

Evidence-Based Evaluation of the Hospitalist Model of Care

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Most health care professionals now recognize a hospitalist as a physician who dedicates 25% or more of his or her time to the practice of inpatient medicine and who manages the care of hospitalized patients for primary care physicians [1,2]. The National Association of Inpatient Physicians (NAIP) estimates there are currently 3000 to 4000 practicing hospitalists in the United States; this number is expected to increase, as 1999 hospital census data support as many as 30,000 hospitalist positions [3].

As the U.S. medical system continues to embrace the use of hospitalists, there are still many questions regarding the efficacy and benefit of this model of care. To facilitate discussion and comparison of the different care models, including hospitalist versus nonhospitalist models, it is useful to refer to Wachter's 4-stage model of hospital care (Table 1) [2,4]. Wachter classifies hospital care into the primary care stage (I), hospital rotation stage (II), voluntary hospitalist stage (III), and mandatory hospitalist stage (IV). This article will endeavor to answer some key questions regarding outcomes associated with hospitalist care (stages III and IV) through a review of the literature.

Does the Hospitalist Model Decrease Use of Resources?

One of the goals of the hospitalist model is to improve clinical outcomes while minimizing the use of resources. Traditionally, inpatient use of resources has been measured using length of hospital stay (LOS) and overall costs of care. Other resource use indicators include use of consultants and specific testing charges.

Data

There have been several cohort studies published to date (Table 2). Park Nicollet Clinic [5] converted a stage I care model to a mixed stage II rotation and stage IV hospitalist care model in 1994 and reported decreases in LOS, use of consultants, and hospital charges for the 12 most expensive diagnosis-related groups (DRGs). There were no differences in the ordering of laboratory and radiology tests or in pharmacy charges. Overall, the results are limited by the use of historical controls and administrative data not adjusted for case-mix or secular trends. Diamond and colleagues [6] also

used historical controls to perform a retrospective cohort study at a large community hospital in 1995. They reported a statistically significant decrease in mean LOS and a 16% decrease in mean costs under a stage IV model. To assess for secular trends, nonhospitalist comparison cohorts were studied. These cohorts showed decreases in LOS and cost but not to the extent seen in the study group. Unfortunately, the significance of these differences was not analyzed nor were consultation rates evaluated.

Harvard Vanguard Medical Associates (HVMA) [7] at Brigham and Women's Hospital converted a stage I model to a mixed stage II and stage IV hospital care model in 1996 and using historical controls reported a 12% decline in LOS (3.56 to 3.14 days) at 1 year. After adjusting for case-mix and secular trends, LOS still decreased 0.3 days ($P = 0.008$) and total hospital charges were reduced an average of \$426 per admission ($P = 0.001$) [8]. Other researchers conducted a direct retrospective comparison between hospitalist and community pediatricians in the inpatient treatment of asthma from 1995 to 1996 at Children's Hospital in San Diego [9]. Cases were controlled for severity of illness. No significant differences were found between groups in average LOS, intensive care unit (ICU) admissions, or direct costs. The study was weakened by inadequate descriptions of the study groups and unreported raw data.

Kaiser Permanente of Northern California compared resource use at facilities using hospitalists (stages III, IV) versus nonhospitalist facilities in 1996 and 1997 using an administrative database [10]. In aggregate, there were no statistically significant differences between hospitalist and nonhospitalist facilities in LOS, hospital costs, or consultation rates. In another study, Wachter and colleagues [11] at the University of California at San Francisco (UCSF) performed a prospective analysis comparing a stage IV hospital care model and a stage II traditional academic service model. Adjustments were made for case-mix and patient characteristics. The stage IV

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Table 1. The 4 Stages of Hospital Care

Stage I: the PCP stage PCPs care for their own patients in the hospital
Stage II: the hospital rotation stage PCPs in the group rotate so that group members take turns covering the hospitalized patients of other members. No physician spends more than 25% of his or her time on inpatient care.
Stage III: the voluntary hospitalist stage Dedicated hospitalists are hired; PCPs may choose to use them or not
Stage IV: the mandatory hospitalist stage PCPs must hand off all patients to hospitalists on admission

PCP = primary care physician. (Adapted with permission from Wachter RM. An introduction to the hospitalist model. *Ann Intern Med* 1999; 130(4 Pt 2):338–42.)

model was associated with a statistically significant decrease in adjusted LOS (4.3 versus 4.9 days, $P = 0.01$) and reduced adjusted mean hospital costs (\$7007 versus \$7777, $P = 0.05$). There were no differences in consultation rates between groups.

Stein and colleagues [12] performed a retrospective study comparing a stage IV hospital care model with 2 stage I models (1 model included residents, the other did not). The study isolated comparisons to 1 diagnosis and adjusted for patient characteristics and severity of illness. The hospitalist group had the shortest LOS in the setting of significantly higher severity-of-illness scores ($P < 0.05$). There was meaningful difference in total costs between the hospitalist model and the stage I model without residents, as the hospitalist group had higher laboratory and radiology charges. When the participation of residents remained constant, the hospitalist group had lower costs than the stage I model, although significance was not reported.

A randomized trial by Meltzer and colleagues [13] from the University of Chicago was recently reported. Patients were randomized to either a general medicine hospitalist service or a traditional stage II care model between 1996 and 1997. After controlling for diagnosis, the hospitalists had a 0.8-day lower LOS ($P < 0.01$) and 11% lower costs ($P < 0.01$) in the second 6 months of the trial. Patients in the lower half of the cost range accounted for the cost savings attributed to the hospitalists ($P < 0.08$).

Discussion

Studies comparing hospitalists and nonhospitalists are technically difficult [14]. Before-and-after analyses within the same institution are confounded by secular trends. Comparisons among different facilities lead to bias in case-mix and variance in patient population characteristics. Despite

these challenges, the weight of the evidence from Stein et al and the prospective studies of Wachter and Meltzer confirms that the hospitalist model can decrease the use of resources. The true mechanism for this benefit is still unknown. Data from Wachter and Stein support the assertion that the hospitalist model decreases the use of resources when residents are involved in patient care. Meltzer's results suggest that the "practice makes perfect" phenomenon may be the key to decreasing costs. Until this type of success is replicated in other practice sites, speculation will remain as to whether the hospitalist model itself is as decisive as the individual practitioners within the model and which hospitalist model affords the greatest benefit. Furthermore, resource reductions and cost savings must be balanced by spending increases required to support any given hospitalist model. Depending on how value is translated into dollars, the hospitalist model may not add up to overall cost gains. More data will be needed to better define the full financial impact of the hospitalist model on hospitals and physician organizations.

Does the Hospitalist Model Improve Health Outcomes?

General indicators of health outcomes include mortality, readmission rates, adverse events and complications, and functional status.

Data

Most of the studies that investigated resource utilization under the hospitalist model also examined some measure of clinical outcome. Diamond and colleagues [6] found no differences in mortality between the hospitalists and nonhospitalists, yet the hospitalists had decreases in both 14-day and 30-day readmission rates of over 50% ($P < 0.001$). Wachter and his colleagues at UCSF [11] evaluated mortality, readmission rates, and functional status postdischarge. There were no differences between the stage IV and stage II models with respect to these outcomes. Stein and colleagues [12] also looked at mortality, 30-day readmission rates, and in-hospital ICU transfers. No differences between the hospitalist and nonhospitalist groups were appreciated. Meltzer et al [13] also reported no differences in mortality or readmission rates.

Discussion

Although Diamond saw a decrease in readmission rates, the results are limited in that patient admissions were not tracked at outside institutions. Overall, the sum of the data available provides no evidence that the hospitalist model actually improves clinical outcomes. In the setting of lower costs, the lack of a negative impact is also important. Much work remains to be done in assessing the effect of the hospitalist model in this area.

Table 2. Impact of Hospitalist Model on Resource Utilization

Study	Year	Type of Study	Groups Compared	Single Diagnosis?	Case-mix Adjustment?	Results	P Value
Park Nicollet [5]	1994	Retrospective cohort with historical controls	Stage I vs. a mixed stage II and IV model	No	No	Decrease in LOS of 0.64 days; 17% decrease in use of consultants; 25% decrease in hospital charges for 12 most expensive DRGs; no difference	*
Diamond et al [6]	1995	Retrospective cohort with historical controls	Stage I vs. stage IV	No	Yes	27% decrease in LOS; 16% decrease in mean costs	*
Harvard Vanguard Medical Associates [7,8]	1996	Retrospective cohort with historical controls	Stage I vs. a mixed stage II & IV model	No	Yes	Decrease in LOS of 0.3 days; decrease in charges of \$426 per admission	P = 0.008 P = 0.001
Children's Hospital San Diego [9]	1995-96	Retrospective cohort	Stage I vs. stage IV	Yes	Yes	No significant differences seen in LOS, cost per case, readmissions, PICU days, sentinel events	*
Kaiser Northern California [10]	1996-97	Retrospective cohort with historical controls	Stage I, II vs. stage III, IV	No	No	No significant differences in LOS, cost per case, consultation rates	*
Wachter et al [11]	1995-96	Prospective cohort	Stage II vs. stage IV	No	Yes	0.6-day decrease in LOS; adjusted mean cost reduced \$770; no differences in use of consultants	P = 0.01 P = 0.05
Stein et al [12]	1995	Retrospective cohort	Stage I ± residents vs. stage IV	Yes	Yes	Hospitalist group had sickest patients but shortest LOS; hospitalist costs and costs of stage I without residents were the same; hospitalist group had lower costs than stage I when participation of residents remained constant	P < 0.05
Meltzer et al [13]	1997	Randomized trial	Stage II vs. stage IV	No	Yes	Hospitalists had 0.8-day shorter LOS and 11% lower costs at 6 to 12 months	P < 0.01 P < 0.01

LOS = length of stay; PICU = pediatric intensive care unit.

*Statistical analysis was not performed or not reported.

Does the Hospitalist Model Improve Patient Satisfaction?

Despite an increased national focus on patient satisfaction, health care continues to lag far behind other industries in measures of service quality [15]. Patients express difficulties in many important dimensions of health care service, including physician communication, coordination of care, involvement of family and friends, emotional support, physical comfort, and control of pain. Many have argued that the hospitalist model will lead to further dissatisfaction of inpatients [16-19]. Critics hold that the busy hospitalist will be unable to treat the human being as well as the disease [16], a disconnect that will make it impossible to individualize patient care, give emotional support, and provide patients with choices that will maximize their satisfaction. Yet 2 goals of the hospitalist model are to improve physician communication and coordination of care and to make PCPs more avail-

able to outpatients with the hope that outpatient satisfaction will increase [2].

Data

At Park Nicollet Clinic [5], surveys were used to measure patient satisfaction before and after implementation of the hospitalist model. Inpatients reported no significant change in attitudes toward quality of care or willingness to recommend the facility to family and friends. Outpatients under the new system noted improvements in the ease of making appointments, reductions in waiting time for examination rooms, and improvements in the overall quality of care. Park Nicollet used these results to gain support for the hospitalist model from their physicians. However, no raw patient satisfaction data were reported by the researcher and the extent of improvement seen in outpatient satisfaction remains unclear.

Kaiser Northern California [10] saw no differences in patient satisfaction between hospitalist and nonhospitalist sites. Similarly, Wachter et al [11] also found no significant changes in patient satisfaction between the stage IV and stage II models at UCSF: 98% of stage IV patients would “definitely or probably recommend” UCSF for hospitalization compared with 93% of stage II patients. In another study, Simon and colleagues [20] looked at physician-patient communication within a hospitalist model for patients admitted with chest pain. Patient surveys asked about potential communication problems and assessed whether the primary care physician (PCP) was involved in the hospital care. Simon found a statistically significant decrease in patient understanding of the purpose of diagnostic tests ($P < 0.003$) and their results ($P < 0.001$) when PCPs were not involved in hospital care. Although more communication problems occurred, there were no formal questions evaluating whether this was a source of patient dissatisfaction with hospital care.

Discussion

The issue of patient satisfaction is complex. The data available regarding the effect of the hospitalist model are too scant for any formal conclusion. There is some evidence that the hospitalist model may improve outpatient satisfaction, with no evidence that inpatients are more satisfied. It is important to note that the data do not show greater patient dissatisfaction with hospitalists. Simon’s results do suggest that the hospitalist model can lead to problems in communication, and this has been an important dimension in patient satisfaction in the past. In addition, communication problems may be associated with poorer clinical outcomes [21,22]. All aspects of patient satisfaction and the hospitalist model deserve closer study.

Does the Hospitalist Model Improve Physician Satisfaction?

Since the initial description of the U.S. hospital model in 1996 [1], there has been opposition from a variety of internists, family practitioners, and subspecialists to its application [16–19]. However, true evaluation requires experience within the model firsthand. Many objections have been raised regarding use of the stage IV (mandatory hospitalist) model. The NAIP position statement denounces mandatory hospitalist programs as inappropriate and insupportable unless the endorsement of the PCPs has been obtained [23].

Data

Park Nicollet Clinic [5] surveyed their physicians 2 years after implementation of the hospitalist model. Eighty-nine percent felt the hospitalist model was “better or much better” than the old system. Diamond and colleagues [6] at

Western Pennsylvania Hospital did not report on physician satisfaction; however, the model of care applied in the study was disbanded and reorganized shortly after publication [24]. Anecdotally, this was felt to be due to conflicting priorities among the hospitalist group. Wachter at UCSF [11] found no differences in faculty satisfaction among hospitalist and nonhospitalist attendings; PCPs were not interviewed. Of note, the UCSF residents appeared more satisfied with the hospitalist model ($P = 0.06$). At HVMA [7], the inpatient physician program was felt to have improved job satisfaction by 70% for the PCPs, regardless of whether they were solely office-based or not. In fact, 83% of the office-based physicians answered in the affirmative to the question, “Would you recommend adoption of a similar program for other primary care medical groups?” Residents working with the HVMA inpatient rounder model were also more satisfied with their educational experience ($P = 0.04$).

In an NAIP survey, 79% of hospitalists indicated they were satisfied with their current position and expected to be hospitalists in 3 years [25]. Most hospitalists characterized the response of PCPs, subspecialists, and nurses to their roles as enthusiastic or very enthusiastic (91%, 86%, and 98%, respectively).

Discussion

For many primary care physicians, the hospitalist can provide significant lifestyle benefits. The PCP workday is usually predictable and without unwanted interruptions in a busy outpatient schedule. Night call is often reduced as is the pressure of being responsible for hospitalized patients. However, satisfaction is achieved only if the benefits outweigh the potential disadvantages. Most PCPs fear the decline of inpatient skills, loss of hospital privileges and prestige, and perhaps even control over what happens to their patients when they are most ill. It is important that all physicians within a group agree to implementation of a hospitalist model without having the model imposed on them. The Western Pennsylvania Hospital experience underscores the fact that hospitalist programs vary and the best fit for 1 practice group may be different for another. Nevertheless, when physician expectations are known and matched to the appropriate stage of hospital care, it appears that the hospitalist model can improve physician satisfaction. It also appears that the hospitalist model may be preferred among residents.

Conclusion

Although physician lifestyle was the original impetus for hospitalists, its growth has been accelerated by health care economics [26]. The data support the assertion that the hospitalist model can decrease the use of resources without reducing quality. Inpatient satisfaction seems generally unaffected, and

outpatient satisfaction may actually improve. It is important to recognize that hospitalist models are not uniform and therefore the advantages may not be applicable to all practice situations. More work needs to be done to better understand the benefits and limitations of the hospitalist model of care. Future work should evaluate the mechanisms for resource reduction and better define the effect that hospitalists can have on clinical outcomes.

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