

Nurse Discharge Planning in the Emergency Department: A Toowoomba, Australia, Study

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Keywords: emergency department; length of stay; nurse risk screening; older people; re-presentations; readmissions

Abstract

Aim. This study aimed to ascertain whether a model of risk screening carried out by an experienced community nurse was effective in decreasing re-presentations and readmissions and the length of stay of older people presenting to an Australian emergency department.

Objectives. The objectives of the study were to (i) identify all older people who presented to the emergency department of an Australian regional hospital; (ii) identify the proportion of re-presentations and readmissions within this cohort of patients; and (iii) risk-screen all older patients and provide referrals when necessary to community services.

Design. The study involved the application of a risk screening tool to 2139 men and women over 70 years of age from October 2002 to June 2003. Of these, 1102 (51.5%) were admitted and 246 (11.5%) were re-presentations with the same illness. Patients presenting from Monday to Friday from 08:00 to 16:00 hours were risk-screened face to face in the emergency department. Outside of these hours, but within 72 hours of presentation, risk screening was carried out by telephone if the patient was discharged or within the ward if the patient had been admitted.

Results. There was a 16% decrease in the re-presentation rate of people over 70 years of age to the emergency department. Additionally during this time there was a 5.5% decrease in the readmission rate (this decrease did not reach significance). There was a decrease in the average length of stay in hospital from 6.17 days per patient in October 2002 to 5.37 days per patient in June 2003. An unexpected finding was the decrease in re-presentations in people who represented to the emergency department three or more times per month (known as 'frequent flyers').

Conclusions. Risk screening of older people in the emergency department by a specialist community nurse resulted in a decrease of re-presentations to the emergency department. There was some evidence of a decreased length of stay. It is suggested that the decrease in re-presentations was the result of increased referral and use of community services. It appears that the use of a

specialist community nurse to undertake risk screening rather than the triage nurse may impact on service utilization.

Relevance to clinical practice. It is apparent that older people presenting to the emergency department have complex care needs. Undertaking risk screening using an experienced community nurse to ascertain the correct level of community assistance required and ensuring speedy referral to appropriate community services has positive outcomes for both the hospital and the patient.

Introduction

This paper reports on a project undertaken in Toowoomba, Queensland, Australia, from October 2002 to June 2003 into the use of a community nurse-administered risk screening assessment tool in the emergency department (ED) of the Toowoomba Health Service (THS). Toowoomba is situated approximately 100 km west of the city of Brisbane, capital of the state of Queensland, on the edge of the Great Dividing Range. It has a population of approximately 89 000 people (Australian Bureau of Statistics 2001). Within Toowoomba are one public and one private hospital ED.

This study was carried out in the public hospital ED and was funded by the Australian Government Department of Health and Ageing as part of their National Hospital Demonstration Hospital Program Number 4 (NDHP4). The focus of NDHP4 was better management of older people in the acute hospital system. THS was a collaborating hospital in this study with the lead hospital being the Prince of Wales Hospital located in Sydney, New South Wales, Australia.

The need to manage ED visits by older people better in Toowoomba had become a priority for several reasons. First, whilst recognizing that older people (defined as a person over the age of 65 years) are not a homogenous group, the Australian literature suggests that:

- Older people over the age of 65 represent about one-third of all Australian hospital separations (defined as when an admitted patient is discharged, transferred to another institution, leaves against medical advice, dies whilst in care, statistical discharge, that is when type of care changes from/to acute, rehabilitation, palliative or non-acute care, or leaves hospital for a period of seven or more days), but 50% of all occupied bed days (calculated by dividing total patient days by the number of days in the year; Duckett & Jackson 2004);
- People over 65 years of age represent 12.5% of the Australian population, but account for 38% of total allocated health expenditure (Australian Institute of Health and Welfare 2004);
- Patient days (defined as the aggregate number of days of stay for all overnight-stay patients separated from hospital during the year) per 1000 population for people over 65 days are more than 10 times higher than that of younger groups (Australian Institute of Health and Welfare 2004, Duckett & Jackson 2004);
- More Australians are living to an older age with increasing life expectancy at age 65, 75 and 85 years (Australian Institute of Health and Welfare 2004);
- The Australian total population over 65 years of age is less than that of Japan and Sweden, but similar to Canada and the USA (Australian Institute of Health and Welfare 2004).

The study was modelled on previous research into the use of risk screening tools within EDs in both Australia (Fry *et al* 1996, Moss *et al.* 2002) and internationally (McCusker *et al.* 2001, Mion *et al.* 2001, 2003, Aminzadeh & Dalziel 2002, Dendukuri *et al.* 2004).

The model reported upon in this paper can be differentiated from these past models in a number of ways. Triage nurses were not used to undertake the risk-screen assessment (Mion *et al.* 2001, Moss *et al.* 2002). Rather, a specialist community nurse was employed to work within the ED. However, this community nurse did not hold a postgraduate qualification in aged care (Aminzadeh & Dalziel 2002). Because of the way that the Home and Community Care Services (HACC) are organized within Toowoomba, the community nurse in this study was able to refer patients eligible for HACC services directly to the team and allow the team to undertake further assessment and organize community care as necessary. This can be seen as a more efficient use of the community

nurse's time than using a model where community nurse would have to contact individual providers of home care (Mion *et al* 2001, Moss *et al.* 2002). It was only if the patient was not eligible for HACC services that the DARTs (Discharge and Referral to Services) nurse liaised directly with community care providers.

A third difference from past models is that this model does not focus upon increasing referrals to the older person's general practitioner and measuring the results of these effects (McCusker *et al.* 2001). This was not the major focus of this model. Whilst the community nurse did send, by facsimile, a copy of the risk screening assessment to the older person's general practitioner, the main focus was on ensuring that the HACC team undertook assessment and implemented home services. Additionally, the community nurse in this model was not involved in individual follow-up of the older patients screened (Fry *et al.* 1996). Rather, the nurse relied on the work of the HACC team to follow-up the older person. However, informal follow-up did occur, with the community nurse asking the HACC co-ordinator about patient outcomes which were of concern.

Finally, it was not considered appropriate for the screening tool to be handed to the older person or their carer and have them self-administer the questionnaire (Dendukuri *et al.* 2004). The project team believed, though it took more time, that an assessment undertaken by the community nurse would produce more accurate results than self-report.

Method

Aim

The main aim was to ascertain whether a community nurse, employed to undertake a risk-screening of older people (defined as over 70 years of age for the purposes this study) presenting to the ED, decreased re-presentations (i.e. the proportion of patients who had previously presented to the ED within the last seven days) and readmissions to the ED.

Objectives

The objectives of the study were to:

- (i) identify and risk-screen all older people presented to the ED
- (ii) refer all older patients who appeared to need community support services to the HACC team; and
- (iii) ascertain the impact of risk-screening on the proportion of older people re-presenting to the ED and being readmitted to hospital.

Study design

This was a 'before and after study', where data were collected prior to the intervention (the employment of a community nurse in the ED) and again after the intervention. An experienced and qualified community nurse was seconded from the hospital Community Health Department. The nurse's major role (who was given the title of DARTS nurse) was to implement a risk screening tool for all older patients presenting to the ED.

Population and sampling

Inclusion criteria

All men and women over 70 years of age who presented to the ED during the period October 2002 to June 2003, who were able to provide informed consent.

Exclusion criteria

1. Patients readmitted within the diagnosis related groups (DRG) classifications of renal dialysis, chemotherapy, palliative care and mental health;
2. Patients from high care residential aged care facilities;
3. Patients who could not provide a legal consent.

A total of 2139 patients presented during the study period (October 2002 to June 2003). Of these, 1102 (51.5%) were admitted, and 246 (11.5%) were re-presentations with the same illness. It should be noted that all patients who met the inclusion criteria for the nine months prior to the intervention and for the nine months of the intervention were included in the study.

To ensure community ownership and collaboration, the study was guided by a reference group composed of representatives of Toowoomba's general practitioners, medical staff within the THS, allied health staff from the hospital and representatives from HACC.

Risk screening tool

The risk screening tool used in this study, presented in Fig. 1, was adapted from Screening Tool for Elderly Patients (STEPS) Before Home screening tool developed at the Princess Alexandra Hospital, Brisbane. This tool was origin-ally adapted from the Identification of Seniors at Risk (ISAR) tool (McCusker *et al* 2001).

DO NOT WRITE IN BINDING MARGIN	TOOWOOMBA HEALTH SERVICE DISTRICT Discharge and Referral to Services (DARTS)	UR No: _____ Surname: _____ Given Names: _____ DOB: _____ Sex: _____ <i>(Please affix patient identification label here)</i>	
	Risk Screening Tool (to be completed on all community living patients >= 70yo being discharged from the Toowoomba Health Service Emergency Department (ED), to ascertain the level of risk for discharged from ED)		
	Date of presentation:		
	General Practitioner:		
	Presenting problem:		
	1. Have you fallen in the last 4 weeks? <input type="checkbox"/> Yes <input type="checkbox"/> No		
	2. Do you usually need someone to help you at home? (eg community services or family/friends to assist with meal preparation, washing, shopping etc) <input type="checkbox"/> Yes <input type="checkbox"/> No		
	3. In your current condition will you need more help than usual to take care of yourself? <input type="checkbox"/> Yes <input type="checkbox"/> No		
	4. Do you live alone? <input type="checkbox"/> Yes <input type="checkbox"/> No		
	5. Have you been hospitalised as an inpatient during the last 6 months? <input type="checkbox"/> Yes <input type="checkbox"/> No		
DO NOT WRITE IN BINDING MARGIN	6. In general, do you have problems with your sight? <input type="checkbox"/> Yes <input type="checkbox"/> No		
	7. Do you have caring responsibilities for someone at home? <input type="checkbox"/> Yes <input type="checkbox"/> No		
	8. Do you take more than three different medications every day? <input type="checkbox"/> Yes <input type="checkbox"/> No		
	Total yes responses for 1 – 8: <i>(Adapted from ISAR Screening Tool. J Am Geriatr Soc 47: 129-1237)</i>		
	Risk screening tool completed by:		
	Signature:		
	Name:		
	Date and time:		
	<input type="checkbox"/> In person <input type="checkbox"/> By phone		
	Patient disposition:		
<input type="checkbox"/> Discharged home <input type="checkbox"/> Admitted (ward)			
<input type="checkbox"/> Hospital Liaison notified <input type="checkbox"/> Existing services cancelled			
General Practitioner notified of presentation and risk screening tool by fax <input type="checkbox"/> Yes <input type="checkbox"/> No			

Figure 1. Risk screening tool.

Name:		DOB:	UR:
EXISTING SERVICES			
HACC services		ACAT approval dates: _____	
<input type="checkbox"/>	Home care	<input type="checkbox"/>	High care
<input type="checkbox"/>	Meals on Wheels	<input type="checkbox"/>	Low care
<input type="checkbox"/>	Domiciliary services	<input type="checkbox"/>	Respite
<input type="checkbox"/>	Transport	<input type="checkbox"/>	CACPS
<input type="checkbox"/>	Home maintenance and minor modifications		
Other services			
<input type="checkbox"/>	Specialist CNC		
<input type="checkbox"/>	Allied Health		
<input type="checkbox"/>	Mental Health Services		
<input type="checkbox"/>	Indigenous Services		
<input type="checkbox"/>	ATODS		
<input type="checkbox"/>	SCOPE		
<input type="checkbox"/>	Other _____		
REFERRAL RECOMMENDATIONS FROM THE RISK SCREEN			
<input type="checkbox"/>			
REFERRALS COMPLETED PRIOR TO DISCHARGE			
HACC services		ACAT approval dates: _____	
<input type="checkbox"/>	Home care	<input type="checkbox"/>	High care
<input type="checkbox"/>	Meals on Wheels	<input type="checkbox"/>	Low care
<input type="checkbox"/>	Domiciliary services	<input type="checkbox"/>	Respite
<input type="checkbox"/>	Transport	<input type="checkbox"/>	CACPS
<input type="checkbox"/>	Home maintenance and minor modifications		
Other services			
<input type="checkbox"/>	Mental Health Services		
<input type="checkbox"/>	Indigenous Services		
<input type="checkbox"/>	ATODS		
<input type="checkbox"/>	SCOPE		
<input type="checkbox"/>	Other _____		
COMPLETED BY			
Signature:			
Print name & designation:			
Date and time:			

Figure 1. Risk screening tool (cont'd).

Use of the risk screening tool

During business hours, the DARTs nurse undertook a face-to-face assessment of the presenting older person. The protocol for this assessment is presented in Fig. 2. The DARTs nurse was then able to refer the patient either to the HACC team or, if they were not HACC-eligible, to an outside community provider for assessment. There were two protocols used for after-hours assessments, which are presented in Figs 3 and 4. If the patient had been admitted, the DARTs nurse would undertake the risk assessment. The outcome of this risk assessment would be communicated to the Hospital Liaison Nurse responsible for organizing discharge for in-patients (Fig. 3). If the older person had been discharged from the ED, the DARTs nurse undertook a risk assessment using a telephone interview (Fig. 4). If the patient was too ill to be assessed, the carer was involved in the risk screening. To ensure risk screening

was culturally appropriate, indigenous patients underwent a risk screen carried out by Aboriginal and Torres Strait Islander Health Workers.

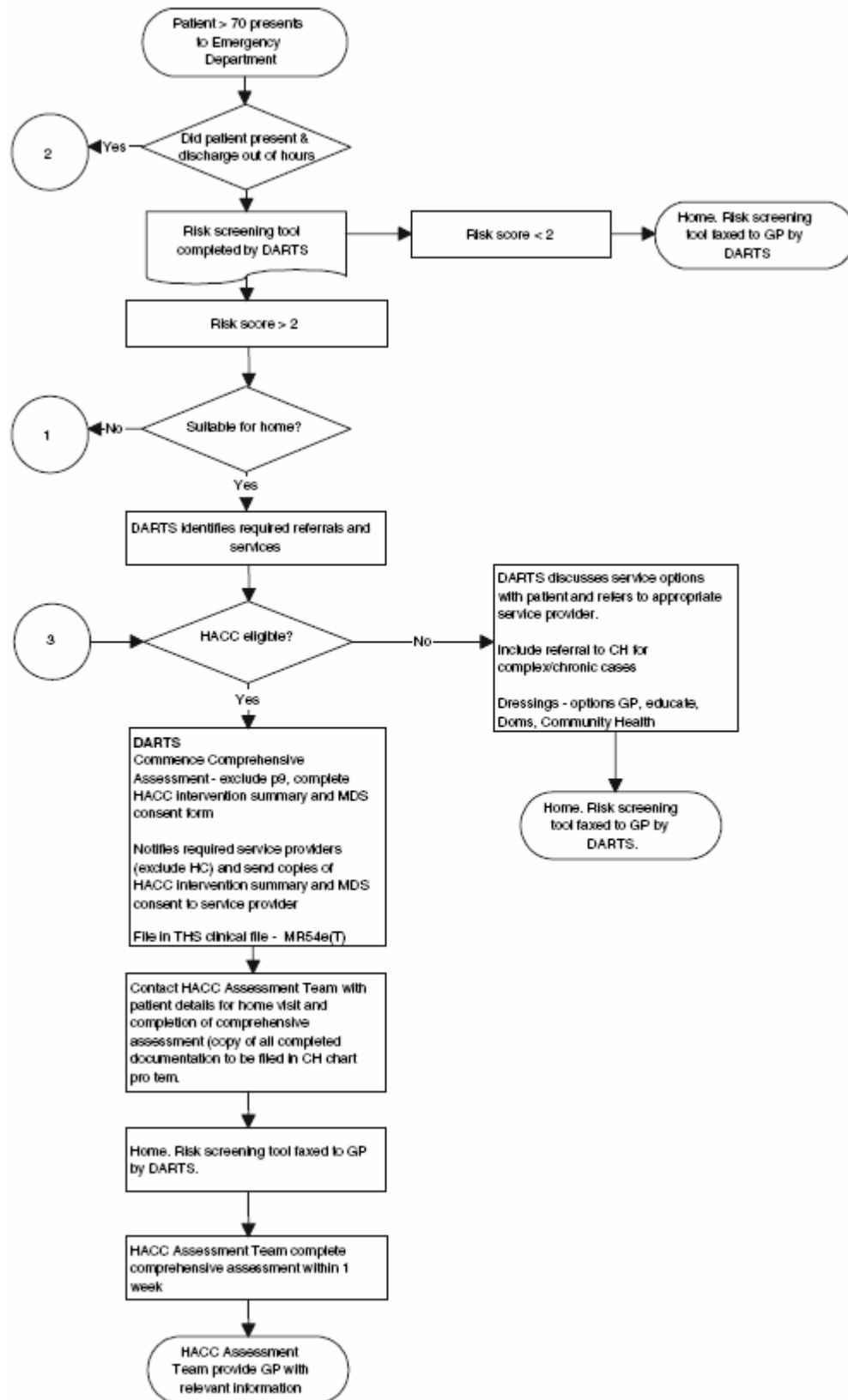


Figure 2. Protocol for implementing risk screening tool when patient presented to emergency department during business hours.

Data collection

To assess the impact of the risk screening tool, data were collected from several sources:

1. Monthly reports of all presentations to the ED. These data were collected from the ED's Information System. From these data, re-presentations could be identified.
2. The average length of stay (ALOS). This was collected from the Transition II hospital Information Technology (IT) system.
3. All hospital admissions and readmissions (i.e. readmission within 28 days in the same DRG grouping) were also collected from the Transition II hospital IT system.

To gain a baseline of the number of older persons presenting and re-presenting to the ED, older persons being admitted via the ED to the hospital and their consequent length of stay, data for the nine months prior to the intervention were collected to allow a descriptive comparison with data collected in the nine months following the introduction of the intervention (only four months immediately prior to the intervention and the corresponding rates during the last four months of the data collection period were included in the statistical analyses).

Data analysis

The measure of model performance that best accesses the effect of the DARTS nurse is the likelihood of a person re-presenting to the ED, expressed as a percentage of all relevant presentations. Other variables that measure benefits proffered by the overall model are the rate of readmission to the ED, expressed as a percentage of all relevant admissions, and average length of hospital stay. Decreases in any of these measures would provide evidence for the model effectiveness.

Descriptive statistics were formulated for the dependent variables re-presentations, readmissions and ALOS. Re-presentation rates (re-presentation vs. no representation) and readmission rates (readmission vs. no readmission) were included in statistical analyses as dependent variables. The strength of the difference between the pre- and post intervention periods was calculated. To allow sufficient time for the intervention to be established (in this study, five months was considered to be adequate), rates in the four months immediately prior to the intervention were compared with corresponding rates during the last four months of the data collection period. Differences in re-presentation and readmission rates resulting from the intervention were analysed using cross tabulations and chi-squared tests of significance. A significance level of 0.05 was used in each test.

Ethics

All patients were approached by the DARTS nurse and ethical approval for inclusion in the study was gained. Patients were informed that should they not wish to participate in the study, their care would not be compromised. They were informed that all publications from this study would not contain any identifying data. In line with the National Health and Medical Research Council Guidelines, ethical approval was sought and gained for this study by the Prince of Wales Hospital, Sydney, as they were the lead hospital for the NDHP4 project.

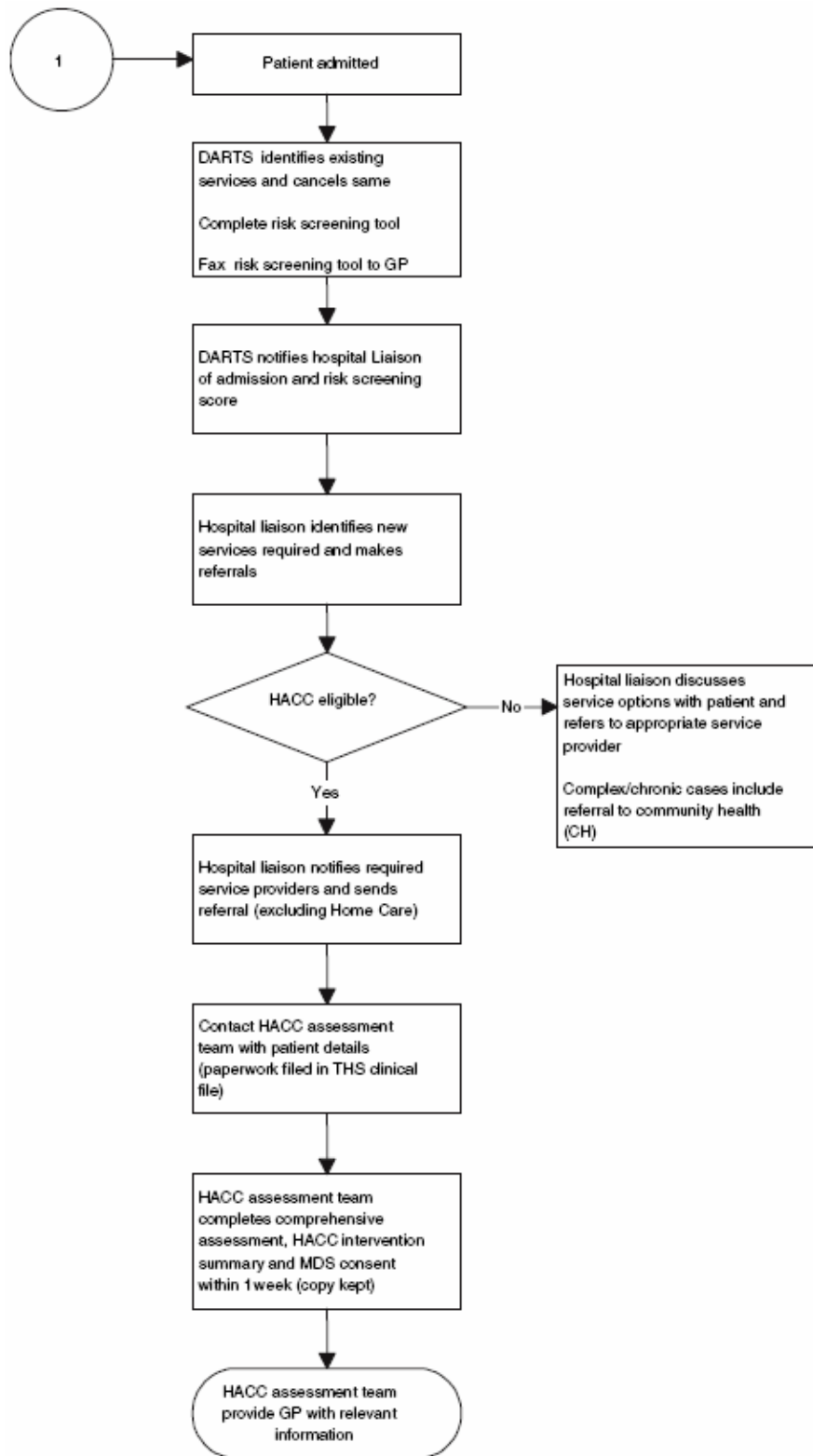


Figure 3. Protocol for implementing risk screening tool after hospital admission.

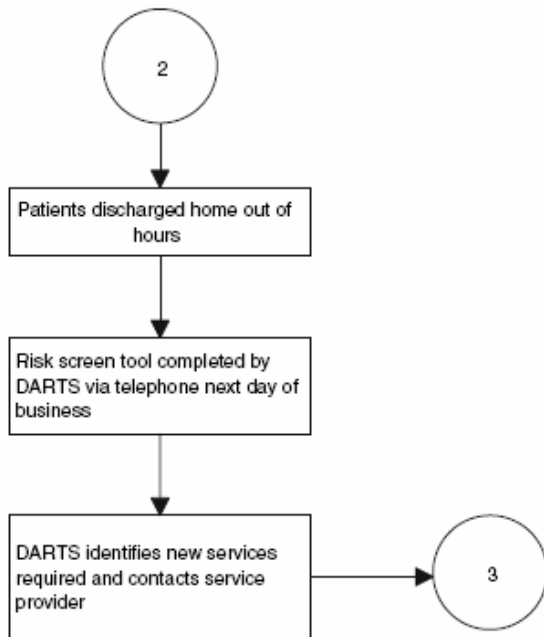


Figure 4. Protocol for implementing risk screening tool when patient presented to emergency department after-hours.

Results

Re-presentations to the ED

Figure 5 illustrates the re-presentation data for the period prior to the introduction of the model, while Fig. 6 shows corresponding data from the postintervention period. In each figure, total number of presentations in each month is represented by bars, and the percentage of re-presentations related to that month is also provided. A line of regression is also presented in each figure to illustrate the presence of linear relationships between the variables in the data. A lack of any discernible relationship prior to intervention would indicate a steady baseline, while a negative relationship subsequent to the intervention would indicate a beneficial effect of the nurse-led model. The numbers of representations remained relatively stable over the preintervention period.

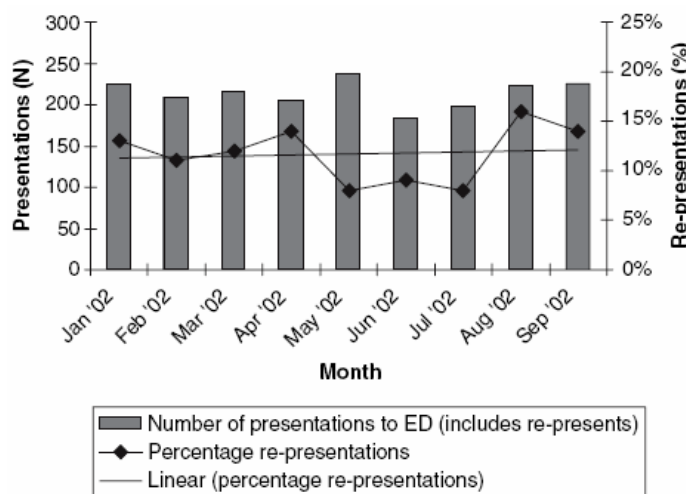


Figure 5. Re-presentation rates within seven days with the same presenting problem for target group as percentages from January 2002 to September 2002.

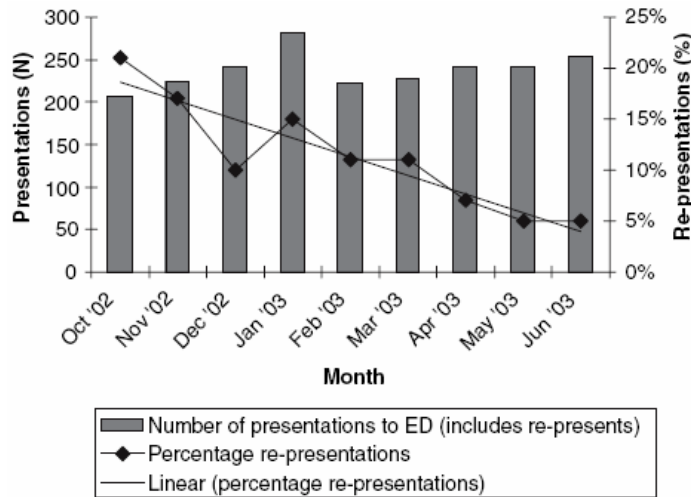


Figure 6. Re-representation rates within seven days with the same presenting problem for target group as percentages from October 2002 to June 2003.

The data in Fig. 6 suggest a gradual and consistent decline in the number of re-presentations to the ED subsequent to the intervention. Indeed, during the eight months following the intervention there was a decrease in the re-representation rate from 21% to 5%. The analysis of the data supported this observation, with re-representation rates at the end of the postintervention period being significantly lower than the rates in the four months prior to the start of the intervention ($\chi^2 = 15.59, P < 0.001$).

During an examination of the postintervention data, an unexpected outcome was identified. The data suggested that there was a change in the pattern of presentations for ‘frequent flyers’ (defined as patients who re-presented to the ED three or more times per month). The data ranged from a high of 25 patients re-presenting a total of 45 times in October 2002 to a low of 12 patients re-presenting a total of 13 times in June 2003. It should be noted that, in the early part of the project, the DARTS nurse found that many of the re-presenting older patients had been sent home from the ED with no follow-up. When the risk-screen was applied, it was apparent that these patients had previously required some sort of community support. Once the community support was put into place, the patients appeared less likely to re-present to the ED. This result would appear worthy of further investigation.

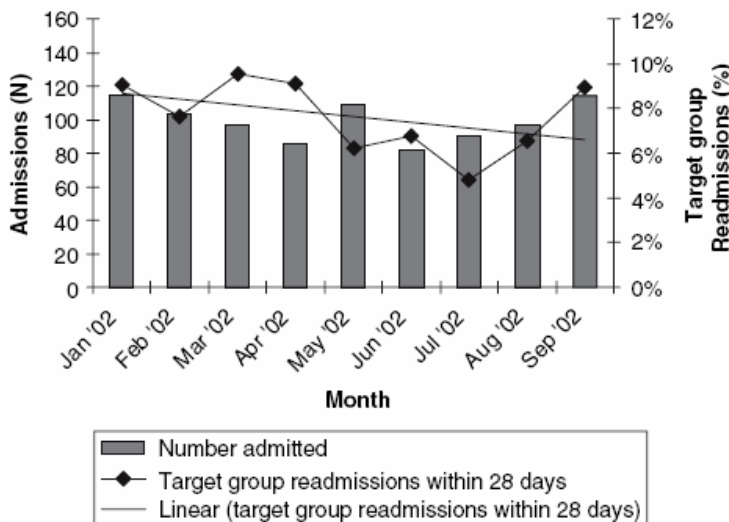


Figure 7. Numbers of patients admitted and target group readmission rate for patients for period January 2002 to September 2002.

Readmission rate

Figures 7 and 8 illustrate the pre- and postintervention readmission rates. In each figure, total number of admissions in each month is represented by bars, with the percentage of readmissions related to that month also provided. Again, a regression line illustrates the presence of linear relationships between the variables in the data.

Readmission rates prior to the intervention showed a slightly negative relationship. Figure 8 shows that readmission rates gradually declined further over the period between October 2002 and June 2003 from 10.2% (N = 9) to 4.7% (N = 7). The analysis of the data supported this observation, with readmission rates at the end of the postintervention period being significantly lower than the rates in the four months prior to the start of the intervention ($\chi^2 = 4.61, P < 0.05$).

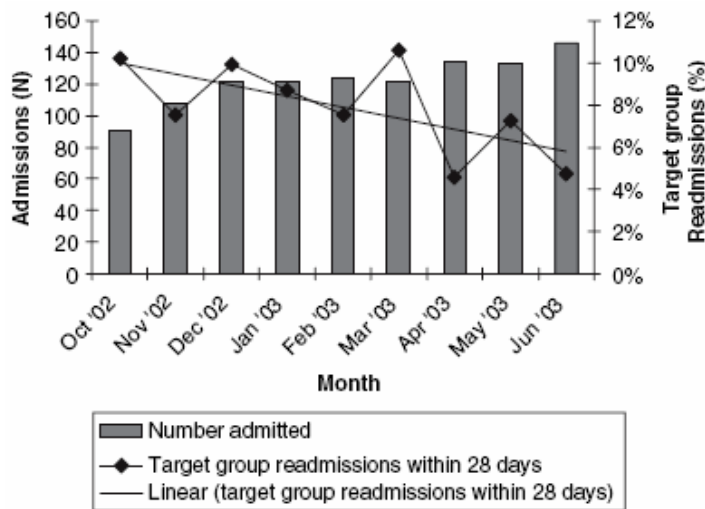


Figure 8. Numbers of patients admitted and target group readmission rate for patients for period October 2002 to June 2003.

ALOS for those admitted

Data for ALOS in the pre- and postintervention periods presented in Figs 9 and 10 respectively. Information on variation in the data was not made available for the report because of privacy restrictions, therefore, statistical analysis was not possible. Data trends are therefore presented for illustrative purposes only, in the hope of spurning further interest in the possible effects of this model on ALOS. Prior to the intervention, there was a slight trend towards ALOS being longer (an average of approximately 7.8 days in the four-month period prior to the intervention). Subsequent to the intervention, the trend appears to reverse, such that ALOS in the last four months of the intervention period was approximately 5.4 days.

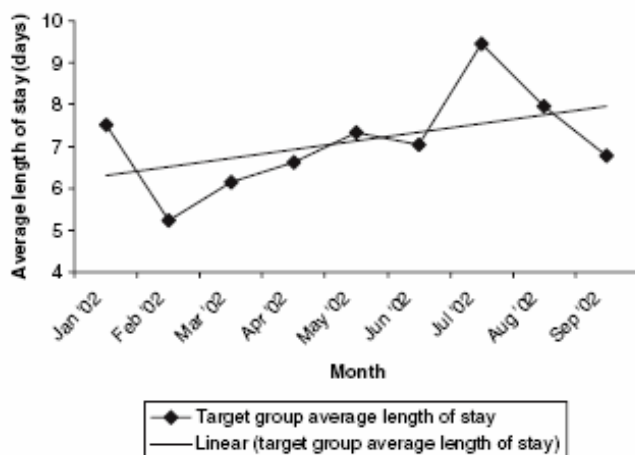


Figure 9. Average length of stay (in days) for patients 70 years or older admitted to hospital during period January to September 2002.

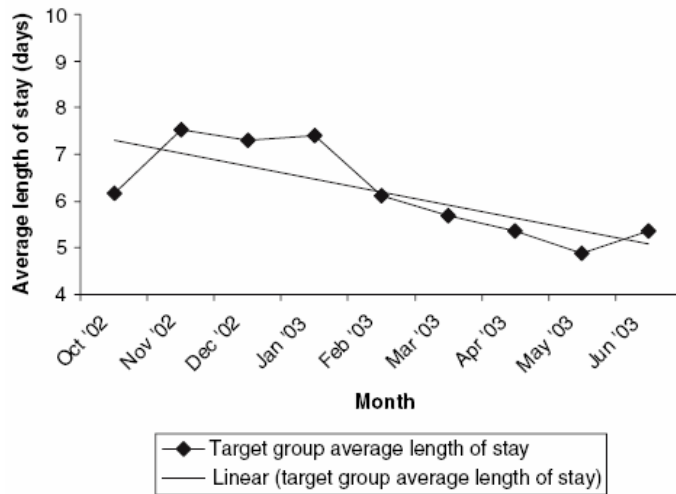


Figure 10. Average length of stay (in days) for patients 70 years or older admitted to hospital during period October 2002 to June 2003.

Discussion

Overall, the nurse-led model of discharge planning achieved its aim by supporting the inclusion of an experienced community health nurse in the ED to assist in the effective management of older people. In particular, the data indicate that the overall number of re-presentations to the ED significantly decreased. This is consistent with findings of other studies (McCoy *et al.* 1992, Naylor *et al.* 1999, Bull & Roberts 2001, Moss *et al.* 2002). However, it is also inconsistent with the findings of Mion *et al.* (2003) who reported no statistically significant impact on service usage.

Similar to the findings of Mion *et al.* (2003), the data suggest a decreased length of stay. These findings were in contrast to those reported by Miller *et al.* (1996). Our findings suggest that the use of a risk screening tool in the ED allowed hospital discharge nurses to begin discharge planning on admission. This impact of the DARTS nurse on the length of stay, however, should be treated cautiously, as the average number of days started to decrease prior to the introduction of the intervention, which may suggest some other factor(s) than the nurse-led model of discharge planning may have influenced the results. The negative change during the period of the intervention was consistent, though, with the changes older admitted to hospital during period January to September 2002 evident in the re-presentation data.

Additionally, there was an increase in the number of community referrals from the ED as the DARTS nurse referred those patients ineligible for HACC services to individual community providers (see Fig. 2). While this model differs from models used in other similar studies (some studies used ED triage nurses to refer to specialist community nurses, other studies involved models where the ED-based nurse provided community follow-up of the discharged patients), the findings reported in this study are consistent with these previous studies (Fry *et al.* 1996, McCusker *et al.* 2001, Mion *et al.* 2001, 2003). Thus, the model could be seen to identify issues of need previously unidentified by ED staff resulting in greater use of community services (McCusker *et al.* 2000).

An unexpected finding of the current research was the decline in the numbers of 'frequent flyers' who repeatedly presented to the ED. Although these patients had previously received medical clearance, the risk screening process identified both real and perceived concerns. The process of early identification of real or potential issues, which may impact on the return home, could have reduced the need for this patient group to unnecessarily re-present to the ED.

Readmission rates also declined, again consistent with previous studies (Moss *et al.* 2002), but in contrast to others (McCoy *et al.* 1992). Our findings suggest it is likely that the nurse-led model of care may have prevented some unnecessary admissions (including planned and emergency admissions).

Limitations to the study

The evidence presented above provides good support for the implementation of the nurse-led model of discharge planning. However, without a control group, the decreasing rates in the data cannot be attributed to the intervention alone, and other factors may have contributed to the decline. For example, the preintervention period occurred from January to September, whilst the intervention was implemented over the period from October to June. It is possible that the reduced rates during the intervention period could have occurred because of the change in seasons. Further research, using an equivalent control groups design, will exclude the contribution of other factors.

Conclusion

This model and other recently developed models illustrate that the ED is in a unique position to provide screening and identification of the at-risk older patient (Fry *et al.* 1996, Aminzadeh & Dalziel 2002, Moss *et al.* 2002). This model provides an alternative pathway for the older patient presenting to the ED. As the population ages, customization of ED services and innovative models will be necessary to meet the emergency care needs of the older patient. The increasing numbers of referrals to community services demonstrates the effectiveness of the model to reduce re-presentation and readmission rates, and the ALOS in hospital.

Acknowledgements

The project was funded by the Australian Government Department of Health and Ageing as part of the National Demonstration Hospital Program Number (NDHP) 4.

Contributions

Study Design: DH, CC, JM, MM, GC; data analysis: CC, DH, EB, TF; manuscript preparation: DH, EB, TF.

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