Interface between residential aged care facilities and a teaching hospital emergency department in Western Australia

Judith C Finn, Leon Flicker, Eileen Mackenzie, Ian G Jacobs, Daniel M Fatovich, Shelley Drummond, Michelle Harris, D'Arcy C D J Holman and Peter Sprivulis

ABSTRACT

Objective: To estimate the appropriateness of emergency department (ED) presentations by people aged ⩾ 65 years living in residential care facilities.

Design, setting and participants: Retrospective cohort study of older residents of residential care facilities who presented to the ED of the Royal Perth Hospital, Western Australia, between January and June 2002. Data were reviewed by an expert clinical panel.

Main outcome measures: Appropriateness of ED presentation, presenting complaint, involvement of a general practitioner/locum doctor prior to transfer, proportion of patients admitted to hospital from the ED, survival to discharge.

Results: 541 residents aged ⩾ 65 years were transferred by ambulance to the ED, comprising 8.3% of all ED presentations of people in this age group. The mean age of the study cohort was 83.7 years (SD, 7.0 years), of which 68% were women. Of the 541 presentations, 326 (60%) resulted in hospital admission, and of these, 276 (85%) survived to hospital discharge. Musculoskeletal disorders accounted for 25% of all presentations, and 22% were falls-related; pneumonia (11% of presentations) was the single largest presenting complaint. ED attendance was deemed "inappropriate" for 71/541 cases (13.1%; 95% CI, 10.5%–16.2%); in only 25% of ED presentations was a GP/locum doctor involved prior to transfer.

Conclusions: The majority of ED presentations by aged care residents were considered to be appropriate, but there was scope for improvement in coordinating care between the hospital ED and residential care institutions.

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Studies published in the United States have indicated that nursing home/hostel residents have a high incidence of hospital presentation for emergency conditions,[1-3] and hospitalisation rates ranging from 21% to 47%.[1,4-6] Various studies have assessed the "appropriateness" of the transfer of nursing home/hostel residents to hospital, with findings ranging from regarding the "majority" as "appropriate"[7] to estimating that 40% of hospital admissions are "inappropriate".[8] Some, but not all, of this variation can be explained by inconsistent definition of what constitutes "appropriate" transfer. However, it has been suggested that some hospital admissions of nursing home patients could be avoided by providing "relatively unsophisticated acute services" on site (eg, administering intravenous antibiotics).[2,4,9,10]

There is a paucity of Australian data on the pattern of emergency department (ED) presentations and hospitalisation of older people living in residential care facilities, ascribed in part to a lack of data systems that link hospital and residential care. Finucane et al,[11] in a study of 300 consecutive referrals of elderly people in residential care to the ED of an Adelaide teaching hospital over a 3-month period, reported high rates of hospital admission and re-presentation. In a further study of the same cohort the major reason for admission was found to be hip fractures; 65% of hostel residents and 89% of nursing home residents returned to their place of origin, and the overall in-hospital mortality rate was 4%.[12]

Our study sought to describe the characteristics of older people living in residential care who were referred to the ED of a metropolitan teaching hospital and to identify the resources that would have been required to effectively manage the patients in their residential setting.

METHODS

Royal Perth Hospital (RPH) is the largest teaching hospital in Western Australia. Its ED has an annual census of 53 000 and an admission rate of 44%.[13]

Patients. All patients aged 65 years and over who were transported to RPH ED by ambulance from any aged care residential facility within the Perth metropolitan area between 1 January and 30 June 2002 were included in our study. These patients were identified from the WA St John Ambulance Patient Care Record database, which codes all hospitals and residential care facilities numerically. The demographic data recorded in the database have been found in previous research to be accurate.[14]

Clinical review panel. An expert multidisciplinary clinical review panel was formed, consisting of a geriatrician (LF), critical care nurses (JF and EM), emergency physicians (DF and PS), a paramedic/emergency department nurse (IJ), an aged care liaison nurse (SD) and a nursing home Director of Nursing (MH). The panel initially convened to define criteria that would have excluded any possibility of the patient's condition being managed in a nursing home, leading to the development of an "appropriateness evaluation protocol" (Box 1), similar in concept to that previously reported.[15] The research nurse (EM) manually reviewed the medical records of all study participants against the defined criteria.

An "appropriate" ED attendance was defined as one that could not have been assessed or managed in a primary care setting or at the patient's residence. Those meeting the criteria were designated as "appropriate" attendances and no further review occurred. By definition, all hospital admissions were deemed appropriate attendances. The records of patients not meeting the criteria were reviewed by the clinical panel to determine whether the episodes of care could have been managed within the nursing home setting.

"ED diagnosis". Consistent with a previous study,[11] the "presenting medical complaint" was operationally defined as that identified by the ED staff after initial assessment and investigation and reported on the ED record as the "ED diagnosis". A presentation was regarded as "falls-related" if the triage or the ED diagnosis included the word "fall".

Statistical analysis. Data were analysed using the SPSS statistical package, version 12.0 (SPSS Inc, Chicago, Ill, USA). Where percentages are reported, denominators may vary depending on subgroup characteristics and/or missing data and are indicated where appropriate. A χ^2 test was used to compare categori-

1 Criteria for assessing an emergency department presentation as "appropriate"

One or more of the following:

- Procedure unable to be performed in a nursing home
- Suitable observations unable to be provided
- History of trauma with suspected fracture
- No x-ray facilities available
- Requirement for plaster application
- Difficult IDC insertion
- PEG tube insertion
- Suspicion of cerebral event with decreasing consciousness
- Requirement for intravenous antibiotics
- Admission to hospital

IDC = indwelling catheter. PEG = percutaneous endoscopic gastrostomy. ◆

cal outcomes, with Fisher's exact test used for 2 × 2 contingency tables. The Student's *t*-test was used for two independent samples with continuous outcome variables. Unconditional logistic regression was used for multivariate analysis of dichotomous outcome variables. Statistical significance was determined at the 5% level.

Qualitative data. After completion of the clinical panel review process, panel members were asked to comment on the major issues facing EDs in relation to older people living in residential care, possible solutions and any other relevant issues. All comments were transcribed into a separate database. These were initially examined line by line to identify units of information, which were then grouped together into categories. Where necessary, a new category was added or others were collapsed.[16]

Ethics approval. Our study was approved by the RPH and University of Western Australia ethics committees.

RESULTS

A total of 580 ambulance transfers from residential care institutions to the RPH ED were identified. Of these, 39 involved people aged under 65 years and were excluded from further analysis. The remaining 541 presentations comprised 2.1% of the total 25 820 ED presentations during the study period and 8.3% of the 6551 ED presentations of patients aged ⩾ 65 years.

Characteristics of patients and presentations. Some characteristics of patients and procedures performed in the ED are summarised in Box 2. The length of time the resident had been "unwell" before transfer to the ED was reported in 460 of 541 cases: 220 (48%) had been unwell for < 6 hours, 299 (65%) for < 24 hours and 340 (74%) for < 2 days. In 38 cases (8%), the person had been unwell for over a week.

Three hundred and fifteen transfers (58%) were from "nursing homes", 131 (24%) from "hostels" and 95 (18%) from facilities classed as "both nursing home and hostel".

Of the 541 residential care patients, 326 (60%) were admitted to hospital (compared with 67% of *all* patients aged ⩾ 65 years who were admitted during the study period): 179/315 (57%) from nursing homes compared with 94/131 (72%) from hostels ($P = 0.004$). Of the 326 patients admitted, 276 (85%) survived to hospital discharge. Of those not admitted, 210/213 (99%) survived to ED discharge. The mean length of stay of admitted patients was 8.4 days (SD, 9.4 days; median, 5 days; range, 0.5–69 days).

The mean time spent in the ED was 5.9 hours (SD, 3.3 hours) for admitted patients compared with 4.3 hours (SD, 2.0 hours) for patients not admitted.

Main presenting medical problems. The main medical problems identified among patients presenting to the ED are summarised in Box 3. Pneumonia, occurring in 11.1% of patients, was the single largest diagnostic category. Of the 541 presentations, 118 (21.8%) were related to falls.

Appropriateness of presentations. Based on the previously determined criteria for appropriateness (Box 1), 91 (17%) of the ED presentations were initially classified as "potentially inappropriate" and required review by the expert panel. After review, 71 (78%) remained "inappropriate", 18 (20%) were changed to "appropriate" and two (2%) were deemed "indeterminate" (the third category mainly resulting from insufficient information being given in the medical record). Thus only 71 (13.1%; 95% CI, 10.5%–16.2%) of the 541 ED presentations analysed in our study were considered "inappropriate" by the panel.

There were 28 ED presentations in which a patient was admitted to hospital (thus fulfilling our predetermined criteria for "appropriateness") but the research nurse flagged the presentations as "potentially inappropriate". After review by the panel, 16 of the cases were deemed "inappropriate", 10 "appropriate", and two "indeterminate". Notwithstanding this, for the purposes of reporting results, residents admitted to hospital were all

2 Comparison between "appropriate" and "inappropriate" emergency department (ED) presentations, by patient characteristics, clinical services provided in the ED, length of stay and outcome

Characteristic	All patients ($n = 541$)	Presentation "appropriate" ($n = 468$)*	Presentation "inappropriate" ($n = 71$)*	Difference†
Mean age in years (SD)	83.7 (7.0)	83.8 (7.1)	83.7 (6.5)	$t = 0.09$, $P = 0.93$
Number of men (%)	176 (32.5%)	153 (33%)	23 (32%)	$\chi^2 = 0.002$ (1 df), $P = 0.96$
Reviewed by GP or locum doctor before presentation (%)	136 (25%)	126 (27%)	10 (14%)	$\chi^2 = 5.4$ (2 df), $P = 0.02$
Blood test (%)	430 (80%)	405 (87%)	24 (34%)	$\chi^2 = 105$ (1 df), $P < 0.001$
Electrocardiogram (%)	347 (64%)	326 (70%)	20 (28%)	$\chi^2 = 46$ (1 df), $P < 0.001$
X-ray (%)	403 (74%)	374 (81%)	27 (38%)	$\chi^2 = 57$ (1 df), $P < 0.001$
Intravenous cannula inserted (%)	358 (66%)	345 (74%)	13 (18%)	$\chi^2 = 85$ (1 df), $P < 0.001$
Referred by ED staff to specialist (%)	371 (69%)	361 (77%)	10 (14%)	$\chi^2 = 114$ (1 df), $P < 0.001$
Mean length of ED stay in hours (SD)	5.3 (3.0)	5.5 (3.1)	4.1 (2.0)	$t = 5.1$, $P < 0.001$
Survived to discharge from hospital or ED (%)	488 (90%)	416 (90%)	70 (99%)	$\chi^2 = 6.5$ (1 df), $P = 0.02$

GP = general practitioner. * Two cases were "indeterminate". † Difference between "appropriate" and "inappropriate" presentations. ◆

3 Number (%) of 541 patients with various emergency department diagnoses

Musculoskeletal system	
Hip fracture	29 (5.4)
Other fracture	24 (4.4)
Soft tissue injury	53 (9.8)
Other musculoskeletal problem	29 (5.4)
Total	*135 (25.0)*
Respiratory system	
Pneumonia	60 (11.1)
Asthma/COPD	16 (3.0)
Other respiratory problem	6 (1.1)
Total	*82 (15.2)*
Cardiovascular system	
Chest pain/angina/AMI	23 (4.3)
Cardiac failure	14 (2.6)
Other cardiovascular problem	25 (4.6)
Total	*62 (11.5)*
Neurological system	
Stroke	14 (2.6)
Seizure	14 (2.6)
Head injury	8 (1.5)
Altered conscious state	26 (4.8)
Other neurological problem	9 (1.7)
Total	*71 (13.1)*
Gastrointestinal system	
Abdominal pain	8 (1.5)
Bowel obstruction	5 (0.9)
Constipation	12 (2.2)
Gastrointestinal bleed	22 (4.1)
Other gastrointestinal problem	7 (1.3)
Total	*54 (10.0)*
Genitourinary system	
Urinary tract infection	26 (4.8)
Renal failure	6 (1.1)
Other genitourinary problem	9 (1.7)
Total	*41 (7.6)*
Miscellaneous	
PEG tube/IDC insertion	27 (5.0)
Mental illness	6 (1.1)
Other infections, NEC	23 (4.3)
Fluid and electrolyte imbalance, NEC	15 (2.8)
Social issues	8 (1.5)
Other, NEC	17 (3.1)
Total	*96 (17.7)*

AMI = acute myocardial infarction. COPD = chronic obstructive pulmonary disease. IDC = indwelling catheter. NEC = not elsewhere classified. PEG = percutaneous endoscopic gastrostomy. ◆

4 Major issues identified by the expert clinical review panel

Problem	Possible solutions
Lack of clinical support for staff in RCFs, especially after hours	• Incentives and training for GPs to attend patients in RCFs, including visits after office hours • An alternative to transfer to ED for assessment and referral • Adequate registered nurse cover of RCFs, including hostels
Lack of planning for adverse clinical events	• Advanced directives discussed with resident and family, and adherence to them • Practice guidelines to direct the response to acute emergencies
Lack of alternative to ED for relatively simple clinical procedures	• Performance of simple clinical procedures (eg, PEG tube or IDC insertion, neurological observations) by registered nurses in RCFs • Adequate funding of resources for RCFs (eg, PEG tubes) to deter cost-shifting
Lack of communication between RCF and hospital	• Documentation (ideally standardised across all RCFs) about functional status, medical conditions and drugs to accompany all residents to hospital • Direct line of communication between RCF staff and ED, prior to transfer to ED, to discuss options

ED = emergency department. GP = general practitioner. IDC = indwelling catheter. PEG = percutaneous endoscopic gastrostomy. RCF = residential care facility. ◆

included in the "appropriate" ED presentation group.

A comparison between "appropriate" and "inappropriate" ED presentations is shown in Box 2. For patients in the "appropriate" presentation group, prior consultation of a general practitioner or locum doctor was more common, the number of clinical interventions performed was higher, the length of stay in ED was longer, and the overall survival rate to discharge from hospital or the ED was lower.

In only 25% of ED presentations was there any documentation that a GP or locum doctor had been consulted beforehand. Moreover, in only 208 (39%) of ED presentations was any nursing or medical documentation provided by the residential care facility.

Qualitative survey of panel members' views. The major issues identified by panel members, and possible solutions suggested, are summarised in Box 4.

DISCUSSION

Despite anecdotal evidence to the contrary, our study showed that the majority of ED presentations by older residential care residents are appropriate. Our results support those of Finucane et al,[12] who found that, in nine cases out of 10, the therapeutic and/or diagnostic requirements of a patient's acute condition preclude the patient being managed outside the ED. The finding of no GP involvement in the majority of referrals to ED has also been noted elsewhere.[11]

However, the consensus panel process clearly illustrated the difficulties in determining what constitutes an "appropriate" ED presentation. The panel was frequently frustrated by the lack of alternative strategies for managing residents because of resource constraints within the residential care facility. On that basis, there was often no other choice than transfer to the ED.

In the initial baseline criteria, admission to hospital was considered by the panel to be one of the most reliable indicators of appropriate referral to ED. However, review of medical records showed that this was not necessarily the case. In some cases, residents seemed to be admitted for psychosocial reasons, often at the family's insistence and not uncommonly involving a need for palliative care. While transfer to the ED was deemed inappropriate in such cases, it was acknowledged that the solutions are complex. It is hoped that the MedicarePlus initiatives and the formation of residential aged care panels may provide the mechanism for greater GP availability and training of all members of the health care team in residential care facilities.[17]

Some residents were transferred despite the existence of previously authorised advance directives providing specific instructions to be followed in the case of a catastrophic event. For example, cardiopulmonary resuscitation was performed on a resident by ambulance officers and continued during transport to the ED because the nursing home staff were unable to locate the "not for resuscitation" directives prepared in advance by the resident in collaboration with the GP and family.

The prevalence of hospital diagnoses of falls-related injuries and pneumonia in elderly persons living in residential care has been reported elsewhere.[4,7] Of interest is that some

5 Resources/actions that could potentially have prevented "inappropriate" ED presentations

Resource	Number (%) of presentations preventable
GP review	45 (63.4)
PEG tube insertion by nursing home staff*	11 (15.5)
IDC insertion by nursing home staff*	6 (8.5)
Advance directives	3 (4.2)
Better communication	3 (4.2)
Observations	3 (4.2)
Total	*71 (100)*

GP = general practitioner. IDC = indwelling catheter. PEG = percutaneous endoscopic gastrostomy. *For uncomplicated insertions. ◆

studies have found no significant difference in survival in residents with pneumonia who were admitted to hospital compared with those who were treated in the nursing home.[18,19] In our study, the need for insertion of PEG feeding tubes or IDCs was listed as the ED diagnosis in 5% of cases. It was difficult to ascertain whether transfer of residents to hospital for these procedures was motivated by cost-shifting, a lack of expertise in the residential care setting, or even fear of litigation. It has been suggested that the practice of cost-shifting is greatest in for-profit nursing homes.[20]

Our study had some limitations. It was difficult to retrospectively determine what level of care a patient was normally receiving if their residential care facility was "both nursing home and hostel". This is compounded by the fact that people classified as requiring a higher level of care may live in a so-called "hostel". Furthermore, the opinion of an "expert panel" was by its very nature subjective. However, it did provide insight into the perspectives of the represented disciplines that could serve well as a model for real-life collaborative clinical practice. The obvious stakeholder not represented on our clinical review panel was a GP, which was a regrettable omission.

Notwithstanding the above limitations, in order to reduce the number of "inappropriate" ED presentations and admissions of elderly residential care patients, increased health care resources for residential aged care facilities are needed. Resources and/or actions at the point of residential care that the panel believed could have prevented inappropriate presentations to the ED are summarised in Box 5. Review by a GP could have prevented up to 63% of inappropriate presentations, and the capability of nursing home staff to routinely perform uncomplicated PEG tube or IDC insertions could potentially have prevented another 24%. However, even with improved skill levels and communication between acute care and residential care facilities, the vast majority of presentations to the ED seem unavoidable. Over recent times there have been attempts to improve the access of residential care institutions to expertise within acute hospitals. Such examples include a residential care call line that has commenced at RPH since the completion of our study. However, the overall impact of such services is limited.[21]

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COMPETING INTERESTS

None identified.

AUTHOR DETAILS

Judith C Finn, PhD, RN, FRCNA, Senior Lecturer in Clinical Epidemiology, School of Population Health[1]
Leon Flicker, MBBS, PhD, FRACP, Geriatrician[1,2]
Eileen Mackenzie, RN, GDCritCare, Critical Care Nurse[1,2]
Ian G Jacobs, BAppSci, PhD, RN, Associate Professor[1]
Daniel M Fatovich, MBBS, FACEM, Clinical Associate Professor[1,2]
Shelley Drummond, RN, Aged Care Liaison Nurse[2]
Michelle Harris, RN, Director of Nursing[3]
D'Arcy C D J Holman, MBBS, MPH, PhD, Professor of Public Health[1]
Peter Sprivulis, MBBS, FACEM, PhD, Emergency Physician[1]
1 University of Western Australia, Perth, WA.
2 Royal Perth Hospital, Perth, WA.
3 Catherine McAuley Nursing Home, Perth, WA.
Correspondence: judith.finn@uwa.edu.au

REFERENCES

1 Bergman H, Clarfield AM. Appropriateness of patient transfer from a nursing home to an acute-care hospital: a study of emergency room visits and hospital admissions. *J Am Geriatr Soc* 1991; 39: 1164-1168.
2 Ackermann RJ, Kemle KA, Vogel RL, Griffin RC. Emergency department use by nursing home residents. *Ann Emerg Med* 1998; 31: 749-757.
3 Madden C, Garrett J, Busby-Whitehead J. The interface between nursing homes and emergency departments: a community effort to improve transfer of information. *Acad Emerg Med* 1998; 5: 1123-1126.
4 Barker W, Zimmer JG, Hall W, et al. Rates, patterns, causes, and costs of hospitalization of nursing home residents. *Am J Public Health* 1994; 84: 1615-1620.
5 Friedmann PD, Jin L, Karrison TG, et al. Early revisit, hospitalization, or death among older persons discharged from the ED. *Am J Emerg Med* 2001; 19: 125-129.
6 Fried TR, Mor V. Frailty and hospitalization of long-term stay nursing home residents. *J Am Geriatr Soc* 1997; 45: 265-269.
7 Jones JS, Dwyer PR, White LJ, Firman R. Patient transfer from nursing home to emergency department: outcomes and policy implications. *Acad Emerg Med* 1997; 4: 908-915.
8 Saliba D, Kington R, Buchanan J, et al. Appropriateness of the decision to transfer nursing facility residents to the hospital. *J Am Geriatr Soc* 2000; 48: 154-163.
9 Kayser-Jones JS, Wiener CL, Barbaccia JC. Factors contributing to the hospitalization of nursing home residents. *Gerontologist* 1989; 29: 502-510.
10 Ackermann RJ. Nursing home practice. Strategies to manage most acute and chronic illnesses without hospitalization. *Geriatrics* 2001; 56: 37, 40, 43-44 passim.
11 Finucane PM, Wundke R, Whitehead C, et al. Profile of people referred to an emergency department from residential care. *Aust N Z J Med* 1999; 29: 494-499.
12 Finucane P, Wundke R, Whitehead C, et al. Use of in-patient hospital beds by people living in residential care. *Gerontology* 2000; 46: 133-138.
13 Fatovich DM. Responses to access block in Australia: Royal Perth Hospital. *Med J Aust* 2003; 178: 108-109.
14 Finn J. Prognostic determinants of out-of-hospital cardiac arrest in Perth, Western Australia: identification of strategies to improve outcome [PhD thesis]. Perth: University of Western Australia, 2002.
15 Baggoley C, Phillips D, Aplin P. A study of emergency admissions at the Flinders Medical Centre using the Appropriateness Evaluation Protocol. *Emerg Med* 1994; 6: 29-36.
16 Kihlgren AL, Nilsson M, Sorlie V. Caring for older patients at an emergency department — emergency nurses' reasoning. *J Clin Nurs* 2005; 14: 601-608.
17 Australian Government Department of Health and Ageing. Aged Care GP Panels Initiative. Statement of rationale for the Divisions' performance indicators. 2004. Available at: http://www.health.gov.au/internet/wcms/publishing.nsf/Content/health-medicare-health_progp-rationale.htm (accessed Mar 2006).
18 Mylotte JM, Naughton B, Saludades C, Maszarovics Z. Validation and application of the pneumonia prognosis index to nursing home residents with pneumonia. *J Am Geriatr Soc* 1998; 46: 1538-1544.
19 Thompson RS, Hall NK, Szpiech M. Hospitalization and mortality rates for nursing home-acquired pneumonia. *J Fam Pract* 1999; 48: 291-293.
20 Freiman MP, Murtaugh CM. The determinants of the hospitalization of nursing home residents. *J Health Econ* 1993; 12: 349-359.
21 Australian Department of Health and Ageing. National Demonstration Hospitals Program Phase 4. National evaluation of project impact. Final report. 2003. Available at: http://www.health.gov.au/internet/wcms/publishing.nsf/Content/health-hospitals-demonstration-NDHP (accessed Mar 2006).

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