The effect of multidisciplinary case management on selected outcomes for frequent attenders at an emergency department

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People who frequently attend hospital emergency departments (ED) are a vulnerable population, with a high burden of disease,[1,2] increased mortality rates, and a greater risk of death from violent causes including suicide and alcohol or drug misuse.[3] Frequent attenders are characterised by poverty and homelessness, as well as psychiatric illness, drug and alcohol use, and chronic medical conditions.[4-6] As frequent, chaotic and episodic users of health services,[7,8] including multiple EDs,[9] they are difficult to engage in long-term care.[10]

There is a belief that these people use health services excessively and that their ED utilisation is often inappropriate and unnecessary.[11] In several countries, attempts to divert frequent attenders from EDs and reduce "unnecessary" ED attendances have met with varying results. Neither education of patients[12] nor management care plans[13] have altered the frequency of ED attendance. The most effective diversion strategies adopted multidisciplinary approaches, including social-work support.[14,15] The limited Australian research on this topic suggests that the majority of frequent attenders are not suitable for diversion to general practice.[16]

In 2000, the Victorian Government introduced the Hospital Admission Risk Program to address the demand for hospital services.[17] Under this program, St Vincent's Hospital in Melbourne established the Assessment, Liaison and Early Referral Team (ALERT) in 2001 — an ED-based, multidisciplinary case management (CM) service, providing care to people with complex needs, including frequent attenders. Given that similar multidisciplinary approaches in other countries reduced ED use and improved psychosocial outcomes for a similar population, we aimed to evaluate the effect of ED-initiated, multidisciplinary CM on hospital utilisation patterns and psychosocial factors for frequent attenders at an Australian ED.

METHODS

A retrospective cohort analysis was conducted in which the study population of frequent ED attenders provided its own

ABSTRACT

Objective: To evaluate the effects of multidisciplinary case management (CM) on emergency department (ED) utilisation and psychosocial variables for frequent attenders at the ED.

Design: Retrospective cohort analysis, with the study population as historical controls and data analysed 12 months before and after CM intervention in the period 1 January 2000 – 31 December 2004. Subgroup analyses were performed according to primary problem categories: general medical, drug and alcohol, and psychosocial.

Setting: Inner urban tertiary hospital ED.

Participants: Frequent ED attenders who received CM.

Main outcome measures: ED attendances: length of stay, triage category, ambulance transport, disposition, attendances at the only two EDs nearby. Psychosocial factors: housing status, drug and alcohol use, and primary and community care engagement.

Results: 60 CM patients attended the ED on 1387 occasions. Total attendances increased after CM for the whole group (610 v 777, $P = 0.055$). Mean average length of stay (minutes) of the total study population and each subgroup was unaffected by CM (297 v 300, $P = 0.8$). Admissions for ED overnight observation increased as a result of CM ($P = 0.025$). CM increased scores for housing stability ($P = 0.007$), primary care linkage ($P = 0.003$), and community care engagement ($P < 0.001$) for the whole group and variously within subgroups. Drug and alcohol use was unaffected by CM.

Conclusion: ED-initiated, multidisciplinary CM appears to increase ED utilisation and have a positive effect on some psychosocial factors for frequent attenders. A trend towards increased ED attendance and utilisation with CM may have implications for policies that seek to divert frequent attenders away from hospitals.

MJA 2006; 184: 602–606

historical controls. The setting was St Vincent's Hospital, Melbourne (SVHM), an inner metropolitan tertiary hospital with an annual ED attendance of 32 000 adults. A 24-month study period was set for each patient between 1 January 2000 and 31 December 2004, consisting of 12 months before and after commencing ED-initiated CM. ED attendance dates for the study population at the only other two adult, general, public hospitals located within 5 km of SVHM were obtained.

Patient selection and subgroup division

Consistent with the recognised range of use by heavy users of EDs (between three and ten visits per year),[8,16] we defined frequent attenders as those presenting six or more times per year.

Frequent attenders were identified for CM during their ED attendance. ALERT CM was not available to patients with pre-existing CM provided by another agency (eg, psychi-

atric CM); patients with chronic medical conditions receiving full medical support and other services from the Hospital Admission Risk Program; or patients already receiving full supportive care (eg, nursing home).

Hospital electronic and ALERT records identified adult frequent attenders with ALERT CM initiated between 2001 and 2003. Those selected had a relationship of at least 12 months' duration with SVHM before commencing ALERT CM. Patients who died during the study period were excluded.

Using medical records, two independent reviewers classified patients into three key diagnostic groups according to the main reason underlying their frequent ED presentations: drug and/or alcohol, psychosocial, or chronic, general medical. For patients with multiple comorbidities, the key factor contributing to their frequent ED use was identified. Any conflict between reviewers was resolved by consensus.

Case management intervention

CM is defined as an integrated approach to intensive patient care within the hospital and the community.[18] It draws on multiple disciplines including medical, nursing, allied health, social work, primary health and community care, psychiatry, and drug and alcohol. The SVHM ALERT model combined hospital-based care, community and primary health care, and short- and long-term CM for the study population. The CM was highly flexible and varied according to the needs of each patient. ALERT services were available 09:00 to 21:00 every day.

Variables measured

Patterns of utilisation at SVHM before and after CM were compared for the study population and for the subgroups. Variables included: number of ED presentations, ED length of stay (not including emergency observation unit admission time), ambulance utilisation, triage category, and ED disposition (including "did not wait", "discharge at own risk", ED observation unit admission, and inpatient unit admission).

The number of ED presentations at the two neighbouring hospitals before and after commencing CM was also compared.

Based on a previous study,[14] an ED specialist (G A P) and an ALERT clinician (D S B) developed a scoring tool (Box 1) for measuring psychosocial variables in frequent attenders from their medical records. Variables included housing status, drug and alcohol use, and degree of engagement with primary and community care services. The same ED specialist and ALERT clinician performed collaborative scoring. Two other trained clinicians with equivalent ED medical and ALERT experience validated the tool through blinded re-scoring. Each patient was scored for all variables twice. The first score represented the status of the patient up to 1 month before commencement of CM. The second score was the patient's status between 11 and 12 months after CM commenced.

Statistical analyses

We used SPSS for Windows (version 13.0, SPSS Inc, Chicago, Ill, USA) for the statistical analyses. Preliminary analyses of quantitative data indicated significant violations of normality that could not be rectified through variable transformation. This necessitated non-parametric techniques. For quantitative data involving comparison of repeated measures (ie, before CM v after CM), the Wilcoxon signed-rank test was

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1 Psychosocial variables scale for frequent attenders receiving case management

(a) Housing status scale
- Sleeping rough / on streets (includes "no fixed place of abode")
- Crisis accommodation
- Rooming house / boarding house / transitory hotel
- Supported accommodation / supportive residential service
- Permanent or stable accommodation (includes hostel, nursing home, private and public rental, ownership)

(b) Drug and/or alcohol use
- Yes / No

(c) Engagement / linkage scale
- Primary care (single general practitioner or group medical clinic)
- Community care (allied health services, drug and alcohol, psychiatric services, home nursing, local government services, non-government services)
- Not linked at all
- Linked but not engaged
- Intermittent engagement
- Fully engaged

Further details of the scoring tool are available from the authors. ◆

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used.[19] ED disposition for the group was calculated as the sum of the disposition-category percentages for each patient. Inter-rater reliability of scored variables was calculated for 28% of the sample using the κ-statistic. Psychosocial data were analysed using McNemar's test for dichotomous variables and the Wilcoxon signed-rank test for scored variables. To compare diagnostic groups, the Kruskal–Wallis test[20] was used on "after CM" minus "before CM" scores. For all tests, α was set at 0.05.

Ethical approval

Patient consent for CM intervention was obtained. The human research and ethics committees of all three hospitals approved the study.

RESULTS

Demographic characteristics

Of the 150 frequent attenders identified, 71 received ALERT CM. Eleven who died and/ or were unknown to SVHM before the study period were excluded, leaving 60 eligible patients.

Of the 60 patients, 41 were men (68%; 95% CI, 57%–77%), 55 were non-Indigenous (92%; 95% CI, 85%–97%), and 20 had no identified general practitioner (33%; 95% CI, 21%–45%). Their average age was 48 years (95% CI, 42–53). Other demographic details are given in Box 2.

Quantitative variables

The 60 patients attended the ED 1387 times. Hospital utilisation variables analysed for the group as a whole showed that there were 610 ED attendances before CM and 777 after CM ($P = 0.055$), and that the mean length of stay in the ED before CM and after CM was 297 min and 300 min, respectively ($P = 0.8$). The summed percentages for ED overnight observation gave 77 before CM and 205 after CM ($P = 0.025$) (Box 3). The results of subgroup analyses are shown in Box 4.

Attendances at the other EDs were unaffected by CM, with total ED attendances for both hospitals combined being 313 before CM and 401 after CM ($P = 0.4$). Subgroup analysis also showed no change to presentations at the other EDs as a result of CM, although the bulk of the presentations came from the drug and alcohol subgroup (general medical: 37 v 69, $P = 0.4$; drug and alcohol: 189 v 241, $P = 0.7$; psychosocial: 87 v 91, $P = 0.9$).

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2 Demographic profile of frequent attenders ($n = 60$)

	Frequency (% [95% CI])
Primary problem category	
General medical	16 (27% [15%–35%])
Drug and alcohol	26 (43% [30%–53%])
Psychosocial	18 (30% [18%–39%])
First language	
English	55 (92% [85%–97%])
Not English	5 (8% [1%–15%])
Country of birth	
Australia	42 (70% [58%–82%])
Overseas	18 (30% [18%–42%])
Marital status	
Single	35 (58% [46%–68%])
Married	1 (2%)
Separated	6 (10% [2%–16%])
Divorced	10 (17% [7%–24%])
Widowed	8 (13% [5%–20%])

3 Emergency department utilisation for frequent attenders receiving CM

Variable	Before CM	After CM	Z, P
Total number of attendances	610	777	− 1.918, 0.055
Length of stay, min (mean of mean for each patient)	297	300	− 0.287, 0.8
Triage category (median of mode for each patient)	4	4	− 0.768, 0.4
ED arrival mode (% [95% CI] ambulance transport)	53% (40%–66%)	48% (35%–61%)	− 0.577, 0.6
Disposition (sum of percentages)			
"Did not wait"	704	577	− 0.580, 0.6
"Discharge at own risk"	175	266	− 1.115, 0.3
ED overnight observation	77	205	− 2.243, 0.025
Inpatient admission	1104	931	− 0.721, 0.5

ED = emergency department; CM = case management. ◆

4 Emergency department utilisation for frequent attender subgroups

Variable	Before CM	After CM	Z, P
Total number of attendances			
General medical	152	152	0.000, 1.0
Drug and alcohol	284	423	− 1.952, 0.051
Psychosocial	174	202	− 0.785, 0.4
Length of stay, min (mean of mean for each patient)			
General medical	352	415	− 1.655, 0.1
Drug and alcohol	297	293	− 0.038, 0.9
Psychosocial	249	207	− 1.502, 0.1
Triage category (median of mode for each patient)			
General medical	3	3	− 0.577, 0.6
Drug and alcohol	4	4	− 0.676, 0.5
Psychosocial	4	4	− 0.072, 0.9
ED arrival mode (% ambulance transport)			
General medical	56%	38%	− 1.732, 0.1
Drug and alcohol	64%	64%	0.000, 1.0
Psychosocial	41%	44%	− 0.447, 0.7
Disposition – "did not wait" (sum of percentages)			
General medical	130	119	− 0.315, 0.8
Drug and alcohol	366	376	− 0.259, 0.8
Psychosocial	208	81	− 1.601, 0.1
Disposition – "discharge at own risk" (sum of percentages)			
General medical	51	60	− 0.105, 0.9
Drug and alcohol	106	117	− 0.628, 0.5
Psychosocial	18	89	− 1.572, 0.1
Disposition – ED overnight observation (sum of percentages)			
General medical	7	94	− 1.782, 0.075
Drug and alcohol	26	71	− 1.820, 0.069
Psychosocial	43	40	0.000, 1.0
Disposition – inpatient admission (sum of percentages)			
General medical	405	412	− 0.220, 0.8
Drug and alcohol	380	260	− 1.251, 0.2
Psychosocial	319	259	− 0.114, 0.9

ED = emergency department; CM = case management. ◆

Qualitative variables

The inter-rater reliability κ statistic for the scoring tool was 0.723 ($P < 0.001$). For the whole group, there were changes across three variables, and across a number of variables for the subgroups (Box 5). Mean housing status score for the whole group increased from 3.6 before CM to 4.1 after CM ($P = 0.007$), with changes also in primary care engagement (2.6 before CM v 3.1 after CM; $P = 0.003$) and community care engagement (2.1 before CM v 3.2 after CM; $P < 0.001$). Details of psychosocial scores are presented in Box 5A. Drug and alcohol use was unaffected by CM. CM did not affect any subgroup more than others.

DISCUSSION

Our study has shown that implementation of ED-based multidisciplinary CM resulted in a trend towards increased utilisation of ED services, especially overnight stays, for frequent ED users. The study also provides evidence that CM improves psychosocial factors for frequent attenders, in particular housing status and linkage with general practice and community services.

A randomised controlled trial of multidisciplinary CM in the United States,[13] which included use of patient care plans but no social worker involvement or patient consent, failed to show a change in ED visits by frequent attenders. In Europe, social-work intervention reduced ED visits by frequent attenders,[2] while generally, other models of multidisciplinary CM have been shown to be effective clinically and costwise.[21] In the US, Okin et al found that ED-initiated, multidisciplinary CM for frequent attenders decreased ED use and improved psychosocial status while saving costs.[14] Pope et al in Canada found that intensive CM of a small number of frequent attenders reduced ED visits.[15] Both studies were prospective, required consent and used the patients as their own historical controls. In our study, retrospective analysis allowed us to include patients (those who were intoxicated, confused or psychotic) whose ability to consent in a prospective study would have been impaired. This, in itself, may account for the different findings of our study compared with those in other countries.

In another Australian study of ED-based care coordination funded by the Hospital Admission Risk Program,[22] hospital admission rates fell but ED re-presentation rates were unaltered; there were no controls and frequent attenders were not targeted.

5 Psychosocial scores for all frequent attenders before and after case management (CM) (n = 60)

A: Housing status, primary care, and community care engagement
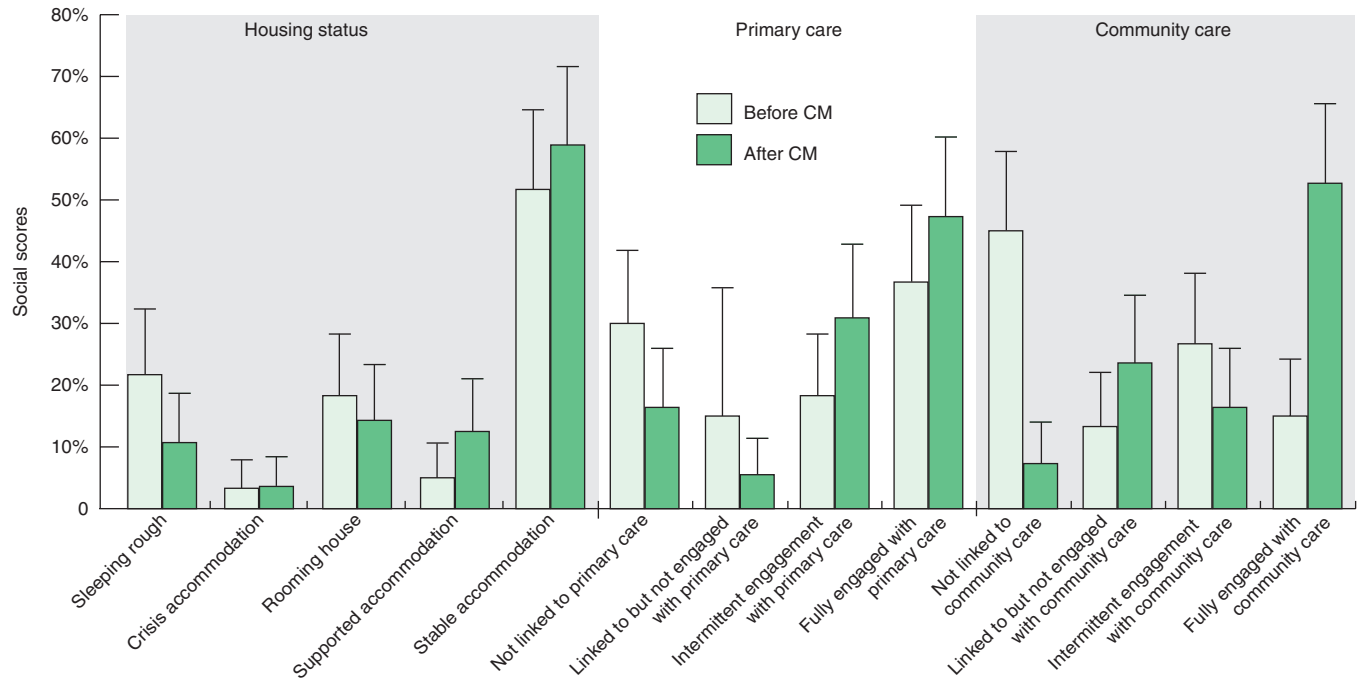
B: Statistical analysis of social scores for housing status, substance use, primary care and community care engagement

Population	Housing status (mean score)			Drug and alcohol use (% positive)			Primary care engagement (mean score)			Community care engagement (mean score)		
	Before CM	After CM	Z, P	Before CM	After CM	P	Before CM	After CM	Z, P	Before CM	After CM	Z, P
Whole group	3.6	4.1	–2.681, 0.007	68.3%	58.9%	0.1	2.6	3.1	–2.971, 0.003	2.1	3.2	–5.086, < 0.001
Subgroups												
General medical	4.2	4.6	–1.633, 0.1	31.3%	12.5%	0.3	3.2	3.6	–1.276, 0.2	2.3	3.5	–2.994, 0.003
Drug and alcohol	3.0	3.4	–1.981, 0.048	100%	92.0%	0.5	2.1	2.7	–2.401, 0.016	1.9	2.9	–3.213, 0.001
Psychosocial	3.9	4.5	–1.134, 0.3	55.6%	53.3%	1.0	2.8	3.3	–1.492, 0.1	2.3	3.2	–2.658, 0.008

CM = case management. ◆

Our different results may also be explained by the diagnostic profile of our patients: 73% had either substance misuse or psychosocial issues as their primary problem, and only 27% had chronic medical problems. Moss et al had only 12% of patients with substance misuse or psychosocial problems,[22] and two other studies[5,8] reported 51% and 55% of patients with chronic medical problems.

We found that an increase in primary care linkage and engagement does not appear to alter the pattern of ED use for frequent attenders, despite expectations that it should. Our findings support previous research[1,7] showing that frequent attenders use multiple health services heavily but availability of primary care does not alter ED use.

Our study has a number of limitations. Although most similar research has used the 12 months before and after framework, this may not allow sufficient time to observe outcomes for patients with complex needs. Furthermore, the CM model may have varied over time with the changeover of clinicians, and evolution of the ALERT program over the study period may have affected outcomes.

Retrospective analyses are subject to more bias than prospective studies. For our study, quantitative data were complete and objective and thus sufficiently robust for statistical analysis. We minimised reporter bias with clearly written guidelines for psychosocial scoring, collaborative scoring, and inter-rater reliability testing.

The before-test – after-test study design, using patients as their own historical controls, is limited by what happens to patients over time. Hospital utilisation patterns may have changed not as a result of CM, but because of illness progression or other factors, such as a geographic change of residence. Although ED use for some frequent attenders decreases over time, others (those with mental illness or substance misuse) evince sustained heavy use of multiple EDs over a number of years.[8]

Sample selection is open to bias. Given the unique characteristics of the frequent

attenders receiving ALERT CM, it was impossible to compare them with other frequent attenders or with a matched control group. Most frequent attenders not picked up for ALERT CM were receiving psychiatric CM and thus were unsuitable for comparison. While our study population was complex (and previously difficult to engage in services), it was this type of patient that we wished to study.

From an emergency demand reduction perspective, CM appears to have the opposite of the desired effect; however, frequent attenders comprise a small proportion of the ALERT program. From the program's own analysis of all patients receiving ALERT CM care, except frequent attenders, ALERT CM results in expected outcomes of reduced hospital utilisation (unpublished data — Hospital Admission Risk Program Evaluation Document. SVHM ALERT/HiT H02-190. Six-month report to the Department of Human Services, July–December 2004).

Beliefs that ED use by frequent attenders is inappropriate and should be reduced are not substantiated; expectations that they can be diverted from the ED by CM are questionable. ALERT clinicians interpret the trend towards increased ED presentation after CM in a positive light, as these patients, previously very difficult to engage in any service, are now showing a tendency to engage. Some of the time taken to deliver this service occurs in the ED and hence increases ED utilisation. From a patient perspective, it may be desirable for frequent attenders to present to the ED more often, so their complex health needs can be addressed.

Arguably, EDs are among the most appropriate places for this population to access acute medical care, offering 24-hour services without exclusion criteria, no monetary charge, and a safe environment with high levels of medical, nursing and allied health resources. Dent et al have shown, for an inner urban ED, that attendances of people who present most frequently are appropriate, and these people are unsuitable for general practice diversion.[16]

Since attempted diversion has no proven patient benefit, EDs should be wary of assumptions about inappropriate or unnecessary use of ED services. EDs are well placed for delivery of care to vulnerable and complex patients, and should be resourced to facilitate this.

The improvement in psychosocial factors as a result of CM has longer-term implications for health outcomes that may not manifest or be measurable in the short term.[23] The challenge for the future is to measure longer-term outcomes for frequent attenders, particularly links between psychosocial improvements and health status, including ED utilisation. Additionally, more qualitative research into the lives of frequent attenders would provide valuable insights into this complex and unique population.

ACKNOWLEDGEMENTS

COMPETING INTERESTS

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