The impact of hospitalists on length of stay and costs: systematic review and meta-analysis

Rachoin JS, Skaf J, Cerceo E, Fitzpatrick E, Milcarek B, Kupersmith E, Scheurer DB

CRD summary
The authors concluded that hospitalists significantly reduced length of hospital stay when compared to services delivered by non-hospitalists. A limited search strategy, unclear quality of the included studies and unexplained significant statistical variation between the studies suggest that the authors' conclusion may not be reliable.

Authors' objectives
To compare length of hospital stay between hospitalists and traditional non-hospitalists.

Searching
PubMed was searched to February 2011 for studies in English; search terms were reported. Bibliographies of eligible studies were handsearched for further studies.

Study selection
Eligible studies were retrospective and prospective studies carried out in adults and that compared average length of hospital stay between hospitalist (in USA a term for a physician who specialises in care of in-patients) and non-hospitalist groups. Review articles, case reports and letters to the editor were excluded.

The included studies used different definitions of the term hospitalist that ranged from membership in the Society of Hospital Medicine to physicians who spend a specific percentage of time (range 25% to 100%, where reported) caring for in-patients. Comparator groups included primary care physicians, family medicine teaching, non-hospitalists and private physicians. Most participants were general hospitalised in-patients; some studies focused on patients with specific diagnoses of pneumonia, hip fracture, congestive heart failure, chronic tension headaches or gastrointestinal bleeding. Studies were categorised as being resident or non-resident services; resident services (hospitalist or non-hospitalist) were defined as patient care services where the attending physician also supervised residents.

Two reviewers independently selected studies for inclusion. A third reviewer checked the included studies for eligibility.

Assessment of study quality
The authors did not state that they assessed study quality.

Data extraction
Means and standard deviations for length of hospital stay were extracted to calculate mean difference (MDs), estimated with 95% confidence intervals (CIs). Study authors were contacted for any missing data.

Two reviewers independently extracted data.

Methods of synthesis
Mean differences and 95% CIs for average length of hospital stay were pooled in meta-analyses using the inverse variance tau method with random-effects modelling. Statistical heterogeneity between all included studies was assessed using a funnel plot and the I² statistical test (25% or less indicated low heterogeneity). Publication bias was assessed using the trim and fill method and weighted least squares Egger's test.

Subgroup analyses compared average length of hospital stay between hospitalists and non-hospitalists in resident and non-resident services. Studies with incomplete data (means and standard deviations not reported for the outcomes in both groups) were not included in the meta-analysis. Instead, average weighting by sample size was used to compare differences in length of hospital stay between hospitalist and non-hospitalist groups.

Results of the review
Seventeen studies were included in the review (137,561 patients were reported to be included). Study duration ranged
from six months to five years.

Average length of hospital stay was significantly shorter with hospitalist groups than with non-hospitalist groups (MD -0.44 days, 95% CI -0.68 to -0.20; 17 studies). For non-resident services, a similar result was shown in favour of hospitalist services (MD -0.69 days, 95% CI -0.93 to -0.46; eight studies) compared with non-resident non-hospitalist services. No further statistically significant differences were found for analyses that compared average length of hospital stay among hospitalist and non-hospitalist resident and non-resident services.

Statistically significant differences were found between all included studies ($I^2=97.9\%$); the funnel plot suggested that this heterogeneity was linked to three outlier studies. Statistical heterogeneity remained high ($I^2=85\%$) after removal of the three outlier studies. No evidence of publication bias was found.

Fifteen further studies not included in the meta-analysis (75,493 patients) had incomplete data; following average weighting by sample size, average length of hospital stay for hospitalist groups was -0.35 days shorter compared with non-hospitalist groups (62,122 patients).

**Cost information**

Compared with non-hospitalists with residents, statistically significantly higher average costs (US$) were observed for hospitalists with residents (MD $890, 95% CI 53 to 1,729; 7,333 patients). In studies with incomplete data, average cost was $51 less with hospitalist groups than with non-hospitalist groups (55,220 patients).

**Authors' conclusions**

Hospitalists significantly reduced length of hospital stay.

**CRD commentary**

The review question was clear. Inclusion criteria seemed sufficiently replicable. The search strategy was limited to one electronic database so it was possible that relevant studies were missed. Efforts were made to reduce risk of error and bias during the review process. The authors did not report any quality assessment, so the methodological quality of the studies was unclear. Study details were presented and methods of synthesis seemed appropriate. Significant statistical heterogeneity was not explained by removal of outlying studies.

A limited search strategy, unclear quality of the included studies and unexplained significant statistical variation between the studies suggest that the authors' conclusion may not be reliable.

**Implications of the review for practice and research**

**Practice:** The authors stated that the review findings could be used as a benchmark for expectations for medical centres that employed hospitalists. Any reduction in length of hospital stay could translate into overall cost savings within diagnosis-related group-based reimbursement systems.

**Research:** The authors did not state any implications for further research.

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