Associations with reduced length of stay and costs on an academic hospitalist service
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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
The study examined care provided by hospitalist physicians (HPs) in a general internal medicine service. The term hospitalist was defined as physicians who provide inpatient care in place of primary care physicians or academic one-month-per-year attendings.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised patients directly admitted to the general internal medicine service.

Setting
The setting was an academic hospital. The economic study was carried out in the USA.

Dates to which data relate
The effectiveness and resource use data were gathered from July 2000 to June 2001. The price year was not reported.

Source of effectiveness data
The effectiveness evidence was derived from a single study.

Link between effectiveness and cost data
The costing was carried out prospectively on the same sample of patients as that used in the effectiveness study.

Study sample
Power calculations were not reported. Of the 1,887 consecutive patients initially identified, 1,706 (90%) cases were directly admitted to the general internal medicine service. These formed part of the final study group. Patients transferred from the medical intensive care unit (n=105) or from surgical or other non-medicine services (n=76) were not included. There were 447 patients (52.8% male) in the HP group and 1,259 patients (51.2% male) in the NHP group. The mean age was 54.7 (+/- 19) years in the HP group and 55.2 (+/- 19) years in the NHP group.

Study design
This was a prospective observational study, based on a quasi-experimental design, which was carried out at a single
centre, the University of Iowa Hospitals and Clinics. The patients were sequentially allocated to the study groups in an alternating manner, regardless of diagnosis or complexity. The patients were followed until hospital discharge and the outcomes were assessed over a 30-day period. No patient was lost to the follow-up assessment.

**Analysis of effectiveness**

All of the patients included in the initial study sample were accounted for in the analysis of effectiveness. The outcome measures used were in-hospital mortality, the 30-day readmission rate and LOS. The study groups were comparable at baseline in terms of age, gender, race, type of insurance, admission source, discharge destination, mean distance from home to hospital, and 9 out of 10 diagnostic categories (defined using the diagnosis-related group classification). A sub-group analysis was used to determine whether the impact of hospitalist care was similar in sub-groups defined by distance from the hospital, need for post-acute care nursing services (including home health care, intermediate nursing care, or skilled nursing care), and admission source. Regression analysis was carried out to evaluate the impact of baseline factors such as age, gender, admission month and type of insurance. The relationship between LOS and several physician characteristics was examined.

**Effectiveness results**

The rate of in-hospital mortality was 1.3% in the HP group and 2.1% in the NHP group (difference -0.8%; p=0.29). The 30-day readmission rate was 7.8% in the HP group and 8.7% in the NHP group (difference -0.9%; p=0.55). The LOS was 5.5 days in the HP group and 6.5 days in the NHP group (difference -1 day; p=0.009).

The regression analysis did not show any significant relationship between LOS and the number of years since attending physicians' completed residency or the number of days of service during the academic year.

Similar results were obtained in the analyses of transfer patients and in the analyses of all admissions.

In the adjusted analysis, the odds of death for HP patients were comparable to those for NHP patients. However, adjusted LOS remained significantly different. The odds ratio was 16.2% lower (95% confidence interval: -31.2 to -1.6; p=0.03) for HP patients.

The stratified analysis showed that the difference in LOS between groups was larger for patients residing 25 miles or less from the hospital and for those discharged to nursing services.

**Clinical conclusions**

The effectiveness analysis showed that HP led to a significant reduction in LOS without affecting hospital mortality and readmission rates.

**Measure of benefits used in the economic analysis**

The health outcomes were left disaggregated and no summary benefit measure was used in the economic analysis. In effect, a cost-consequences analysis was performed.

**Direct costs**

Discounting was not relevant since the costs were incurred during a short timeframe. The unit costs were not presented separately from the quantities of resource used. All relevant hospital costs were included in the economic evaluation. These were grouped into nursing costs, laboratory costs, pharmacy costs and radiology costs. Other residual costs were also considered. The cost/resource boundary of the hospital appears to have been adopted. Resource use was estimated using patient-level data that were obtained from the sample of patients included in the effectiveness study. The costs were derived from the hospital's information systems using the TSI cost accounting system, which determines the fixed and variable costs of all billable hospital services. Non-billable costs were also determined and grouped by category. However, only the total costs and grouped costs were reported. The price year was not explicitly reported.
but the costs were estimated over the academic year 2000/2001.

**Statistical analysis of costs**
Multivariate regression analyses were performed to account for the skewed distribution of the economic data. Age, gender, type of health insurance and admission month were considered independent variables in the regression model. Cost outliers were excluded from the analysis.

**Indirect Costs**
The indirect costs were not considered in the economic evaluation.

**Currency**
US dollars ($).

**Sensitivity analysis**
Sensitivity analyses were not performed.

**Estimated benefits used in the economic analysis**
See the 'Effectiveness Results' section.

**Cost results**
The mean total costs per patient were $7,694 in the HP group and $8,611 in the NHP group (difference -$917; p=0.08).

The mean nursing costs per patient were $2,601 in the HP group and $3,205 in the NHP group (difference -$604; p=0.002).

The mean laboratory costs per patient were $834 in the HP group and $960 in the NHP group (difference -$126; p=0.04).

The mean pharmacy costs per patient were $1,179 in the HP group and $1,307 in the NHP group (difference -$128; p=0.27).

The mean radiology costs per patient were $672 in the HP group and $664 in the NHP group (difference $8; p=0.9).

The mean cost per day was $1,476 in the HP group and $1,354 in the NHP group (difference $122; p=0.003).

Similar results were observed when all admissions were considered. None of the differences in cost categories reached statistical significance when only transfers were considered.

The adjusted total costs were 9.7% lower (95% confidence interval: -19.3 - -0.5; p=0.04).

**Synthesis of costs and benefits**
A synthesis of the costs and benefits was not relevant since a cost-consequences analysis was carried out.

**Authors’ conclusions**
The use of hospitalist physician (HP) services for the management of patients admitted to a general internal medicine service led to reductions in the costs and length of stay (LOS) without affecting clinical outcomes. However, the mean costs per day were higher, reflecting a more intense use of resources.
CRD COMMENTARY - Selection of comparators
The selection of the comparators was appropriate because HP and NHP care represented typical physicians attending general internal medicine services. You should decide whether they are valid comparators in your own setting.

Validity of estimate of measure of effectiveness
The effectiveness evidence came from a quasi-experimental design. This limits the potential impact of confounding factors and bias, which were further reduced by the use of statistical analyses. The two study groups were comparable at baseline and the clinical outcomes were, in general, unaffected by the baseline characteristics. Power calculations were not performed but fairly large sample was considered. The length of follow-up was short, but it was unclear whether the use of a longer assessment period would have been useful. The study sample was quite unselected and was likely to have been representative of the patient population. These issues tend to enhance the internal validity of the analysis. However, the authors noted that the case-mix was not accurately assessed at baseline, although the quasi-random design should have reduced the possible impact of selection bias.

Validity of estimate of measure of benefit
No summary benefit measure was used in the analysis because a cost-consequences analysis was conducted. Please refer to the comments in the 'Validity of estimate of measure of effectiveness' field (above).

Validity of estimate of costs
The authors did not report explicitly the perspective of the study and only hospital costs were included in the analysis. A detailed breakdown of the cost items was not provided, and the unit costs were not presented separately from the quantities of resources used. Further, the price year was not reported. The costs were presented as macro-categories, which limits the possibility of replicating the study and reﬂating the results of the analysis in other settings. The source of the data was reported. Appropriate statistical analyses, to deal with the skewed distribution of the costs and to examine the impact of baseline factors on the total costs, were performed.

Other issues
The authors compared their findings with those from other published studies, finding similar results for both the costs and clinical outcomes. In terms of the generalisability of the study results, the authors stated that caution is required when extrapolating the conclusions of the analysis to other settings because the analysis was carried out at an academic centre, which might not be representative of other institutions. As other studies have shown the HP services improve over time, the results of the current analysis could be considered conservative. The study results referred to unselected patients admitted to a general internal medicine service and this was reﬂected in the authors' conclusions.

Implications of the study
The study results supported the use of HP care for the management of patients admitted to a general internal medicine service. The authors suggested that further studies should corroborate these ﬁndings, to clarify some of the controversial issues surrounding care delivered by HPs.

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Bibliographic details
Other publications of related interest


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