

# Implications of bed reduction in an acute psychiatric service

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The reduction of psychiatric beds in health services has been a matter of much debate since the era of deinstitutionalisation.<sup>1–3</sup> Before the National Mental Health Plan of 1992,<sup>4</sup> deinstitutionalisation in Australia saw a reduction of beds from 30 000 to 8000 over 30 years.<sup>5</sup> This shift of focus from hospital to community-based care was in line with policy direction throughout the Western world.<sup>1</sup> The National Mental Health Plan led to mainstreaming of psychiatric services from stand-alone psychiatric institutions to general hospitals and community-based care.<sup>5</sup> Between 1993 and 2002, the number of long-stay beds was reduced by 52% and the overall number of acute beds increased by 6%.<sup>6</sup> Although the number of psychiatric beds varies internationally, Australia is at the lower end of bed numbers per 100 000 population.<sup>7,8</sup>

The demand for psychiatric services in Australia has increased. For example, between financial years 1998–99 and 2002–03, overnight admissions to acute psychiatric units increased by 7%.<sup>9</sup> One response to this has been to encourage inpatient units to increase efficiency by reducing patients' length of stay (LOS). While the reduction in LOS raises concerns about increased readmission rates, there is little evidence to associate reduced LOS with poorer health outcomes in hospitalised patients.<sup>10</sup>

Our study retrospectively examined the impact of reducing beds in a single psychiatric service and introducing new care pathways in inpatient and community settings. We looked at the impact on bed management; patient flow between the emergency department (ED), the inpatient ward and the community; and ward practices.

## METHODS

Cramond Clinic was established at the Queen Elizabeth Hospital (QEH), Adelaide, in 1997 as a regional 40-bed acute inpatient unit "mainstreamed" into a general hospital setting as part of the deinstitutionalisation of mental health services. The unit serves a population of 127 500, aged between 18 and 65 years, and receives its patients from the QEH ED. The clinic is part of the Western Mental Health Service, which is a subdivision of the Central Northern Adelaide Health Service (CNAHS) Mental

## ABSTRACT

**Objective:** To evaluate the impact of psychiatric inpatient bed closures, accompanied by a training program aimed at enhancing team effectiveness and incorporating data-driven practices, in a mental health service.

**Design and setting:** Retrospective comparison of the changes in services within three consecutive financial years: baseline period — before bed reduction (2006–07); observation period — after bed reduction (2007–08); and intervention period — second year after bed reduction (2008–09). The study was conducted at Cramond Clinic, Queen Elizabeth Hospital, Adelaide.

**Main outcome measures:** Length of stay, 28-day readmission rates, discharges, bed occupancy rates, emergency department (ED) presentations, ED waiting time, seclusions, locality of treatment, and follow-up in the community within 7 days.

**Results:** Reduced bed numbers were associated with reduced length of stay, fewer referrals from the community and subsequently shorter waiting times in the ED, without significant change in readmission rates. A higher proportion of patients was treated in the local catchment area, with improved community follow-up and a significant reduction in inpatient seclusions.

**Conclusion:** Our findings should reassure clinicians concerned about psychiatric bed numbers that service redesign with planned bed reductions will not necessarily affect clinical care, provided data literacy and team training programs are in place to ensure smooth transition of patients across ED, inpatient and community services.

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Health Directorate. CNAHS has governance responsibility for four services, including the Western Mental Health Service.

In June 2007, inpatient beds in the clinic were reduced from 40 to 31 following a reduction in available consultant time, high use of agency nurses and a belief that reducing beds while maintaining accessibility to clinical care might be possible. As part of the National Mental Health Benchmarking Project, CNAHS set up a key performance indicator (KPI) development group in November 2007. The group recommended that each mental health inpatient unit discharge two patients per day to facilitate bed flow across services. Periodic graphical comparison reports were made available to clinical staff on a regular basis from November 2008.

## The TeamSTEPPS program

In May 2008, a Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS) program was implemented at Cramond Clinic, sponsored by the South Australian Department of Health's Safety and Quality Unit.<sup>11</sup> Following training of a group of key clinicians, roll-out commenced in July 2008, with this group training all

Cramond Clinic staff in TeamSTEPPS principles. These included introducing a structured communication tool at all handovers, restructuring multidisciplinary meetings and clearly defining the roles and responsibilities of all clinical staff.

New strategies were put in place to ensure continuity of care. A transfer-of-care coordinator was appointed and a postdischarge clinic established, with the aim of following up patients within 7 days of discharge from the inpatient unit to ensure effective linking with community and support services. A "hospital at home" team was further developed to provide short-term monitoring of patients in their own homes.

## Study design

Our retrospective study comprised an analysis of the service data of three consecutive financial years: baseline period — before bed reduction (2006–07); observation period — after bed reduction (2007–08); and intervention period — the second year after bed reduction (2008–09).

All patients presenting to the QEH ED with a psychosocial problem that had resulted in an ICD-10 (International classification of diseases, 10th revision) psychiatric

diagnosis were included in the study. This information was obtained from the Hospital Administration Software Solutions-ED database. The time spent in the ED for patients needing admission was obtained from the health service's Health Information Portal database. The number of admissions to Cramond Clinic, number of discharges, LOS, diagnosis, 28-day readmission rates, patient catchment area, and number of days with and without discharges were extracted from the Clinical Reporting Repository database. While patients whose episode duration exceeded 35 days were excluded from the LOS calculation in line with the national KPI definition, we calculated the proportion of patients with LOS > 35 days for comparison purposes.

The patient catchment area was categorised into Western Mental Health Service region (in which Cramond Clinic is located) and non-Western region by matching postcodes of patients' residence with locality of service. Bed occupancy was calculated retrospectively from the casemix coding database, based on occupancy at 8 am each day, and averaged for each of the comparisons. The Australian Incident Monitoring System database was used to derive the number of unique seclusion events per month in the clinic. The statistical analysis was carried out using a combination of SPSS, version 14 (SPSS Inc, Chicago, Ill, USA) and Excel (Microsoft, Redmond, Wash, USA) statistical functions. Differences in mean scores were tested using *t* tests.

## RESULTS

The comparison measures for different time frames are listed in Box 1. Throughout each study period, 10% of the bed days were occupied by patients with LOS > 35 days. The average LOS for patients with LOS > 35 days did not change significantly between the periods.

### Observation period compared with baseline period

During the observation period (after bed reduction), there was a 22.5% reduction in bed capacity at the clinic (Box 1). Activity levels, measured by number of discharges per day, dropped by 27.3% ( $P < 0.001$ ) in the observation period compared with baseline, but there was no significant change in average LOS ( $P = 0.802$ ). The number of ED presentations with psychiatric diagnoses fell by 13.4% ( $P < 0.001$ ). For patients requiring admission, there was no significant change

### 1 Summary of outcomes during baseline, observation and intervention periods\*

	Baseline	Observation	Intervention	$P^\dagger$	$P^\ddagger$
Study period <sup>§</sup>	2006–07	2007–08	2008–09		
Bed capacity, <i>n</i>	40	31	31		
Average length of stay for daily discharges	20.1 (1.0)	19.8 (0.9)	15.8 (0.8)	0.802	< 0.001
Discharges per day	2.2 (0.09)	1.6 (0.07)	1.8 (0.06)	< 0.001	0.021
Waiting time in ED for admission (hours)	25.2 (2.6)	23.7 (1.6)	20.2 (1.3)	0.185	0.086
Daily occupancy rate	95.1% (1.4%)	95.6% (1.3%)	93.2% (1.5%)	0.300	0.010
28-day readmission rate per month	13.0% (2%)	16.0% (5%)	15.0% (5%)	0.120	0.330
7-day follow-up rate per month	43.0% (5%)	52.0% (4%)	63.0% (5%)	0.008	< 0.001
Number of seclusion events per month	42.9 (11.3)	22.4 (10.3)	5.3 (2.7)	0.007	0.002
Mental health ED presentations per month	142 (8)	123 (6)	124 (8)	< 0.001	0.427

ED = emergency department. \*Data are mean (SD), except where otherwise specified. †Observation period compared with baseline period. ‡Intervention period compared with observation period. §Each study period was 12 months, from July to June.

in time spent in the ED before being admitted ( $P = 0.185$ ). Bed occupancy rates were similar in both periods ( $P = 0.30$ ). The 7-day follow-up rate increased by 9 percentage points ( $P = 0.008$ ). There was no significant change in readmission rates ( $P = 0.12$ ). The number of seclusions declined by 47.8% ( $P = 0.007$ ) (Box 1).

### Intervention period compared with observation period

During the intervention period (the second year after bed reduction), activity levels (discharges per day) increased by 12.5% ( $P = 0.021$ ) compared with those of the observation period (Box 1). There was no significant change in the number of mental health ED presentations ( $P = 0.427$ ). The waiting time for admissions from the ED to the ward decreased by 14.8% ( $P = 0.086$ ), influencing occupancy rates, which fell by 2.5% ( $P = 0.01$ ). Average LOS further decreased by 20.2% ( $P < 0.001$ ). The number of days without any discharges roughly halved from 85 in the observation period to 48 in the intervention period (Box 2). The 7-day follow-up rate improved a further 11 percentage points ( $P < 0.001$ ). There was no significant change in readmission rates ( $P = 0.33$ ). The number of seclusions dropped by 76.3% ( $P = 0.002$ ) (Box 1).

### Patient catchment area

In the observation period, the proportions of Western region (local) and non-Western

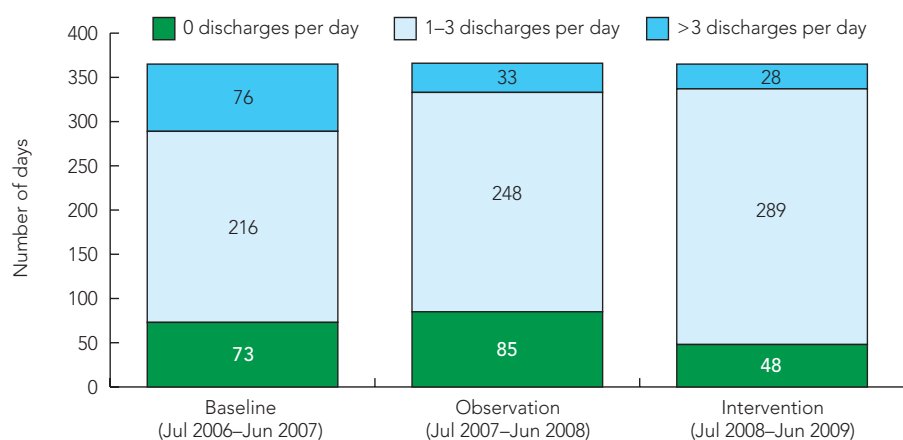
region patients presenting to Cramond Clinic decreased by 20.0% ( $P < 0.01$ ) and 42.9% ( $P < 0.01$ ), respectively. At the same time, the proportion of Western region patients presenting to hospitals in other regions increased by 18.8% ( $P = 0.05$ ). During the intervention period, the proportion of Western region patients presenting to Cramond Clinic increased by 19.4% ( $P < 0.05$ ) compared with the observation period, while the number of these patients presenting in other regions fell by 47.0% ( $P < 0.01$ ). There was no significant change in the proportion of non-Western region patients presenting to the Cramond Clinic during this period ( $P = 0.22$ ).

### Patient flow

LOS and waiting times in the ED decreased during the intervention period. There was a more even flow of discharges, shifting towards one to three discharges per day, during the observation period compared with the baseline period, but there was no reduction in the number of days without discharges (Box 2).

From baseline to the observation period, the mean number of days per month with one to three discharges increased from 18 to 21 ( $P = 0.007$ ), while the mean number of days with more than three discharges decreased from 6 to 3 ( $P = 0.001$ ). From the observation period to the intervention period, the mean number of days per month with one to three discharges increased from

## 2 Number of days with 0, 1–3 and > 3 discharges per day during baseline, observation and intervention periods



21 to 24 ( $P=0.01$ ), while the mean number of days with more than three discharges decreased from 3 to 2 ( $P=0.655$ ). Over the same period, the number of days per month with no discharges fell from 7 to 4 ( $P=0.003$ ).

## DISCUSSION

Our study demonstrated that reducing beds and introducing new care pathway interventions in inpatient and community settings are associated with better ward practices and improvements in patient flow between the ED, the inpatient ward and community teams. Most notably, we observed a marked reduction in seclusion rates. The literature on seclusion rates in psychiatric settings suggests that a multimodal team-based approach is necessary to reduce rates of seclusion.<sup>12</sup> Certainly, in our study, the reduction was associated with improved staff training in handling aggression, improved team communication, better data feedback on seclusion rates, and strengthened clinical leadership. The introduction of a TeamSTEPPS program, with its emphasis and training in the four competency areas of leadership, situation monitoring, mutual support and communication, may have led to improved teamwork and clinical outcomes in the unit. The effect of formal teamwork training has been previously documented in health care settings and has been shown to improve team behaviours and staff attitudes and to reduce errors.<sup>11</sup> While a reduction in rehospitalisation rates would have been ideal, there was at least no evidence of an increase in 28-day rehospitalisation rates during the period of our study. We developed a protocol for discharge plan-

ning that encompassed structured communication processes. Discharge-planning interventions are also effective in reducing rehospitalisation rates and LOS.<sup>13</sup> A formal transfer clinic, in which patients were seen by the treating inpatient team within 1 week of discharge, was facilitated by the appointment of a transfer-of-care coordinator.

The reduced rate of presentation to the ED over the study period may indicate that community services to psychiatric patients improved. Awareness of the bed reduction may have led community services to raise the severity-of-illness threshold for referral to the ED. This is in line with the finding that demand is to some extent generated by ready availability of psychiatric beds.<sup>14</sup> Reducing demand is beneficial from a health economics point of view, but may also indicate that care is being more appropriately provided in the community. There have been concerns that reducing psychiatric beds without providing appropriate community services may contribute to increased homelessness. However, retrospective review that we conducted of the number of referrals to the Homeless Support Service in metropolitan Adelaide did not substantiate these concerns. Referrals to this service decreased from 103 to 59 during the study period, and hospital-at-home activity rose from 25 to 66 patient episodes.

Mathematical modelling of contributions to access block in inpatient units suggests that variable discharge patterns are more influential than variable admission rates.<sup>15</sup> Therefore, the policy aimed at consistent rather than fluctuating discharge rates may have been a significant contributor to the efficiencies noted in our study. After bed reduction, the ward's capacity to care for

local patients increased, but the change only became apparent after a year. It could be argued that localised treatment is better for patients, as it provides better coordination of care, reduced referral pathways and improved access to local resources. It may therefore be important to set incentives that promote localisation, such as allowing units to run wards at 85% occupancy rates.<sup>16</sup> Evidence indicates that allowing vacant beds prevents future crises and bed access block.<sup>17,18</sup>

Historically, Adelaide's Western Mental Health Service operated in a data-poor environment. The first monthly data report on national KPIs for the region was published in November 2007. Staff training involved the development of improved data presentation formats, including timeline graphs and the use of data to inform clinical practice. The data feedback acted as an incentive for improving performance and allowed for benchmarking with similar services in SA Mental Health. It may be that a key intervention for health services is to translate KPI reporting structures from the management level to clinical teams.

There were several limitations to our study. First, we considered only quantitative aspects of the impact of bed reduction, changes in staff training, bed flow management and care pathway interventions. We did not investigate the subjective experience of the impact of these changes on users of the service. However, measurable changes that occurred during the study period — for example, the reduction in seclusion rates — would have substantially improved the subjective experience of hospitalisation for many. Second, the study took place in only one component of the larger CNAHS service. The ideal study would have investigated the impact of similar changes introduced more broadly across an entire service region. Third, given the retrospective nature of the analysis, it was not possible to quantify the magnitude of the association attributable to any one intervention and the improvements seen. Finally, more qualitative analysis of consumer experience could be considered in future studies.

Our analysis suggests that, by adopting innovative practices, it is possible to redesign services and reduce beds without adverse effects within inpatient mental health services. By making team training activities a vital part of the change process and by embedding a data-driven culture into clinical practice, reform is achievable. Our findings should reassure clinicians who

are concerned that there are not enough acute psychiatric beds. The challenge remains to find ways of creating systemic incentives for patient flow. A prospective trial allowing some units to run at 85% bed occupancy while other units run at 100% occupancy would be particularly useful to analyse the effect of providing incentives for units to run at lower occupancy rates.

## COMPETING INTERESTS

None identified.

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