

# Educational Benefits of Allowing Pediatrician Supervision of Emergency Medicine Residents

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## ABSTRACT

**Background** According to the Accreditation Council for Graduate Medical Education emergency medicine (EM) program requirements, EM residents on EM rotations must be supervised by board-certified/board-prepared EM or pediatric EM (PEM) faculty.

**Objective** We sought to understand the effect of allowing EM residents to be supervised by attending pediatricians while caring for pediatric urgent care patients.

**Methods** The EM residents were permitted to staff pediatric urgent care patients with either an EM/PEM attending or an attending pediatrician from August 2017 to July 2018. Outcomes were assessed through resident focus groups, a mixed-methods survey of EM residents and EM/PEM/pediatrician attendings, and clinical outcomes, including length of stay, best evidence/clinical care guideline adherence, and 48-hour return visits requiring admission. Qualitative data were inductively coded using a phenomenological framework, with themes emerging from consensus discussion.

**Results** Ninety percent of residents participated in 1 of 7 focus groups. Four key themes emerged from qualitative analysis of focus group transcripts: (1) pediatricians have unique skills that complement those of EM physicians; (2) EM resident education improved; (3) patients may get better care with dual staffing; and (4) other PEM department and urgent care team members may have benefited from the change. The survey response rate was 72%, and it did not uncover additional themes. Length of stay was shorter for patients supervised by attending pediatricians (114 versus 128 minutes,  $P < .001$ ); there was no difference in best evidence/clinical care guideline adherence or 48-hour return visits requiring admission.

**Conclusions** Physicians' perceived education was improved by adding complementary perspectives without significant negative consequences for learners or patients.

## Introduction

Historically, the Accreditation Council for Graduate Medical Education (ACGME) Common Program Requirements in Emergency Medicine (EM) have required EM residents to be supervised only by faculty physicians who are board-certified or board-prepared in EM or pediatric EM (PEM) when completing a rotation in an emergency department (ED).<sup>1</sup> A range of providers that include EM physicians, PEM physicians, pediatricians, and advanced care providers care for pediatric patients in the ED and in urgent care settings. Pediatricians with training in general pediatrics, but without advanced training in PEM, commonly see pediatric urgent care (PUC) patients. The EM residents caring for PUC patients may benefit from learning from both EM/PEM physicians and pediatricians who have unique but complementary skills.<sup>2</sup>

In July 2017, the ACGME Review Committee (RC) for EM granted a rules waiver to the Denver Health Emergency Medicine Residency program to study the effect on resident education of allowing residents to staff PUC patients with attending pediatricians in addition to EM/PEM attendings during a rotation in a pediatric ED and urgent care (PEDUC) setting in an academic safety net hospital. We hypothesized that allowing attending pediatricians to supervise EM residents in the care of PUC patients would be favorably viewed by EM residents and all types of attendings who worked in the PEDUC as assessed through focus groups and surveys and, secondarily, that clinical outcomes data would not differ for PUC patients supervised by attending pediatricians compared with patients supervised by EM/PEM attendings.

## Methods

At the Denver Health Emergency Medicine residency program, residents rotate through the PEDUC, which has an annual volume of 26 000 patient visits. The EM residents rotate in the PEDUC for an average of 6

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weeks for postgraduate year (PGY)-1, 3 weeks for PGY-2, and 7 weeks for PGY-4 (PGY-3 residents do not rotate through the PEDUC). All patients who are triaged as “emergency care” treated by an EM resident were staffed with the EM/PEM attending on shift, but residents were able to choose to staff patients triaged to PUC status with either an EM/PEM attending or an attending pediatrician. Attending pediatricians are on shift from 7:00 AM to 11:00 PM daily, and this provides a second attending in the department (in addition to the EM or PEM attending physicians who are scheduled 24 h/d). All 6 attending pediatricians who work in the PEDUC participated in the model and have an average of 12 years of experience working in PUC (range, 7–21 years) and 6 years working in the PEDUC (range, 4–10 years). Educational impact was assessed through resident focus groups and an anonymous survey sent to both residents and attendings. Clinical outcomes were assessed via an electronic health record review. All 50 residents who rotated in the PEDUC were included in the study and participated in the staffing change from August 1, 2017, through July 31, 2018.

### Resident Focus Groups

Residents participated in 60-minute optional focus groups in which discussions were facilitated with a semistructured script. All EM residents who completed shifts in the PEDUC were invited to participate via an email from the residency program coordinator. No resident declined to participate, but 10% (5 of 50) of the residents were unable to participate due to scheduling challenges. Focus groups occurred at the end of the academic year (May–August 2018). Each focus group included only residents of the same PGY to control for any difference in perception of the staffing change by year of training or undue influence by more senior residents. Goal focus group size was 8 participants, but due to resident availability, actual group sizes varied from 2 to 10 residents. A PEDUC nurse educator who had clinical experience and familiarity with the PEDUC staffing model, but was not directly part of the study, facilitated the groups. She received formal training in moderating focus groups by a qualitative research expert and practiced using the focus group script. Digitally recorded focus groups were transcribed by an administrative assistant who removed identifying information prior to coding. The transcript from the initial focus group was reviewed by the investigators to determine the adequacy of the focus group script, and no modifications were deemed necessary. After each subsequent focus group, a debriefing session was held with

#### What was known and gap

Emergency medicine (EM) residents are required to be supervised only by faculty physicians board-certified or board-prepared in EM or pediatric EM while completing an emergency department rotation, yet they might benefit from the perspectives of general pediatricians who commonly see pediatric urgent care patients.

#### What is new

A mixed-methods study of the effect of allowing EM residents to be supervised by attending pediatricians while caring for pediatric urgent care patients.

#### Limitations

Study was conducted at a single institution with pediatricians with skill and knowledge working in urgent care, which may not be generalizable to other institutions.

#### Bottom line

Permitting EM residents to staff with attending pediatricians is beneficial to EM resident education and patient care.

the facilitator to ensure consistency of interviews and to monitor for needed changes to the script; no further changes to the script were necessary.

Focus groups were inclusive of all EM residents rotating through the PEDUC during the study period and were not designed to stop with a saturation of insights. Since there is no established framework for understanding the educational experience of residents learning from attendings from different specialties while in the same clinical context, a phenomenological qualitative approach was used in which transcripts were inductively coded, and then, through consensus discussion, themes emerged to describe the experience of residents in this new model of supervision.

Three clinical content experts (M.R. [pediatric], J.B. [EM], G.R. [PEM]) received training from an institutional expert in the qualitative coding process. The 3 coders independently used an inductive coding process for the first focus group transcript with each coder labeling each statement with at least 1 code. A common set of codes was created through consensus discussion. The constant comparative method was followed with all subsequent transcripts that were independently reviewed by the coders. Additional codes were added and refined through iterative discussion, and previously reviewed transcripts had codes adjusted to reflect code changes. After the final transcript was reviewed, codes were organized into categories, and themes emerged through consensus discussion. To confirm the validity of the data, we used method triangulation by confirming focus group findings with data received by individual resident surveys, triangulation of sources by including data from attendings reported in the survey, and analyst triangulation by including coders with EM, PEM, and general pediatrics training backgrounds.

## Resident and Attending Survey

An 18-item survey was distributed to PGY-1, PGY-2, and PGY-4 EM resident participants and EM/PEM and attending pediatricians who worked in the PEDUC. Most items were adapted from a prior survey of residency graduates, but the final survey was not piloted prior to distribution. The survey (provided as online supplemental material) contained both free text and Likert scale questions addressing the effects of the staffing change on patient care, resident education, and work environment and was revised with input from an institutional expert in survey design. The survey was created prior to any focus groups and was distributed after completion of all focus groups; a total of 3 reminder emails were sent over a 3-week period. Survey participants were categorized as EM residents, EM attendings, PEM attendings, or attending pediatricians. Through an iterative review of the free text comments, a unique set of inductive codes were generated by the 3 coders (G.R., J.B., M.R.) involved with the focus group coding. Codes were deductively associated with the themes that emerged from the focus groups to determine whether any additional themes emerged from the survey data. The coders were blinded to provider category of the survey participants.

## Clinical Outcomes Data

To assess potential differences in patient care outcomes, the electronic health record was queried to determine length of stay (LOS), adherence to local clinical care guidelines (CCGs) with best evidence from cohort studies, and 48-hour return visits requiring subsequent admission. Outcomes were compared between patients staffed with EM/PEM attendings and those staffed with attending pediatricians. Head computed tomography scan use in minor head trauma, chest radiograph use in bronchiolitis, and administration of dexamethasone for croup were selected for CCG adherence, as there is strong evidence for ideal treatment of these conditions and reported variation in practice between EM and pediatrics physicians.<sup>3-10</sup> Minor head trauma was defined as blunt head trauma without altered mental status, seizures, high suspicion of non-accidental trauma, facial trauma suggestive of fractures, loss of consciousness, vomiting, or intoxication. Clinical outcomes were considered a secondary outcome, and an a priori power analysis was not completed.

The study was approved, and informed consent was waived by the Colorado Multiple Institutional Review Board.

## Statistical Analysis

Nominal variables were presented as percentages or proportions with 95% confidence intervals (CIs) and analyzed with either chi-square or Fisher's exact test. Continuous variables were presented as medians with interquartile ranges (IQRs) and analyzed with a Wilcoxon rank sum test due to nonnormal distributions. Descriptive statistics were calculated for all survey response data by respondent category. Likert data from the survey were dichotomized into positive (extremely satisfied/somewhat satisfied, strongly agree/somewhat agree, much better/somewhat better) versus negative/neutral responses. The analysis was performed with SPSS Statistics version 24.0 (IBM Corp, Armonk, NY).

## Results

Of the 25 711 patients seen in the PEDUC during the study period, 16 951 (66%) were PUC patients. Of 4419 PUC patients seen by EM residents, 3051 (69%) were supervised by an EM/PEM attending, and 1368 (31%) were supervised by an attending pediatrician. All EM residents managed at least 1 PUC patient under the supervision of an attending pediatrician during the study period.

### Qualitative Findings: Focus Group Results

Forty-five of 50 (90%) of the EM residents participated in 1 of 7 focus groups, and 73 codes were developed from the transcripts. Four themes emerged: (1) pediatricians have unique skills that complement EM physicians; (2) EM resident education improved; (3) patients may get better care with dual staffing; and (4) other PEDUC team members may have benefited from the change. Representative quotes within each theme are listed in the BOX.

*Pediatricians Have Unique Skills That Complement EM Physicians:* Attending pediatricians were noted to be more confident than EM attendings with clinical assessments of infants and young children, more thorough in nonemergent situations, and more knowledgeable about recent pediatric literature. Some residents commented that the teaching approach of attending pediatricians provided a very safe learning environment. Attending pediatricians were noted to have a more detailed or nuanced understanding of how parents and patients experience illness or what is considered in the range of normal signs, symptoms, and behavior for pediatric patients at different ages. Most codes in this theme were focused on diagnoses, content areas, and patient types that attending pediatricians added to the EM residents' learning by

**BOX Representative Quotes of Themes**

**Pediatricians have unique skills that complement emergency medicine physicians**

“There are weird rashes and things that are benign, but you get more insight when you talk with one of the pediatricians. Pediatricians are more able to address parents’ real concerns. I’ll evaluate a child and I’ll be like, ‘Good news, it’s not an emergency.’ (...) The pediatricians can actually counsel people on what they’re really worried about.”

“Staffing with the emergency attending, this isn’t kernicterus, they’re fine. Staffing with the pediatrician, ‘This is probably breast milk jaundice. Here’s some things you can do at home. Here’s what we can do to set up for lights at home, even though it’s not life threatening. Here’s when you need to follow up with your pediatrician.’”

**Emergency medicine resident education improved**

“I’d say it’s helpful to be able to staff with both because they have different approaches to similar complaints. And then we’re building a composite of how we want to practice, and it gives you an opportunity to utilize both of those approaches.”

“‘Hey I’m really worried about this kid for X, Y, and Z reason.’ And they say, ‘No we see this all the time.’ (...) Even really good ER docs who’ve been doing this a long time just don’t have that same level of training, specific to peds, and that same huge amount of experience with peds.”

**Patients may get better care with dual staffing**

“Whether you staff with the pediatrician or not, having them nearby to chime in on cases is incredibly valuable.”

“You would know you had a low-acuity patient who (...) doesn’t need a massive workup, you can get that rolling faster by staffing with a pediatrician.”

**Other PEDUC team members may have benefited from the change**

“I think it’s better for the peds residents too because they’re not staffing all their patients with a pediatrician and they can get some EM perspective and flow input, which I think they can benefit from, many of them.”

Abbreviations: ER, emergency room; peds, pediatrics; PEDUC, pediatric emergency department and urgent care; EM, emergency medicine.

providing a different perspective or approach than what they were exposed to through EM attendings (TABLE).

**EM Resident Education Improved:** Attending pediatricians made a substantial contribution to resident education in the domains of clinical reasoning, communication, and care coordination by providing a different perspective from other attendings. The care provided by attending pediatricians was felt to be similar to EM attendings, but attending pediatricians added a valuable perspective on how they counseled patients and families and how they thoroughly delivered anticipatory guidance around common pediatric illnesses.

**Patients May Get Better Care With Dual Staffing:** Residents noted that having an attending

**TABLE**

Focus Groups and Survey Results: Diagnoses, Content Areas, and Patient Types in Which Pediatricians Added to Emergency Medicine Residents’ Learning

Diagnoses
Child abuse
Bronchiolitis
Herpangina
Behavior concerns
Circumcision issues
Apophysitis
Colic
Neonatal jaundice
Rash
Umbilical cord issues
Ingrown toenail
Nursemaid’s elbow
Paronychia
Lumbar puncture
Urinary tract infection
Rare disorders <sup>a</sup>
Content areas
Pediatric ECG/radiologic studies
Vaccinations
Growth charts
Child stools
Infant stools
Developmental milestones
Medical history
Routine infant care
Fever in infant
Fever in young children
Patient types
Newborns
Young children
Anxious parents and patients <sup>a</sup>
Patients with complex pediatric illnesses <sup>a</sup>

Abbreviation: ECG, electrocardiogram.

<sup>a</sup> Only found in survey results and not in focus groups.

pediatrician working alongside an EM physician highlighted complementary skills. Perceptions of the effect on LOS were mixed. Some residents thought it made the visits longer but also felt staffing with attending pediatricians provided more complete care to the patients. Many residents commented that the overall throughput time of the department was faster after the change. Some noted that, with the less sick patients, attending pediatricians requested fewer tests than EM physicians did, resulting in shorter visits. Residents valued staffing acutely ill or injured patients with an EM/PEM physician. Residents valued the



autonomy in being able to choose with whom to staff patients, based on the perceived needs of the patient.

**Other PEDUC Team Members May Have Benefited From the Change:** By allowing EM residents to staff with attending pediatricians, EM attendings may have been able to staff more patients with the family medicine and pediatric residents in the department. Many felt this change created a more collaborative and cohesive provider group where patient care was discussed more often among attendings.

**Countervailing Opinions:** A few participants described negative opinions about having the ability to staff patients with an attending pediatrician. Some residents felt that staffing with attending pediatricians led to slower assessment and treatment of patients. Other comments noted that attending pediatricians may not be as good at managing adolescent patients who had a diagnosis more commonly seen in adult patients as well as patients with significant trauma or in need of acute resuscitation. Residents also noted that this model may not be generalizable to other sites given the extensive urgent care expertise of the attending pediatricians in the PEDUC.

### Qualitative Findings: Survey Results

**Advantages of EM Residents Staffing Patients With Pediatricians:** This question was answered by 60 of 63 respondents (95%) and generated 36 unique codes that occurred 157 times. All codes were consistent with 1 of the 4 preexisting themes, and most codes related to the theme “Pediatricians have unique skills that complement EM physicians.” As there were no codes inconsistent with the previously established themes, no new themes emerged.

**Disadvantages of EM Residents Staffing Patients With Pediatricians:** This question was answered by 55 of 63 respondents (87%) and generated 7 unique codes. Most respondents (44 of 55, 80%) reported that there were no disadvantages. Five respondents (9%) noted that high acuity patients were better staffed with EM physicians. Six disadvantages were mentioned once: concerns about EM scope of practice, teaching a practice pattern different from EM standard of care, ultrasound, attending pediatricians being slower than EM/PEM physicians, currently attending pediatricians not being permitted to staff, and attending pediatricians being not as well trained to manage patients with significant trauma. Due to the variability and low frequency of codes found in the disadvantages, no new themes emerged from these codes.

**Type of Patient or Patient Population Served Better or Worse When EM Residents Chose to Staff Patients With Pediatricians:** This question was answered by 47 of 63 respondents (75%) and generated 23 unique codes that occurred 80 times. Codes related to conditions “better staffed by pediatricians” were similar to those found in the focus groups, and only 4 additional diagnoses/types of patients were added to the list generated from the focus groups (TABLE). Five codes (22%) were categorized as those for which the presence of an EM/PEM physician would be better and all were only mentioned once: older teenagers, patients requiring ultrasound, patients with abdominal pain, headache, or severe respiratory distress. These categories were deemed consistent with the theme “Pediatricians have unique skills that complement EM physicians,” and hence, no new themes emerged. There was a comment box titled “Other Comments,” from which we received 13 responses. Eleven of those responses (85%) were in favor of keeping this staffing model. One respondent (8%) commented about rules, and one comment (8%) stated that the PEDUC has too many providers, diluting the learning for residents.

### Quantitative Findings

**Survey Results:** The overall survey response rate was 72% (62 of 86), with 66% (33 of 50) of residents responding, including PGY-1 (76%, 13 of 17), PGY-2 (75%, 12 of 16), and PGY-4 (57%, 8 of 14), and 81% (29 of 36) of attendings responded, including attending pediatricians (83%, 5 of 6), PEM attendings (100%, 6 of 6), and EM attendings (75%, 18 of 24). All but 2 of the residents and attendings who completed the survey left at least 1 comment in a comment box. Nearly all survey respondents (97%, 60 of 62) were extremely satisfied or somewhat satisfied with this staffing model (provided as online supplemental material).

**Clinical Outcomes Data:** Median LOS was slightly shorter for those patients supervised by attending pediatricians as compared with those patients supervised by an EM/PEM attending—114 minutes (IQR, 83–159) versus 128 minutes (12% reduction; IQR, 91–174;  $P < .001$ ). Practice patterns in areas where there are best evidence/CCGs were not different between patients staffed with an attending pediatrician versus EM/PEM attending: head computed tomography obtained for minor head injury 8% (95% CI 2–21) versus 6% (95% CI 2–13,  $P = .72$ ), chest radiograph in bronchiolitis 0% (95% CI 0–18) versus 18% (95% CI 2–52,  $P = .13$ ), and dexamethasone administration in croup 91% (95% CI 72–99)

versus 88% (95% CI 77–94,  $P = .62$ ). There was no difference in the rate of 48-hour return visits requiring admission ( $P = .69$ ) between patients supervised by a pediatrician (2.2/1000 visits, 95% CI 0–7.1/1000 visits) versus those managed by an EM/PEM attending (1.6/1000 visits, 95% CI 0–5.2/1000 visits).

## Discussion

To our knowledge, this is the first study to assess the educational impact of integrating clinical teaching attending physicians from different specialties into a core educational rotation for residents. As there were no established theories regarding the benefits or risks of this approach, we chose a phenomenological approach, rather than a grounded theory–based approach, to the qualitative research design to describe the experience of EM residents staffing patients with an attending pediatrician. This model of staffing patients was overwhelmingly supported by EM residents as well as by EM, PEM, and pediatric faculty.

We found that physicians in the PEDUC perceived improvements in both patient care and EM resident education that seemed to be rooted in the different perspectives offered by attending pediatricians compared with EM attendings. Residents also mentioned that, although the medical decisions were very similar between the specialties, the attending pediatricians focused more on aspects of care that affect the patient experience like communication, anticipatory guidance, and calming anxieties of patients and family members. Focus group participants mentioned that attending pediatricians may be less confident in managing acutely ill patients or patients with diseases that are more prevalent in adult populations. These differences in expertise likely reflect different emphases and experience in the medical training of these 2 specialties and were perceived as complementary by the residents and attendings. Since our themes emerged from self-reported data by study participants and there was no objective measurement of changes to learning outcomes, it is unknown whether there were measurable improvements in EM education or only the perception of improvement. Our presumptive theory is that residents trained by different specialty physicians in areas in which there is a shared scope of practice develop greater sets of clinical skills that can be used to improve patient care and patient experience.

This study was conducted at a single institution, limiting its transferability. This model may not be generalizable due to the skill and knowledge of our attending pediatricians. Urgent care centers are sometimes staffed by physicians in their first several

years after residency before pursuing further training or as a moonlighting opportunity for physicians whose primary practice is not based in the ED or urgent care. In contrast, our attending pediatricians have a mean of 12 years of experience and work only in this emergency/urgent care setting with no turnover in the past 6 years. We believe, for this staffing model to benefit EM resident education, the attending pediatricians must have a breadth of experience and commitment to urgent care practice.

Although not a primary focus of our study, we evaluated whether certain clinical outcomes were significantly different between attending pediatricians and EM attendings. The outcomes of interest in our study did not differ based on supervising attending, except that patients staffed with an attending pediatrician had slightly shorter LOS. The shorter LOS may be explained by attending pediatricians ordering fewer studies and tests for PUC patients, which is consistent with data showing that pediatricians ordered fewer tests on urgent care patients than EM/PEM physicians.<sup>11</sup> Allowing residents to choose their supervising attending may have introduced a selection bias as they may have chosen an attending pediatrician to supervise the lower-acuity patients who were able to be discharged more quickly. However, the only patients included in the analysis were those triaged as urgent care patients, who, by definition, are lower acuity than emergency care patients. Additionally, there were only a few patients with the disease processes we chose for adherence to best evidence/CCGs, which may have limited our ability to detect a difference in the clinical care provided. The lack of clinical outcome differences echoed the focus group findings, in which EM residents reported that they thought patient care was the same or better for PUC patients staffed with attending pediatricians.

Attending pediatricians added complementary education and patient care to that of EM/PEM physicians, but did not supplant the education provided by the EM/PEM attendings. Pediatricians provided the greatest educational benefit to EM residents around non-emergent diagnoses specific to younger pediatric patients. Although attending pediatricians were not felt to be appropriate as the supervisor for certain patients (eg, patients requiring emergent or urgent resuscitation), residents reported that attending pediatricians were helpful during resuscitations as members of the care team, adding advice regarding diagnosis and management, particularly with young infants and patients with chronic or complex medical histories. These findings suggest that having opportunities to staff patients with both specialties may be a key factor in improving resident education.

Regulatory and cultural divides between health care professionals with a shared scope of practice were noted by the Institute of Medicine's *Crossing the Quality Chasm*<sup>12</sup> report as a significant barrier to educating a safer workforce. Notable practice differences have been observed in other areas of medicine with a shared scope of practice, including schwannoma treatment between neurological surgery and otolaryngology, pediatric discoid lupus treatment between pediatric dermatologists and pediatric rheumatologists, and cryptorchidism treatment between pediatric surgeons and pediatric urologists.<sup>13–15</sup> We believe exposing learners to different approaches to illnesses treated by providers with different training can provide rich educational opportunities to expand a learner's perspective and possibly lead to a more nuanced and less rigid approach.<sup>16</sup>

We hypothesize that training residents with different specialty physicians in areas in which there is a shared scope of practice may facilitate a more well-rounded and complete set of clinical skills, which, in turn, can lead to improved patient care. Based on our findings, the ACGME RC for EM approved the continuation of this staffing model at our institution.

## Conclusions

Permitting EM residents to staff with attending pediatricians is beneficial to EM resident education and patient care where there is a dyad of EM/PEM physicians and pediatricians. Residents valued and respected the expertise provided by the experienced pediatricians; they embraced this staffing model and wanted to ensure it continued.

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