

Pediatric Hospitalist Perceptions Regarding Trainees' Effects on Cost and Quality of Care

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KEY WORDS

cost, cost-effectiveness, residents, quality

ABBREVIATION

GME: graduate medical education

www.hospitalpediatrics.org

doi:10.1542/hpeds.2014-0086

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HOSPITAL PEDIATRICS (ISSN Numbers: Print, 2154 - 1663; Online, 2154 - 1671).

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FINANCIAL DISCLOSURE: The authors have indicated they have no financial relationships relevant to this article to disclose.

FUNDING: Surveys within this study were developed and administered by using the REDCap (Research Electronic Data Capture) database, which is supported by grant UL1 TR000445 from the National Center for Advancing Translational Sciences at the National Institutes of Health. Funded by the National Institutes of Health (NIH).

POTENTIAL CONFLICT OF INTEREST: The authors have indicated they have no potential conflicts of interest to disclose.

abstract



OBJECTIVE: To determine pediatric hospitalists' perceptions about residents' effects on 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 180 hospitalists surveyed, 127 completed surveys (71%). Overall, 76 (60%) and 91 (72%) hospitalists believed that residents increase quality and cost of care, respectively. Respondents who worked with residents all the time were more likely to state that residents increase quality (50 of 70 [71%]) compared with those who worked with residents sometimes (18 of 42 [43%]) or never (8 of 15 [53%]; $P = .01$). Similarly, academic hospitalists were more likely than community hospitalists to believe that residents increase quality (67 of 103 [65%] vs 9 of 24 [38%]; $P = .03$). Although only 28 (22%) respondents reported receiving formal cost-effectiveness training, 116 (91%) believed that they provided cost-effective care, and 103 (81%) believed that they were qualified to teach this topic. Most respondents ($n = 115$ [91%]) believed that residents should participate in a cost-effectiveness curriculum.

CONCLUSIONS: Most respondents felt trainees increase both the costs and quality of care for hospitalized children. The perception of increased quality was associated with increased resident interaction, whereas cost perceptions were similar across groups. Pediatric hospitalists report a lack of formal cost-effectiveness training, but nearly all respondents supported the incorporation of such training into graduate medical education programs.

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 2 separate studies, university hospitals were 33% to 44% more costly than nonteaching 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 physicians' input, are typically responsible for the initial diagnostic evaluation, which is the segment of care most consistently associated

with cost differentials.³⁻⁷ However, studies specifically comparing resident care with nonteaching/attending-only care have produced 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 with faculty-only care.¹⁴

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

METHODS

An anonymous, 15-item electronic survey was developed by using Research Electronic Data Capture.¹⁵ Survey items included questions related to hospitalists' perceptions of residents' 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 before administration.

Data on potential survey respondents were obtained from a database maintained at Washington University's St Louis Children's Hospital (St Louis, MO). The database contains contact information for 197 pediatric hospitalists from 114 institutions across the United States (36 states plus Washington, DC) and Canada who voluntarily submitted their information for the purpose of conducting survey research. Before survey dissemination via e-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 1-month period to nonresponders.

Data were summarized by using frequencies and percentages. Nondemographic data were collected by 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 versus neutral versus disagree/strongly disagree and slightly/greatly increase versus neutral versus slightly/greatly decrease. Subgroup analyses were performed according to resident interaction (always versus sometimes versus never), hospital affiliation (academic versus community), and years of practice (0-5 vs 6-10 vs >10) by using Fisher's exact tests with a 2-sided level of significance of 0.05. Stata version 12.0 (Stata Corp, College Station, TX) 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 (71%) of the 180 hospitalists surveyed. 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 1 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 ($n = 103$ [81%]). A similar number ($n = 101$ [80%]) reported spending >75% of their clinical time as a hospitalist. Fifty-two (41%) of the respondents had been in practice for ≤5 years, 53 (28%) for 6 to 10 years, and 40 (31%) for >10 years.

Perception of Resident Impact on Quality and Costs

Overall, 76 (60%) respondents believed that residents increase quality of care (Table 1). The 3 most-cited reasons were more time spent at the bedside ($n = 49$ [64%]), improved continuity ($n = 41$ [54%]), and efficiency ($n = 27$ [36%]). Only 21 (17%) respondents believed that residents decrease quality of care; reasons included decreased efficiency ($n = 16$ [76%]), decreased adherence to evidence-based practices ($n = 12$ [57%]), and less time spent at the bedside ($n = 10$ [48%]).

Those who work with residents all the time were more likely to perceive residents as increasing quality ($n = 50$ [71%]; $P = .014$) compared with those who work with residents sometimes and those who never work with them. Similarly, hospital affiliation significantly affected perceptions of quality. Faculty associated with academic hospitals ($n = 67$ [65%]; $P = .03$) were more likely to perceive that

TABLE 1 Quality and Cost Comparisons (*N* = 127) Across Subgroups

Variable	Quality			Cost		
	Increased (<i>n</i> = 76 [60%])	No Change (<i>n</i> = 30 [23%])	Decreased (<i>n</i> = 21 [17%])	Increased (<i>n</i> = 91 [72%])	No Change (<i>n</i> = 29 [23%])	Decreased (<i>n</i> = 7 [6%])
Interaction						
All the time (<i>n</i> = 70 [55%])	50 (71)	10 (14)	10 (14)	50 (71)	15 (21)	5 (7)
Sometimes (<i>n</i> = 42 [33%])	18 (43)	14 (33)	10 (24)	30 (71)	11 (26)	1 (2)
Never (<i>n</i> = 15 [12%])	8 (53)	6 (40)	1 (7)	11 (73)	3 (20)	1 (7)
			<i>P</i> = .014*			<i>P</i> = .834
Hospital type						
Community (<i>n</i> = 24 [19%])	9 (38)	10 (42)	5 (21)	20 (83)	4 (17)	0
Academic (<i>n</i> = 103 [81%])	67 (65)	20 (19)	16 (16)	71 (72)	25 (24)	7 (6.8)
			<i>P</i> = .033*			<i>P</i> = .332
Years of experience						
0–5 (<i>n</i> = 52 [41%])	33 (63)	11 (21)	8 (15)	33 (63)	14 (27)	5 (10)
6–10 (<i>n</i> = 36 [28%])	23 (66)	7 (20)	5 (14)	27 (77)	7 (20)	1 (3)
>10 (<i>n</i> = 30 [31%])	20 (50)	12 (30)	8 (20)	31 (78)	8 (20)	1 (3)
			<i>P</i> = .673			<i>P</i> = .475

Results are presented as *n* (%).

residents contribute to increased quality compared with attending physicians from community hospitals.

Overall, 91 (72%) respondents believed that residents increase costs. The 3 most cited reasons were ordering more laboratory tests (*n* = 82 [90%]), more radiographic tests (*n* = 66 [73%]), and more consults (*n* = 31 [34%]). Only 7 (5.5%) respondents believed that residents decrease costs; all but 1 of these respondents chose “other” and noted 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 that 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 that residents increase cost, 51 of those also thought they increase quality of care. 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 that residents decrease cost, all believed the residents increase quality.

Training and Attitudes Toward Cost-effectiveness Education

Only 28 (22%) respondents reported having received formal cost-effectiveness training (Fig 1, Table 2). However, nearly all (*n* = 118 [93%]) agreed that cost-effectiveness education is part of

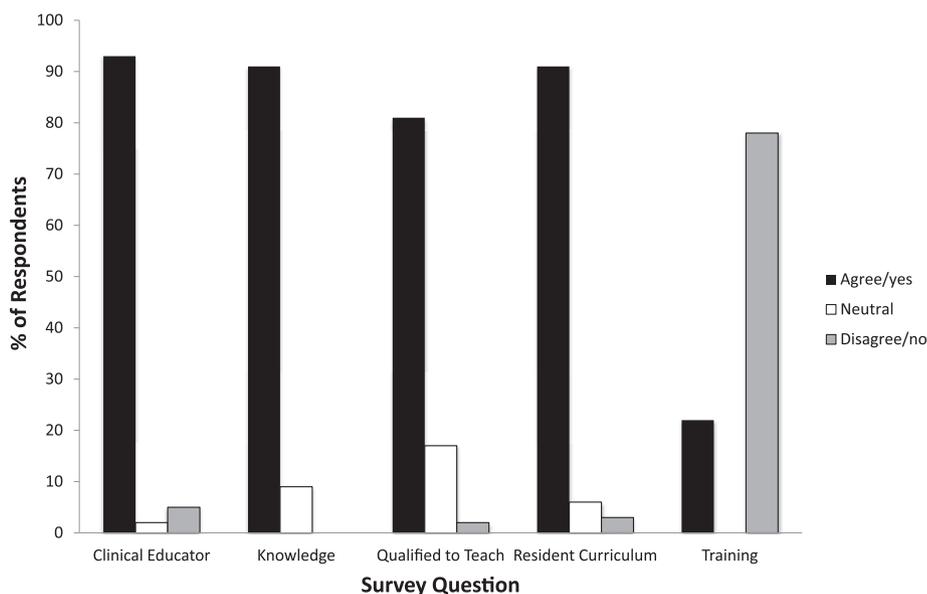


FIGURE 1 Survey responses regarding education. All questions were asked by using a Likert scale with agree/neutral/disagree except for the final question on the graphic, which was simply yes/no. Survey statements for these data are as follows: 1. Part of my job as a clinical educator includes educating 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 2 Training and Education Comparisons (N = 127)

Variable	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 a Cost-effective Care Curriculum		
	Agree (n = 118 [93%])	Neutral (n = 2 [2%])	Disagree (n = 7 [6%])	Agree (n = 116 [91%])	Neutral (n = 11 [9%])	Disagree (n = 0)	Agree (n = 103 [81%])	Neutral (n = 22 [17%])	Disagree (n = 2 [2%])	Yes (n = 28 [22%])	No (n = 99 [78%])	Agree (n = 115 [91%])	Neutral (n = 8 [6%])	Disagree (n = 4 [3%])
Resident interaction														
All the time (n = 70 [55%])	67 (96)	0	3 (4)	62 (89)	8 (11)	0	58 (83)	11 (16)	1 (1)	17 (24)	53 (76)	62 (89)	6 (9)	2 (3)
Sometimes (n = 42 [33%])	36 (86)	2 (5)	4 (10)	39 (93)	3 (7)	0	35 (83)	7 (17)	0	11 (26)	31 (74)	39 (93)	1 (2)	2 (5)
Never (n = 15 [12%])	15 (100)	0	0	15 (100)	0	0	10 (67)	4 (27)	1 (7)	0	15 (100)	14 (93)	1 (7)	0
			P = .187			P = .439					P = .071			P = .672
Hospital type														
Community (n = 24 [19%])	21 (88)	1 (4)	2 (8)	23 (96)	1 (4)	0	21 (88)	3 (13)	0	4 (17)	20 (83)	23 (96)	1 (4)	0
Academic (n = 103 [81%])	97 (94)	1 (1)	5 (5)	93 (90)	10 (10)	0	82 (80)	19 (18)	2 (2)	24 (23)	79 (77)	92 (89)	7 (7)	4 (4)
			P = .308			P = .689								P = 1.00
Years of experience														
0-5 (n = 52 [41%])	49 (94)	1 (2)	2 (4)	44 (85)	8 (15)	0	39 (75)	12 (23)	1 (2)	11 (21)	41 (79)	47 (90)	3 (6)	2 (4)
6-10 (n = 35 [28%])	33 (94)	0	2 (6)	32 (91)	3 (9)	0	27 (77)	7 (20)	1 (3)	10 (29)	25 (71)	31 (89)	3 (9)	1 (3)
>10 (n = 40 [31%])	3 (7.5)	1 (2.5)	36 (90)	40 (100)	0	0	37 (93)	3 (7)	0	7 (17)	33 (83)	37 (93)	2 (5)	1 (2)
			P = .944			P = .017*								P = .966

Results are presented as n (%). Within-group comparisons with responses to survey questions pertaining to education and training. All questions were asked by using 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. *Denotes a P value <.05.

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 (n = 116 [91%]) and were qualified to teach residents about this topic (n = 103 [81%]).

Increasing years of practice was associated with a perceived increased ability to provide cost-effective care (P = .02) and, for those with >10 years of experience, a nonsignificant 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 of care, although this finding was more frequently indicated by respondents with academic center affiliations and those who always work with residents. Although nearly all respondents felt comfortable providing cost-effective care and that it should be included in GME training programs, few reported having had formal training in this area themselves.

The perception that residents increase costs is not altogether surprising because the majority of the literature supports this scenario.^{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 nonteaching services, but the attending physicians 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 belief 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. Furthermore, 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, as well as in attending physicians' 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, >80% of respondents felt that they provide cost-effective care and were qualified to teach cost-effectiveness. Those in practice longer were significantly more likely to feel that they provide cost-effective care, and their data trended toward feeling more qualified to teach it. This finding raises the possibility that despite the lack of formal training, clinical experience has provided these respondents with the skills to deliver and to teach cost-effective care. However, these perceptions of their own ability differ significantly from studies revealing that both attending physicians and residents are unable to provide accurate estimates for costs, charges, or reimbursements.¹⁸

Nearly all of our respondents stated that 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 Accreditation Council for Graduate Medical Education.¹⁶ As

such, curricula on the topic are beginning to emerge.²⁰⁻²²

The present 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. In addition, the study benefited 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. Although this approach may protect against response errors, it might 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. In addition, respondents were not provided with definitions of quality or cost-effectiveness, which may have contributed to response variability. We only surveyed hospitalists who previously indicated a willingness to participate in survey research. Although this choice likely improved our response rate, the 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 affect resident education and patient care. Nevertheless, a rigorous study using objective data to corroborate or refute our findings is needed.

From these limitations, 2 potential opportunities emerge. First, a study comparing teaching and nonteaching services within 1 system (eg, same institution, same faculty on teaching and nonteaching services, ancillary services, systems) 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. An opportunity exists to incorporate high-value, patient-centered, cost-effective care into medical student and residency curricula.

GME is a necessity to train our next generation of physicians. The direct resident physician costs to hospitals in terms of salary and support are well known, but indirect health system 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 GME should strongly consider ways to formally introduce the topics of high-value care in an effort to quell the rising costs of health care today.

APPENDIX HOSPITALIST SURVEY

Our group is interested in pediatric hospitalist perceptions of the impacts that resident trainees have on the care that hospitalized pediatric patients receive. We would like your thoughts whether you work with residents all the time, never, or somewhere in between.

The survey includes ~15 questions and should take you <5 minutes to complete. All responses will be anonymous, and data will be viewed in aggregate. Your willingness to complete the survey implies consent to participate in this study.

Please complete the survey below.

Thank you!

I have residents on my team:

- all the time
- some of the time
- never

[Please note that for the actual survey, wording of the following questions was slightly different based on their response to the aforementioned question. For example, for those who never work with residents, the first question read, “In what way WOULD working with residents affect patient quality of care?” In addition, survey logic within Research Electronic Data Capture automatically provided the appropriate follow-up questions to questions 1 and 2.]

1. In what way does working with residents affect patient quality of care?
 - a. Greatly increases
 - b. Slightly increases
 - c. No change
 - d. Slightly decreases
 - e. Greatly decreases

(if a or b) In what ways do residents increase the quality of care? (choose all that apply):

- Residents provide more inpatient continuity of care
- Residents spend more time at the bedside than I do

- Residents are more up-to-date on evidence-based care
- Residents show more compassion and empathy for the patients than I do
- Residents are more efficient in common inpatient tasks
- Other (please specify)

(if d or e) In what ways do residents decrease the quality of care? (choose all that apply):

- Residents provide less inpatient continuity of care
- Residents spend less time at the bedside than I do
- Residents are less up-to-date on evidence-based care
- Residents show less compassion and empathy for the patients than I do
- Residents are less efficient in common inpatient tasks
- Other (please specify)

2. In what way does working with residents affect hospital costs?
 - a. Greatly increases
 - b. Slightly increases
 - c. No change
 - d. Slightly decreases
 - e. Greatly decreases

(if a or b) In what ways do residents increase hospital costs? (choose all that apply)

- Residents order more laboratory tests
- Residents order more expensive laboratory tests
- Residents order more radiographic tests
- Residents order more expensive

radiographic tests

- Residents provide longer hospital stays
- Residents request more consults
- Residents order more medications
- Residents order more costly medications
- Other (please specify)

(if d or e) In what ways do residents decrease hospital costs? (choose all that apply)

- Residents order fewer laboratory tests
- Residents order less expensive laboratory tests
- Residents order fewer radiographic tests
- Residents order less expensive radiographic tests
- Residents provide shorter hospital stays
- Residents request fewer consults
- Residents order fewer medications
- Residents order less costly medications
- Other (please specify)

3. Part of my job as a clinical educator includes educating learners about efficient utilization of resources.

1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

4. I know how to provide cost-effective care.

1. Strongly disagree
2. Disagree
3. Neutral

4. Agree
5. Strongly agree

5. I am qualified to teach residents about the efficient utilization of resources.

1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

6. I have received training regarding effective use of hospital resources.

- yes
- no

7. Residents should have cost-effective curriculum during their training.

1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

I am a:

- pediatrician
- pediatrician and internist
- family medicine doctor

I work in a:

- community hospital
- academic hospital
- jointly in an academic and community hospital

I have been in practice for:

- 0 to 5 years
- 6 to 10 years
- 11 to 15 years
- 16 to 20 years
- >20 years

I have worked as a hospitalist for:

- 0 to 5 years
- 6 to 10 years
- 11 to 15 years
- 16 to 20 years
- >20 years

How much of your clinical time do you spend as a hospitalist?

- 0% to 25%
- 26% to 50%
- 51% to 75%
- 76% to 100%

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Hospital Pediatrics 2015;5;211

DOI: 10.1542/hpeds.2014-0086

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Pediatric Hospitalist Perceptions Regarding Trainees' Effects on Cost and Quality of Care

David P. Johnson, Whitney L. Browning, James C. Gay and Derek J. Williams
Hospital Pediatrics 2015;5;211
DOI: 10.1542/hpeds.2014-0086

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