

Implications of the Hospitalist Model for Medical Students' Education

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ABSTRACT

At many academic health centers, medical students in internal medicine, family medicine, and pediatrics are working with a new form of attending physician, the hospitalist. Although a growing literature demonstrates the benefits of hospitalists for patients and housestaff, the influence of hospitalists on students has been underemphasized. Advantages of the hospitalist model for students can include hospitalists' expertise in general inpatient medicine, their availability to teach throughout the day, and their role-modeling of the provision of high-quality and efficient care. However, the change in the ward attending workforce from non-hospitalist generalists, sub-

specialists, and biomedical researchers to generalist-hospitalists potentially limits students' exposure to the broad range of career opportunities the former group represents. The authors propose a research agenda to investigate the educational impact of the hospitalist model, suggest strategies to mitigate the limitations in students' exposures to subspecialty faculty, and recommend professional development in teaching for hospitalists to ensure that student education thrives in this new environment of inpatient medicine.

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The hospitalist movement in the United States has significantly transformed inpatient care, and hospitalists (defined below) are members of the health care team at an increasing number of academic health centers. Because 89% of currently practicing hospitalists are internists,¹ the movement has vast implications for internal medicine trainees. Moreover, both internal-medicine-trained and family-medicine-trained hospitalists now supervise family medicine residents in inpatient rotations, and pediatrics hospitalists do the same for pediatrics trainees.^{2,3}

Despite significant analysis of housestaff experiences in hospitalist systems,^{4,5} little has been written or reported re-

garding the impact of hospitalists on medical students' education. In this article, we analyze the implications of using hospitalists with respect to students' training in internal medicine, family medicine, and pediatrics services and offer recommendations designed to maximize the benefits of and minimize any potential harm from this practice.

THE HOSPITALIST MOVEMENT

Hospitalists are inpatient-based physicians, usually generalists, who manage the care of hospitalized patients and facilitate the transfer of their care back to primary care physicians.⁶ The hospitalist model has emerged in the setting of recent economic pressures compelling ambulatory care physicians to see larger numbers of office patients and spend less time rounding in the hospital. Concurrently, acuity of illness has increased among hospitalized patients as length of stay has declined. In this environment, the hospitalist model offers several potential advantages.⁶ Hospitalists develop expertise in inpatient medicine and can be available throughout the hospital day to expedite diagnosis and treatment. They can focus on communicating efficiently with consultants and primary providers, thereby coordinating patients' care through the health care system. Finally, they can be-

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come leaders in hospital-based quality improvement activities.

Data now support the strengths of this new model of inpatient care, with studies suggesting improved efficiency of care^{5,7-9} without a change in patients' satisfaction.^{5,8} In part fueled by these data, the use of hospitalists has grown rapidly in the United States. A recent analysis projected an ultimate U.S. hospitalist workforce of nearly 20,000,¹⁰ approximating the number of board-certified cardiologists.

HOSPITALISTS IN ACADEMIC CENTERS

Increasingly, teaching hospitals are moving to a hospitalist model, motivated primarily by cost constraints but also by a desire to improve patient care and teaching. The reorganization of the inpatient medical service at the University of California, San Francisco, School of Medicine (UCSF) to one primarily employing hospitalists was designed to improve quality and decrease costs but also succeeded in bettering housestaff satisfaction.⁵ Despite early concerns that hospitalists would threaten housestaff autonomy, the teaching skills of the faculty members selected as hospitalists rapidly dispelled these concerns. Similarly, a hospitalist program employing dedicated inpatient internists rotating for two-week periods increased residents' satisfaction at Harvard's Brigham and Women's Hospital.¹¹ More than two dozen other academic medical institutions have also developed hospitalist services. Among these are Case Western Reserve University School of Medicine, Emory University School of Medicine, the University of Chicago Division of the Biological Sciences Pritzker School of Medicine, the University of Pennsylvania School of Medicine, the University of Utah School of Medicine, the University of Michigan Medical School, the Mayo Medical School, and the Cleveland Clinic.

STUDENTS' EDUCATION ON TRADITIONAL INPATIENT MEDICAL SERVICES

At teaching hospitals, ward attending duties have traditionally been divided among a cadre of biomedical researchers and clinicians, both subspecialists and generalists. Under this model, each attending physician serves one or perhaps two months per year, emerging from a laboratory or outpatient practice to become the attending physician of record for inpatients and the instructor for a team of trainees. Strengths of this model include the diversity of knowledge and experience these academicians bring to trainees and the opportunity afforded these trainees to interact with physician-scientists and subspecialists. However, such attendings may be handicapped by outdated or fragmented knowledge of acute general medicine and a variable interest in clinical

education. The teaching content of rounds led by attending physicians may include specialized topics that are familiar to the attending physicians but only marginally relevant to the trainees. Under the traditional model, attending physicians rarely see patients on the day of admission,⁵ which often makes it necessary for trainees to present a patient's detailed history, examination, and laboratory data to update the attending physician. Because these ward attending physicians spend the majority of their year involved in their research and their primary care or subspecialty careers, few can be expected to participate in quality improvement, practice guideline development, or other leadership activities related to the inpatient service.

At community teaching hospitals and some academic health centers, the attending physician of record is not the one responsible for teaching, an arrangement that has both advantages and drawbacks (see below). Private attending physicians—who admit their own patients to teaching hospitals and care for them with housestaff in place of the team's attending physician—expose trainees to multiple management styles and a breadth of patients. However, that system requires that trainees make numerous telephone calls each day to busy primary care physicians, and raises educational tension when management styles conflict. Moreover, the inpatient knowledge bases of many primary care physicians may be limited. A separate teaching attending physician may be assigned to run attending rounds, offsetting some of these problems by providing a consistent educational session with a single teacher. The teaching attending physician is charged with involving learners in stimulating discussions of cases and providing expertise at the bedside and in the classroom.¹² Unfortunately, this model can be limited by the teaching attending physician's lack of familiarity with the team's patients. It may also foster a false dichotomy between teaching and patient care in the eyes of the students.

The academic hospitalist not only merges the roles of physician of record and teaching attending physician, but also adds value at the hospital level. Intimately involved with the daily activities on the inpatient ward, hospitalists have front-line, ongoing exposure to ancillary providers and unique insight into factors influencing quality of care. Hospital-specific topics such as quality improvement, guideline development, health economics, and end-of-life care can become areas of expertise for academic hospitalists via research and committee work.⁴

ASSESSING THE IMPACT OF THE HOSPITALIST MODEL ON STUDENTS' EDUCATION

The inpatient ward is a key site of education for medical students. Despite increasing emphasis on ambulatory education in internal medicine clerkships and medical school

Table 1

Impact of a Hospitalist System on Medical Students' Education: Potential Advantages and Disadvantages	
Advantages	Disadvantages
Hospitalists develop their own expertise in inpatient medicine and impart their knowledge to students	Reduced length of stay, with less time for students to follow patients' natural histories of illness
Accessibility of hospitalists to students	Conflict between education and efficiency
Emphasis on continuum of care	May marginalize the primary care physician
Develop students' expertise in communication skills	Fragments inpatient versus outpatient medicine
Systems improvements in areas such as Follow-up service Communication with primary care physicians Post-acute care Palliative care	Decreased exposure of students to subspecialists
Models realistic practice style in managed care setting and fosters appreciation of importance of cost effectiveness	Decreased exposure of students to primary care physicians
Models viability of career in inpatient generalism	Decreased exposure of students to physician-scientists
More frequent contact of students with single hospitalist versus with many primary care physicians or specialists	

curricula overall, students will spend most of their core internal medicine rotations on the inpatient ward.¹³ In pediatrics also, a major portion of the core clerkship is often in the inpatient setting. Thus the major structural change on inpatient wards to a hospitalist model has major implications for students that are potentially both advantageous and deleterious. These are discussed below and are summarized in Table 1. However, we feel it is important to realize that for any individual student, the quality of the inpatient experience might depend more on the quality of the individual attending physician than on the organizational model of care and teaching.

Advantages for Students' Education

A primary charge for hospitalists is to develop their own expertise in inpatient medicine and impart this knowledge to their trainees. Today's medical literature is more likely to be mastered by a physician's breaking it into manageable amounts, as indicated by a recent study demonstrating that fully one third of the general medical literature could be classified as primarily inpatient-oriented.¹⁴ Academic hospitalists selected for their clinical and teaching excellence may introduce key concepts in hospital medicine more skillfully

than do laboratory or subspecialty-based attending physicians, who have infrequent contact with beginning students or inpatient general medical patients.

A tenet of the hospitalist model is that dedicated inpatient providers will be more available on the wards, facilitating patient care. This availability may translate into accessibility to housestaff and students, an attribute of attending physicians that housestaff value as highly as clinical knowledge and interpersonal skill.¹⁵ Educationally, hospitalists' involvement in service-oriented rotations that have histories of minimal attending physician involvement (e.g., medical consultation) can improve education and patient care simultaneously.

The emphasis that high-quality hospitalists place on maintaining continuity of care can provide an important educational opportunity and essential role modeling. Hospitalists must effectively communicate with post-acute-care providers and primary physicians to bridge the gap between the inpatient ward and the patient's usual environment.¹⁶ In a survey of 738 practicing hospitalists regarding the importance of a variety of clinical, organizational, and continuity issues to their practice, the hospitalists rated communication with referring physicians as highly important (4.9 on a five-point scale).¹⁷ Hospitalists trained in communication skills

and medical education can impart to students their techniques for sharing information with primary care providers.

The growing presence of hospitalists on academic medical services may affect students' perceptions of internal medicine and pediatrics as career choices. Students drawn to the excitement of their inpatient core rotations may be inspired to realize that this path now represents a viable career option.⁴ Hospitalists spend much concentrated time teaching and rounding with trainees, two qualities associated with being identified as an excellent role model.¹⁸ Exposure to primary care internists in clinics or on wards has been associated with career choices in primary care,¹⁹ and exposure to poor internal medicine attending physicians has been linked with a lower likelihood of choosing internal medicine.²⁰ Exposure to effective hospitalists may lead students to pursue this new path or enhance the attractiveness of internal medicine in general. At the residency level, as our hospitalist program has expanded at UCSF, we have seen increasing numbers of our internal medicine residents and, to a lesser extent, pediatrics residents choosing careers as hospitalists.

The hospitalist model can serve as a forum for enhancing medical education in the current health care environment. Traditional curricula have often promoted a time-consuming, resource-intensive style of care that inadequately prepares trainees for practice in managed care settings.²¹ Moreover, in a recent survey of students, residents, and faculty at academic medical centers regarding managed care, responses were overwhelmingly negative, with 56% of students and housestaff unable to identify any positive influence on their attitudes toward managed care.²² Despite limited exposure to managed care, trainees responded as negatively as faculty, the latter presumably role modeling for the former. The hospitalist model came about in large part due to market pressures to provide better, more efficient inpatient care in increasingly managed care markets.^{5,7,23} Hospitalists who emphasize such high-value care may counter negative perceptions of managed care by imparting an understanding of managed care principles and an appreciation of the inevitable importance of cost effectiveness in the current health care environment.

Disadvantages for Students' Education

The hospitalist model may have a negative effect on students if it is not adapted to the needs of beginning clerks, who differ from housestaff in terms of their clinical skills and learning goals. For instance, the traditional format of attending rounds, in which students and housestaff present detailed histories and physical examination to attending physicians, creates redundancy for many hospitalists, who will have seen most patients prior to the attending rounds and often discussed them with the resident. The student may feel

particularly superfluous if the hospitalist remains in the hospital for part or all of the night on call but the student does not. The student's presentation may seem to the team a waste of valuable time and to the student an unnecessary yet anxiety-provoking exercise.

Prior to the hospitalist movement, the increasing acuity and declining lengths of stay among medical inpatients already limited the amount and quality of interaction between student and patient.²⁴ A hospitalist who further reduces the length of stay^{5,7-9} may compound this problem. In addition, inadequate communication between hospitalist and primary care provider, or inadequate exposure of the student to this link, may increase the students' perception that the hospitalization is an isolated event not related to the patient's chronic medical problems or social situation.

Students considering internal medicine, family medicine, or pediatrics as career choices may be confused or dissuaded by the apparent dissociation between clinic and hospital, and by the paucity of role models who span these sites of care. The common organization of core clerkships into discrete inpatient and outpatient components may do little to unify for students the variety of generalists' potential activities. Students may perceive primary care physicians as more peripheral to or less involved in the critical aspects of their patients' care, particularly if hospitalists carelessly promote this perception.

In internal medicine and pediatrics, the employment of primarily clinical hospitalist faculty on the wards displaces traditional attending physicians, who are often laboratory-based and subspecialty faculty. Consequently, students considering careers as biomedical researchers, particularly in internal medicine, may suffer from limited exposure to clinician-scientist role models under a hospitalist system. During the crucial specialty decision-making time during the third and fourth years of medical school, students may not elect rotations that allow them to work closely with research-based academic leaders. This curtailment of students' exposures to a diverse group of academicians may compound the decline in the number and quality of young clinician-scientists.²⁵

RECOMMENDATIONS

Amidst the climate of change for academic medical services described above, strategic planning must include analyses of the educational consequences of using hospitalists for students and novel solutions for potential educational deficiencies. We propose the following recommendations to address these concerns. (These recommendations are summarized in List 1.)

- *Research the impact of hospitalists on medical students*

The current fiscal crisis at many major academic centers magnifies inherent conflicts among clinical, educational, and

List 1

Summary of Recommendations for Students' Education in Hospitalist Systems
<i>Research the impact of hospitalists on medical students</i>
Build assessment of students' satisfaction into studies of hospitalist systems at teaching hospitals
Track the career paths of students and the impact of hospitalists on students' perceptions of primary care, hospital medicine, subspecialties, and medical science
<i>Develop and reward innovative teaching strategies in hospitalist systems</i>
Charge academic hospitalists to be both excellent teachers and curricular innovators
Identify resources to support teaching and curricular development in hospital medicine
Develop curricula that include non-clinical topics such as ethics, quality improvement, and end-of-life care
Consider alternate venues to focus on students' presentation skills, supplementing the teaching during attending rounds
<i>Ensure students' exposure to the breadth of internal medicine, pediatrics, and family medicine</i>
Educate hospitalists to model effective communication with primary care providers, specialists, and families
Integrate subspecialists and biomedical scientists into clinical education, through participation at conferences, residents' report, and attending rounds
Allow students to participate in the continuum of care, visiting skilled nursing facilities, hospices, and post-discharge clinics

financial goals. The excess costs at teaching hospitals compared with those at non-teaching hospitals must be justified in the context of a broader mission that includes training future practitioners and advancing medical science. The role of hospitalists in furthering this mission can best be understood with research specifically addressing the impact of this new model on trainees. Careful assessment of students' learning of core knowledge and skills as well as evaluation of their satisfaction should be routinely integrated into evaluations and publications describing academic hospitalist programs. Particular emphasis on the fundamental skills of case presentation and differential diagnosis must be explicit to minimize the inherent conflict between teaching and efficiency

on the busy post-call day. Because the development of oral presentation skills will remain an essential goal of the core clerkships,²⁶ studies that assess the clinical skills of students trained in different models of care may elucidate features of the optimal learning environment.

The impact of hospitalists on students' ultimate choices of career paths will not be fully realized for at least five years, at the time that the current cohort of beginning clerks finishes residency. Trends in applications to internal medicine training programs and other primary care and specialty disciplines and the motivations behind students' decisions should be scrutinized to determine what factors about the core clerkships are perceived as appealing or dissuading. Similarly, trends in students' interest in physician-scientist careers should be monitored.

▪ *Develop and reward innovative teaching strategies in hospitalist systems*

In addition to their clinical and research missions, academic hospitalists must be charged with enhancing the education of students and housestaff. However, clinician-educators generally require institutional support of create sustainable job descriptions that allow them to balance clinical, educational, and creative objectives, either in the inpatient or in the outpatient setting.²⁷ Because teaching may jeopardize clinical efficiency, innovative educational forums and faculty development strategies are needed. For instance, Irby showed that effective clinical attending physicians demonstrate planning and interactive skills that could be taught in faculty mentoring or development programs.²⁸ In addition to enhancing students' satisfaction, improved clinical teaching has been shown to develop better trainees, at least by the measure of standardized examination scores.²⁰

Academic hospitalists serve as inpatient clinician-educators, and should be accountable for the quality of education just as they are accountable for the quality of patient care. Their responsibility for an inpatient curriculum means that the implementation of effective and efficient attending rounds is their first obligation. Logistic changes, such as the reorganization of traditional attending rounds to minimize time away from patients, may streamline clinical care in the morning and free afternoon time for individualized instruction and bedside teaching. Redundant, protracted student presentations at attending rounds can be varied so that students can practice presenting both full histories and physicals and also "bullets" (i.e., shorter summaries of their patients' status). Some student time on rounds can profitably be transformed from presentations into a clinical problem-solving format. If necessary, fundamentals of case presentations can be reviewed outside formal attending rounds. A core curriculum covering topics relevant to hospital medi-

cine, such as health economics, quality improvement, and inpatient ethics and palliative care, may complement traditional pathophysiology and disease-based instruction throughout a ward month.

- *Ensure students' exposure to the breadth of internal medicine, family medicine, and pediatrics*

Broad exposure to the ambulatory, inpatient, and research aspects of generalist fields is crucial for students to appreciate the scientific mechanisms and social context of disease.²⁹ Integrated teaching models, such as longitudinal clinics that span throughout inpatient clerkships, may counteract some of the perceived fragmentation in care. Hospitalists who communicate well with other clinical and research faculty model effective practice and respect for their colleagues.

We perceive an ongoing need for creative mechanisms to expose trainees to subspecialist and research faculty, including maintaining a limited cadre of highly regarded non-hospitalist teachers from research and subspecialty disciplines as ward attending physicians. Interactive conferences featuring specialized attending physicians, linking their work with that of the generalist-hospitalists, highlight for trainees the strengths of these faculty and the relevance of their work. Examples include bench-to-bedside conferences and regular participation by subspecialists at residents' report, or as guest participants in attending rounds. During subspecialty elective months, trainees can perform consultations guided by an expert and explore the range of the specialist's academic responsibilities.

The educational deficiencies inherent in a managed care climate and exacerbated by hospitalists' efficiency, including decreased lengths of stay for acute care, can be remedied in conjunction with efforts to improve continuity of care across care sites. For instance, a follow-up service that allows hospitalists and their trainees to have limited numbers of visits with patients after discharge facilitates a safe transition of care back to the primary care physician and demonstrates to trainees the issues in post-acute care. Just as hospitalists are increasingly participating in the provision and organization of subacute care, students should actively rotate to the sites of such care during their medicine rotations or during separate required or elective months.

SUMMARY

With the advent of the hospitalist model of care, students are encountering new role models and evolving career options. Despite increasing pressures to reduce lengths of stay and costs of care, academic hospitalists must prioritize education, using time-efficient, novel teaching methods that streamline teaching and clinical duties. Departments of med-

icine and pediatrics particularly face the challenge of exposing students to their subspecialty and research faculties to ensure a comprehensive clinical curriculum and a diversity of trainee career paths. Trials evaluating the impact of new hospitalist programs must assess students' experiences to ensure that comprehensive core knowledge is mastered in an appropriate learning climate. Attention to students in this time of health care reorganization is crucial to shaping the skills and values of our future physicians.

REFERENCES

1. Lindenauer PK, Pantilat SZ, Katz PP, Wachter RM. Hospitalists and the practice of inpatient medicine: results of a survey of the National Association of Inpatient Physicians. *Ann Intern Med.* 1999;130:343-9.
2. Bellet PS, Wachter RM. The hospitalist movement and its implications for the care of hospitalized children. *Pediatrics.* 1999;103:473-7.
3. McConaghy JR. The emerging role of hospitalists—will family physicians continue to practice hospital medicine? *J Am Board Fam Pract.* 1998;11:324-6.
4. Goldman L. The impact of hospitalists on medical education and the academic health system. *Ann Intern Med.* 1999;130:364-7.
5. Wachter RM, Katz P, Showstack J, Bindman AB, Goldman L. Reorganizing an academic medical service: impact on cost, quality, patient satisfaction, and education. *JAMA.* 1998;279:1560-5.
6. Wachter RM, Goldman L. The emerging role of "hospitalists" in the American health care system. *N Engl J Med.* 1996;335:514-8.
7. Diamond HS, Goldberg E, Janosky JE. The effect of full-time faculty hospitalists on the efficiency of care at a community teaching hospital. *Ann Intern Med.* 1998;129:197-203.
8. Davis KM, Koch KE, Harvey JK, Wilson R, Englert J, Gerard PD. Effects of hospitalists on cost, outcomes, and patient satisfaction in a rural health system. *Am J Med.* 2000;108:621-6.
9. Stein MD, Hanson S, Tamaro D, Hanna L, Most AS. Economic effects of community versus hospital-based faculty pneumonia care. *J Gen Intern Med.* 1998;13:774-7.
10. Lurie JD, Miller DP, Lindenauer PK, Wachter RM, Sox HC. The potential size of the hospitalist workforce. *Am J Med.* 1999;106:441-5.
11. Brown MD, Halpert A, McKean S, Sussman A, Dzau VJ. Assessing the value of hospitalists to academic health centers: Brigham and Women's Hospital and Harvard Medical School. *Am J Med.* 1999;106:134-7.
12. Ende J. What if Osler were one of us? Inpatient teaching today. *J Gen Intern Med.* 1997;12(suppl 2):S41-S48.
13. Levinsky NG. A survey of changes in the proportions of ambulatory training in internal medicine clerkships and residencies from 1986-87 to 1996-97. *Acad Med.* 1998;73:1114-5.
14. Wofford JL, Moran WP, Berard SH, et al. Improving reading efficiency for general internists: dividing medical literature between hospitalist and ambulatory practices. *J Gen Intern Med.* 1998;13(suppl 1):S77.
15. Kroenke K, Simmons JO, Copley JB, Smith C. Attending rounds: a survey of physician attitudes. *J Gen Intern Med.* 1990;5:229-33.
16. Pantilat SZ, Alpers A, Wachter RM. A new doctor in the house. Ethical issues in hospitalist systems. *JAMA.* 1999;282:171-4.
17. Fenton CL, Plauth WH, Pantilat SZ, Wachter RM. Training for hospital based practice: do we need a specialized curriculum? *J Gen Intern Med.* 1999;14(suppl 2):S134.
18. Wright SM, Kern DE, Kolodner K, Howard DM, Brancati FL. Attributes of excellent attending-physician role models. *N Engl J Med.* 1998; 339:1986-93.

19. Henderson MC, Hunt DK, Williams JW. General internists influence students to choose primary care careers: the power of role modeling. *Am J Med.* 1996;101:648–53.
20. Griffith CH, Wilson JF, Haist SA, Ramsbottom-Lucier M. Relationships of how well attending physicians teach to their students' performances and residency choices. *Acad Med.* 1997;72(10 suppl 1):S118–S20.
21. Lurie N. Preparing physicians for practice in managed care environments. *Acad Med.* 1996;71:1044–9.
22. Simon SR, Pan RJD, Sullivan AM, et al. Views of managed care: a survey of students, residents, faculty, and deans at medical schools in the United States. *N Engl J Med.* 1999;340:928–36.
23. Bellet PS, Whitaker RC. Evaluation of a pediatric hospitalist service: impact on length of stay and hospital charges. *Pediatrics.* 2000;105:478–84.
24. Schroeder SA, Schapiro R. The hospitalist: new boon for internal medicine or retreat from primary care? *Ann Intern Med.* 1999;130:382–7.
25. Schrier RW. Ensuring the survival of the clinician–scientist. *Acad Med.* 1997;72:589–94.
26. Caldicott CV. What's wrong with this medical student today? Dysfluency on inpatient rounds. *Ann Intern Med.* 1998;128:607–10.
27. Levinson W, Branch WT, Kroenke K. Clinician–educators in academic medical centers: a two-part challenge. *Ann Intern Med.* 1998;129:59–64.
28. Irby DM. How attending physicians make instructional decisions when conducting teaching rounds. *Acad Med.* 1992;67:630–8.
29. Cassel CK. Bigger is still better for internal medicine: keeping the family under the tent. *Am J Med.* 1998;104:313–4.