

“It’s Kind of a Rite of Passage”: An Exploration Into Residents’ Experience of Learning in a Critical Care Setting

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ABSTRACT

Background Many trainees complete rotations in intensive care units (ICUs), but little is known about how ICU rotations impact learners. Understanding residents’ experiences in ICU rotations is a crucial step toward improving resident education and understanding the consequences, intended and unintended, of critical care learning.

Objective We performed a qualitative study to understand how pediatric and emergency medicine residents experience a pediatric ICU (PICU) rotation.

Methods For this phenomenological study, we explored residents’ experiences with critical care learning by focusing on the high-stakes, emotionally charged PICU environment. Semistructured interviews were conducted with 12 residents after their first PICU rotation from July 2019 through March 2020. Data were analyzed through line-by-line coding, serial discussions, and consensus meetings. Finally, emergent themes and convergent narratives were constructed around the resident PICU experience.

Results Residents perceived the PICU as a challenging environment for independent, self-driven, and active learning. They suffered adverse psychological effects, leading some to “give up” and many to experience feelings consistent with acute traumatic stress. Despite these challenges, residents described their PICU rotation as a “rite of passage” and reported increased comfort with caring for “sick kids.”

Conclusions Residents describe their PICU rotations as intense experiences that result in increased physician comfort. However, they also endure psychologically traumatic experiences that may hinder them, and the independent practitioners they become, from caring for certain types of patients in the future.

Introduction

Many residents rotate through an intensive care unit (ICU) during their training.¹⁻³ Previous research into resident ICU experiences has focused primarily on the optimal delivery of critical care content, with studies describing the application of asynchronous e-learning, learning passports, flipped classroom models, reflective learning, and high-fidelity simulation.⁴⁻¹⁰ Recent studies have also reported on the negative effects on residents of rotating through the ICU, such as increased incidences of depression, emotional exhaustion, moral distress, and burnout, during and after their ICU rotations.¹¹⁻¹³ However, few studies have directly explored the resident experience of rotating in a critical care setting, which is a crucial next step toward understanding how residents learn in the ICU and what might

improve previously reported negative effects of ICU training on resident wellness and professional development.

We sought to explore the resident ICU experience by focusing on pediatric medicine (PM) and emergency medicine (EM) residents rotating through the pediatric ICU (PICU) for the first time. The ICU is a unique, technologically driven, high-stress environment, where clinicians grapple with critical illness, extreme social and ethical dilemmas, and end-of-life care.¹⁴ PM and EM trainees represent various personality types, have trained in multiple settings, and include a diversity of learner characteristics.¹⁵ Additionally, the PICU exemplifies a high-stakes training environment, where caring for critically ill children and their families adds an additional layer of emotional intensity. Prior to a PICU rotation, for example, many residents have not yet witnessed a patient death.^{16,17} However, in the PICU, 2% to 5% of their patients will die, most commonly due to acute abusive head traumas in previously healthy children.^{18,19}

For these reasons, studying PM and EM learning experiences in a rich environment such as the PICU

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may shed light on the consequences to residents—intended or unintended—that occur during an ICU rotation. The knowledge gained from this exploration may be applicable to all critical care environments’ curriculum development, educational practices, learner assessment, program evaluations, and decisions regarding residency requirements, especially regarding attempts to tackle any negative effects of ICU training on wellness and professional development.

Methods

Qualitative Approach and Research Paradigm

This qualitative study applies an interpretivist paradigm and a phenomenological approach to explore the resident PICU experience.²⁰ While phenomenology is broad, we used hermeneutic phenomenology, as described by van Manen because it is well-suited to study learners’ experiences in a way that can bring us closer to their worldviews and ensure our educational interactions with them may be more tactful.²¹ As such, hermeneutic phenomenology provides avenues for generating powerful pedagogical knowledge.²¹ We aimed to develop a rich description of PM and EM residents’ behaviors in and reactions to the PICU, which critical care educators can utilize to more effectively guide trainees through the PICU.^{22,23} We strove for results that provide illuminating, meaningful, and impactful insights, which van Manen argues the strength of any phenomenological study must be based on.²⁴

This was a preplanned, secondary phase of a previously published study, where we had interviewed residents prior to their PICU rotations. The first investigation used grounded theory methods to explore residents’ expectations, perceptions, and preparations for the PICU.¹⁶ This study focuses on the residents’ lived experience of rotating through the PICU. Data collection for both studies occurred simultaneously, and we allowed insights from our first study to influence iterative revisions to our interview protocol for this study.

Environmental Context and Setting

We conducted our research in an academic children’s hospital with level 1 trauma designation, which is located in the Pacific Northwest and has EM and PM training programs with 11 and 18 residents per year, respectively. During their second postgraduate year, PM and EM residents are required to rotate together through a 20-bed, quaternary PICU.²⁵ Prior to this, a minority had experienced the PICU as medical students, while all EM residents had rotated through adult ICUs.¹⁶ In the PICU, residents care for medical and postoperative surgical patients for 3 to

KEY POINTS

What Is Known

Pediatric and emergency medicine residents frequently train in the high-stakes, emotionally charged pediatric intensive care unit (PICU).

What Is New

In this qualitative study of residents’ first ICU rotation, residents perceived the PICU to be challenging and associated with suffering and psychological stress, but the PICU also increased their comfort in caring for sick children.

Bottom Line

For some pediatric and emergency medicine residents, the PICU is a traumatic experience that may affect future practice choices.

4 weeks, alongside 2 third-year PM residents. In this PICU, attending pediatric intensivists remain in-house at all times. Additionally, pediatric cardiologists and cardiothoracic surgeons comanage congenital cardiac surgical patients. Residents serve as “first call,” or primary point-of-contact, for all patients, within a multidisciplinary team of nurses, fellows, pharmacists, respiratory therapists, dietitians, pediatric nurse practitioners, consultants, and patients’ families.

Research Team and Reflexivity

At the conception of this research, A.J.K. was a first-year pediatric critical care medicine fellow. He began interviewing the residents in his second year, analyzed the data as a graduating fellow, and is currently a junior attending in another academic PICU located in the Southwestern United States. B.W.S. is an attending outpatient pediatrician, and K.F. is an attending pediatric intensivist. S.P.K. is a PICU nurse practitioner who manages the medical student, nurse practitioner, physician assistant, and resident PICU rotations. Lastly, L.M.Y. is an attending pediatric EM physician, the immediate past EM residency program director, and the current Vice Chair for Education. All bring their experiences as graduated trainees and current pediatric health care professionals, as well as graduate medical education faculty, to this research.

Participant Recruitment and Data Collection

A.J.K. invited all second-year residents who rotated in the PICU from July 2019 through March 2020 to participate in an hour-long, one-on-one, post-rotational interview. Interviews were conducted within the first few weeks after residents completed their rotation; however, due to scheduling difficulties, some were delayed up to 6 months. Interviews took place just prior to and during the initial months of the COVID-19 pandemic.²⁶ This convenience sampling strategy, with

no exclusion criteria, aimed to capture our most current resident PICU experience. Consequently, A.J.K., S.P.K., and K.F., all precepted these residents in the PICU, while L.M.Y. supervised them as the EM residency program director, during the study.

We developed an interview guide with the intent to explore the entire resident PICU experience. Items were developed based on content areas from our initial study, iterative discussions among our team, and a literature review, to optimize content validity. A.J.K. began each interview by asking, “So, how was your rotation?” He then explored the residents’ PICU-specific learning processes, encounters with bad patient outcomes or deaths, overall wellness during and after their rotation, and key lessons or takeaways. Foremost, A.J.K. encouraged residents to relay stories and personal memories from their rotation. He ended each interview by reviewing the residents’ responses from their pre-rotational interviews to gauge how their perspectives may have changed. As the experiential meaning emerged, additional prompts were iteratively incorporated into future interviews (online supplementary data).

A.J.K. audio recorded, transcribed, and pseudonymized all interviews. Interviews that could not be completed in-person, due to COVID-19 social distancing restraints, were captured via Webex, a secure online video-conference platform. Unlike other research methodologies, phenomenology utilizes smaller sample sizes to ensure the rich mosaic of experiential data remain manageable and appropriately represented.²¹ After 12 interviews, our team determined thematic sufficiency had been achieved, as no new themes were emerging. We felt the ample dataset justifiably encapsulated the resident PICU experience and, therefore, ended participant enrollment.

Data Analysis

After conducting all interviews, A.J.K. randomly divided the transcripts between B.W.S., S.P.K., and K.F. He met with each co-investigator, one-on-one, to discuss each. For reflexivity, these discussions included reflections on personal experiences and reactions. On average, each meeting consisted of 1 to 2 hours of exposition. A.J.K. took notes and maintained an audit trail from these conversations. Afterward, he shared all impressions with the research team via email. Over the course of 3 consensus meetings, we inductively organized our insights into a coding scheme. Using QDA Miner Lite (Provalis Research), each transcript was then doubly coded and examined for idiosyncratic language, by A.J.K. and either B.W.S., S.P.K., or K.F., who were assigned

different transcripts than before. The team convened once more to finalize the overall themes and exemplar quotes that characterized the resident PICU experience.²⁷

Consistent with various phenomenological traditions, we also constructed composite phenomenological examples to illustrate each theme, by weaving verbatim quotes from the dataset together into representations of what rotating through the PICU is like for residents. These serve as rhetorical devices created to evoke deep appreciations of the phenomena central to each theme.²⁸ In the presentation of results, the phenomenological examples represent the residents’ voices, while the descriptions of themes contain the authors’ investigational analysis.

To ensure scientific rigor, A.J.K., S.P.K., K.F., and B.W.S. analyzed varying transcripts, while L.M.Y. remained blinded to all transcripts, providing an additional layer of interpretive clarification and trustworthiness. We invited nonparticipating residents and a pediatric residency program director to read our manuscript, as a form of indirect member checking. Finally, we presented our findings at 2 pediatric department-wide seminars, using that feedback to help refine our conclusions.²⁹ Upon completion of our principal draft, each team member reviewed and revised the manuscript until all could attest to its fidelity to the participants’ voiced experiences.

The Oregon Health & Science University Institutional Review Board approved this research (IRB #20134) with a waiver of written consent.

Results

After their first PICU rotation, residents described experiences evoking the following themes: (1) Trainees perceive the PICU as a challenging environment for independent, self-driven, and active learning, due to the fast-paced, high-stakes, and stressful work climate; (2) Trainees suffer adverse psychologic effects from their PICU experience, leading some to “give up” and/or endure a period of post-PICU acute traumatic stress; and (3) Despite the challenges in the PICU, trainees report increased comfort with caring for children who are critically ill, or “sick kids,” at the completion of their rotation. All initial draft readers and audiences remarked on how these findings validated their own past ICU training experiences. The themes are described below and summarized along with exemplar quotes in the TABLE. BOXES 1 to 3 present the phenomenological examples for each theme.

The PICU as a Challenging Environment for Independent, Self-Driven, and Active Learning

Residents describe learning in the PICU as incredibly intense. The PICU feels like a completely different

TABLE

Summary Descriptions of Essential Themes and Related Exemplar Quotes

Theme	Summary Description of Theme	Exemplar Quotes
The PICU as a challenging environment for independent, self-driven, and active learning	The PICU is a complex environment where many concepts and tasks lay out of reach for rotating residents. As lessons become unattainable, residents assume an observership role, learning passively while completing their work.	"There're always constant interruptions. Like ... you're reading something about this one kid you're trying to take care of, but then your other kid with [diabetic ketoacidosis] is now altered with a concern for cerebral edema, and you have to go and do that." P4 "All the different modes that are on these new vents and why we're choosing certain modes ... a lot of things just happen really quickly and you're not always part of all the decisions. So then you'll just be on a new vent mode and you don't really know why ... There's too much happening all at once." P11 "It was surprising how the time went by, because it felt like we were constantly doing things." P8 "Decisions would be made and then you would have to try to jump on the train as it was like leaving the station to figure out what the hell was actually happening." P3 "I also feel like a lot of learning happened actually when I was typing up my transfer summary ... because it provides a good overview of like, 'Oh, this is what we did, this is why we did it, and this is the outcome.'" P1 "I think I was learning like just by osmosis." P11
Adverse psychological effects of the PICU experience	Residents suffer from various forms of psychological trauma, or "adverse learning experiences," in the PICU. They become emotionally withdrawn and demotivated. After their PCCM rotation, residents endure a period of acute traumatic stress.	"We had what sounds like an unreasonable amount of kids pass [away] while I was on." P4 "I definitely felt very little agency ... Sometimes it felt kind of pointless to come to work. And it was not a good ratio of time to learning or feeling like I was affecting patient care in a positive way ... Part of why I felt bad during my PICU rotation was because I felt like I wasn't doing a good job. And that made me feel sad." P12 "One time, cardiology started talking about how to manipulate a pacemaker, and I was like, 'That's really interesting. I'm never going to do that ... I'm probably going to call you before I do anything at the bedside.'" P9 "I just started to not care what they thought basically, which didn't feel awesome, but ... at some point the exhaustion hits you and you're just like, 'Alright we're just going to do this. It's fine.' It wasn't beautiful but somebody will tell me I'm wrong at some point." P6 "It made me not want to take care of the kid, which I really never like to think about that—I never want to feel like I don't want to take care of a patient for something that seems relatively trivial. And for me, that happened a lot." P2 "I was the person that finished on a long call. And like I said, a patient died on that last morning. So I really just needed a physical and emotional break ... for about 3 weeks." P9 "Things catch up with me later ... The last couple of weeks I've been thinking about it more and been sad about it ... I've just had dreams about like those scenarios happening again." P11

TABLE

Summary Descriptions of Essential Themes and Related Exemplar Quotes (continued)

Theme	Summary Description of Theme	Exemplar Quotes
		"I guess dysthymia? ...I wouldn't say like a full-blown depression, but it just kind of felt like burnout ... I slept a little bit longer and probably had a few more beers than I usually do on my baseline week ... I was [also] probably a little bit more agitated, especially trying to get out of work sooner ... I think a couple of my attendings might have noticed ... They would try and teach me stuff and I'd be like, 'Oh, okay cool,' instead of like, 'Oh tell me more' ... They probably noted that it came off as a little bit like I don't care." P5 "Everyone should get a vacation after the PICU." P12
Becoming more comfortable with caring for sick kids	Residents journey through the PICU, learning to appreciate "sick" versus "not sick," and gain a boon of comfort around critically ill children.	"There was a lot of stuff, over the course of the month, you become familiar with and realize that, 'Yes this is an entirely different world.'" P7 "There's a lot of physiology and pathophysiology and things you learn more acutely in the PICU." P8 "I kind of learned your language ... it allows me to talk to you over the phone and for us to speak the same language and understand each other of like, 'This is the kid I have in my ED.' And I can explain that in a way that you understand because I went through this rotation." P4 "I got a better sense of what sick kids versus not sick kids look like ... [and] I feel a little bit more comfortable around sick children." P12 "It's kind of a rite of passage and in a way you feel a little bit good that you made it through." P12

Abbreviations: PICU, pediatric intensive care unit; P, participant; PCCM, pediatric critical care medicine; ED, emergency department.

world, one that intimidates them by the gravity of its work and constant flashing alarms. During their PICU rotation, everything is weight-based and titratable, and everyday feels frenetically paced, protocol-driven, and ethically charged. So much happens at once. Work-related tasks, such as writing notes, checking off to-dos, placing orders, and ensuring all lines of communication remain open between the PICU and many consulting teams, generate high extraneous cognitive loads, especially under the barrage of constant interruptions. Thus, it feels as though learning must occur somewhat passively in the PICU, without conscious effort, through random exposures to critical concepts over the duration of their work.

For instance, during their PICU rotation, residents are supported by a variety of team members who act as local guides, mentors, and allies. Residents rely on them to provide supplementary lessons and on-demand answers to their clinical questions, rarely identifying textbooks, journal articles, or other online references, as chosen resources. However, due to the high acuity of patients' conditions, these individuals also often prevent residents from assuming ownership of the clinical

management. As a result, residents feel they must adopt an observership role during their PICU rotation.

Though residents resent this role regression, they gain important lessons from such vantage points. Residents enjoy listening to attendings and following their thought processes, especially while they converse with other physicians. Additionally, residents take part in end-of-life care conversations with families, where they learn to model the compassionate communication styles of PICU clinicians. Finally, residents observe code events, where the composure of attendings, fellows, and nurses leaves a lasting impression.

According to residents, the main priority during their PICU rotation seems to be the clerical work they need to complete, then bedside patient care, and finally learning. Still, in the fast-paced PICU, residents acquire a new appreciation for alternative educational opportunities, which they previously perhaps thought of as undesirable, and recognize how learning often occurs simultaneously with the work they must complete. For instance, residents acknowledge how writing daily progress notes or patient transfer summaries helps them to organize their thoughts.

BOX 1 Composite Phenomenological Example to Illustrate Theme 1: The PICU as a Challenging Environment, the PICU as a Fast-Paced, High-Stress Learning Environment

In a PICU, the kids are so complex. I'd suddenly find my patient on a new ventilator mode and not really know why. The fellows and attendings were always doing stuff, and even though you were supposedly "first-call," it was tough to keep up. And there were nonstop interruptions. I'd get inundated, and it would make it hard for me to just sit and learn one thing at a time. Even to make time for an hour lecture from the fellow, we were just too busy.

Ideally, I would have had time to look things up and have better-formed plan to present on rounds, but I would only be partway through presenting when I'd feel I could say, "This is what I'm seeing, and this is what I want to do." Rounds could take a long time. I wanted to be complete but didn't know what's unimportant. That alone was stressful. Everyone just wanted to get through talking about the patients, so we could move on to caring for them.

There was also no time to sit and read about things before rounds and then not always time to sit, read, or digest anything after rounds. The bulk of the learning happened on rounds listening to the discourse between the cardiac PICU attending, the cardiology attending, and the PICU and cardiology fellows. I would always try to listen carefully though to how other people wanted to manage their patients and hear the attending's feedback, because on rounds you really needed to pay attention, even if you weren't the one presenting. Rounds was a team effort—one resident put in orders, another updated the handoff, and all while someone else pulled up the images. Those skills took a lot of brain power and energy.

In the PICU, I mostly learned from the people around me, the attendings, nurses, pharmacists, dieticians, and respiratory therapists. I relied on them more than even my own readings. For instance, if something changed at the bedside with a patient, a nurse would come and ask me about it. And if they were concerned, I knew I should be concerned too. I also gained a lot from observing how calm people can be when there's something that would potentially be very stressful in another setting. Some learning happened while doing the work. The notes, for example, were helpful to organize my brain. Typing up transfer summaries provided me with a good overview. Also, while discussing interesting or complex cases with consulting teams, I heard first-hand the way specialists think.

I still felt the PICU rotation to be a little too hands off. I wasn't involved in almost any bedside procedures. I had multiple patients who coded, and I held the bag-mask. But otherwise, I just watched the attendings put a chest tube in a cardiac kid and another place a central venous catheter, while they sort of explained things while they were doing it. I did see how the attendings communicated with family. Though that was slightly uncomfortable for me. I almost felt like I was intruding on something very personal.

Honestly, it was hard to take ownership of patients in the PICU. Sometimes, it was more the nurses' willingness to allow me ownership of my patients. They would often go straight to the fellow or attending, decisions would be made without me, and nobody would come back and tell me the plan. That made me feel like I had to try to jump on the train as it was leaving the station. I would also try to be nosy and listen in when attendings were talking to referring physicians over the phone or to each other.

With a super protocolized patient though, you knew what to expect and could say, say, "Okay I've got my to-dos checked, now maybe I can focus on learning." To get work done, I had to put my learning second and patient care first. Eventually I learned to finish that H&P note later or ask somebody else to put orders in while I took care of the patient at the bedside, which was ultimately where I learned the most. And with those patients that had only one problem, I eventually was able to gear my presentation to that one active issue. Even at the end though, for some things, I had to not even try to think about why we were doing something. For instance, with the sedation protocol, I never actually knew what it was. We would just say on rounds, "RESTORE initiated," and I'd be like, "Alright. Cool."

Abbreviations: PICU, pediatric intensive care unit; H&P, history and physical.

They also gain experiential knowledge while listening to other residents' management plans, and subsequent attending feedback, during rounds. Finally, lessons solidify after caring for the same pathologies multiple times.

Adverse Psychological Effects of the PICU Experience

For residents, rotating through the PICU can be particularly difficult. Many describe feeling the most depressed while on their PICU rotation. At a baseline, residents see multiple tragic cases. Some of these encounters can feel further complicated by medical errors, conflicts between medical teams, or challenges with patients' families. Residents may also witness patient deaths that are both unexpected and

upsetting to them. Though they recognize the negative effects these encounters have on their attitude, mood, and ability to learn, residents attempt to maintain composure and defer processing these traumas to a future time.

Residents also describe stressors unrelated to their patients' clinical states. For instance, when residents enter the PICU, some report a demoralizing decrease in autonomy. They feel like medical students again, regarded only as a repositories of patient data. Sometimes, while presenting on rounds, attendings repeatedly interrupt, challenge, or even critique them in front of many people. Eventually, residents may begin to doubt whether they meaningfully contribute to patient care. They relay a tendency to quit and express disappointment over becoming the type of disengaged learner they never envisioned themselves

BOX 2 Composite Phenomenological Example to Illustrate Theme 2: Adverse Psychological Effects of the PICU Experience

Four of my primary kids died during those 3 weeks. I would maintain things at work and get upset at home. For one patient, I found out while walking into work the next morning. They were already cleaning his room. I didn't have time to process his death or say goodbye. I had to get back to work. I saw another patient's external cerebral ventricular drain fill up with blood. Next thing I knew, we were all shut out. I didn't really want to debrief what happened in that moment. My anxiety was high. I was in fight mode basically, and trying to be emotional wouldn't work. For another kid who was getting sicker, the family ultimately decided to redirect care. The attending I was with told me, "Stay out of it. Give them space. I'll handle this death stuff." It felt like a slap in the face not to participate in that part of their care. A pre-teen kid died from an intentional drug overdose, and there were 2 other kids of similar ages that that showed up that night due to drug overdoses. I texted a friend of mine who has a 13-year-old daughter, saying, "Oh god, I'm worried ... I don't feel good. This is heartbreaking." I really didn't feel quite like myself. I couldn't explain what I was going through to the nonmedical people I was meeting up with. Talking about a 7-year-old who unexpectedly died is just too unspeakably tragic for most people. It's basically taboo. My family had no idea of what I was doing that month, because I didn't want to burden them. Instead, I kept things vague and tried to protect them. I intentionally didn't attend any of the departmental didactic sessions that month, either. I was in such a weird, dark place, it didn't feel right to be around my co-residents. Essentially, I felt removed from the rest of the world, even when I was outside of the PICU.

In the PICU, parents would get really frustrated and took it out on us basically saying, "I don't like residents, and I don't want you to take care of my child." One night, I accidentally gave a kid too much insulin. It was around 4AM. I was doing the math and kept getting interrupted by people for other things. I forgot to divide by 2 or something. The patient was fine, but I just felt like crap. Also, I was so stressed out about presenting because I knew I was going to get interrupted. One time, I got chastised in front of everybody. Cardiologists would pimp me on things, and I'd be embarrassed answering wrong in front of 15 people. I thought, "Why was I even bothering when it was obviously so far out of my expertise? I'm never going to manipulate a pacemaker without calling one of you to the bedside, first." So, I didn't always feel like I was affecting patient care in a positive way. I felt very little agency. Towards the end, there were days it felt pointless to come to work. It was hard to feel involved and like it mattered being there. I stopped putting as much energy into pre-rounding. I just clicked the little checkboxes. Part of why I felt bad during my rotation was because I felt like I wasn't doing a good job. It became very daunting to show up every morning and try to present when I knew nothing about the patient's physiology. It just felt soul crushing. I understood that sometimes people were in a bad mood, but when everyone was in a bad mood, I'd think, "Uch, I don't want to learn." There were even times I got so frustrated it made me not want to take care of a kid.

I just tried to keep going and get through everything, and at the time I felt tired but fine. But afterwards, things caught up to me. I finished my PICU rotation on a 24-hour call. For the next 3 weeks, I felt numb, drained, and exhausted—physically, mentally, and emotionally. I had planned on starting some research, but I was totally burnt out. I experienced dysthymia, had decreased energy, slept a little bit longer, and probably had a few more beers than I usually do. I thought I would want to talk about the hard stuff with the counseling center, but, when it was actually over, all I wanted was to put it all in a box on the shelf to deal with later, or never. Still, I ruminated a lot about the PICU cases I saw, mostly while I was walking to work or at home doing other things. I had weird stress dreams about one of my kids who was really sick, or the horrible scenarios I had witnessed, where I would call for help and no one was there and there were labs I needed to follow up on. I felt kind of helpless, but also tried not to reminisce on things that could've gone better. I just wanted to find closure, wrap my head around it, and hopefully be done with it. It took a few weeks after the PICU rotation to regain the level of energy I rely on, and interest in doing the things that normally give me joy. I really didn't want to come back to work. Unfortunately, I had to, so I was sort of there, just fed up with people. I was no longer there to learn. I was more there to put in the time and then get the hell out of there. Some residents have a 3-week independent study elective after the PICU, to really recuperate without a lot of clinical responsibilities. Without that wash-out period, it's natural to remain a little more irritable, pessimistic, and cynical, to the point where it certainly affects work.

Fortunately, the past few weeks have been a lot easier for me, emotionally speaking, because I'm in the trauma ICU now.

Abbreviations: PICU, pediatric intensive care unit; ICU, intensive care unit.

to be. Likewise, when different attendings recommend contradictory treatment plans, residents express a sense of withdrawal and focus on tasks (eg, placing orders), rather than learning.

Moreover, residents seem to endure a form of emotional isolation during their PICU rotation. Even if they could convey the inexplicable occurrences to friends or loved ones, who often lack advanced medical literacy, they worry whether discussing tragic topics, such as dying children, with their support systems would be considered too sad, burdensome, or taboo. In this way, learners describe feeling compelled to protect others from potential ricochet traumas.

Residents also admit to avoiding critical emotional debriefs and residency educational events, due to fears of potentially retraumatizing their co-residents, who have completed a PICU rotation, and needing to return to the PICU immediately ready to get back to work.

In addition to these events—or perhaps as a result—residents report feeling physically and emotionally exhausted after completing their PICU rotation. They convey a period of decreased energy, apathy, anhedonia, and sleep disturbances. They suffer invasive thoughts and dreams and enter their next rotation feeling emotionally labile and irritable. These

BOX 3 Composite Phenomenological Example to Illustrate Theme 3: Becoming More Comfortable With Caring for Sick Kids

The PICU was an entirely different realm. It always felt like this brightly lit place with constant alarms and rooms you could see right into. The PICU is also a very difficult world. Most of the upper residents told me to prepare myself, by saying, "You're going to see really sad situations." With adults, I know I can depersonalize things and say, "This adult made certain choices." But kids, you can't write them off as easily. Still, the PICU was a great place to learn about physiology, pathology, and things we don't necessarily think about all the time in other places. At the bedside in the PICU was where I began to understand more about where to start.

For the first couple of days, I didn't really understand what everyone was talking about. I felt lost on rounds. Fortunately, everyone in the PICU was so collaborative and helpful. The rotation essentially felt like a shared experience. Residents functioned more as a team than individuals. We also had a lot of backup in the PICU. Eventually, I kind of learned how intensivists talk and the basic framework for how to approach a sick kid that might go to the PICU. Now, I can talk with them over the phone, speak the same language, and we understand each other. I can try to pick their brains and see what I should start with to optimize my patient. And when a kid comes to the wards after the PICU I know what to expect when it comes to what happened.

Dealing with children and taking care of kids who are dying, though, is definitely still not an experience I'd had before the PICU. We extubated one patient around sunrise, in the courtyard, after waiting for everyone to say their goodbyes, which was sad but really special too. I had never witnessed anything like that before. I'd watched a couple of deaths, but they were resuscitative attempts. I had not been in a situation of taking away life support. Anyway, that happened around 6:00 in the morning. I then had to rush to pre-round on my other patients and join the team for rounds right afterwards. That felt really weird and hard, but that was just the nature of the PICU, where everyone immediately jumps right back into things.

One of the most important takeaways from the PICU rotation was essentially learning to recognize "sick" from "not sick." I was able to solidify that understanding for what a really sick kid looks like by seeing a lot of them there. I learned how to pick up on the subtle signs, and now I know how to manage them—at least initially—while I contact the experts. I also feel more confident about going back to the wards as a senior resident on nights, knowing when I should be worried about a patient and when I should not be worried about a patient. It's also helpful to just know people down here a little bit and know you have people you can talk to if you're worried about a patient.

One night towards the end of my PICU rotation, the nurses came saying, "This patient's pressures are tanking. What do you want us to do?" By that point I knew enough to get things started. Afterward, I called my attending, who said, "That sounds great," and went back to sleep. I realized then I had actually learned something. When I returned to my outpatient pediatric continuity clinic, I was just bored, which is not what I was expecting to feel. I remember one of my clinic attendings said, "Oh that kid was really sick." I felt that they weren't that sick, after just being in the PICU. It felt different than before, especially my perspective on a sick kid.

The PICU rotation is one of the notoriously hardest and least-liked rotation for us; however, it's kind of a rite of passage, and, in a way, you feel good that you made it through. When I went back to the emergency room, I was super relieved to return to a more familiar environment. I'll always feel uncomfortable around the sickest children, as I should. But overall, what I'd say to a resident about to start their PICU rotation is, "It's all going to be OK. There's all this talk about how the PICU is really scary, but there's a lot of support and it's a great place to learn and find comfort for caring for very sick, complex kids."

Abbreviation: PICU, pediatric intensive care unit.

symptoms may last up to 3 weeks, after which residents seem to recover from their PICU experience.

Becoming More Comfortable With Caring for Sick Kids

Residents describe their PICU experience much like one might an immersion in a foreign culture. During their PICU rotation, they adopt PICU-specific language and protocols. They also aspire to assume characteristics believed to be valued by the PICU culture. In the PICU, they see pathophysiology in new ways. Familiar clinical scenarios, such as intentional toxic ingestions, are amplified. Residents also encounter death, either during codes or transitions toward comfort care. These experiences shape the meanings of patient death and subsequently inform how they view deaths as either "good" or "bad." Ultimately, since residents

witness countless examples of sick, very sick, and the sickest patients they have ever seen, they learn one of the most fundamental objectives of their training—how to recognize "sick" from "not sick" children.

Once residents complete their PICU rotations, they describe having attained an insider's perspective of what happens before and after patients are transferred to and from the PICU. They feel better equipped for future rotations, including non-PICU rotations, and more familiar with basic resuscitative approaches. Although challenging and not necessarily desirable to revisit, they feel this journey has provided them with newfound comfort around caring for acutely ill patients. They return from the PICU to a seemingly different world. For instance, in the outpatient pediatric clinic, a child with uncomplicated community-acquired pneumonia may no longer seem as sick as they might have before the resident's PICU

experience. Instead, residents now find such encounters mundane.

Discussion

In this study of residents' first PICU rotation, we found that residents view the pediatric ICU as a challenging environment for independent, self-driven, and active learning; they experience adverse psychological effects and a period of post-PICU acute traumatic stress, yet they leave their PICU rotation with a newly acquired comfort and understanding of "sick" versus "not sick."³⁰ Herzog et al described similar qualitative findings for residents rotating through a medical ICU.³¹ However, we believe our themes, along with the phenomenological examples, can potentially bring ICU educators closer to the resident's worldview and help guide future educational interventions aimed to improve learning and resident wellness and development.²¹

Many of these themes relate to previously described concepts. For instance, our first and third themes can be similarly appreciated through Vygotsky's zone of proximal development,³² Lave's and Wenger's theory of workplace learning,^{33,34} Eraut's nonformal learning and tacit knowledge in professional work,³⁵ and the ongoing conflict between "service" versus "education" that plagues learners throughout the hospital.³⁶ Other, more novel, themes include the constellation of physical, emotional, cognitive, and psychosocial morbidities that residents endure during and after completing their ICU rotation. In our view, however, the most striking theme from our study is how residents describe their PICU rotation as a transformative "rite of passage," where they learn to become "more comfortable" with caring for "sick kids." Although physician comfort is a ubiquitous term,³⁷ with broad relevance across the gamut of medical education research, it is unclear how comfort correlates with knowledge, skills, and attitudes, or ultimate competency. Still, it is an outcome that was meaningful to our participants and may warrant further study.

Our previous study of residents' perceptions prior to a PICU rotation suggested that many had experienced previous psychologically traumatic educational events, which we categorized as "adverse learning experiences."¹⁶ In this study, we also found further descriptions of events residents describe as traumatic and persistent negative feelings for several weeks beyond the rotation. Considering these findings, we wonder whether a trauma-informed approach to medical education—where one considers, "What type of experiences might lead [a rational learner] to make certain [seemingly irrational] decisions or act in an [apparently detrimental] way?"³⁸—may be helpful. In

the PICU, residents have the opportunity to involve themselves in the care of extremely ill pediatric patients.¹⁷ If properly nurtured, this can provide residents with a realistic sense of how acute illnesses present and the immediate, required resuscitative measures. Alternatively, if pushed too far by stress and disempowering encounters, some residents may lapse into a form of learned helplessness,^{39,40} where they begin to feel emotionally withdrawn, ashamed,⁴¹ and discouraged from attempting independent assessments and plans. They may then describe a desire to avoid, or a "discomfort" around, autonomous management of certain types of patients, without immediate subspecialty intervention, in their future.

Recently, the Accreditation Council for Graduate Medical Education reduced the mandatory PICU training for PM residents from 8 to 4 weeks.⁴² The results of our study, however, demonstrate the potential educational value of resident ICU experiences. ICU rotations seem to be opportunities for residents to discover personal safety or confidence with being involved in the management of an unstably ill patient. Furthermore, critical care rotations in general might be the key to uncovering what "being comfortable" in a clinical setting means. Although trainees experience units such as the PICU as stressful and challenging,¹² a trauma-informed approach to medical education may help residents process these adverse learning experiences in ways that promotes post-traumatic growth rather than post-traumatic stress,⁴³ avoid burnout, and, ultimately, optimize critical care learning.

Limitations

As a phenomenological investigation, our goal was not necessarily to assess training effectiveness in the PICU. For instance, we did not attempt to qualify actual learning or measure sequential performance data during the residents' PICU rotations. Likewise, we conducted our study at a single site, where the interviewer and co-investigators were well-known to the subjects. This relationship with the investigators may have affected the comfort participants had to fully and honestly express their views on their rotation. However, all the interviews were conducted by A.J.K., who was a pediatric critical care medicine fellow, also in training, and had no role in evaluating the residents' performance. Additionally, participants were assured all interviews would be transcribed under a unique pseudonym, their faculty would never hear the recording, and their participation would in no way affect their grades or academic standing.

This study also occurred during the COVID-19 pandemic.²⁶ While we hoped to interview all residents in-person and within 2 to 4 weeks of their first

PICU rotation, it became very difficult to meet that time frame, and eventually we needed to transition to virtual interviews. This may have affected the residents' recollections and made it difficult for us to differentiate between the residents' interpretations versus their tacit understanding of the PICU experience. Likewise, the pandemic itself could have affected the residents' training.²⁶ Still, we believe our interviews provided rich and vivid data for phenomenological interpretation.

Conclusions

Residents describe the PICU experience as a challenging learning opportunity that may lead to adverse psychological experiences. However, they also acknowledge growth as a result of their PICU rotation and, upon completion, are more comfortable with caring for children who are sick.

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