ORIGINAL RESEARCH

Characteristics of Pediatric Hospital Medicine Fellowships and Training Programs

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OBJECTIVE: To explore the structure, components, and training goals of pediatric hospitalist fellowship programs in North America.

DESIGN: We constructed a 17-item structured questionnaire to be administered by phone. Questionnaire items focused on documenting goals, training, requirements, and clinical duties of pediatric hospitalist training programs. From February through June 2007, research staff contacted directors of the programs. Responses were analyzed to determine program characteristics, including goals, formal training requirements, clinical rotations, and participation in hospital administrative activities.

RESULTS: All 8 training programs completed the survey. There appear to be 2 distinct tracks for pediatric hospitalist training programs: clinical or academic specialization. Currently there are no standards or requirements for fellowship training from an external accrediting body and the curriculum for these programs is likely driven by service requirements and speculation on the needs of a future generation of pediatric hospitalists. The stated goals of the programs were quite similar. Seven reported that the provision of advanced training in the clinical care of hospitalized patients, quality improvement (QI), and hospital administration are central goals of their training program. Six reported training in the education of medical students and residents to be a primary goal, while 5 indicated training in health services research as a primary goal.

CONCLUSIONS: Pediatric hospitalist fellowships are in the very early stages of their development. In time, greater structure across institutions will need to be put in place if they are to succeed in becoming a necessary prerequisite to the practice of hospital medicine. ***Journal of Hospital Medicine*** **2009;4:157–163.**

KEYWORDS: fellowships, hospitalists, pediatric, teaching, training.

The field of pediatric hospital medicine is undergoing rapid growth. In 2002, there were approximately 600 pediatric hospitalists[1] and in 2006 this number was estimated to be approximately 1000.[2] A recent study found that approximately 25% of pediatric hospitalist practices are less than 2 years old.[3] As such, there are many new physicians entering the field and most do so without specific training in hospital medicine prior to beginning their employment.[4] There is also significant variability in the roles, work patterns, and scope of practice across institutions,[3] and hospitalists are engaged in a wide variety of clinical, educational, and administrative functions.

A survey of pediatric department chairs in 2001 found that very few believed that any additional training beyond a pediatric residency was required to perform hospitalist medicine.[5] However, since then the field has undergone significant growth. A more recent survey of practicing hospitalists found that 92%

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believed there was a need for additional training in a variety of domains.[6] Specifically, respondents were most interested in achieving greater skill in performing critical care procedures and academic training. These hospitalists regarded pediatric hospitalist fellowships as the best way to gain the additional skills in teaching, research, and administration needed for their positions.

Nonetheless, for a variety of reasons, not the least of which is perhaps the paucity of hospitalist fellowship training programs, few hospitalists in practice today have completed a fellowship in hospital medicine. Over the past several years, a number of pediatric-specific hospitalist fellowship programs have been initiated, yet little is known of their requirements or curricula. We conducted a study to explore the structure, components, and training goals of the pediatric hospitalist fellowship programs in North America.

MATERIALS AND METHODS

Sample

To examine the characteristics of pediatric hospitalist training in North America, we examined all 8 fellowships or training programs that were in existence in early 2007. The total sample included the following sites: Children's Hospital Boston, Children's Specialists of San Diego, Children's National Medical Center, Children's Healthcare of Atlanta, Texas Children's Hospital, All Children's Hospital, University of North Carolina, and The Hospital for Sick Children.

Survey Instrument

We constructed a 17-item structured questionnaire to be administered by phone. The instrument was designed to be completed in approximately 10 minutes. Questionnaire items focused on documenting the goals, training, requirements, and clinical duties that characterize current pediatric hospitalist training programs. The questionnaire was comprised of a mixture of fixed-choice and open-ended questions. A draft of the instrument was shared with representatives of the Society of Hospital Medicine Pediatrics Committee for comment and suggestions.

Questionnaire Administration

The research team sent a prenotification letter to directors of the 8 pediatric hospitalist training programs to inform them of the research study. From February through June 2007, research staff contacted the directors of the programs, explained the purpose of the study, and obtained verbal consent.

Data Analysis

Responses were reviewed to compare and contrast the characteristics of the various programs. The study was approved by the University of Michigan Medical Institutional Review Board.

RESULTS

Response Rate

Of the 8 training programs, all completed the survey, representing a response rate of 100%. One institution offers 2 separate fellowship paths: academic and clinical.

Pediatric Hospitalist Fellowship and Training Program Overview

The first pediatric hospital medicine fellowship was initiated 15 years ago. However, the majority of pediatric hospitalist training programs in North America were established more recently, between 2003 and 2007.

Most pediatric hospitalist training programs offer 1 position per year. The duration of the training programs range from 1 to 3 years. Minimum clinical duties required by the programs vary from 4 to 8 months and the maximum amount of clinical time permitted ranges from 4 to 20 months. Most programs indicated that there is some flexibility in the clinical duties required or available to the fellows.

Six of the 8 programs offer an academic degree. Table 1 provides an overview of the programs, types of degrees offered, and funding sources for academic work. Subsequent tables provide blinded results to protect respondent confidentiality.

The number of fellowship or training program positions available each year has remained fairly consistent. However, to date, enrollment has not kept up with position availability (Table 2).

Program Goals

Seven out of 8 programs reported the provision of advanced training in the clinical care of hospitalized patients, quality improvement (QI), and hospital administration to be central goals of their training program. Six respondents reported the provision of training in the education of medical students and residents to be a primary goal of their program, while 5 indicated training in health services research to be a primary goal.

TABLE 1
Pediatric Hospital Medicine Fellowships and Training Programs in North America, 2007

Program	Year Established	Division	Number of Positions, 2007	Duration of Program	Minimum Clinical Time	Maximum Clinical Time	Degree Possible?	Who Pays for Degree?
Toronto-Academic	1992	Pediatric medicine	3	2 years	4 months	4 months	Yes: fellow's choice	Fellow
Children's Boston	1998	Emergency medicine	1	2 years	8 months	12 months	Yes: MPH, MEd, MPP	½ Depart. funds; ½ External funds (creative)
Children's National	2003	Hospital medicine	1-2	2-3 years	6 months	20 months	Yes: MPH	Faculty benefits
Children's Spec. San Diego	2003	Hospital medicine	1	1-2 years	7 months	NA	Yes: MAS	Division
Toronto-Clinical	2004	Pediatric medicine	1	1 year	8 months	8 months	No	NA
Texas	2005	Emergency medicine	1	2 years	8 months	8 months	Yes: MPH, MME	Varies
University of North Carolina	2006	General pediatrics and adolescent medicine	1	1 year	5 months	6 months	No	NA
All Children's	2007	General pediatrics	1	2 years	8 months	9 months	Yes: MPH, MS	External funding pending (federal grants)
Children's Atlanta	2007	Pediatric hospitalist section	1	1 year	6 months	6 months	No	NA

Abbreviations: MAS, Master of Academic Sciences; MEd, Master of Education; MME, Master of Medical Education; MPH, Master of Public Health; MPP, Master of Public Policy; MS, Master of Science.

TABLE 2
Pediatric Hospital Medicine Fellowship and Training Program Availability and Enrollment

Program	2006-2007 Positions Available	2006-2007 Fellows Enrolled	2007-2008 Positions Available
A	NA	NA	1
B	2	1	2
C	1	1	1
D	NA	NA	1
E	1	0	2
F	1	0	1
G	2	0	3
H	1	2	1
I	1	1	0

Participation in General Hospital Activities

Trainees in all programs participate in clinical care, resident education, student education, research activities, and hospital committees. Seven out of 8 programs reported that fellows or trainees participate in patient safety activities and guideline development.

Formal Training

Half of the programs reported that they provide formal coursework in areas of education and hospital administration including quality improvement, resident teaching, and student teaching. Three of the 8 programs provide formal coursework in hospital economics.

Three of the 8 programs provide seminars in resident teaching, student teaching, hospital economics, and leading a healthcare team (Table 3).

Seven of 8 pediatric hospitalist training programs provide formal coursework in epidemiology and research methodology. Six programs reported that they provide formal coursework in biostatistics and 5 in publications or grant writing. Four offer seminars in health economics, research methodology, and QI methodology (Table 4).

Program Requirements

Seven pediatric hospitalist training programs require fellows to complete a research project. Six programs reported that they require fellows or trainees to complete a quality improvement project or participate on a hospital committee. Six of the programs require pediatric hospitalist fellows to attempt to present at a national meeting, and 4 programs require that fellows attempt to publish their research in a peer-reviewed publication. Graduate degrees are required at 3 of the 8 pediatric hospitalist training programs (Table 5).

Clinical Service Requirements

All programs indicated that they require the fellow or trainee to serve as an attending on the general pediatric ward. Five programs require the fellow

TABLE 3
Formal Hospital Administration Training Provided by Pediatric Hospitalist Fellowship and Training Programs

	Resident Teaching		Student Teaching		Hospital Economics		Quality Improvement		Leading a Healthcare Team	
Programs	Coursework	Seminars	Coursework	Seminars	Coursework	Seminars	Coursework	Seminars	Coursework	Seminars
A		Yes		Yes		Yes	Yes			
B	Yes		Yes		Yes		Yes		Yes	
C					Yes	Yes	Yes	Yes		Yes
D	Yes		Yes		Yes		Yes		Yes	
E		Yes		Yes				Yes		Yes
F						Yes				
G	Yes	Yes	Yes	Yes				Yes		Yes
H	Yes	Yes	Yes	Yes				Yes		Yes
I	Yes		Yes							

NOTE: Blank equals "No."

TABLE 4
Formal Research Training Provided by Pediatric Hospitalist Fellowship and Training Programs

	Epidemiology		Biostatistics		Health Economics		Research Methodology		QI Methodology		Publications/ Grant Writing		Translation Research		Educational Research	
	Course	Seminar	Course	Seminar	Course	Seminar	Course	Seminar	Course	Seminar	Course	Seminar	Course	Seminar	Course	Seminar
A	Yes		Yes			Yes	Yes			Yes	Yes		Yes		Yes	
B	Yes		Yes		Yes		Yes		Yes		Yes	Yes	Yes		Yes	
C	Yes		Yes			Yes	Yes	Yes		Yes		Yes				
D	Yes		Yes			Yes	Yes		Yes		Yes				Yes	
E	Yes		Yes		Yes		Yes	Yes		Yes		Yes				
F	Yes			Yes			Yes	Yes			Yes	Yes				
G	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
H	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
I																

NOTE: Blank equals "No."

or trainee to provide service at the fellow or PL-3 level in the pediatric intensive care unit (PICU), anesthesia service, and transport team. Four programs reported that they require service in the emergency department, and 3 programs require service in the neonatal intensive care unit (NICU), newborn nursery, and general pediatric ward at the fellow or PL-3 level. Only 2 programs require service in the pediatric subspecialty ward, and 1 program requires service in outpatient urgent care. No program requires primary care service (Table 6).

Pediatric Hospitalist Fellowship and Training Program Funding Sources

Five of the programs use department funds to finance the fellowship program. Four of the programs utilize the fellow or trainee's clinical work as a funding source. Two of the programs reported that the program is paid for through hospital funds.

Pediatric Hospitalist Fellow or Trainee Independence

Respondents indicated that fellows or trainees become increasingly independent over the course of the program. Fellows are supervised or mentored by hospitalists on staff. Half of the programs surveyed allow fellows or trainees to bill independently under certain circumstances (Table 7).

DISCUSSION

There appear to be 2 distinct tracks for pediatric hospitalist training programs: clinical or academic specialization. However, this is not surprising, as

TABLE 5
Fellowship or Training Program Requirements

	QI Project	Research Project	Abstract/ Presentation at National Meeting*	Peer-Reviewed Publication*	Committee Participation at Hospital	Attending on General Ward Leading Resident Team	Specific Advanced Clinical Training	Graduate Degree Program	Other
A	Yes	Yes	Yes	Yes	Yes	Yes		Yes	
B		Yes				Yes			
C	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
D	Yes	Yes	Yes		Yes	Yes	Yes		
E	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
F	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
G	Yes	Yes	Yes					Yes	
H									
I					Yes	Yes	Yes		Journal club

NOTE: Blank equals "No."
*Required to try.

most programs are relatively new and there are no standards or requirements for fellowship training from an external accrediting body. As such, the curriculum for these programs is likely driven by a combination of service requirements and local speculation on the needs of a future generation of pediatric hospitalists. Most programs also reported that they provide significant flexibility for each fellow based on their self-perceived training needs and background.

Although there has been considerable emphasis on the potential educational role of hospitalists, formal coursework in teaching and education is not a part of the curriculum for half of the existing fellowship programs. Recent reports have demonstrated that hospitalists have received better teaching evaluations than traditional subspecialty attendings.[7] However, this is in the absence of additional training in education and may reflect greater time that hospitalists might devote to their clinical trainees. The opportunity to further improve the educational training of hospitalists could be an important part of the fellowship experience.

Hospitalists have also been hypothesized to be in a prime position to either lead or have meaningful participation in quality improvement and cost-saving efforts in the hospital setting. However, only half of programs provide formal coursework in QI and even fewer in areas of hospital economics.

Interestingly, most programs provide coursework in research methods, epidemiology, and grant writing. Requirements regarding clinical duties ranged from a minimum of 17% to a maximum of 67% of program time. It is unclear what the long-term expectations in career achievement with regard to research will be for those physicians who spend the majority of their training time providing clinical care rather than in research. Previous authors have described the fallacy of expecting brief periods of coursework to prepare individuals for independent research careers.[8] However, such coursework can certainly assist graduates of such programs to meaningfully participate in research projects and to put to valuable use their knowledge in both the educational and clinical aspects of their work. Though trainees enrolled in 1-year programs will spend a larger proportion of their time providing clinical care based on program requirements, trainees in multiyear programs can choose to spend additional time performing clinical duties. Thus, 1 of the possible advantages of a 2-year or 3-year program may simply be the flexibility that the fellow has to tailor the program to his or her individual career goals.

Although previous studies have demonstrated that pediatric hospitalists may provide clinical service in a variety of hospital settings,[2,3,9–11] most of the current fellowship programs do not provide extensive clinical experiences beyond the general pediatric ward. If hospitalists are to play a more comprehensive role in the care of the pediatric hospitalized patient, programs should consider expanding the scope of clinical training and exposure they provide.

The financial viability of hospitalist fellowship programs is also an important issue. If the additional training provided by these programs is felt

TABLE 6
Assigned Clinical Duties in Pediatric Hospitalist Fellowship and Training Programs

	PICU		NICU		Anesthesia		Primary Care (Outpatient)		Emergency Department		Urgent Care		Transport		General Pediatric Ward		Pediatric Subspecialty Ward		Other Units
	Attd	Fellow	Attd	Fellow	Attd	Fellow	Attd	Fellow	Attd	Fellow	Attd	Fellow	Attd	Fellow	Attd	Fellow	Attd	Fellow	
A		Yes								Yes		Yes		Yes	Yes				Newborn nursery
B															Yes				
C		Yes		Yes		Yes				Yes				Yes	Yes	Yes			Stepdown ICU
D		Yes		Yes		Yes				Yes				Yes	Yes				
E		Yes				Yes				Yes					Yes	Yes			Child abuse, newborn nursery, subacute care rehabilitation facility
F		Yes		Yes		Yes								Yes	Yes	Yes		Yes	Variety of hospitals (county-based)
G															Yes				Child abuse, consultation clinic, community-based practice
H															Yes				Child abuse, consultation clinic, community-based practice
I						Yes								Yes	Yes			Yes	Newborn nursery

NOTE: Blank equals "No." **Abbreviations**: Attd, attending; ICU, intensive care unit; NICU, neonatal ICU; PICU, pediatric ICU.

TABLE 7
Independence in Pediatric Hospitalist Fellowship and Training Programs

	Bill Independently?	Supervision?
A	No: bill under a supervising attending	Supervised by hospitalist and given autonomy with supervision from hospitalist attending.
B	Yes	First couple of months during fellow's clinical period, more interaction with supervisors. Senior folks always available for consultation.
C	Yes: after 3 months	Clinical mentor (1 of 4 senior hospitalists) with whom they discuss patients on a more informal basis when on service.
D	Yes: on general wards, when functioning as attending	Fellows meet weekly with fellowship director. Hospitalist on call available for consult.
E	Fellows: no; faculty fellows: yes	Traditional fellowship role. Fellows complete several clinical electives with various levels of supervision.
F	Yes: after first 6 months	Fellows are supervised in their first year by hospitalist faculty.
G	No	Day to day in patient care, senior staff review as needed. Each fellow has 1 primary supervisor. When on service overnight, fellows call staff attending.
H	No	Day to day in patient care, senior staff review as needed. Each fellow has 1 primary supervisor. When on service overnight, fellows call staff attending.
I	Yes	Trainees are supervised by the director of the hospitalist program, the inpatient attending, and other hospitalists.

to be of value to individual hospitals, it is likely that there will be an increase in the proportion of hospitals who wish to fund such training. A likely incentive for hospitals would be to position themselves to attract and retain hospitalists who possess a unique skill set for which they ascribe value for their patients and/or their bottom line.

Currently, in contrast to traditional, subspecialty-based fellowships, half of the existing hospitalist fellowship programs allow hospitalist fellows to bill independently. This will have important implications both from an economic perspective, as well as relative to the perceptions of the degree of supervision provided by the respective training programs. This finding may also raise questions as to whether the need for additional clinical training after residency is really necessary to practice hospital medicine.

Whether the training and experience provided by these programs will be seen as a necessary precursor for careers in hospital medicine remains unknown. However, currently there appears to be

a mismatch between what some hospitalists have identified as potential clinical educational needs[6] with more than 50% desiring additional training in intensive care unit settings, and what is provided through the existing programs. In 2001, a survey of pediatric department chairs found that most did not believe additional formal training beyond residency was necessary to take on the role of a pediatric hospitalist.[5] The value of pediatric hospitalist training programs may lie in their provision of or exposure to academic skill sets and the provision of administrative opportunities, in addition to targeted clinical training.

Potential Future Areas of Focus

The potential of a mismatch between education and practice or a "training practice gap" has been identified in internal medicine hospitalist training programs.[12] To provide guidance to address this gap, Glasheen et al.[13] assessed the spectrum and volume of specific diagnoses encountered in hospitals and the level of involvement of hospitalists in the care of these patients. They posit that training prioritized to the case mix expected to be encountered by hospitalists would be an appropriate concentration on which both tracked residency and fellowships could focus.

Of significant importance to many community physicians is the pattern of communication between hospitalists and the primary care physician of their patients. Recent reports have suggested this is a problem for many hospitalist programs.[14] As such, it seems relevant that any hospitalist training program both develop a defined communication protocol and include instruction in physician-to-physician communication as a distinct part of their curriculum. Specifically, the importance of initial contact and timely discharge summaries should be addressed.

We did not explicitly ask respondents to discuss the scope of mentorship in their fellowship programs. However, based on respondents' descriptions of fellow or trainee supervision, we believe that the structure of mentorship programs likely varies across fellowships. Further study will be needed to determine the scope of mentorship in pediatric hospitalist training programs, and the impact of mentorship on training efficacy.

CONCLUSIONS

Pediatric hospitalist fellowship training programs are in the very early stages of their development. In time, greater structure across institutions will need to be put in place if they are to succeed in becoming a necessary prerequisite to the practice of hospital medicine. As the roles of hospitalists become more defined, the nature and extent of their advanced training needs will do so as well.

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