

## Review

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# Nursing home residents attending the emergency department: clinical characteristics and outcomes

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## Summary

Nursing home (NH) residents represent the frailest group of older people, and providing gerontologically attuned care that addresses these frailties is often a challenge within the emergency department (ED). This study sought to prospectively profile acutely unwell NH residents in order to clarify some of the challenges of providing emergency care to this group. Over an 18-week period, we prospectively reviewed all NH residents presenting to the ED of an urban university teaching hospital. Relevant data were retrieved by direct physician review (as part of a comprehensive geriatric assessment in the ED), collateral history from NH staff and primary carers, and review of electronic records. There were 155 ED visits by 116 NH residents. Their mean age was 80.3 ( $\pm 9.6$ ) years. High

pre-morbid levels of dependency were reflected by a mean Barthel Index of 34.1 ( $\pm 20$ ) and almost two-thirds had a pre-existing diagnosis of dementia. One-third of visits were during 'normal' working hours. Patients were reviewed by their regular NH doctor pre-transfer for 36% of visits. Using accepted international criteria, over half of the visits were deemed 'potentially preventable'. Unwell NH residents have complex medical needs. The decision to refer these patients to the ED is often made by 'out of hours' general practitioners and their initial care in the ED is directed by physicians with limited experience in geriatric medicine. Most referrals to the ED are potentially preventable but this would require enhancements to the package of care available in NHs.

## Introduction

The emergency department (ED) plays a vital role in the provision of care to nursing home (NH) residents, by facilitating urgent care for an unexpected acute illness<sup>1</sup> or as an access point for hospitalization when there is deterioration of a chronic illness.<sup>2</sup> NH residents represent the frailest group of older people, and providing gerontologically attuned care that addresses these frailties is often a challenge within the ED environment.

Consistent with the international trend of ageing populations, there is an expectation of an exponential increase in the numbers of care-dependent older persons over the coming decades, with many more requiring long-term residential care.<sup>3</sup> NH residents have greater care needs than age-matched community dwelling cohorts, with higher rates of polypharmacy, disability and functional impairment,<sup>4</sup> more numerous medical comorbidities with consequent increased medical complexity, as well as a higher prevalence of dementia/cognitive impairment, and

an increased likelihood of recurrent falls.<sup>5</sup> As with most frail older patients,<sup>6</sup> NH residents admitted to acute hospitals have higher rates of delirium, falls, hospital acquired infections and other iatrogenic complications,<sup>7</sup> so identification of potentially preventable admissions is a priority in order to minimize exposure of this frail group to this risk.<sup>8,9</sup>

Systems in place within EDs are often unsuited to care provision for older frail patients.<sup>10,11</sup> NH residents often present atypically, with non-specific symptoms and higher rates of delirium, making the formulation of an accurate diagnosis and implementation of a comprehensive individualized management plan a significant challenge in the time-poor setting of the ED.

In 2006, there were almost 22 500 persons aged  $\geq 65$  years (4.8% of all people aged 65+) in long-term residential care in Ireland, and a further 14 500 people requiring residential care is projected by 2021.<sup>12</sup> With this anticipated increase, it is important we examine the processes and use of EDs by this cohort, to inform appropriate organization of care for the frail older patient.<sup>13</sup> This study sought to prospectively profile and characterize all NH residents presenting to an urban hospital ED in order to clarify some of the current and future challenges of providing emergency care to this group. Ethical approval for this study was obtained from the St James Hospital/Tallaght Hospital research ethics committee in September 2011.

## Methods

### Study setting

Over an 18-week period from November 2011 until March 2012, we prospectively reviewed ED usage and hospitalization rates of all NH residents presenting to the ED of a 600-bed urban university teaching hospital. Over 42 000 patients are reviewed annually in the adult ED and 17% are aged  $\geq 65$  years. There are approximately 500 ED attendances by NH residents annually ( $\sim 1.2\%$  of total ED visits). Data were retrieved by direct physician review (as part of a comprehensive geriatric assessment in the ED<sup>14</sup>), collateral history from NH staff and primary carers, review of electronic ED records and the hospital inpatient enquiry database.

### Participant details

Patient characteristics recorded included age, gender, duration resident in NH, comorbid conditions, pre-morbid diagnosis of dementia (prior formal diagnosis or history of cognitive decline of greater than 6 months duration with associated

functional decline), history of recurrent falls (defined as two or more falls in the preceding 6 months), pre-morbid polypharmacy (defined as  $\geq 5$  medications) and baseline functional ability, based on a collateral history from a NH-based informant (Barthel activity of daily living scale<sup>15</sup>).

Details of the time of day when patients presented to the ED, frequency of ED presentations within the preceding 12 months and details of their pre-hospital care were noted.

Specifics on the nature of the presenting illness, the presence of delirium (CAM-ICU and geriatrician opinion<sup>16</sup>), the severity of infection (SIRS, systemic inflammatory response syndrome criteria<sup>17</sup>) and discharge or admission details were also recorded. Clinical outcome data including the risk of hospitalization, the duration of hospital stay and the mortality risk during the current hospitalization period or over the following 6 months (ascertained by contacting the NH) were noted.

### Visit types

Applying the accepted criteria which have been validated in previous ED studies of NH residents, we assessed the 'appropriateness' of each ED visit.<sup>18</sup> Under these criteria, a 'potentially preventable' attendance is one that may have been avoided if optimal management of an existing condition was available in the NH at an earlier stage. A 'low acuity' visit is one rated as standard or non-urgent on the ED triage System (The Manchester triage system is used on this study site<sup>19</sup>) and not requiring in-patient management resulting in direct discharge from ED; 'other' visits are categorized as not potentially preventable or not low-acuity, and include visits due to fall or non-fall-related injuries, unspecified chest pain, unspecified abdominal pain, acute stroke or cardiac arrest amongst others.

### Statistical analysis

Data were entered into SPSS 16.0 (SPSS Inc, USA) for statistical analysis. Descriptive data of participant's characteristics were presented as frequency and percentage, and continuous variables were presented as mean  $\pm$  SD (standard deviation). Proportionate comparisons between different groups, e.g. those with delirium versus those without, were calculated using the Pearson chi square test. Relative risk scores for mortality and hospitalization outcomes were calculated and presented with 95% confidence interval (CI). Differences in the length of stay between index hospitalizations and subsequent re-hospitalizations were measured using the Students *t*-test. A *P*-value of  $<0.05$  was considered statistically significant.

## Results

### Study population demographics

Over the 18-week study period, there were 155 ED visits by 116 different NH residents (Table 1). Their mean age was 80.3 ( $\pm 9.6$ ) years and the majority of patients were women (84/116, 72%). The mean length of time that the studied patients had been resident in the NH was 1035 ( $\pm 1021.9$ ) days. High pre-morbid levels of dependency were reflected by a mean Barthel Index score of 34.1/100 ( $\pm 20$ ).

The mean number of documented comorbid medical diagnoses per patient was 5.4 ( $\pm 1.5$ ), while almost all patients (106/116, 91%) had restricted mobility pre-morbidly, and a quarter (29/116, 25%) had a history of recurrent falls. Over 96% (111/115, 97%) of patients reviewed were on at least five medications. Almost two-thirds (71/111, 64%) had a pre-existing diagnosis of dementia prior to index ED review. Over a quarter (32/116, 28%) of patients had visited the ED at least once in

**Table 1** Baseline characteristics of NH patients presenting to the ED ( $n = 116$ )

Mean age (years)	80.3 $\pm$ 9.6
Gender	84/116 female
LOS in NH (days)	1035.0 $\pm$ 1021.9
Mean BIS	34.1 $\pm$ 20.0
ED visits 6/12	32/116 (27.6%)
Mean ED visits 6/12	0.8 $\pm$ 1.5
Mean no. comorbidities	5.4 $\pm$ 1.9
No. comorbidities >4	99/116 (85.3%)
Limitation mobility	106/116 (91.4%)
Falls history	29/116 (25.0%)
Dementia	71/111 (64.0%)
Polypharmacy	111/115 (96.5%)

LOS in NH, number of days patient is resident in nursing home; Mean BAS, mean Barthel Index score; ED visits 6/12, number of patients who visited Tallaght Hospital ED in 6 months prior to their initial presentation during the study period; mean ED visits 6/12, mean number of Tallaght Hospital ED visits per patient prior to their initial presentation during the study period; mean no. comorbidities, mean number of medical comorbidities; no. comorbidities >4, number of patients with at least four medical comorbidities; limitation mobility, number of patients with restrictions/limitations to their mobility; falls history, number of patients with two or more falls in 6 months prior to their initial presentation during the study period; dementia, number of patients with pre-existing diagnosis of dementia; polypharmacy, number of patients on five or more medicines regularly prior to their initial presentation during the study period.

the prior 6 months and eight (7%) patients had visited the ED at least four times in the 6 months prior to their initial presentation during the study period.

### Pre-hospital care

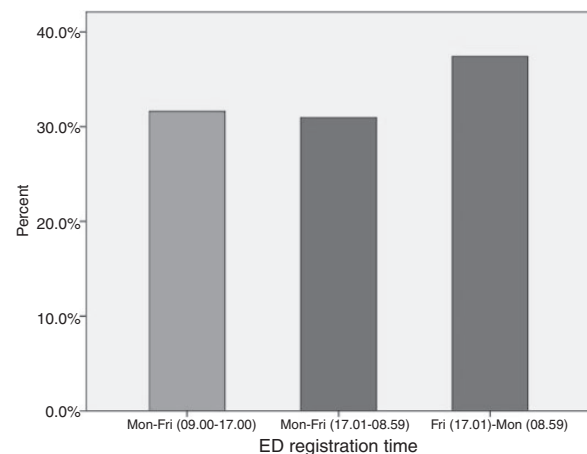
Patients were reviewed by their regular NH doctor pre-transfer for only 36% (56/155) of ED visits, and on 61 (61/155, 40%) occasions patients presented without prior review by any doctor. This was more likely to occur outside of 'normal' working hours (47/61, 77%). Patients were more likely to have received review by their own regular general practitioner (GP) prior to ED transfer if they attended ED during normal working hours (Pearson chi square = 13.79,  $P = 0.001$ ). Pre-hospital review by their regular primary care physician did not influence the likelihood of hospitalization (Pearson chi square = 0.17,  $P = 0.68$ ).

### Visit details

Only a third of ED visits (49/155, 32%) were during normal working hours, with proportionately more patients visiting the ED over the weekend, than during normal working hours Monday to Friday (Figure 1). There was no significant difference in the proportion of patients admitted relative to their time of ED registration (Pearson chi square = 0.42,  $P = 0.81$ ).

### Indications for ED visit

The most frequent reasons for ED referral were pneumonia (45/155, 29%), falls (26/155, 17%) and urinary tract infection (13/155, 8%). There was a statistically and clinically significant relationship between the presenting diagnosis and the necessity for admission (Pearson chi square = 21.1,  $P = 0.04$ ), with

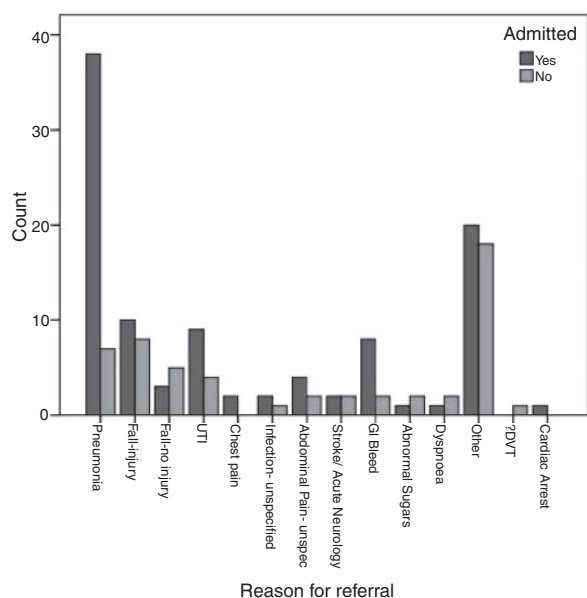


**Figure 1.** ED registration times.

a significantly greater chance of admission associated with a diagnosis of urinary tract infection or pneumonia (Figure 2). A substantial proportion of patients were identified as having delirium (48/138, 35%) and/or SIRS (55/155, 36%). The presence of delirium or SIRS in the ED was associated with a significantly worse outcome (Table 2).

## Clinical outcomes

The hospitalization rate was 70% (109/155) for all ED visits: 81% (88/109) of patients were admitted under the medical services, while general surgery and orthopaedic surgery admitted 14% (15/109) and 5% (6/109), respectively. Excluding patients who were discharged directly from the ED, the average length of stay was 8.3 ( $\pm$  8.6) days. The average length of stay under the medical services was 8.2 ( $\pm$  8.5) days and was 5.6 ( $\pm$  6.3) days and 17.2 ( $\pm$  14.7) days under the general surgical and orthopaedic services, respectively.



**Figure 2.** Reason for referral to the ED and proportion of admissions relative to reason for referral.

Excluding patients who were not admitted to hospital, i.e. discharged back to NH, inpatient mortality was 12% (13/111). In total, 6-month mortality (from date of ED visit) was 18% (28/155).

## ED recidivism

While over a quarter of patients (32/116, 28%) had visited the ED at least once in the prior 6 months, 7% (8/116) patients had visited the ED at least four times in the 6 months prior to their initial presentation during the study period. During the 18-week study period, 28% (31/116) of patients subsequently presented to the ED at least once more, repeat presentations accounted for 25% (39/155) of the total ED visits. Two-thirds (26/39) of these repeat visits culminated in an admission to hospital.

## 'Potentially preventable' ED visits

Over half of all ED visits (85/155, 55%) were deemed 'potentially preventable' according to the aforementioned criteria, while almost a quarter (36/155, 23%) were categorized as low acuity, and the remainder (34/155, 22%) were 'other' visit types. There was no significant relationship between the visit type and ED registration times (Pearson chi square= 3.2,  $P < 0.53$ ). The majority (35/39) of repeat ED visits were categorized as potentially preventable.

## Discussion

This is one of the few European studies that comprehensively characterizes and thus illustrates the complexity of NH patients presenting to the ED. Their complexity is reflected by the high prevalence of pre-morbid functional loss and limited mobility, coupled with multiple medical comorbidities, high rates of polypharmacy and a high prevalence of dementia. This confluence of complexity raises significant challenges for care provision to this cohort. Within the hospital, their immediate care is often directed by ED physicians and clinicians who have no formal training in geriatric medicine and varying

**Table 2** Delirium and SIRS: prevalence and mortality

	Delirium	SIRS
Prevalence	48/138 (34.8%)	55/155 (35.5%)
Admission rate	RR 19.9 (95% CI 2.8–139.2)	RR 6.9 (95% CI 2.3–20.9)
Mortality (admission)	RR 2.2 (95% CI 1.3–3.7)	RR 2.7 (95% CI 1.6–3.6)
Mortality (6 months)	RR 1.9 (95% CI 1.2–2.9)	RR 1.8 (95% CI 1.2–2.7)



degrees of experience.<sup>20</sup> Additionally, the decision to refer an individual to the hospital is often made by an 'out of hours' GP who is not familiar with the patient.

While referral to the ED is often necessary, it confers significant risks on NH patients. As this study demonstrates, the majority of residents are referred outside normal working hours, when waiting times may be longer and access to specialist input, including a comprehensive geriatric assessment, palliative care advice and the multidisciplinary team review is restricted. These services would likely enable earlier implementation of appropriate care plans and in many circumstances facilitate discharge on the same day of attendance. The high rates of delirium evident in NH residents, paralleling the high prevalence of underlying dementia, also carries with it a significant increase in the risk of death, both as an inpatient and longitudinally.

The ED environment is unsuited to meeting these patients' care needs. The constantly moving and round-the-clock nature of the environment removes the sense of night and day, further increasing the risk of delirium and behavioural disturbance, while physical examination in the restricted space available provides an extra challenge in patients with pre-morbid restricted mobility and poorer cognition.<sup>21</sup>

A focus on preventing avoidable admissions would limit exposure of frail NH residents to the risks associated with ED transfer. The often fragmented nature of medical care in NHs in Europe is well recognized however,<sup>22</sup> and while over half of the study visits were deemed 'potentially preventable', this is only realistically achievable if significant changes are made to the structure of care in these facilities and the community at large. With over one-third of patients referred with infections, the provision of intravenous antibiotics and access to specialist review or input on-site would likely impact significantly on the necessity to attend ED and facilitate earlier treatment of conditions before they escalate to the point whereby hospitalization is unavoidable. Additionally, when we consider the high prevalence of swallow impairment in NH residents,<sup>23</sup> enhanced access to dysphagia assessment and management in NHs is also likely to reduce presentations due to respiratory illnesses.

Improved communication and development of holistic care planning for NH residents, with earlier involvement of the patient in decisions regarding their care, and consideration to where that care is best provided in line with their wishes would empower individual residents in directing their own

care. Programmes directing future care, including do-not-hospitalize orders, targeted at residents with terminal clinical conditions, reduce the likelihood of the patient dying in hospital, but need to be reflected in improved access to similar quality care within the NH setting.<sup>24</sup>

The appointment of community geriatricians with essential access to multi-disciplinary teams, as a liaison between the acute hospital and NHs, would facilitate the required enhancements to the structure of medical care in NHs,<sup>25</sup> for example by introducing practical programmes, like INTERACT<sup>26</sup> which aids NH staff in identifying unwell patients or by promoting rationalization of the medicines of NH residents, with the aim of reducing the polypharmacy evident in our study.<sup>27</sup> NH staff, including medical, nursing and therapeutic, must be adequately supported in terms of time, training, multi-disciplinary support and reimbursement, with the aim of keeping individuals with the required skills in the NH sector.

The strengths of this study include its prospective design and the fact that several sources of information were used to gather the data used. Every patient included was reviewed by a geriatrician to confirm diagnoses. The main limitation of this study is that it was conducted on a single site only and as such the findings may not be representative of care in every hospital. Additionally, the study period involved is relatively short at only 18 weeks.

This study highlights the challenges to the provision of acute care to older NH residents. The ageing population, coupled with societal shifts such as smaller families and emigration, means that the cohort of NH residents will increase significantly in the coming years. Significant enhancements are needed to the package of care available to this frail group. All sites involved in the care of NH patients should have policies and care pathways in place for managing these patients, as well as a requirement to audit their activity, in much the same way as those that care for cancer or stroke patients do. Such positive changes are necessary if management of unwell NH patients aims to avoid the preventable transfer of vulnerable patients to an inappropriate ED environment with consequent increased risk of delirium and functional decline. While it is not a hospital's prerogative to decide what is a potentially avoidable attendance, as there are pull/push factors mitigating the necessity for ED referral, individual to each NH, these factors are perhaps best addressed by gerontological expertise at hospital sites engaging with primary care physicians, NH owners and commissioners of residential care in their catchment area.

*Conflict of interest:* None declared.

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