

Managing older medical patients in hospital: a study of the outcomes from a shift of resources to the ‘front door’

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ABSTRACT

We performed a retrospective cohort comparison study to look at the processes for concentrating geriatric resources in the acute admissions area in a general hospital in the UK and compare key outcomes.

The number of consultant geriatricians and other staff working at the ‘front door’ – acute medical unit (AMU) and short stay ward (SSW) – was increased.

We compared ‘front door’ outcomes with whole department outcomes in 2013 and 2014, looking at the proportion of patients discharged within 3 and 5 days of admission, the proportion discharged from the ‘front door’, mean lengths of stay (LOS) and readmissions within 28 days of discharge. There were 1,147 and 1,381 discharge episodes in 2013 and 2014, respectively. ‘Front door’ discharges rose from 36% to 46% ($p < 0.001$) between 2013 and 2014, and the proportion of ‘front door’ discharges occurring within 3 days rose from 56% (2013) to 68% (2014), compared with 35% and 33% for the department as a whole ($p = 0.006$). The mean LOS at the ‘front door’ fell from 6.1 to 3.8 days ($p = 0.007$). Readmissions from ‘front door’ discharges rose from 12% to 14% ($p = 0.004$). The change in the configuration of the acute geriatric service was associated with more favourable discharge performance outcomes at the ‘front door’ but modest improvements in discharge performance for the geriatric service as a whole.

KEYWORDS: Clinical outcomes, comprehensive geriatric assessment, front door

Introduction

Many hospitals in the UK, and elsewhere, have progressively shifted qualified resources to the admissions areas of general hospitals in an attempt to improve the care of acutely ill older patients and shorten the time they spend in hospital. In 2007, we

set up an older persons’ assessment and liaison (OPAL) service at Royal Bournemouth Hospital. This service had a positive effect on length of stay, timeliness of comprehensive geriatric assessment (CGA) and a number of other indicators.^{1,2} The service was modelled on the pioneering work by Harari *et al.*³ Between 2009 and 2013 the configuration and capacity of the OPAL team did not change significantly and was spread across the emergency department (ED) and acute medical unit (AMU). By 2013, it was apparent that the prevailing arrangements for acutely ill older people were no longer able to deliver a satisfactory service, partly because of a continued rise in admission numbers and partly because it fell short, in some key elements, of recommendations emanating from national bodies, such as the Royal College of Physicians,^{4–6} British Geriatrics Society,^{7,8} Royal College of Nursing,⁹ National Institute for Health and Care Excellence¹⁰ and Department of Health.¹¹ Here we describe how we reshaped existing resources and utilised modest new development monies to form an acute geriatric service that came as close as possible to the perceived ideal, concentrating on changes that we considered would be the most likely to deliver real improvements for patients and the most efficient return on investments.

Acute medical admission model prior 2014

Before the current changes, the *modus operandi* for acute medical admissions was based on a consultant ‘on take’ for 24 hours but with other duties running in parallel. All suitably qualified physicians took part. There were two consultant post-take ward rounds (PTWRs) per day, Monday–Friday. At weekends there were morning consultant PTWRs and a review of all AMU patients in the afternoon. The mix of physicians was such that the chances of a frail older patient being assessed on the PTWR by a geriatrician was only 25%. Patients triaged to geriatric medicine were reviewed the next weekday by a consultant geriatrician, and those flagged for a review by the OPAL team were reviewed by the consultant geriatrician embedded in the OPAL team the next weekday morning.

Weaknesses of the pre-2014 model

Senior members of the medical, nursing and therapy staff, managers and invited external advisors identified a number of important problems and weaknesses in the existing system. That process consisted mainly of an informal analysis based on the observations and opinions of experienced staff, but took into account information gleaned from the trust’s routine data

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capture and specific information generated by targeted systems analysis. A number of problems were identified:

- > The overall length of the inpatient stay (LOS) for a significant proportion of patients was longer than necessary and potentially detrimental for some.
- > The AMU capacity was too small to allow efficient management and timely discharge of all the potential short-stay patients, of whom about half were older than 80 years of age and a third were in the frail older category.
- > Patients with a predicted short LOS (less than 5 days) were often moved from the AMU to a standard ward with consequent loss of momentum in their management and discharge planning due to the less intense attention to those matters in wards at that time. There was consistent narrative evidence that the LOS of such patients was thereby prolonged by at least 1 day. Consequently, some of the advantages added by the OPAL team were lost.
- > A substantial proportion of the acutely ill, frail older patients were being retained for 2–4 days under the care of the acute medicine consultants before being re-triaged to the medicine for the elderly (MFE) specialty. There was strong and consistent narrative evidence that this delayed comprehensive geriatric assessment, full diagnosis, holistic management and discharge planning.
- > Too few frail older patients were assessed by a consultant geriatrician within 12 hours of admission.
- > Clear evidence emerged that clinical management plans made after midday, including investigations, treatments, consultations with specialists, liaison with external agencies and setting up discharge support services, could often not be actioned until the following day, adding a full day to the LOS.
- > The OPAL team (nurses, physiotherapists, occupational therapists) capacity for the AMU and ED at weekends was increased to match that of weekdays (requiring three newly appointed staff).
- > Weekday afternoon and evening PTWRs were introduced, with a consultant in acute medicine conducting the PTWR up to 7 pm and another physician (sometimes a geriatrician) from 7–10 pm seeing new admissions on a rolling basis. These later PTWRs included all adult patients and were not differentiated by age, although the extended hours substantially reduced the average time to consultant review for all patients. This was largely achieved through changes to job plans with a plan for one additional consultant.
- > One consultant geriatrician was present in the AMU in the afternoon to review selected patients, provide supervision and training for junior doctors, support the OPAL team and conduct PTWR reviews of some older patients arriving on the AMU after the morning PTWR.
- > A 28-bed standard ward was enhanced to form a short-stay ward (SSW) to cohort patients given a predicted LOS less than 5 days (EACM triage), rather than being distributed to all geriatric wards. To sustain the throughput in that ward, the nurse:bed ratio was increased and two consultant geriatricians conducted ward rounds every weekday morning to enable all patients to be reviewed. One consultant geriatrician was present on the ward in the afternoon. At weekends, the geriatrician conducting the morning PTWR also attended the new SSW to review patients selected by the nurse in charge or a junior doctor. In effect, the SSW functioned as an extension of the AMU with a 7-day OPAL team presence and unfettered access to urgent investigations and treatments.

The new service from 2014

Based on the deliberations outlined above, and with strong support from senior management, the following changes were made to the service for older acute medical patients:

- > The morning PTWR was conducted by one geriatrician and one other physician 7 days per week so that all newly admitted older patients (age greater than 80 years and/or having indicators of frailty) could be reviewed by a geriatrician. This usually covered about half the total list of patients. The triage definitions used were the same before and after the intervention.
- > A new triage, EACM (elderly acute medicine), was created in parallel to acute medicine for older adults where length of stay was predicted to be less than 5 days.
- > The PTWR had sufficient junior doctor and senior nurse support to enable various tasks to be undertaken before midday in most cases. For geriatric medicine, this required a shift of one whole time equivalent (WTE – one whole time equivalent is 10 consultant sessions per week) junior doctor to the acute medical unit (AMU).
- > In addition to the PTWR, two consultant geriatricians were allocated to the AMU on weekday mornings, supported by two junior doctors. Working closely with the OPAL team, that enabled all older patients in the AMU to be reviewed by 11 am then have plans agreed at a team meeting for action by midday. This required investment in one additional consultant and a shift of 1.5 WTEs to enable 4.5 WTEs of consultant time in the admissions areas.

Methods

This study was undertaken in The Royal Bournemouth Foundation Trust, which is a general hospital on the south coast of England serving the people of Bournemouth, as well as neighbouring Christchurch and Hampshire. There were no substantial changes in the configuration or capacity of other hospital or community services between 2013 and 2014. We therefore made the reasonable assumption that any differences observed in selected performance indices before and after the service developments described above were likely to be due to those changes. We identified all admission and discharge episodes under consultant geriatricians for the 3-month periods February–April 2013 (pre-change) and February–April 2014 (post change).

Data sources

Data used in this study were extracted from the trust's electronic data system. There were no changes in the data capture methods across the period of the study.

An admission episode was defined as the first consultant episode of a stay in hospital (or the second episode if first episode was in the ED) where the LOS was more than a day and the consultant was one of the geriatricians (patients staying less than a day were not captured as admissions in the system). A discharge episode was defined as the final episode of a stay where the consultant was one of the geriatricians for a provider spell longer than 1 day. In the context of this study, the term 'front door' applies to admission and discharge episodes from the AMU and SSW (post

change) or the AMU and the unenhanced standard ward (pre-change). International Classification of Diseases 10 diagnostic codes were used to identify discharge diagnoses. A readmission was defined as an admission within 28 days of discharge. The primary data set was constructed by electronic extraction of information from the trust's in-house data sources. Any discrepancies were further examined and reconciled manually.

Statistical methods

For the purposes of this study, the main independent variable was exposure (defined as admission or discharge) to the 'front door' geriatric service (defined as above). Dependent variables were age, sex, LOS, discharge within 3 days and 5 days, readmission within 28 days of discharge, discharge destination, inpatient mortality and number of comorbidities (grouped into three categories: up to 2, 3–5, and >5). To achieve as high a level of validity as possible, admission and discharge episodes were analysed separately for all outcomes. Tests for statistically significant difference were performed using the *t*-test with unequal variance (positive skew) for continuous variables and logistic regression for binomial variables. We grouped data in 2×2 format to compare 'front door' outcomes with overall outcomes for the MFE department as a whole (Statistical Analysis System version 9.2, SAS Institute, Cary, North Carolina).

Results

From February to April 2013, 1,156 admission episodes and 1,147 discharge episodes were recorded under the care of consultant geriatricians. Similarly, from February to April 2014, 1,447 admission episodes and 1,381 discharge episodes were recorded. This constituted the final data set for analysis. There were no substantial differences found between the admission and discharge analyses, so the outcomes from the discharge analysis are presented in this paper.

Analysis of discharge episode outcomes

The analysed data are summarised in Table 1. A significantly higher proportion of discharge episodes were from the 'front door' in 2014 (46%) compared with 2013 (36%). The average LOS for the discharge episodes from the 'front door' was significantly shorter in 2014 (3.8 days) compared with 2013 (6.1 days). A smaller reduction in average LOS was observed for all discharge episodes for patients under the care of geriatricians (10.2 versus 12.2 days), thereby freeing about 24 beds per day across the geriatric medicine bed base.

The proportion of discharges within 3 days from the 'front door' rose significantly in 2014 (68%) compared with 2013 (56%). The proportion of discharges within 5 days also rose significantly at the 'front door'. The overall proportion of discharges within these time frames under geriatricians across all wards increased significantly in 2014 compared with 2013, but to a lesser extent. A significantly higher proportion of patients were discharged home (defined as no change of place of residence) from the 'front door' in 2014 compared with 2013 ($p < 0.001$).

The readmission rate was significantly higher for the discharges from the 'front door' in 2014 (14%) compared with 2013 (12%; $p = 0.004$). No significant trend was observed for mortality. A significantly higher proportion of patients with less

than two and two to five comorbidities were discharged from the 'front door' areas in 2014, which was in concordance with the trend for admission episodes. However, the proportion of discharges from the 'front door' of patients with more than five comorbidities did not rise, possibly reflecting their frailty and need for a longer hospital stay.

Other outcomes

By February 2014, the majority of frail older patients were under a geriatrician from the day of admission to hospital. The proportion of frail older patients reviewed by a consultant geriatrician within 12 hours of admission rose from 55% to 80%, and the proportion reviewed within 24 hours rose from 80% to 100%. The impact on overall bed occupancy was limited and the changes did not enable all older medical patients to be cared for in specialised wards. This was in part due to the continued rise in the total number of older people presenting to the hospital with acute medical illnesses, and partly a result of delays to the discharge of patients requiring complex care in the community. The shift of senior medical resources to the 'front door' depleted the capacity for senior medical supervision of other parts of the service. That might have contributed to the modest outcomes demonstrated by this study.

Discussion

Our data have shown that the reconfiguration of 'front door' hospital services resulted in a larger proportion of acutely ill older patients being managed by geriatricians alongside the OPAL team. There was a clear and immediate improvement towards compliance with the recommendation that all older medical patients, particularly those with indications of frailty, should be managed by multidisciplinary teams led by geriatricians from the time of admission. The cost of the changes included one new consultant geriatrician, two new therapy staff and one new nurse, as well as a shift of 1.5 consultant geriatricians, one junior doctor and two nurses from standard geriatric wards to the 'front door' areas. In our study, some of the improvement in process appears to have resulted in modest but worthwhile improvements in certain measured outcomes, particularly the proportion of patients discharged from the 'front door', and the lower mean LOS of 'front door' discharges and for the department overall. However, there was a small but significant rise in the rate of readmissions which, combined with the general rising secular trend in admissions to hospitals, appears to have resulted in a rise in total admissions and discharges over the study period. It can also be argued that diversion of senior medical and nursing resources to the 'front door' components of the service for older people could have slowed discharge planning in the standard wards. Scrutiny of individual cases indicated that the shortened LOS achieved by the changes were almost entirely seen in patients who were likely to have a relatively short stay in any case, whereas the overall LOS was to a great extent influenced by patients waiting in hospital for various community services to be provided. Such services were dependent on the provisions of other agencies over which hospital staff had little influence. We found no effect on mortality, although it is difficult to know whether that was due to a lack of change in the overall standard of care or simply a reflection of the frailty and complexity of the group of patients in question. The higher proportion of patients

Table 1. Outcomes related to discharge episodes

	Discharges under geriatricians at the 'front door'		Discharges under geriatricians throughout the whole hospital		'Front door' compared with the whole hospital for February–April 2013 and February–April 2014	
	February–April 2013	February–April 2014	February–April 2013	February–April 2014	p-value	Odds ratio (95% confidence interval)
Total number of discharges, n	403	632	1134	1381	<0.001	1.188 (1.113–1.268)
Mean age, years	80.3	82.3	82.3	83.2	0.894	NA
Male/female, n	221/182	259/373	479/655	576/805	0.06	NA
Mean LOS (SD)	6.1 (12.1)	3.8 (7.6)	12.3 (14.4)	10.3 (14.6)	0.007	NA
Number of discharges within 5 days, n (% of total)	307 (76%)	491 (78%)	486 (43%)	657 (48%)	<0.001	1.457 (1.222–1.737)
Number of discharges within 3 days, n (% of total)	225 (56%)	423 (68%)	486 (35%)	657 (33%)	0.006	1.360 (1.087–1.702)
Discharge residence unchanged, n	332	573	867	1050	<0.001	1.358 (1.248–1.478)
Mortality, number of deaths	54	34	160	144	0.051	0.867 (0.751–1.007)
Re-admission within 28 days of discharge, n	49	86	155	183	0.004	1.29 (1.084–1.53)
Number of recorded comorbidities:						
1–2	141	238	405	478	<0.001	1.294 (1.154–1.457)
3–5	162	246	480	578	0.003	1.153 (1.049–1.268)
>5	60	85	157	190	0.22	1.118 (0.936–1.335)

recorded as having multiple comorbidities in the 2014 group was probably due to the increased presence of consultant geriatricians across the patients' episodes in hospital, leading to better identification and recording of comorbid conditions.

We have demonstrated that a substantial shift of resources to the 'front door' of a general hospital improved compliance with national recommendations and had an important, positive effect by shortening LOS, particularly for patients with a short predicted LOS, but had only a modest influence on overall LOS and overall bed utilisation. ■

Author contributions

Divya Tiwari: conception of idea, design, data extraction, data analysis, discussion and final version.

Michael Vassallo: idea, design, accuracy and final version.

Charlotte Oven: feasibility study, design and final approval.

Richard Renaut: conception of idea, design, methods and critical evaluation.

Stephen Allen: literature review, methods, discussion, data interpretation and final version.

Conflicts of interest

The authors declare no conflicts of interest. The cost of the study, in terms of staff time, was supported by the trust management but there was no other source of funding. This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors. The study presented describes the fully anonymised outcomes from a service development so it was not considered necessary to seek external ethical approval.

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