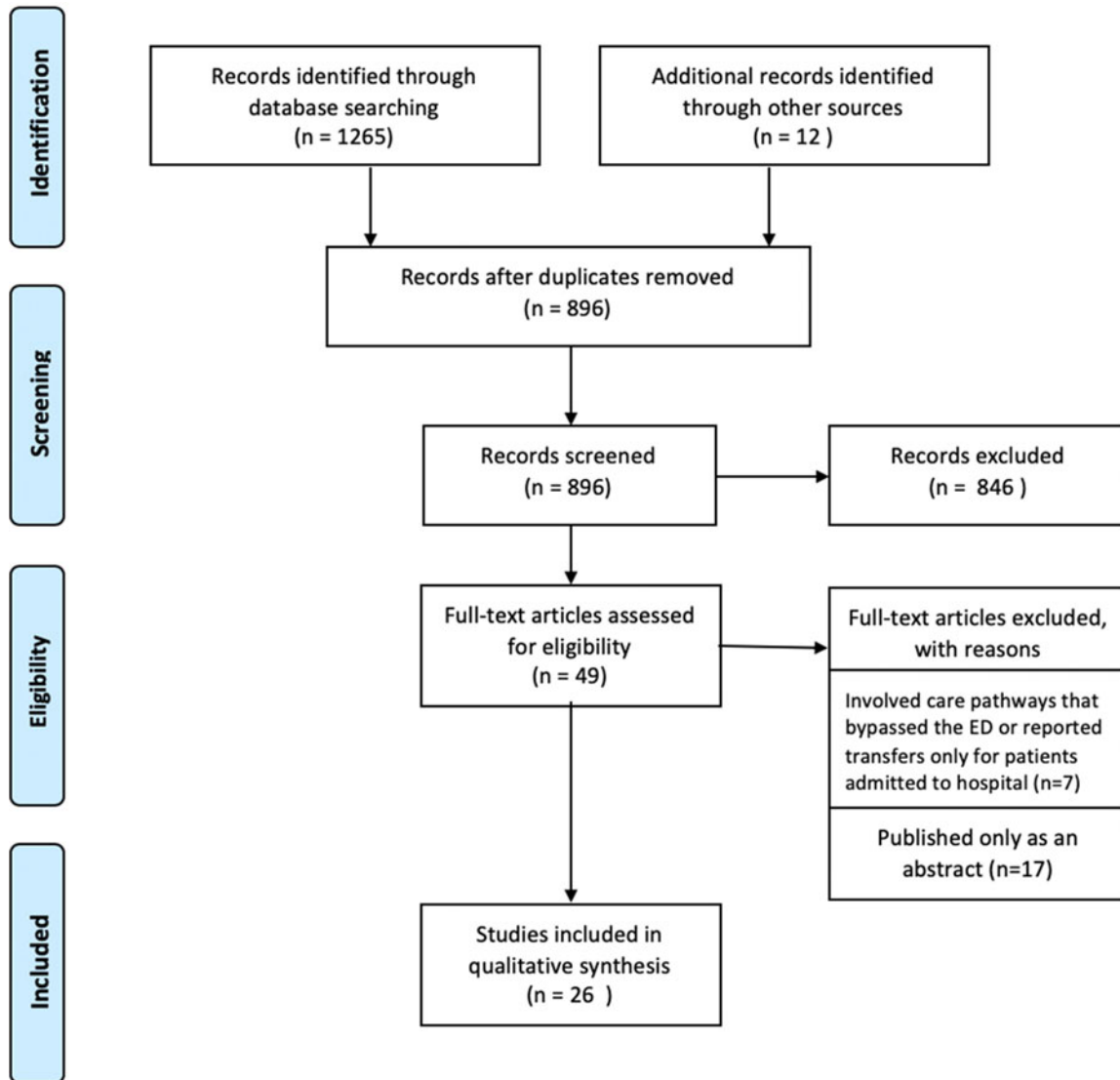


Figure 1. PRISMA flow diagram depicting study selection process.

decrease in transfers of 4.4% to a significant 8.8% reduction of in transfers.^{14,15} Hofmeyer et al. did not examine changes in the rate of ED transfers, but reported that 511/736 (69%) telehealth consults over one year did not result in a transfer, while they could have otherwise.

Outreach teams

Three studies evaluated interventions by Outreach Teams. Bandurchin et al. studied a mobile nurse team that identified at-risk patients and attended emergency consultations, which reduced ED transfers by 10%.¹⁶ Codde et al. described a service in which long-term care facility staff could request in-house services by an

emergency nurse with a supervising general practitioner. This team reduced ED transfers by 17%.¹⁷ El-Masri et al. examined a nurse practitioner-led outreach team who provided direct care in long-term care facilities.¹⁸ Although total ED transfer reduction was not measured, the authors noted there was no change of ED transfers between teams led by nurse practitioner versus physicians.

Two studies by Jensen et al. looked at extended care paramedic programs where paramedics managed long-term care patients on-site.^{19,20} The studies reported a 31% and 62% reduction in ED transfer rate. Chappell and Murrell found that nurse practitioner visits to long-term care facilities every 60 days were associated with 8% decrease in ED transfers when compared with a control

Table 1. Details of the study title, authors, date of publication, long-term care facility location and funding model, study design, primary outcome measures, and results for all 26 included studies, categorized by intervention type.

Authors	Public/Private, Rural/Urban	Size (# of beds)	Sample Size	Study Design	Intervention type	Results	QA
Grabowski (2014) ¹⁴	Private, Urban	900–1200 beds across 6 facilities	1768	RCT	Telemedicine approach with team of NP, RN, and physician to cover urgent or emergent calls on weeknights and weekend days.	Raw rate of hospitalization declined 5.3% for control group and 9.7% in treatment group - nonsignificant 4.4% difference in pre–post hospitalization. Statistically significant reduction in nursing homes that were significantly engaged in program.	Good
Hui (2001) ¹⁵	Public, Urban	200 bed facility	200	Pre–post design	Telemedicine approach with both routine follow-ups and urgent review. Connected with geriatrician, psychogeriatrician, nurse specialists, physiotherapists, occupational therapists, as well as dermatology and podiatry services.	Most consultations were adequate for telemedicine. Telemedicine was cheaper than conventional outreach or outpatient services. ED attendance reduced by 8.8% from 328 to 299 visits per annum.	Fair
Hofmeyer (2016) ³⁹	NS, Rural	5000 residents over 34 facilities	5000	Observational	Telemedicine approach with central hub with advanced practice providers and RN.	511/736 (69%) of eLTC consults did not require ED transfer afterward. Authors reason that patients with similar complaints would have been transferred pre-pilot.	Poor
Bandurchin (2011) ¹⁶	Public, Urban	2298 beds across 12 facilities	2298	Pre–post design	Mobile RN team which proactively visits LTCFs to identify at risk patients as well as visits patients on emergent basis.	Number of ambulance transfers decreased by 10% from 368 to 330 per quarter. Long-term care staff believed the service was beneficial to residents, reducing ED visits and waiting times, and improving quality of life.	Fair
Codde (2010) ¹⁷	Public, Urban	1807 beds	503	Pre–post design	Primary care service provided by ED-based nurses.	There was a statistically significant reduction (17%; $p < 0.001$) in the number of transfers during the intervention period, which held (15%) when adjusted for seasonal variation.	Good
El-Masri (2015) ¹⁸	Public, Urban	350 beds across 4 facilities	1353	Observational prospective cohort design	NP-led outreach program to LTCs; assists LTC staff with assessment and management of health problems.	ED transfers by NPs were 27% less likely to be nonurgent than transfers by MDs and 3.23 times more likely to be admitted than transfers by MDs	Fair
	Public, Urban	NR	336	Pre–post design			Fair

Chappell ! 1994) ²¹						Patients receive regular visits from nurses every 60 days; receive nursing assessments, reviews of records, and evaluations of care plan implementation.	Over 2 year period, 85 readmissions and 107 ER visits of experimental group (n = 168) v. 120 readmissions and 131 ER visits in control group (n = 168). Both differences significant ($p < 0.001$, 0.01)	
Kane (2003) ²²	Public, Urban	NR	4804	Quasi-experimental pre-post test	NPs work in cooperation with PCPs, have regular contact with Nursing Home residents, respond to problems, train nursing home staff in some aspects of care, etc.	Incidence of hospitalization was reduced 48% compared with control residents (2.43 v. 4.63/4.67 hospitalizations per 100 residents per month).	Good	
Jensen (2016) ¹⁹	Public, NS	NR	360	Retrospective cohort study	Extended care paramedic program. Assessment and treatment intervention beyond current scope of practice.	Decrease of number of patients transferred to ED after EMS call from 94.9% (129/136) to 65.6% (147/224), $p < 0.001$.	Fair	
Jensen (2013) ²⁰	Public, Urban	NR	238	Pre-post design	Extended care paramedic program. Assessment and treatment intervention beyond current scope of practice.	When ECP involved, 70% (98/140) of calls did not result in a transfer. When ECPs were not involved, 21.4% (21/98) of calls did not result in a transfer.	Good	
Burl (1998) ²³	Public, Urban	1077 beds in 45 facilities	1461	Retrospective cohort study	Use of joint Geriatric Nurse Practitioner and MD teams (v. just MD teams) in long-term care facilities. GNPs have roles such as writing admission notes, developing plan of care, reviewing patients status every 30-60 days, etc.	17% Reduction in ED transfers (664 v. 797 days in ED per 1000 residents per year).	Fair	
Reuben (1999) ²⁴	NS, Urban	922 beds across 3 nursing home programs	350	Cross-sectional study	Described three health maintenance organizations that provided extended primary care for nursing home residents. Each had physicians and NPs/PAs assigned to nursing homes and visit regularly. Variations in who does the initial patient assessment, who does the follow-ups, who handles urgent calls.	Most successful HMO achieved a 80% reduction in hospitalizations per resident (0.5 v. 0.1 per year, $p < 0.05$) and a 75% reduction in ED transfers per patient (0.4 v. 0.1 per year, $p < 0.05$).	Fair	
Bellantonio (2008) ²⁵	Private, Urban	Two dementia-specific LCTFs	100	Randomized controlled trial	Multidisciplinary team assessments (geriatrician, geriatrics advanced practice	Reduced risk of unanticipated transitions (13%), permanent relocation to nursing	Good	

(Continued)

Table 1. Continued.

Authors	Public/Private, Rural/Urban	Size (# of beds)	Sample Size	Study Design	Intervention type	Results	QA
Pain (2014) ²⁶	Public, Urban	One facility, number of beds not reported	NS	Pre-post design	nurse, physical therapist, dietitian, social worker) during first 9 months in assisted living. In-house GP services to LTCF residents. Dedicated in-house nursing and IT support. Daily in-house clinic and 24 h call.	facility (11%), ED visits (12%), hospitalization (45%), and death (63%). 69% reduction (35 vs. 11) in ED transfers comparing three months before and after intervention.	Fair
Chan (2018) ²⁷	Public, Urban	1325 in 12 facilities	986	Pre-post design	Patients transferred from a skilled nursing facility to hospital are given a decision making tool to help ED practitioners determine appropriate disposition.	Statistically significant 10.2% reduction in ED transfers ($p = 0.001$).	Good
Kane (2017) ²⁸	NS, Urban	36717 in 85 facilities	36717	RCT	Nursing home QI program (Interventions to Reduce Acute Care Transfers). Tools to identify and evaluate acute changes in residents, care paths to avoid hospitalization, advance care planning and QI tools.	Implementation had nonsignificant reductions in hospitalization rates (net difference, -0.13 per 1000 resident-days; $p = 0.25$) and ED visits (net difference, 0.02 per 1000 resident-days; $p = 0.83$).	Good
Tena-Nelson (2012) ²⁹	Public, Urban	11310 over 30 facilities	11310	Pre-post design	Representatives from LTCF attend INTERACT educational seminars and implement back home.	Nonsignificant 10.6% reduction in hospital admissions from 4.07 to 3.64 per 1000 resident-days pre-post.	Fair
Rantz (2018) ³⁰	NS, Urban	120–321 in each of 16 facilities	1750	Pre-post design	A prospective, single group intervention design, the MOQI included an advanced practice registered nurse (APRN) embedded full-time within each nursing home (NH) to influence resident care outcomes.	30% reduction in all-cause hospitalizations.	Fair
Arendts (2018) ³¹	Public, Urban	352 beds in 6 facilities	200	Cluster RCT	RCT (RACFs matched on resident characteristics and staff:resident ratios). Residents matched with NP with autonomous scope of practice (incl. diagnosis and prescribing) + best practice resource folder for care (guidelines for medical assessment; family/family education, care pathways for specific acute diseases, etc.).	Nonsignificant 8% reduction in number of ED transfers ($p = 0.10$)	Good

Hullick (2016) ³³	Public, Urban	413 beds over 4 facilities	413	Pre-post	New model of care (Aged Care Emergency Service, or ACE). Provide clinical support to nurses in RACFs by pt. management algorithms, education, ED RN telephone consultation service, proactive case management, and establishing goals of care before ED transfer	No overall reduction in ED presentation, but reduced LOS by 45 min, and 40% less likely to be admitted to hospital.	Fair
Connolly (2015) ³²	Public, Urban	1998 in 36 facilities	1998	Cluster randomized controlled trial	Multifaceted intervention: Gerontology nurse specialist-led staff education, facility bench-marking, GNS resident reviews and multidisciplinary discussion of residents selected using standard criteria.	Intervention did not have impact on avoidable acute admissions (RR = 1.07; 95% CI = 0.85 to 1.36; $p = 0.59$) or mortality (RR = 1.11; 95% CI = 0.76 to 1.61; $p = 0.62$).	Good
Marshall (2015) ³⁴	NS, Urban	1424 beds over 10 facilities	598	Observational time-series study.	Care by Design™ (CBD) (Canada), a model of coordinated team-based primary care, was implemented in long-term care facilities (LTCFs) in Halifax, Nova Scotia, Canada, to improve access to and continuity of primary care and to reduce high rates of transfers to EDs.	ED Transfers were reduced by 36%, (68 to 44 per month) ($p < 0.01$)	Good
Rolland (2016) ³⁵	Public, Mixed	1675 bed in 175 facilities	6275	Non-randomized controlled trial	Delivering NH staff descriptive statistics on indicators of their NH and peer NHs + quality indicators discussed in meetings between hospital geriatrician and NH staff.	Prevalence of emergency department transfers dropped 26.1% ($p = 0.004$) in intervention group while increasing 13.7% ($p = 0.02$) in control group.	Good
Zimmer (1988) ³⁶	Public, Urban	One facility, number of beds not reported	112	Retrospective cohort study	Consists of financial incentives, paid by Medicare, to facilities and to responsible physicians to evaluate and care for acutely ill patients in the SNF's when medically safe and feasible.	A retrospective evaluation using a physician assessment committee concluded that among the first 112 patients in the program, 76% were very probably saved hospitalization or at least an emergency room visit.	Good
Hutt (2011) ³⁷	Private, Urban	1117 bed in 16 facilities	1123	Quasi-experimental trial	Multifaceted intervention to decrease inappropriate hospitalization of residents with	Hospitalization rates did not change significantly in either intervention or control homes (intervention homes:	Fair

(Continued)

Table 1. Continued.

Authors	Public/Private, Rural/Urban	Size (# of beds)	Sample Size	Study Design	Intervention type	Results	QA
Tsai (2018) ³⁸	Private, Urban	6 facilities, number of beds not reported	538	Pre–post design	<p>stable vital signs and increase hospitalization of critically ill residents: (1) institutional changes to facilitate vaccination, testing, and treatment; (2) education to improve vaccination rates and nursing assessment skills; (3) study liaison nurse working for the facility who agreed to act as the change agent; (4) academic detailing to physician to impact diagnostic and prescribing practices</p> <p>Nursing home to emergency room transfer checklist. Included elements such as demographics, symptoms/reasons for transfer, contact information, code status, etc</p>	<p>16.1% baseline versus 13.6% intervention period, $p = 0.55$; control homes: 22.6% baseline versus 23.0% intervention period, $p = 1.00$.</p> <p>Nonsignificant decline in 30 day readmission rate from 15.9% to 13.4% post intervention.</p>	Fair

ED, emergency department; GP, general practitioner; NH, nursing home; QA, quality assessment; RCT, randomized controlled trial; RN, registered nurse; SNF, skilled nursing facility.

group.²¹ Kane et al. found that nurse practitioner visits reduced ED transfers by 47.6% compared with the controls.²²

Interdisciplinary care

Five studies examined Interdisciplinary Care health care teams. These teams differed from Outreach Care teams because these staff were employed within a single long-term care facility, or network of long-term care facilities. One team included a geriatric nurse practitioner and physician who assessed patients upon admission to the long-term care facility, took call, and made joint rounds, resulting in a 17% reduction in ED transfers.²³

Reuben et al. described how three different health maintenance organizations delivered primary care to long-term care facilities within their network.²⁴ The most efficacious program was full-time team composed of a physician and mid-level provider, such as a physician assistant or nurse practitioner. The mid-level providers could order diagnostic tests, consultations, and write orders and prescriptions. The team provided call. This intervention reduced ED transfers by 75% compared with the control long-term care facilities.

Bellantonio et al. implemented a multidisciplinary team of geriatricians, geriatric advanced practice nurses, physical therapists, dieticians, and social workers across several long-term care facilities.²⁵ This intervention achieved a non-significant reduction in ED transfers of 12% ($p = 0.80$). Pain et al. found that a weekly in-house GP clinic with nursing support was associated with a 70% decrease in ED transfers.²⁶ Chan et al. studied the effect of a care team consisting of geriatricians and nurses, and reported a 10.2% decrease in ED transfers.²⁷

Integrated approaches

Eight studies involved Integrated Approaches. Three studies used the INTERACT (Interventions to Reduce Acute Care Transfers) program, a quality improvement program consisting of a set of planning and communication tools to detect acute changes in long-term care facility residents. Two studies found no significant reductions in hospitalization rates, readmission rates, and ED transfers.^{28,29} Conversely, Rantz et al. used INTERACT and performance feedback with in-home advanced care nurses, which reduced hospital transfers by 30%.³⁰

Three studies used a combination of multidisciplinary care rounds, patient management algorithms, and

telephone consultations but did not report significant reductions in ED transfer rate.^{31–33} Marshall et al. took a multi-modal approach titled “Care by Design,” incorporating weekly on-site visits, standing orders and protocols, interdisciplinary care teams, and access to extended care paramedic programs in ten long-term care facilities.³⁴ This program reduced ED transfers by 36%.

Other

Rolland et al. studied a quality improvement program consisting of feedback and audits on predetermined quality indicators and resident health status. Individual long-term care facilities were then able to independently develop interventions to lower transfers. This led to an average ED transfer reduction of 26.1%.³⁵

Zimmer et al. created financial Medicare incentives for physicians and long-term care facilities to keep patients within the facility, reducing hospital transfers 75%.³⁶

Hutt et al. used a multifaceted intervention consisting of long-term care facility staff education, academic detailing, and on-site change agents to decrease transfers among stable patients with long-term care facility-acquired pneumonia. This did not change rates of hospital transfer.³⁷ Tsai and Tsai studied the use of a transfer document to bridge communication gaps during transitions from long-term care facility to ED and vice versa. The study observed a nonsignificant 1.6% reduction in 30-day hospital admission rate.³⁸

Quality assessment

Of the 26 studies, 11 were rated good, 14 were rated fair, and 1 was rated poor using the NHLBI quality assessment tools. There were six total disagreements between reviewers (Cohen’s $k = 0.54$), all of which were resolved by consensus.

DISCUSSION

Interventions in long-term care facilities in a variety of health care settings have resulted in significant reductions in ED transfers. Specifically, leveraging interdisciplinary teams to provide enhanced primary care seems promising. Second, the implementation strategy for any intervention has been shown to be crucial for success. These findings are particularly important now as limited access to professional expertise and poor care

coordination between long-term care facilities and the broader healthcare system have contributed to disproportionate mortality and morbidity from COVID-19 among long-term care facility patients in several jurisdictions.

Only three studies evaluated telemedicine interventions, with mixed results. Hofmeyer et al. (n = 5,000, observational) found that 69% of telemedicine consults could be managed without an ED transfer, but further study is needed to determine if telemedicine interventions are an effective means of reducing preventable transfers from long-term care facilities to EDs.³⁹

While Kane et al. and Jensen et al. reported significant reductions using Outreach team interventions, overall results were mixed across all provider types, suggesting that the design and implementation of the interventions are critical to the impact achieved.

Each of the five interventions involving the use of interdisciplinary teams reduced preventable ED transfers. Reuben et al. and Pain et al. reported the studies with the largest reductions. These interventions were the most effective of all included in this review, and both included regular physician assessments. While it is possible that physicians were best equipped to judge the necessity of a transfer or manage sick patients within the long-term care facility, frequent visits would have enabled these physicians to review these patients' status on an ongoing basis. This would reduce the overall incidence of events that would warrant transfer. In instances when physicians were consulted on an as needed basis, the reduction in ED transfer rates was more modest.

Studies using integrated approaches had mixed results. Of the three studies that involved the INTERACT program, only the study by Rantz et al. was effective (n = 1750, pre-post design). One of the primary differences between it and the other two INTERACT studies was the presence of dedicated coaches to facilitate the implementation of the program, suggesting that superior program implementation contributed to greater success. Similarly, Kane et al. completed a randomized controlled trial (RCT) with multiple long-term care facilities (n = 36,717, RCT), and that study sites with the greatest transfer reductions reported the highest uptake of the program's tools.²⁸

Three studies did not fit in any of the previous categories. The positive results of the audit and feedback system by Rolland et al. (n = 6,275; nonrandomized controlled trial), and the financial incentives system by Zimmer et al. (n = 112; retrospective cohort) suggest that

there is merit in incentivizing staff to create their own interventions to combat unnecessary transfers.

Twenty-five of the 26 included studies were rated either "Fair" or "Good" in the quality assessment. The one "Poor" rated study suffered from a small sample size and a sampling design where the triage nurse selected patients for the telemedical intervention as they saw fit, which introduced additional potential bias.³⁹ Excluding this study would reduce the number of telemedical interventions from three to two, however, it would not impact the substance of our findings within that intervention grouping, or for the review as a whole.

Limitations

This scoping review has several limitations. First, our searches were limited to studies published in English, which could lead to geographic and health system biases. Second, there was considerable heterogeneity in the study designs, reported outcomes, and results, and no discussion of cost-effectiveness. Furthermore, ED transfer rate was the only consistently reported outcome, limiting understanding of any additional costs or benefits of the interventions. It also remains unclear whether strategies with multiple elements, such as the INTERACT program, may be more effective than single interventions, a finding that has been demonstrated in previous research on healthcare transitions.⁴⁰ Finally, four studies reported reductions in *hospital* transfers as opposed to *ED* transfers.^{14,29,30,32} We used this as a proxy measure for ED transfers, although it is possible that some of these patients could have bypassed the ED.

CONCLUSION

Reducing preventable transfers from long-term care facilities to EDs improves patient care and has the potential to reduce ED crowding and health care costs. There are several intervention types that reduce preventable transfers from long-term care facilities to EDs, with interdisciplinary team interventions being particularly effective. Additional studies emphasizing a mixed methods design, economic analyses, and care coordination between long-term care facilities and local EDs would further inform health care policy, and administrative decision-making.

Competing interests: None declared.

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