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Pediatric hospitalist perceptions regarding trainees' effects on cost and quality of care

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Abstract

OBJECTIVE—To determine pediatric hospitalists' perceptions about the effect of residents on the cost and quality of care and their own ability to provide and teach cost-effective, high-quality care.

METHODS—A 15-item survey assessing hospitalist perceptions of resident impact on costs/quality and their role in teaching cost-effectiveness was developed and sent to 180 hospitalists from 113 institutions in the United States.

RESULTS—Of the 180 hospitalists surveyed, 127 responded with complete data (71%). Overall, 76 (60%) believed residents increase quality, and 91 (72%) believed residents increase costs. Respondents who worked with residents all of the time were more likely to believe residents increased quality (50/70, 71%) compared to those who worked with residents some of the time (18/42, 43%) or never (8/15, 53%, $p=0.01$). Similarly, academic hospitalists were more likely than community hospitalists to believe residents increase quality (67/103, 65% vs. 9/24, 38%; $p=0.03$). Only 28 (22%) respondents reported receiving formal cost-effectiveness training, yet 116 (91%) believed they provided cost-effective care and 103 (81%) believed they were qualified to teach it to residents. Nearly all respondents (115, 91%) believed residents should participate in a cost-effectiveness curriculum.

Conclusions—Most respondents perceived that trainees increase both the costs and quality of care for hospitalized children. The perception of increased quality was associated with increased resident interaction, while cost perceptions were similar across groups. There was a paucity of formal cost-effectiveness training among pediatric hospitalists, yet nearly all respondents supported the incorporation of such training in graduate medical education programs.

INTRODUCTION

Teaching hospitals, particularly those that rely heavily on Graduate Medical Education (GME) programs, have long been implicated as a source of increased health care costs.^{1–3} In two separate studies, university hospitals were 33–44% more costly than non-teaching hospitals after adjusting for case-mix intensity.^{1,3} Adjustment for case-mix diminished but did not eliminate cost differences, indicating that cost increases at university centers cannot

be attributed to higher acuity patients alone.^{1,3,4} It is thus likely that other common factors, such as GME programs, are partially responsible for these findings.

The specific contribution of GME to increased costs is poorly understood. Residents, with or without attending input, are typically responsible for the initial diagnostic evaluation, the segment of care most consistently associated with cost differentials.^{3–7} Yet, studies specifically comparing resident care with non-teaching/attending-only care reveal inconsistent results.^{8–11}

Similarly, studies examining whether GME programs influence care quality have yielded mixed results. In pediatrics, resident care is associated with longer length of stay for children hospitalized on general inpatient teams and those with complex conditions cared for by subspecialty services.^{12,13} However, resident care in the adult outpatient setting has been associated with increased quality of care compared to faculty-only care.¹⁴

Previous studies have focused primarily on adult medicine training programs. In addition, attending perceptions have yet to be investigated. Given the varying results of previous studies and paucity of pediatric data, we sought to determine hospital medicine attending perceptions of pediatric residents' impact on costs and quality of care for hospitalized children. We also assessed attending experience and attitudes toward cost-effectiveness education.

METHODS

An anonymous, 15-item electronic survey was developed using REDCap.¹⁵ Survey items included questions related to hospitalist perceptions of resident impact on costs and quality of care, their own experience and perceived role in educating residents about cost-effective care, and the importance of cost-effectiveness training in GME. Demographic information obtained included physician type, hospital affiliation, years in practice, years as a hospitalist, and percent clinical time spent as a hospitalist. The survey was pilot tested for face validity prior to administration.

Potential survey respondents were obtained from a database maintained at Washington University's St. Louis Children's Hospital in St. Louis, MO. The database contains contact information for 197 pediatric hospitalists from 114 institutions across the United States (36 states plus District of Columbia) and Canada who voluntarily submitted their information for the purpose of conducting survey research. Prior to survey dissemination via electronic mail, we excluded duplicate entries (n=5), entries from those practicing outside of the United States (n=1), and entries completed by the study authors (n=2). An additional 9 entries were undeliverable, leaving 180 hospitalists from 113 institutions as recipients of the survey. The survey was distributed up to 3 times within a period of one month to non-responders.

Data were summarized using frequencies and percentages. Non-demographic data were collected using a 5-point Likert scale (1 Strongly Agree to 5 Strongly Disagree or 1 Greatly Increase to 5 Greatly Decrease) or yes/no questions. For purposes of analysis, responses to the 5-point Likert scales were collapsed as follows: agree/strongly agree vs. neutral vs.

disagree/strongly disagree and slightly/greatly increase vs. neutral vs. slightly/greatly decrease. Subgroup analyses were performed according to resident interaction (always vs. sometimes vs. never), hospital affiliation (academic vs. community), and years of practice (0–5 vs. 6–10 vs. >10) using Fisher exact tests with a 2-sided level of significance of 0.05. Stata 12.0 was used for statistical analysis. The project was approved by the Institutional Review Board at Vanderbilt University.

RESULTS

Study population

Surveys were completed by 127 of the 180 surveyed (71%). Of those who responded, 70 (55%) reported working with residents all the time, 42 (33%) some of the time, and 15 (12%) reported never working with residents. All but one respondent (family medicine) identified themselves as pediatricians (99%, including 9 medicine/pediatric providers). Most respondents reported spending some portion of their clinical time within or affiliated with an academic center (103, 81%). A similar number (101, 80%) reported spending >75% of their clinical time as a hospitalist. Fifty-two (41%) of the respondents have been in practice for 5 years, 53 (28%) for 6–10 years, and 40 (31%) for >10 years.

Perception of Resident Impact on Quality and Costs (Table 1)

Overall, 76 (60%) respondents believed residents increase quality. The three most cited reasons were more time spent at the bedside (49, 64%), improved continuity (41, 54%), and efficiency (27, 36%). Only 21 (17%) respondents believed residents decrease quality; reasons included decreased efficiency (16, 76%), decreased adherence to evidence-based practices (12, 57%), and less time spent at the bedside (10, 48%).

Those who work with residents all of the time were more likely to perceive residents increase quality (50, 71%; $p = 0.014$), compared to those who work with residents sometimes and those who never work with them. Similarly, hospital affiliation significantly impacted perceptions of quality. Faculty associated with academic hospitals (67, 65%; $p=0.03$) were more likely to perceive that residents contribute to increased quality compared to attendings from community hospitals.

Overall, 91 (72%) respondents believed that residents increase costs. The three most cited reasons were ordering more labs (82, 90%), more radiographic tests (66, 73%), and more consults (31, 34%). Only 7 (5.5%) respondents believed residents decrease costs, all but one of whom chose “other” and responded that residents are a cheaper workforce than the nurse practitioners, physician assistants, or additional faculty that would otherwise be needed to care for the volume of patients at their hospitals. Two respondents believed residents decreased costs by decreasing length of stay. Subgroup analyses revealed no statistical differences between any of the groups regarding resident impact on costs.

Quality and Cost Interactions

Of the 91 respondents who believed residents increase cost, 51 of those also thought they increase quality. For those 70 respondents who work with residents all the time, of the 50

who believed that residents increase cost, 32 (64%) thought they also increase quality, 9 (18%) thought they decrease quality, and 9 (18%) perceived no change in quality. Of the 5 who believed residents decrease cost, all believed the residents increase quality.

Training and Attitudes Toward Cost-effectiveness Education (Figure 1, Table 2)

Only 28 (22%) respondents reported having received formal cost-effectiveness training. However, nearly all (118, 93%) agreed that cost-effectiveness education is part of a clinical educator's job and 115 (91%) believed that cost-effectiveness training should be incorporated into GME curricula. Despite the lack of formal training, most also perceived that they knew how to provide cost-effective care (116, 91%) and were qualified to teach residents about this topic (103, 81%).

Increasing years of practice was associated with a perceived increased ability to provide cost-effective care ($p=0.02$), and for those with >10 years of experience, a non-significant increase in perceived ability to teach about this topic. There were no differences between subgroups regarding receipt of cost-effectiveness training or perceived need for cost-effectiveness training in GME.

DISCUSSION

An overwhelming majority of survey respondents, including academic and community hospitalists with a wide range of experience and varying degrees of interaction with residents, believed that residents increase patient care costs, primarily as a result of increased diagnostic testing. Most also believed that residents increased quality, although this was more frequently indicated by respondents with academic center affiliations and those who always work with residents. Nearly all respondents felt comfortable providing cost-effective care and that it should be included in GME training programs, yet few reported having formal training in this area themselves.

The perception that residents increase costs is not altogether surprising since the majority of the literature supports this.^{8,10,11,13} However, there is contradictory research showing that residents can also decrease costs.⁹ Inconsistencies in results likely stem from inherent difficulties in study design. These studies all compared teaching versus non-teaching services, but the attendings on the services, hospital wards, and nursing staff often differed between services, resulting in more potential variables than simply resident participation.

Diagnostic testing, the area respondents cited most as contributing to increased costs, is also the line item most often associated with increased costs at academic hospitals.⁴⁻⁷ However, overuse of diagnostic testing may be a result of the training environment and not the responsibility of residents alone. By necessity, the culture of academic medicine encourages trainees to think critically and to generate an extensive differential for each patient. However, without careful consideration of each individual patient's circumstances, this culture could lead to increased and unnecessary diagnostic testing among trainees in an effort to rule out "zebras" or demonstrate academic prowess.^{16,17}

The majority of survey respondents perceived that residents increase quality of care, a feeling more common among those who work with residents all the time and those at academic centers and least commonly reported among those who “sometimes” work with residents. Further, those who work closely with residents also often believed there was an increase in both costs and quality of care, suggesting that those who always work with residents feel there is potential benefit from having residents involved in care despite these learners requiring more of the faculty’s time and more resources for GME support.

As early as 1985, experts in cost analysis were advocating for modifications to medical school and residency curricula to focus on efficient resource utilization.³ The data reported in this survey reflect an ongoing deficit in medical school and resident education, and in attendings’ continuing medical education needs. In addition, respondents who recently finished their GME training were no more likely to report having received formal cost-effectiveness training than those with more experience, indicating that these curricula are not yet prevalent.

Despite a lack of formal education, over 80% of respondents felt they provide cost-effective care and were qualified to teach cost-effectiveness. Those in practice longer were significantly more likely to feel they provide cost-effective care and trended towards feeling more qualified to teach it. This raises the possibility that despite the lack of formal training, clinical experience has provided them the skills to provide and teach cost-effective care. However, these perceptions of their own ability differ significantly from studies revealing that both attendings and residents are unable to provide accurate estimates for costs, charges, or reimbursements.¹⁸

Nearly all of our respondents believe cost-effective curricula should be a component of resident education. Weinberger encouraged the medical education community to focus education efforts on cost-conscious diagnostic testing¹⁹ and actually made a push for cost-conscious care to become the seventh general competency of the ACGME (Accreditation Council for Graduate Medical Education).¹⁶ As such, curricula on the topic are beginning to emerge.^{20–22}

This study has several strengths, including focusing on pediatric rather than adult residency trainees, ascertaining attending perceptions regarding both costs and quality of care, and elucidating experiences and opinions regarding cost-effectiveness training. Additionally, the study benefitted from a high survey response rate and a mixture of hospitalist provider types and settings.

Several limitations are worth noting. First, our survey has not been validated. Second, most items were stated positively and response choices were ordered consistently. While this approach may protect against response errors, it may introduce a positive response bias. Importantly, questions related to resident impact on quality and cost (increase or decrease) were not subject to this potential limitation. Next, respondents were not provided with definitions of quality or cost-effectiveness which may contribute to response variability. We only surveyed hospitalists who previously indicated willingness to participate in survey research. While this likely improved our response rate, respondents may not be

representative of all hospitalists or the general population of pediatricians. Finally, this survey only reveals perceptions which may not reflect objective cost or quality comparison data. However, hospitalists are responsible for the majority of resident education in inpatient settings. Thus, their attitudes likely impact resident education and patient care. Nevertheless, a rigorous study using objective data to corroborate or refute our findings is needed.

From these limitations, two potential opportunities emerge. First, a study comparing teaching and non-teaching services within one system (same institution, same faculty on teaching and non-teaching services, ancillary services, systems, etc.) could be beneficial in further determining pediatric resident impact on costs incurred by academic and teaching medical centers. Second, these results indicate that pediatric hospitalists place a high value on cost-effective education and the majority believes that residents increase costs and quality of patient care. A large opportunity exists to incorporate high-value, patient-centered, cost-effective care into medical student and residency curricula.

Graduate medical education is a necessity to train our next generation of physicians. The direct resident physicians costs to hospitals in terms of salary and support are well known, but indirect health systems costs via patient care remain elusive despite consistent perceptions that residents increase patient care costs. Further research should help delineate these costs and quality measures by attempting to formulate studies in which residents are the primary variable. Finally, leaders in medical school and graduate medical education should strongly consider ways to introduce formally the topics of high-value care in an effort to quell the rising costs of healthcare today.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Figure 1.
Survey Responses Regarding Education

All questions were asked on a Likert Scale with agree/neutral/disagree except for the final question on figure which was simply yes/no. Survey statements for these data are as follows:

1. Part of my job as a clinical educator includes educating learners about efficient utilization of resources.
2. I know how to provide cost-effective care.
3. I am qualified to teach residents about the efficient utilization of resources.
4. Residents should participate in a curriculum focusing on cost-effective care as part of their training.
5. I have received formal training regarding effective use of hospital resources.

Table 1

Quality and Cost Comparisons Across Subgroups

	Quality			Cost		
	Increase 76 (60)	No Change 30 (23)	Decrease 21 (17)	Increase 91 (72)	No Change 29 (23)	Decrease 7 (6)
Total=127						
Interaction n (%)						
All the time 70 (55)	50 (71)	10 (14)	10 (14)	50 (71)	15 (21)	5 (7)
Sometimes 42 (33)	18 (43)	14 (33)	10 (24)	30 (71)	11 (26)	1 (2)
Never 15 (12)	8 (53)	6 (40)	1 (7)	11 (73)	3 (20)	1 (7)
			p=0.014*			p=0.834
Hospital Type n (%)						
Community 24 (19)	9 (38)	10 (42)	5 (21)	20 (83)	4 (17)	0 (0)
Academic 103 (81)	67 (65)	20 (19)	16 (16)	71 (72)	25 (24)	7 (6.8)
			p=0.033*			p=0.332
Years Experience n (%)						
0-5 52 (41)	33 (63)	11 (21)	8 (15)	33 (63)	14 (27)	5 (10)
6-10 36 (28)	23 (66)	7 (20)	5 (14)	27 (77)	7 (20)	1 (3)
>10 30 (31)	20 (50)	12 (30)	8 (20)	31 (78)	8 (20)	1 (3)
			p=0.673			p=0.475

Table 2

Training and Education Comparisons

Clinical educators should teach about resource utilization				I know how to provide cost effective care				I am qualified to teach residents about effective resource utilization				I have received training regarding resource utilization				Residents should participate in cost-effective care curriculum			
	Agree	Neutral	Disagree	Agree	Neutral	Disagree		Agree	Neutral	Disagree		Yes	No	Agree	Neutral	Disagree			
N = 127	118 (93)	2 (2)	7 (6)	116 (91)	11 (9)	0 (0)		103 (81)	22 (17)	2 (2)		28 (22)	99 (78)	115 (91)	8 (6)	4 (3)			
Resident Interaction																			
n (%)																			
All the time	67 (96)	0 (0)	3 (4)	62 (89)	8 (11)	0 (0)		58 (83)	11 (16)	1 (1)		17 (24)	53 (76)	62 (89)	6 (9)	2 (3)			
70 (55)																			
Sometimes	36 (86)	2 (5)	4 (10)	39 (93)	3 (7)	0 (0)		35 (83)	7 (17)	0 (0)		11 (26)	31 (74)	39 (93)	1 (2)	2 (5)			
42 (33)																			
Never	15 (100)	0 (0)	0 (0)	15 (100)	0 (0)	0 (0)		10 (67)	4 (27)	1 (7)		0 (0)	15 (100)	14 (93)	1 (7)	0 (0)			
15 (12)																			
							p=0.187				p=0.346								p=0.672
Hospital Type																			
n (%)																			
Community	21 (88)	1 (4)	2 (8)	23 (96)	1 (4)	0 (0)		21 (88)	3 (13)	0 (0)		4 (17)	20 (83)	23 (96)	1 (4)	0 (0)			
24 (19)																			
Academic	97 (94)	1 (1)	5 (5)	93 (90)	10 (10)	0 (0)		82 (80)	19 (18)	2 (2)		24 (23)	79 (77)	92 (89)	7 (7)	4 (4)			
103 (81)																			
							p=0.308				p=0.714								p=1.00
Years Experience																			
n (%)																			
0-5	49 (94)	1 (2)	2 (4)	44 (85)	8 (15)	0 (0)		39 (75)	12 (23)	1 (2)		11 (21)	41 (79)	47 (90)	3 (6)	2 (4)			
52 (41)																			
6-10	33 (94)	0 (0)	2 (6)	32 (91)	3 (9)	0 (0)		27 (77)	7 (20)	1 (3)		10 (29)	25 (71)	31 (89)	3 (9)	1 (3)			
35 (28)																			
>10	3 (7.5)	1 (2.5)	36 (90)	40 (100)	0 (0)	0 (0)		37 (93)	3 (7)	0 (0)		7 (17)	33 (83)	37 (93)	2 (5)	1 (2)			
40 (31)																			
							p=0.944				p=0.149								p=0.966
							p=0.017*												

Within group comparisons with responses to survey questions pertaining to education and training.

* denotes a p value<0.05.

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All questions were asked on a Likert Scale with agree/neutral/disagree except for the question regarding their own training, which was simply yes/no. Survey statements for these data are as follows:

1. Part of the job of a clinical educator includes educating learners about efficient utilization of resources.
2. I know how to provide cost-effective care.
3. I am qualified to teach residents about the efficient utilization of resources.
4. I have received formal training regarding effective use of hospital resources.
5. Residents should participate in a curriculum focusing on cost-effective care as part of their training