

# Hospitalization of Nursing Home Residents in an Acute-Care Geriatric Department: Direct versus Emergency Room Admission

Efraim Aizen MD<sup>1</sup>, Rachel Swartzman MD<sup>1</sup> and A. Mark Clarfield MD FRCPC<sup>2,3</sup>

<sup>1</sup>Fliman Geriatric Hospital and Rappaport Faculty of Medicine, Technion–Israel Institute of Technology, Haifa, and <sup>2</sup>Sarah Herzog Hospital, Jerusalem, Israel; and <sup>3</sup>Division of Geriatric Medicine, Sir Mortimer B. Davis-Jewish General Hospital, McGill University, Montreal, Canada

**Key words:** hospitalization, nursing home, emergency room, geriatric department

## Abstract

**Background:** Transfer to an emergency room and hospitalization of nursing home residents is a growing problem that is poorly defined and reported.

**Objectives:** To assess the clinical effectiveness of a pilot project involving hospitalization of nursing home residents directly to an acute-care geriatric department.

**Methods:** We retrospectively compared the hospitalization in an acute-care geriatric unit of 126 nursing home residents admitted directly to the unit and 80 residents admitted through the emergency room. The variables measured included length of stay, discharge disposition, mortality, cause of hospitalization, chronic medical condition, cognitive state, functional status at admission, and change of functional status during the hospital stay. Follow-up data were obtained from medical records during the 2 year study.

**Results:** No significant differences between the groups were found for length of stay, mortality, discharge disposition and most characteristics of the hospital stay. The only significant difference was in patients' mean age, as emergency room patients were significantly older (86 vs. 82.9 years). The most common condition among nursing home patients admitted via the emergency room was febrile disease (36.9%), while functional decline was the most common in those coming directly from the nursing home (32.5%). The prevalence of functional dependence and dementia were similar in both groups. Functional status did not change throughout the hospital stay in most patients.

**Conclusions:** Treatment of *selected* nursing home residents admitted directly from the nursing home to an acute-care geriatric unit is feasible, medically effective, results in the safe discharge of almost all such patients and provides an alternative to transfer to an emergency room. This study suggests that quality gains and cost-effective measures may be achieved by such a project, although a randomized controlled trial is necessary to support this hypothesis.

*IMAJ 2001;3:734–738*

and emotionally difficult for the patient and the family, and emergency healthcare professionals often feel uncomfortable caring for such patients [1]. Medical, administrative, logistic, economic and ethical issues – either singly or in combination – can influence the decision to hospitalize nursing home residents [2–4]. Few studies have reported the hospitalization of nursing home residents, and those that have give little reason for confidence that the general hospital – and especially its portal of entry the ER – offers a particularly salutary experience for the frail nursing home patient [5–7].

While one group did report that the majority of transfers from nursing home to acute-care hospitals was appropriate [8], studies from Nottingham (UK) and Belfast found that 9.6–30.9% of the acute medical admissions from nursing homes to hospitals were inappropriate [9,10]. A transfer from a nursing home to the emergency room implies that the former is unable to adequately investigate or treat the resident or that the patient is in need of a higher level of expertise and/or technology than the nursing home can provide. Because of the limited possibilities for consultation in most nursing homes and the increasing clinical complexity of the residents, the decision to transfer a resident to an ER can be a difficult one [11,12].

Nursing home residents tend to be sicker than old people at home [7,13]. The major reasons for transfer and hospitalization of these residents are infections, acute cardiovascular conditions, digestive tract diseases and hip fracture [8,13–17]. The transfer of a resident to an ER is expensive in terms of both transportation and the ER evaluation itself and constitutes an added strain to a usually busy facility.

We attempted a new approach to these problems via a pilot project in which acutely ill nursing home residents were directly hospitalized in an acute-care department of a geriatric hospital, bypassing the ER. We postulated that this kind of program would both avoid some of the unwanted effects of emergency room transfer of nursing home residents without risking the patients' health, and save ER resources.

The present study evaluates the services of such a project offered by a single geriatric center to 11 nursing homes in the surrounding community. The study was designed to compare a

Transfer to an emergency room can be a very disruptive process for a nursing home resident. The procedure is both physically

ER = emergency room

group of patients admitted to an acute-care geriatric department directly from the nursing home with a similar group of patients admitted to the same department through either of two acute hospital ERs. A formal cost-benefit analysis of comparing the two sets of patients was beyond the purview of the study.

## The project

The acute-care geriatric department of 24 beds is located in the Fliman Hospital, a 210 bed public geriatric facility affiliated with the Technion–University Medical School and located in Haifa, Israel. The emergency rooms of two of Haifa's general hospitals (Carmel Medical Center and Rambam Medical Center) were involved in the study, as were the 11 nursing homes located within 15 kilometers of the geriatric hospital.

Elements of hospitalization include a multifaceted intervention that integrates geriatric assessment with optimal medical, nursing and rehabilitation care provided by the relevant health professionals. Before commencing, we discussed the project with all the general practitioners involved in the care of residents in those homes. All referrals were made by the general practitioner through a telephone call to the consultant call geriatrician who applied a predetermined "appropriateness" protocol to the referred patients. This protocol was developed to ensure that nursing home patients would not be denied appropriate emergency services not available at the Fliman Hospital via a transfer to our geriatric unit. Excluded were patients who had any conditions that might potentially require surgical treatment or those who required intensive medical care. A telephonic consultation was also offered for those patients who were deemed not to require hospitalization.

## Methods

We retrospectively studied 126 acute nursing home resident admissions to our department for the 24 month period January 1996 through December 1997. The nursing homes are government-licensed (both for-profit and not for-profit) long-term facilities for the care of patients who require assistance with activities of daily living or skilled nursing care.

The residents' characteristics were recorded and the causes of hospitalization organized into 20 categories (Primary diagnosis according to the International Classification of Diseases, Ninth Revision, ICD-9) [18]. Patients could be classified in more than one category. Also organized into 20 categories were chronic medical conditions (Principal diagnosis according to the ICD-9). Patients could be classified in more than one category.

Other data recorded during hospitalization included the length of stay, discharge status, cognitive state, functional status at admission, and change of functional status during the hospital stay. Discharge status was classified into three categories: discharged back to the nursing home, died, or transferred to an ER. We utilized the Clinical Dementia Rating Scale to assess patients with cognitive impairment [19]. The

**Table 1. Patient characteristics**

Characteristics	Nursing home	Emergency room	P
No. of patients	80	46	
Mean age (yr $\pm$ SD)	82.9( $\pm$ 6.7)	86( $\pm$ 4.8)	0.0075
Range	(65–97)	(72–96)	
Mean length of stay in days (SD)	12.4( $\pm$ 5.5)	11.7( $\pm$ 5.3)	0.697
Range (days )	1–30	1–23	
Males	24	21	0.086
Females	56	25	0.086
Discharged	74	39	0.225
Died	0	3	–
Subsequent transfer to ER	6	4	1.000

CDR Scale utilizes clinical scoring rules, where CDR 0 = no dementia and CDR 0.5, 1, 2, or 3 indicates questionable, mild, moderate, or severe dementia respectively. The Katz Index of Activities of Daily Living was used as the functional status staging tool [20]. The index ranks adequacy of performance in six basic functions. The specific definitions of ADL score used were: ADL = 1(A) – independent in all functions, ADL = 2(B) – independent in all but one function, etc. ADL = 7(G) indicates dependence in all six functions.

Mean values are presented throughout together with the standard deviation (SD). Student's *t*-test was used to compare group means. Categorized data were compared by tests.

## Results

### Patient characteristics [Table 1]

During the 24 months of the study 126 nursing home residents were admitted to the geriatric department: 80 directly from one of the study nursing homes and 46 residents through an ER. There were no statistically significant differences with respect to most patient characteristics between the two groups [Table 1]. The mean length of stay was similar in both groups. The only significant difference found was age, as patients admitted through an ER were on average 3 years older ( $86 \pm 4.8$  years) than those admitted directly from nursing homes ( $82.9 \pm 6.7$  years) ( $P=0.0075$ ).

### Mortality

Of interest was the fact that only 3 of 126 patients (2.4%) died during their geriatric hospitalization, all of whom were admitted via the ER.

### Reasons for hospitalization [Table 2]

The only significant difference found was the higher rate of febrile disease in patients admitted through an ER (36.9% vs. 8.75%). Patients admitted directly from the nursing home were hospitalized most frequently for weakness and functional decline (32.5%). Functional decline was the reason for admission in only 19.5% of ER patients (difference not statistically significant).

CDR = Clinical Dementia Rating

**Table 2.** Reasons for hospitalizations (main primary diagnosis)

Main hospitalization cause	Nursing home – direct (n=80)		Emergency room (n=46)		P
	No.	%	No.	%	
Functional decline	26	32.5	9	19.5	0.149
Abdominal symptoms	11	13.75	3	6.5	0.247
Respiratory infection	11	13.75	10	21.7	0.321
Mental change	9	11.25	4	8.7	0.767
Weight loss	8	10	1	2.17	0.153
Dizziness, syncope	7	8.75	1	2.17	0.256
Chest pain	7	8.75	2	4.3	0.485
Febrile disease	7	8.75	17	36.9	0.0002
Falls	7	8.75	2	4.3	0.485
Congestive heart failure	6	7.5	5	10.9	0.528
Arthralgia	5	6.25	0	0	0.157
Urinary tract disease	3	3.75	3	6.25	0.667
Arrhythmia	2	2.5	3	6.25	0.534
Dehydration	1	1.25	4	8.7	0.059
COPD exacerbation	0	0	4	8.7	0.0163

COPD = chronic obstructive pulmonary disease

### Underlying chronic medical condition

Dementia was a more common preexisting diagnosis in patients admitted through an ER (34.8% vs. 10%). Hypertension (34.8% vs. 10%), heart disease (69.5% vs. 41.25%) and gastrointestinal disease (34.8% vs. 7.5%) were also more common in ER patients. The main chronic medical conditions are summarized in Table 3.

### Cognitive state

Dementia was more common in patients admitted through an ER (60.8%) than in patients admitted directly from a nursing home (45%). A null CDR score (no dementia) was found significantly more frequently in patients admitted directly from a nursing home than in those admitted from an ER (37.5% vs. 10.8%). Patients' cognitive state staged by the CDR [19] is summarized in Table 4.

### Functional status at admission

Functional status, as assessed by the Katz Index of ADL [20], did not differ significantly between the two groups. Dependence in all six functions was more common in patients admitted from an ER than in those admitted directly from a nursing home (39.1% vs. 25%). Independence in all functions was more common in patients admitted directly from a nursing home compared with those admitted from an ER (8.7% vs. 2.5%).

**Table 3.** Distribution of hospitalization by main chronic medical conditions

Chronic medical condition	Nursing home – direct (n=80)		Emergency room (n=46)		P
	No.	%	No.	%	
Heart disease	33	41.25	32	69.5	0.003
Hypertension	15	18.75	20	43.5	0.0039
Eye disease	15	18.75	13	28.2	0.315
Renal failure	15	18.75	5	10.8	0.315
Dementia	8	10	16	34.8	0.0017
Chronic lung disease	13	16.25	11	23.9	0.348
Diabetes	9	11.25	3	6.5	0.533
State post-stroke	7	8.75	7	10.8	0.377
Gastrointestinal disease	6	7.5	14	34.8	0.0017
Pressure sore	2	2.5	5	10.8	0.096
State post-hip surgery	6	7.5	7	15.2	0.225
Incontinence	6	7.5	8	17.4	0.138
Cancer	5	6.25	8	17.4	0.067
Arthritis	8	10	5	10.8	1.000

**Table 4.** Patients cognitive state staged by the Chronic Dementia Rating Scale

CDR	Nursing home – direct (n=80)		Emergency room (n=46)		P
	No.	%	No.	%	
0	30	37.5	5	10.8	0.0017
0.5	14	17.5	13	28.2	0.180
1	8	10	8	17.4	0.271
2	10	12.5	7	15.2	0.787
3	18	22.5	13	28.3	0.0391
Dementia (1 to 3)	36	45	28	60.8	0.095

### Change of functional status during the hospital stay

Functional status did not change from admission to discharge in most patients (81.2% of nursing home patients and 80.4% of ER patients), and improved in 16.3% of nursing home and 17.4% of ER patients.

### Discussion

No significant differences between groups were found for mortality, mean length of stay, subsequent transfer to ER, most causes of hospitalization and chronic medical condition, cognitive state, functional status at admission, and changes during the hospital stay. However, there were significant differences in the mean age of patients, prevalence of febrile disease on admission, and prevalence of some chronic medical conditions such as heart disease, hypertension, dementia and gastrointestinal disease. These differences were to be expected given that the protocol was meant to ensure that unstable patients were referentially sent to the ER.

In view of the fact that we evaluated our pilot project by means of a retrospective observational study and that patients were not randomized to admission from either a nursing home or emergency room, selection bias may explain at least part of our results. Since adjustment for factors was precluded by lack of information, our stratified analysis grouped patients on the basis of their presenting characteristics. This statistical approach is obviously not as ideal as a randomized trial and it is possible that subtle clinical differences were not detected. The limitations of undertaking such a non-randomized comparison and the caution required in interpreting results are acknowledged. Such results, however, can provide an important indication for further research via randomized controlled trials. It is clear that in our strategy and according to our protocol, the project did not appear to cause any harm to the subset of patients admitted directly from the nursing home to the geriatric hospital who otherwise would have been sent to the ER.

Our data suggest that such a project may contribute to a reduction in the transfer of nursing home residents to the emergency room by providing a safe and effective (and possibly cheaper) alternative. Our literature search did not reveal any attempts to minimize transfers and admissions of nursing home residents to the emergency room by providing such an alternative. We believe that at least in selected patients this approach can be appropriate and safe.

The present study confirmed recognized differences between the groups in some aspects. The high rate of infection as a cause of admission in the ER group (36.9%) is compatible with the high rate of infection found in nursing home residents in earlier studies [7,14,17,21]. Of interest was the finding that febrile disease was significantly less frequent in patients admitted directly from nursing homes. It is possible that the rate of admissions due to infections in the direct admission group was decreased as a result of the telephone call to our consultant geriatrician following the protocol. In other more urgent cases, sicker nursing home residents may well have been sent to the emergency room without consultation with our team.

Dementia as established by mental examination was very common in both groups (60.8% in the ER group and 45% in the nursing home group). The high prevalence of this condition (33–42.9%) among nursing home residents has been noted by others [16,17,21]. The higher prevalence of dementia in our study can be explained by the fact that we established the diagnosis by a mental and cognitive examination of the patient, while many other studies obtained data from patients' records. Mental impairment is known to be commonly underdiagnosed in hospitalized older people [22]. This observation was confirmed by our finding that dementia in both groups was more commonly established by examination than as a pre-existing diagnosis (60.8% vs. 34.8% in ER patients, 45% vs. 10% in nursing home patients). Overall, patients admitted from the emergency room tended to be slightly sicker and more mentally impaired than patients admitted directly from nursing homes.

Functional dependence was very common in both groups, especially in the patients admitted from the emergency room. Among these nursing home residents, those with a recent worsening of function might have suffered this decline as a result of an acute illness. This "natural history of functional morbidity" has been described as a very common problem in elderly hospitalized patients [23]. Although we do not know the true extent of recent functional decline in our patients, we have evidence that some of them had recently deteriorated in this domain. Functional status did not change during the hospital stay in most of our patients. Patients suffering from functional decline associated with an acute illness can benefit from a vigorous strengthening program [24], which has been found to result in an impressive improvement in functional mobility after an 8 week training period. In our study the mean length of hospital stay of both groups (nursing home  $12.5 \pm 5.5$  days, ER  $11.7 \pm 5.3$  days) was too short to achieve improved functional capacity and independence although we did initiate a rehabilitation program in many of these patients.

The average length of hospital stay ( $12.4 \pm 5.5$  in nursing home patients and  $11.7 \pm 5.3$  in ER patients) was not significantly different from similar studies (9.7–11.4 days) [17,21]. While other studies have reported that hospitalized nursing home residents can exhibit very high mortality rates (8.06–27%) [17,21,25], our study showed that mortality in both the nursing home (0%) and ER (6.5%) patients was considerably lower. The clinical selection prior to admission may have led to this low outcome by (appropriately and according to the project protocol) preventing seriously ill residents from being admitted to our department. Most patients were safely discharged back to the nursing home. Only six nursing home patients (7.5%) and four ER patients (8.7%) were subsequently returned to the ER, most of them due to a life-threatening situation or need for surgery.

In summary, this study suggests that the treatment of carefully selected nursing home residents admitted directly from a long-term institution to an acute-care geriatric unit and bypassing the emergency room can be effective and safe. Although we did not examine this aspect specifically, our study suggests that for appropriately selected patients this approach may well incur lower costs while offering equivalent clinical outcomes to the usual ER visit and subsequent transfer. The next step would be the initiation of a randomized clinical trial to more rigorously test this hypothesis.

## References

1. Sanders AB. Care of the elderly in emergency departments: conclusions and recommendations. *Ann Emerg Med* 1992;21:830–4.
2. Zimmer JG, Eggert GM, Treat A, Brodows B. Nursing homes as acute care providers: a pilot study of incentives to reduce hospitalizations. *J Am Geriatr Soc* 1988;36:124.
3. Rubenstein LZ, Ouslander JG, Wieland D. Dynamics and clinical implications of the nursing home – hospital interface. *Clin Geriatr Med* 1988;4:471.

4. Ouslander JG. Reducing the hospitalization of nursing home residents. *J Am Geriatr Soc* 1988;36:171.
5. Steel K, Gertman PM, Crescenzi D. Iatrogenic illness on a general medical service at a university hospital. *N Engl J Med* 1981;304:638–42.
6. Fried TR, Mor V. Frailty and hospitalization of long-term stay nursing home residents. *J Am Geriatr Soc* 1997;45:265–9.
7. Gillick M, Steel K. Referral of patients from long-term to acute-care facilities. *J Am Geriatr Soc* 1983;31:74–8.
8. 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;39:1164–8.
9. Snape J, Santharam MG. Inappropriate acute admissions from nursing and residential homes. *Age Ageing* 1997;26:320–1.
10. Beringer TR, Flanagan P. Acute medical bed usage by nursing home residents. *Ulster Med J* 1999;68:27–9.
11. Konings JW, Wendte JF, Danse JA, Ribbe MW. Hospital admission of nursing home patients: a difficult decision? *Ned Tijdschr Geneeskd* 1994;138:2664–8.
12. Konings JW, Wendte JF, Danse JA, Ribbe MW. Who decides on hospital admission of nursing home patients? *Ned Tijdschr Geneeskd* 1994;138:2660–4.
13. Konings JW, Wendte JF, Danse JA, Ribbe MW. Hospital admission of nursing home patients: patient characteristics and purpose of admission. *Ned Tijdschr Geneeskd* 1994;138:2655–9.
14. Irvine PW, Van Buren N, Crossley K. Causes for hospitalization of nursing home residents: the role of infection. *J Am Geriatr Soc* 1984;32:103–7.
15. Tresch DD, Simpson WM, Burton JR. Relationship of long term and acute care facilities. The problem of patient transfer and continuity of care. *J Am Geriatr Soc* 1985;33:819–26.
16. Barker WH, Zimmer JG, Hall WJ, Ruff BC, Freundlich CB, Eggert GM. Rates, patterns, causes, and cost of hospitalization of nursing home residents: a population-based study. *Am J Public Health* 1994; 84:1615–20.
17. Murtaugh CM, Freiman MP. Nursing home residents at risk of hospitalization and the characteristics of their hospital stay. *Gerontologist* 1995;35:35–43.
18. International Classification of Diseases, 9th revision. In: Clinical Modification, 4th edn. Los Angeles, California: Practice Management Information Corporation (PMIC), 1995.
19. Hughes C, Berg L, Danziger W, Coben, Martin R. A new clinical scale for the staging of dementia. *Br J Psychiatry* 1982;140:566–72.
20. Katz S, Ford AB, Moskowitz RW, Jacobson B, Jaffe M. Studies of illness in the aged. *JAMA* 1963;185:94–9.
21. Gabow PA, Hutt DM, Baker S, Craig SR, Gordon JB, Lezotte DC. Comparison of hospitalization between nursing home and community residents. *J Am Geriatr Soc* 1985;33:524.
22. Garcia CA, Tweedy JR, Blass JP. Underdiagnosis of cognitive impairment in a rehabilitation setting. *J Am Geriatr Soc* 1984; 32:339–42.
23. Hirsch CH, Sommers L, Olsen A, Mullen L, Winograd CH. The natural history of functional morbidity in hospitalized older persons. *J Am Geriatr Soc* 1990;38:1296–303.
24. Fiatarone MA, Marks EC, Ryan ND, Meredith CN, Lipsitz LA, Evans WJ. High intensity strength training in nonagenarians. *JAMA* 1990;263:3029–34.
25. Intrator O, Castle NG, Mor VM. Facility characteristics with hospitalization of nursing home residents. *Med Care* 1999;37:228–37.

---

**Correspondence:** Dr. E. Aizen, Dept of Geriatrics, Fliman Geriatric Hospital, Zalman Shneur St. P.O. Box 2263, Haifa 31021, Israel. Phone: (972-4) 830-7070, Fax: (972-4) 822-6017, email: eaizen\_il@yahoo.com