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The impact of a surgical assessment unit on numbers of general surgery outliers

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ABSTRACT

AIMS: Patient care and efficiency outcomes are improved if acute patients admitted to non-specialty (outlier) wards are minimised.¹ Assessment units may help to reduce numbers of outlier patients.² A surgical assessment unit (SAU) was recently established at Middlemore Hospital. We aimed to determine the impact of its introduction on numbers of general surgery outliers on post-acute ward rounds.

METHODS: A 10-bed SAU was introduced in July 2015, coinciding with the closure of 20 beds on the general surgical wards. The numbers and locations of patients on post-acute ward rounds before and after the establishment of the SAU were compared. A student two-tailed t-test was used for statistical comparisons, with $p < 0.05$ considered significant.

RESULTS: A total of 1,462 patient locations were analysed from 71 post-acute ward rounds. There were similar overall numbers of post-acute patients before and after the introduction of the SAU (mean 21 vs 20, $p = 0.33$). There were fewer post-acute patients in outlier wards after the introduction of the SAU (mean 1.7 before vs 0.8 after, $p = 0.04$).

CONCLUSION: Despite a net reduction in general surgery beds and no change in the overall number of post-acute patients, the establishment of a SAU was associated with a reduction in outliers.

Best practice guidelines for ward rounds recommend that patients be nursed on appropriate specialty wards.³ However, with rising numbers of acute admissions and high levels of hospital occupancy, it is often necessary to admit patients to alternative, non-specialty wards as “outlying patients” (outliers).

Outliers are widely considered to be undesirable. They are associated with observed increases in emergency calls, complications,¹ in-hospital mortality^{1,4} and poorer efficiency outcomes (as evidenced by longer hospital stay).⁵ Outliers may disrupt team-based models of care and make communication between medical, nursing and allied staff more challenging.³ Particularly if geographically distant, outliers may also place a greater time-burden on the surgical ward round than patients in home wards.⁶

The use of an assessment or short-stay unit is an increasingly common initiative to streamline the management of acute admissions. The vast majority of published research evaluates medical assessment units. These units have been associated with a reduction in length of stay,^{2,7-12}

reduced emergency department waiting times,¹¹ no increase in readmissions,^{2,7-10} no increase in mortality^{2,7-10} and reduced numbers of outliers.^{2,7}

On 1 July 2015 a 10 bed surgical assessment unit (SAU) was established at Middlemore Hospital. This is a tertiary teaching institution in Auckland, New Zealand, with an average of 9,143 patients admitted as general surgical acute patients annually. The opening of the SAU coincided with the reassignment of part of a general surgery ward (20 beds) to medicine to aid with winter medical demand, resulting in a net loss of 10 general surgery beds. This represented a 17% reduction (the usual number of general surgical ward beds, before the partial closure was 120). Prior to its establishment, general surgery patients awaiting an inpatient bed either stayed in the emergency department's short stay unit overnight or were placed on outlying wards.

The main aims of the SAU were to manage patients with hospital stays less than 28 hours, to increase the number of surgical patients discharged from the front of the hospital and to facilitate timely discharge

before 11am. Based on previous published experience there was a possibility that outlier numbers would decrease.^{2,7} However, there was also concern that the net bed reduction coincident with the introduction of the SAU at Middlemore Hospital could increase the number of outliers for the busy post-acute general surgery team and in turn impact negatively on patient outcomes.

The aim of the study was to determine the impact of the introduction of a surgical assessment unit (SAU) on numbers of general surgery outliers on the post-acute surgical ward round at Middlemore Hospital.

Methods

Approval for the study with the Counties Manukau research office was sought and granted (registration no. 2270); no formal ethics review was required. Post-acute team inpatient lists were prospectively collected over a six-week period immediately prior to the introduction of the SAU (April–May 2015) and in a similar period beginning one month after the introduction of SAU (August–October 2015). These lists represent the total number of patients under the care of general surgery (both in assessment phase and with admission status), resulting from a referral to general surgery in the preceding 24 hours and who were subsequently visited by the admitting/acute team on a post-acute ward round. These lists included patient locations and were generated immediately prior to the daily morning handover meeting and commencement of the post-acute ward round. The number and location of post-acute patients was recorded. Pre-existing team patients (ie those that had not entered the hospital within the preceding 24 hours, including elective patients) were excluded.

A two tailed t-test was used to compare the mean numbers of post-acute team patients in each location, before and after the introduction of the SAU.

Definitions of terms

'Home wards' were defined as in-patient general surgery wards, of which there were four prior to the establishment of the SAU and three and a half after its establishment.

'Non-surgical areas' included all areas other than the 'home wards'—ie outlier wards, as well as the intensive care and high dependency units, the emergency department, the

emergency department's short stay unit and, after its introduction, the SAU.

'Corrected non-surgical areas' included all areas other than the 'home wards', the emergency department's short stay unit before the introduction of the SAU and, after its introduction, the SAU. This term essentially considered the SAU to be a surgical ward and therefore excluded patients in this location as outliers. Because the ED's short stay unit had previously been used in a somewhat similar way—in that, if capacity allowed, general surgery patients were often kept there overnight while awaiting a ward bed—it was felt to be appropriate to also exclude patients in the short stay unit prior to the establishment of the SAU as outliers for part of the analysis.

'Outlier wards' represented in-patient wards other than the 'home wards' and did not include the intensive care or high dependency units or any areas within the emergency department. These locations were of greatest interest as they represented the true surgical outlier patients.

Results

Thirty-five post-acute lists were analysed over a six-week period between April–May 2015, immediately before the introduction of the SAU and 36 lists were analysed from a similar period in August–October 2015, after the introduction of the SAU. Some lists (seven prior to introduction of SAU and six after) were inaccessible to the researchers and so were excluded. Overall, the locations of 1,462 patients (743-before, 719-after the introduction of the SAU) during 71 post-acute ward rounds were evaluated.

There was no significant difference in the number of post-acute patients seen on the post-acute ward round before and after the introduction of the SAU (mean of 21 vs 20, $p=0.33$).

After the introduction of the SAU, there were a higher number of post-acute patients in 'non-surgical areas', ie in all areas outside the 'home wards', (mean of 5.1 before vs 6.6 after, $p=0.05$). However, when 'corrected outlier areas' were considered, there were fewer post-acute patients in these outlier areas after the introduction of the SAU (mean 2.7 before vs. 1.6 after, $p=0.04$).

Importantly, overall, there were fewer post-acute general surgery outliers (ie general surgery patients in 'outlier wards') after the introduction of the SAU (mean of 1.7 patients [range 0–9] before vs 0.8 after [range 0–6], $p=0.04$). Prior to the introduction of the SAU, six (17%) of the post-acute ward rounds contained >3 outlier patients; after the introduction of the SAU only one (3%) ward round contained >3 outliers.

Discussion

This study demonstrates that the introduction of a surgical assessment unit was associated with a decrease in the number of post-acute general surgical patients admitted to non-surgical wards, despite a net decrease in general surgical bed numbers. This implies that the establishment of the SAU has been associated with improved patient flow with potential benefits to patient care.

Outliers are widely considered to be undesirable and published reports suggest that outliers may have poorer quality of care and efficiency outcomes. An Australian observational cohort study of 58,158 all-specialty admissions demonstrated that outlier status was associated with a 53% increase in emergency calls. Outlier patients had more complications and higher in-hospital mortality.¹ In medical patients a retrospective study of heart failure patients found that those initially admitted as outliers had a longer stay in hospital with a mean difference of 2.6 days⁵ while another analysis of nearly 20,000 general medical patients found that being an outlier was associated with an increased risk of in-hospital mortality by over 40%.⁴

Outliers may also disrupt team-based models of care and make communication between medical, nursing and allied staff more challenging. A single-centre study at Auckland Hospital found that outlying patients placed a greater time-burden on the surgical ward round than patients in home wards; the mean time per patient at the bedside was similar, but the mean total time per patient (including transit, gathering notes, bedside consult and discussion) almost doubled (2 min 57 for patients on home wards vs 5 min 40 for outliers).⁶ While transit time will depend on geographical distances between home and outlier wards, certainly in Middlemore Hospital such

distances can be considerable, as the main admission blocks span a distance of approximately 300m over three multi-story and only partially interconnected buildings.

The use of an assessment or short-stay unit is an increasingly common initiative to streamline the management of acute admissions. Advantages include improved access to timely assessment and diagnostics although these factors were outside the focus of the current study. Published experience has demonstrated that the introduction of such units is also associated with a decrease in outliers. A UK study found the mean number of medical patient outliers was lower after the introduction of a 21-bed medical short stay unit despite there being no net change in medical bed numbers and no change in percentage bed occupancy.² Following the introduction of a 12-bed acute surgical admission ward in the Netherlands, outlying patients decreased from 9.5 to 0 percent, however, it is unclear whether there was an associated change in bed numbers.⁷

As expected, there was no difference in the total number of post-acute patients in the two study periods. A higher number of post-acute patients in 'outlier areas' after the introduction of the SAU was observed and was consistent with the fact that this term included the SAU, where some new admissions were now being directed, and that part of one general surgery ward had closed, reducing the number of inpatient ward beds.

However, this study indicates that despite a net reduction in general surgical beds, the establishment of the SAU was associated with a reduction in post-acute general surgery patients being admitted to outlier wards. The inclusion of an analysis of "corrected outlier areas" ensured that the observed effect was not accounted for by a mere change in name of part of the ED (as might be hypothesised when considering the ED short stay unit vs the SAU). There was no change in admission policy thresholds during the study period and no change in access to diagnostic services.

These findings suggest that the SAU has had a positive impact on bed management for acute patients, in that a higher proportion of patients are admitted to surgery-specific areas. The reasons for this positive association are currently unclear

but may be due to improved patient flow—for example, greater numbers of patients seen and discharged directly from the assessment area, and greater numbers of patients directed to the theatre admission area rather than ward admission for minor surgical procedures which results in same day discharge, therefore decreasing burden on inpatient surgical ward beds. Any reduction in length of inpatient stay would likely contribute to reduced numbers of outliers, but was not measured. These factors could be the subject of future study.

Although the locations of pre-existing team patients were excluded from the study, it is unlikely that the observed decrease in post-acute outliers is a consequence of a re-location of pre-existing team patients or elective patients to outlier wards, as this is prevented by hospital policy. Elective patients are allocated to pre-arranged general surgery ward beds and are given priority over acute patients in this regard. Acute patients requiring more than 28 hours in hospital are admitted to a general surgery ward if capacity allows; if not, they are admitted to an outlying ward until a general surgery ward bed becomes available. Once a patient, either elective or acute, is admitted to a general surgery ward, it is hospital practice for the patient to remain on that same ward until discharge; thus while it is possible for an inpatient to move from an outlier ward to a “home” ward, the opposite does not occur.

There are some limitations of this study. The data was non-consecutive because access to some of the post-acute lists was lost (these lists are a real-time reflection of patients in surgical care and so could not be reproduced). Given that the number of missing lists was almost identical in the two study populations, this is felt unlikely to have influenced the observed outcome. The study

did not include patients who may have been seen and discharged from hospital prior to the morning handover meeting, or who may have been well enough to be discharged and asked to return the following day to the theatre admissions area for surgery. These factors do not affect the validity of the findings, however may play a part in accounting for them. The study also did not evaluate numbers of elective admissions during the two periods, which may have impacted on the availability of surgical beds.

Finally, the data reflects the location of patients at a single point in time. This is relevant to the locations of patients at the time of the post-acute ward round, however may overestimate the numbers of all outliers over time, as patients could be moved to a general surgery home ward in the days subsequent to the post-acute ward round. Given that the current data is a true representation of the post-acute teams' movements and that other published studies have also generally not addressed patient movement, the results and conclusions are felt to be valid.

Conclusion

In summary this study investigated the impact of the establishment of a surgical assessment unit at a large teaching hospital on outlier patient numbers. The number of general surgery patients admitted remained similar after the establishment of the unit but the number of outlier patients visited on a post-acute ward round decreased. Previous reports suggest that this is likely to be associated with improved quality of care and efficiency gains.

Further research could be considered to evaluate the reasons for this effect and also to evaluate resultant quality of care and efficiency outcomes in a surgical population.

Competing interests:

Nil.

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