Comparison of specialist and generalist care

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Abstract

Objective. The choice of whether to admit under a specialist or a generalist unit is often made with neither clear rationale nor understanding of its consequences. The present study compared the characteristics and outcomes of patients admitted with community-acquired pneumonia to either a general medicine or respiratory unit.

Methods. This study was a retrospective cross-sectional study using data from public hospitals in Adelaide, South Australia. Over 5 years there were 9775 overnight, unplanned appropriate adult admissions. Patient length of hospital stay, in-patient mortality rate and 30-day unplanned readmission rate were calculated, with and without adjustment for patient age and comorbidity burden.

Results. Over 80% of these patients were cared for by a general medicine unit rather than a specialist unit. Patients admitted to a general medicine unit were, on average, 4 years older than those admitted to a respiratory unit. Comorbidity burdens were similar between units at the same hospital. Length of in-patient stay was ≥1 day shorter for those admitted to a general medicine unit, without significant compromise in mortality or readmission rates. Between each hospital, general medicine units showed a range of mortality rates and length of hospital stay, for which there was no obvious explanation.

Conclusions. Compared with specialty care, general medicine units can safely and efficiently care for patients presenting to hospital with community-acquired pneumonia.

What is known about the topic? Within the narrow range of any specific disease, generalist medical services are often cited as inferior in performance compared with a specialty service. This has implications for hospital resourcing, including both staffing and ward allocation.

What does this paper add? This paper demonstrates that most patients admitted with a principal diagnosis of community-acquired pneumonia were admitted to a generalist unit and did not apparently fare worse than patients admitted to a specialist service; patients admitted to a generalist unit spent less time in hospital and there was no difference in mortality or readmission rate compared with patients admitted to a specialist service.

What are the implications for practitioners? The provision of generalist services at urban hospitals in Australia provides a safe alternative admission option for patients presenting with pneumonia, and possibly for other common acute medical conditions.

Additional keywords: community acquired pneumonia, mortality, relative stay index.

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Introduction

When an acutely unwell individual requires admission to hospital through the emergency department (ED), a decision is made regarding an appropriate admitting unit, often choosing between a specialist and a generalist unit. Sometimes that decision is not straightforward, but is necessary in order for the patient to leave the ED. For common diagnoses, hospitals often have a treatment algorithm that also guides the clinician on disposition of admitted patients.1 The selection of a specialist unit rather than a generalist unit as the admitting unit may depend not only upon the patient’s principal diagnosis and relevant local protocols, but also on less well understood factors such as patient characteristics, resource availability and the presence of social factors likely to prolong length of stay (LOS).1 Patients with an uncertain diagnosis (e.g. exertional dyspnoea as the presenting symptom) may be admitted under general medicine (GM)2 in order to avoid admission under an inappropriate specialty (e.g. a respiratory unit looking after a patient with heart failure). Significant comorbidity may mean...
A patient is admitted to a GM unit, especially if those comorbidities involve more than one system (e.g., both respiratory and cardiovascular systems) and more than one condition is unstable at the time of presentation. The severity of the acute illness may lead to admission under a specialist unit in preference to a GM unit, although this is not a consistent phenomenon.\(^5\) Aging is associated with greater comorbidity\(^7,8\) and the older patient may be more likely admitted under a GM or aged care (AC) unit rather than a specialist unit, despite suffering from single-system pathology.\(^3,5,6\) Inter- and intrainstitutional comparisons of care quality and efficiency can be affected by these differing processes dictating which unit will look after which type of patient with common diagnoses such as community-acquired pneumonia (CAP).

The LOS for patients diagnosed with CAP is influenced by patient age, the number of comorbid conditions, the pneumonia severity index and other factors,\(^7,8\) but interhospital differences in LOS persist after adjustment for these,\(^9\) raising the possibility that care quality differs between sites and between specialist and generalist units at the same site. The specialist or generalist nature of the admitting unit could contribute to those differences on the basis of staff expertise or the resources allocated to each unit for in-patient care (e.g., early access to allied health). The aim of the present study was to compare the characteristics and outcomes of patients with CAP admitted to any one of six South Australian metropolitan public hospitals by comparing patient data and the performance of GM and respiratory units overall, and by comparing performance between hospitals.

**Methods**

Overnight, unplanned (i.e. emergency) adult admissions to six public hospitals in Adelaide, South Australia, across the period January 2011–May 2016 were assessed. In-patient records were selected if the admission consisted of a single, acute episode of care within the one hospital with a principal diagnosis of pneumonia (International Classification of Diseases, 10th Revision, Clinical Modification (ICD-10-CM) codes J12.0–18.9; https://www.cdc.gov/nchs/icd/icd10cm.htm, verified 13 December 2017) and if the patient was discharged home, to an aged-care facility or died in hospital. Patients admitted under GM or a respiratory unit were principally included, although notice was also taken of those admitted to an AC unit. The relative stay index (RSI) was calculated by dividing calculated LOS by expected LOS, the latter being based on contemporary LOS data from a wide range of Australian hospitals considering the patient age and disease complexity after in-patient deaths were excluded.\(^10\) An RSI >1.0 suggests worse efficiency of that unit or hospital than the Australian average. Unplanned readmissions within 30 days were defined as any unplanned admission to any metropolitan public hospital in South Australia with or without the same principal diagnosis as the index admission. Aging and comorbidity are associated with greater in-patient mortality and with more frequent readmission,\(^11\) so we adjusted for both using the Charlson comorbidity index (CCI) as a measure of comorbidity.\(^12\) Because the study was a quality assurance and evaluation activity, local ethics committee approval was not necessary.

**Statistical analyses**

Statistical analyses were performed using Stata 14.2 (StataCorp, College Station, TX, USA). Combined across all hospitals, differences between GM and respiratory units in the categorical variables (in-hospital death, unplanned readmission) were tested using two-tailed Chi-squared tests; the significance of differences in continuous variables that were not normally distributed (LOS, RSI) was tested using the Kruskal–Wallis test. These approaches were also used when comparing GM and respiratory units within individual hospitals. Multiple linear regression models were developed to adjust for the effects of age, sex and comorbidity on the relationship between RSI and unit; logistic regression models were developed to control for the effects of age, sex and comorbidity on the relationship between in-patient mortality rate (IMR) and unit, as well as unplanned readmission rate (URR) and unit.

Comparisons between hospitals were performed using linear regression for age, CCI and RSI, and logistic regression for IMR, with Hospital A as the hospital against which Hospitals B–F were compared.

**Results**

The case-selection process yielded 9555 admissions; a further 220 cases were admitted to AC units across five hospitals (between 3 and 131 admissions at any single site).

**Comparisons between specialties**

Table 1 shows the number of admissions categorised by hospital and unit. Most (83%) were admitted to a GM unit, with 17% admitted to a respiratory unit. Two smaller hospitals (Hospitals C

<table>
<thead>
<tr>
<th>Hospital</th>
<th>General medicine</th>
<th>Respiratory</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Age (years)</td>
<td>n</td>
<td>P-value</td>
</tr>
<tr>
<td>A</td>
<td>665</td>
<td>67 ± 18</td>
<td>–</td>
</tr>
<tr>
<td>B</td>
<td>22</td>
<td>61 ± 19</td>
<td>0.096</td>
</tr>
<tr>
<td>C</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>D</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>E</td>
<td>707</td>
<td>73 ± 16</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>F</td>
<td>184</td>
<td>61 ± 16</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Total</td>
<td>1578</td>
<td>69 ± 17</td>
<td>1.4 ± 1.8</td>
</tr>
</tbody>
</table>
Comparing specialist and generalist care

Patients admitted to a GM unit were, on average, 4 years older than those admitted to a respiratory unit (Table 1; \(P < 0.001\)), but there was no significant difference in average CCI (Table 1; \(P = 0.18\)). As expected, the average AC patient was older (84 years) with a higher CCI (2.1), indicating greater comorbidity in that group.

The median (interquartile range (IQR)) LOS for GM patients was 4.4 days (2.6–7.2 days), compared with 5.8 days (IQR 3.7–9.4 days) for respiratory patients \((P < 0.001)\). Within each hospital, where appropriate, and also when summed across all sites, the GM RSI was consistently lower than the respiratory RSI \((P < 0.001)\; \text{Table 2}\). Multiple linear regression analysis of RSI showed that the significant difference between GM and respiratory units remained after adjusting for sex and CCI (age adjustment was already factored into the expected LOS calculation; \(P < 0.001\)). The IMR did not differ significantly between respiratory and GM patients (9.3% vs 9.6% respectively; \(P = 0.74\)), even after adjusting for age sex and CCI (odds ratio (OR) 0.86; 95% confidence intervals (CI) 0.71–1.04; \(P = 0.13\)). The admitting unit did not affect the 30-day URR (respiratory 12.2%; GM 12.3%; \(P = 0.84\), even after adjustment for age, sex and CCI (OR 0.98; 95% CI 0.83–1.16; \(P = 0.85\)).

AC patients stayed in hospital longer than expected (RSI = 1.31) and were more likely to die in hospital (21.4%) than GM respiratory patients. The elevated IMR for AC persisted after adjustment for age, sex and CCI (OR 1.59; 95% CI 1.12–2.23; \(P = 0.009\) for AC vs GM). The URR for AC (19.0%) did not differ significantly from that of respiratory/GM combined (14.3%; \(P = 0.09\)).

Comparisons between hospitals’ GM units

There were significant differences between hospitals \((P < 0.001)\) and between GM units \((P < 0.001)\) in terms of patient age, and between hospitals \((P < 0.001)\) and between GM units \((P < 0.001)\) in terms of patient CCI.

The RSI differed between GM units across the six hospitals \((P < 0.001)\; \text{Table 2}\); three hospitals (B, E and F) differed significantly from Hospital A \((P < 0.001, \text{P} < 0.001 \text{and} \text{P} = 0.021\) respectively), and these differences remained significant after adjustment for sex and CCI. The IMR differed between GM units \((P < 0.001)\; \text{Table 2}\), and these differences remained after adjustment for age, sex and CCI. Three hospitals (B, D and F) differed significantly from Hospital A (ORs 1.55 (95% CI 1.20–2.02; \(P = 0.001\)), 0.54 (95% CI 0.34–0.86; \(P = 0.009\)) and 1.27 (95% CI 1.01–1.59; \(P = 0.041\) respectively). The URR did not differ between GM units, either before or after adjustment for age, sex and CCI.

Results summary

Most of the patients admitted with CAP to South Australian metropolitan public hospitals are admitted to a GM unit. Patient age may affect the allocation to admitting unit because, at each relevant hospital, those admitted to a GM unit were, on average, older than those admitted to a respiratory unit. CCIs were similar between units within hospitals, so comorbidity may factor less in the allocation decision.

Quality of in-hospital care can be assessed by in-patient mortality and early readmission after discharge; the duration of in-patient stay is more a measure of care efficiency than care quality. In the present study, LOS was 1.5 days shorter for GM compared with respiratory patients. This shorter LOS was achieved without significant compromise in care quality (IMR and 30-day URR). GM units at different hospitals care for patients with CAP who vary in age and comorbidity burden. GM units showed a range of performance, as judged by IMR and RSI, that persisted after adjustment for between-hospital differences in age and comorbidity.

Discussion

Specialist versus generalist care

Efficient use of a hospital’s beds improves occupancy, reduces healthcare costs and increases the ability of that hospital to perform elective services such as surgery. It can be difficult to articulate the ideal LOS for each patient, although RSI is one such attempt. The ideal date for discharging a patient safely is not easy to define, with as many as 20% of patients with pneumonia discharged more than 1 day after reaching clinical stability and 30% discharged before reaching clinical stability. A premature discharge could result in an unplanned readmission. The care of patients with CAP was more efficient (i.e. a lower RSI) in the GM than respiratory units. There was no obvious compromise in care quality given to the GM patients. In fact, other studies have shown that shorter LOS for patients with CAP translates to both reduced health costs and more patients able to return to usual activities or work within 14 days of discharge.

Table 2. Relative stay index (RSI), excluding those patients who died in hospital, and in-patient mortality rates (IMR) by hospital and unit

<table>
<thead>
<tr>
<th>Hospital</th>
<th>n</th>
<th>RSI P-value</th>
<th>IMR (%) P-value</th>
<th>n</th>
<th>RSI P-value</th>
<th>IMR (%) P-value</th>
<th>n</th>
<th>RSI P-value</th>
<th>IMR (%) P-value</th>
<th>Total n</th>
<th>RSI P-value</th>
<th>IMR (%) P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>665</td>
<td>1.09 ± 0.63</td>
<td>0.72</td>
<td>1500</td>
<td>0.89 ± 0.68</td>
<td>0.84</td>
<td>2165</td>
<td>0.94 ± 0.67</td>
<td>0.80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>22</td>
<td>0.89 ± 0.55</td>
<td>0.36</td>
<td>1285</td>
<td>0.73 ± 0.56</td>
<td>&lt;0.001</td>
<td>1307</td>
<td>0.74 ± 0.56</td>
<td>0.004</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>268</td>
<td>0.87 ± 0.67</td>
<td>0.060</td>
<td>926</td>
<td>0.87 ± 0.67</td>
<td>0.72</td>
<td>926</td>
<td>0.87 ± 0.67</td>
<td>&lt;0.001</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>360</td>
<td>0.87 ± 0.50</td>
<td>0.869</td>
<td>533</td>
<td>0.87 ± 0.50</td>
<td>0.004</td>
<td>533</td>
<td>0.87 ± 0.50</td>
<td>0.091</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>116</td>
<td>0.006</td>
<td>0.001</td>
<td>968</td>
<td>0.77 ± 0.70</td>
<td>&lt;0.001</td>
<td>1675</td>
<td>0.84 ± 0.67</td>
<td>&lt;0.001</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>184</td>
<td>0.17 ± 0.76</td>
<td>0.081</td>
<td>2765</td>
<td>0.93 ± 0.72</td>
<td>0.021</td>
<td>2949</td>
<td>0.95 ± 0.73</td>
<td>0.463</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1578</td>
<td>1.02 ± 0.63</td>
<td>9.3</td>
<td>7977</td>
<td>0.87 ± 0.67</td>
<td>9.6</td>
<td>9555</td>
<td>0.89 ± 0.67</td>
<td>9.5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The RSI of AC units was greater than for the other two specialties. Patients in AC units were older and had a higher CCI. Our analysis adjusted for both these characteristics, but the greater RSI may reflect an unmeasured difference in the type of patient admitted to AC. For example, patient frailty or poor cognition may have swayed the decision to admit under AC and contributed adversely to LOS.

In contrast with the present findings, specialist care is generally regarded in the literature as being superior to generalist care within the narrow range of any specified disease. For example, guideline adherence and mortality rates were better for cardiologists than generalist hospital consultants in one large recent national audit of heart failure admissions. A meta-analysis reported generalist care as often inferior to specialist care for a variety of specific diagnoses, including chronic obstructive lung disease, although primary general practitioner care can be confused with tertiary hospital generalist care in this research area. The published evidence does not explore the rationale behind allocations by ED staff to GM or to other more specialized units. We propose that certain types of patients with common diagnoses may be deliberately allocated to specialist rather than generalist units, and hence LOS and IMR could be affected independently of care quality provided at each hospital and by each unit. The discharge-planning skills of each clinician, of each specialty and of each hospital may vary, and so may also affect RSI.

Sometimes admission to a specialist unit is not an obvious choice in the ED: the diagnosis may not be clear or patient comorbidity may cloud the prioritisation of illness acuity. The appropriate specialist unit may be unwilling to take new admissions. In such situations, a generalist unit can aid the process and allow the patient to leave the ED while investigations continue, treatment starts and clarity ensues. The present study provides evidence that GM units can safely and efficiently care for patients presenting to the ED with CAP compared with specialty respiratory care.

A better understanding is long overdue of the basis and outcomes of in-patient unit allocation decisions made in the ED. A prospective study is required in which patients are randomised to equally resourced specialist or generalist units, matching patients for comorbidity, age and disease acuity. Matching for other factors, such as frailty and cognition, may be germane. We need data upon each hospital unit’s compliance with local guidelines for management of common illnesses and the establishment of consistent guidelines within and between hospitals.

Interhospital differences

There were significant differences between hospitals in terms of LOS and IMR for patients admitted with CAP, and these differences were not explained by differences in patient age or comorbidity. A dialogue between these hospitals, currently largely non-existent, may facilitate a reduction in these discrepancies. The differences may arise from resource allocation, site-specific processes or variable adherence to local or national guidelines.

Limitations

Interpretation of our data must be qualified because certain key measures were unavailable for analysis. An index of disease acuity would assist our understanding of which units receive which patients with CAP. Quantifying the cost of each admission would identify whether reduced LOS translates to a reduction in healthcare costs. Significantly fewer patients with CAP were admitted to AC units than to the other two specialties, compromising our ability to compare care quality and care efficiency.

Conclusion

In South Australia over the past 5 years, most adult patients with CAP who were admitted to a metropolitan public hospital were admitted under a GM unit. Admission to a GM unit was associated with an ~20% shorter LOS compared with patients with the same diagnosis admitted to a respiratory unit. This shorter LOS was neither accompanied by a worse IMR nor a higher URR; however, care quality and efficiency varied significantly between the six GM units.

Competing interests

None declared.

References


