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Academic Leadership Journal

Resident Block-rotation in Clinical Teaching Improves Student Learning

ABSTRACT

In 2007, a new block-rotation in clinical teaching was implemented for the third-year residents in the pediatric residency program at Texas Tech HSC in El Paso, Texas. We describe the design and implementation of this rotation, as well as its impact on student learning and satisfaction. During 2.5 academic years, the teaching residents supported the experiences in the pediatric clerkship of 129 medical students. Evaluations of teaching residents and clinical teaching rotation, as well as written feedback indicate improved student learning and satisfaction. Our clinical teaching rotation presents a structured approach to "teaching residents to teach" with an ample time for practice of the new skills and discovery of resident own teaching style. We recommend the implementation of teaching block-rotations to augment training experiences and student learning.

BACKGROUND

Residents are expected to teach students, peers and patients, as a part of the core competency of practice-based learning and improvement. However, oftentimes, they are expected to be good teachers just by the virtue of being residents, with little or no preparation for teaching (Bensinger, Meah & Smith, 2005; Busari et al, 2006; Sargeant & Werner, 2008). Junior residents often have more exposure to students than senior residents; thus, junior residents are expected to teach medical students at the time when they are trying to gain specialty knowledge themselves, experience intense time pressures, and may feel not fully equipped to teach at that early stage of their training (Jablonowski, 2004; Bensinger, Meah & Smith, 2005).

There is a wide variety in the methods used to teach residents to teach, as well as in the time invested in resident training to become good teachers. The teaching interventions vary widely too, and may be in the form of resident-led teaching conferences, small groups, workshops, development programs, teaching rotations or Objective Structured Teaching Examinations (OSTE). These experiences could be formal or informal, closely supervised or not, didactic or hands-on.

There has been some inconsistency in the reported results from resident teaching interventions, and little is known about how much training could be considered sufficient. Common shortcomings of studies of resident teaching experiences are small numbers of participants, short post-intervention periods, difficulties in establishing comparable control groups, and decreased power of the studies (Dewey et al, 2008). Many suggested curricula in resident teaching have emerged without being validated (Wamsley et al., 2004; Farrell et al, 2006). Resident curricula in teaching are also varied and may encompass a number of topics including leadership, teaching skills, evaluation, feedback, team management and career development (Julian et al, 2007).

The time invested in teaching residents to teach programs may be as short as one-hour or as long as a

longitudinal curriculum overarching one or more years of the residency training. A two-day teaching workshop of an experimental resident group (n=14) compared with a control group (n=13) demonstrated increased teaching abilities of the workshop participants (Busari et al, 2006). OSTE was used to evaluate the teaching of two groups of residents after a 10.5-hour workshop-based teaching training (n experimental = 13, n control = 11); the teaching intervention helped to improve the teaching skills of the residents (Gaba et al., 2007).

A teaching program consisting of 4-hour sessions during each training year revealed an increasing appreciation of the teaching role of the residents during the progression of their training, with the senior residents being the most interested in teaching (Johnson et al, 1996). A four-month longitudinal teaching course improved resident confidence in teaching and the residents reported satisfaction with the course content (Julian et al, 2007). Monthly half-day workshops for second-year residents focusing on teaching skills elicited better understanding about the effort involved in teaching and the role of being a teacher (Dimitrov, 2008). Participation in resident Chief's Rounds for one year or longer led to improved resident case preparation and oral presentation skills (Khagsiwala et al., 2007). James, Mintz & McLaughlin (2006) found that assigned reading material and one small group session on teaching skills implied better teaching skills as reported by the resident peers, but failed to elicit better teaching experience from the teaching residents.

With such a variety of approaches, it may be difficult for program directors to choose which would be the teaching experience for their residents that would offer the most value. The differences between and among the specialty training requirements add to the uncertainty about the best method in teaching residents to teach.

ROTATION DESIGN AND IMPLEMENTATION

We share our experience in designing and implementing a block-rotation in clinical teaching during the last year of pediatric residency training. The curriculum content and educational experiences in the rotation continued to evolve during two academic years, based on feedback from faculty, residents and students. We implemented the new rotation during the third year of pediatric residency training, when the residents are well-versed in medical knowledge and have more clinical experience. For the planning and implementation stages of the new rotation we followed the 10 steps described by Kirkpatrick (Kirkpatrick and Kirkpatrick, 2006); these steps are shown in Table 1.

Table 1 Clinical teaching rotation planning and implementation steps

#	Step	Identifiers
1.	Determining needs	· The practice-based learning and improvement competency requires that residents learn how to teach. · Student honor rates in the pediatric clerkship needed improvement
2.	Setting	· Improve resident teaching skills

	objectives	· Improve student honor rates in the pediatric clerkship
3.	Determining subject content	· Pediatric clerkship curriculum based on COMSEP recommendations
4.	Selecting participants	· Third-year pediatric residents · Pediatric faculty · Students in pediatric clerkship
5.	Determining the best schedule	· Design must accommodate resident and student schedules
6.	Selecting appropriate facilities	· Inpatient part of student pediatric clerkship
7.	Selecting instructors	· Clinical faculty – patient care oversight · Academic faculty – teaching and assessment oversight
8.	Preparing audio-visual aids	· Teaching resident sessions/curriculum
9.	Coordinating the program	· Residency coordinator and clerkship coordinator, working together
10.	Evaluating the program	· Evaluations from students and residents

All residents in our program have two workshops annually on teaching skills, throughout all levels of residency training. The purpose of introducing the new rotation in clinical teaching was to further develop residents' effectiveness as medical educators. Resident teaching is a recognized skill with explicit responsibilities, and requires ongoing nurturing. The resident teaching activities have two major components: clinical (bedside) component, and didactic (classroom) component. The teaching resident prepares the students for rounds, demonstrates patient examination techniques, reviews student notes, discusses complex cases, and oversees students' presentations. Additionally, the teaching resident has scheduled didactic sessions with the medical students, ranging from lectures to vignette discussions, to NBME-type question sessions, to Jeopardy-like team games. An example of

resident schedule is presented on Table 2.

Table 2 Example of a teaching resident weekly schedule.

<table>
<tr><th colspan="6">TEACHING RESIDENT WEEKLY SCHEDULE</th></tr>
<tr><th></th><th>MONDAY</th><th>TUESDAY</th><th>WEDNESDAY</th><th>THURSDAY</th><th>FRIDAY</th></tr>
<tr><td>8:00</td><td>8:00-09:00

Morning Report</td><td>8:00-9:00 am

Small Group</td><td>8:00-9:00

Evidence Based Medicine</td><td>8:00-09:00

Morning Report</td><td>8:00-09:00 am

Small Group</td></tr>
<tr><td>9:00</td><td rowspan="3">9:00-11:30 am

Rounds WB/IMCN</td><td rowspan="3">9:00-11:30 am

Rounds WB/IMCN</td><td rowspan="3">9:00-11:30 am

Rounds ICN/IMCN</td><td rowspan="3">9:00-11:30 am

Rounds ICN/IMCN</td><td rowspan="3">9:00-11:30 am

Rounds ICN/IMCN</td></tr>
<tr><td>10:00</td></tr>
<tr><td>11:00</td></tr>
<tr><td>12:00</td><td>Student Lecture by Faculty</td><td>Student Lecture by Faculty</td><td rowspan="5">12:00-4:00 PM

Resident Didactic

Lectures</td><td rowspan="3">Student Lecture by Faculty</td><td rowspan="3">Student Lecture by Faculty</td></tr>
<tr><td>1:00</td><td rowspan="4">Resident preparation afternoon for activities and didactics with students scheduled for the week</td><td rowspan="4">Resident continuity clinic</td></tr>
<tr><td>2:00</td></tr>
<tr><td>3:00</td><td rowspan="2">Teaching resident activity:

Case vignettes and/or

Jeopardy Game</td><td rowspan="2">Teaching Resident activity:

NBME Preparation and/or

Case Review</td></tr>
<tr><td>4:00</td></tr>
</table>

Faculty oversight is continued during the clinical teaching block-rotation. The clinical faculty oversees the quality of bedside teaching and preparation for rounds, while the educational faculty oversees the appropriateness of applied methodology and resident progress in teaching skills and giving feedback to students.

It is important to note that during the clinical teaching rotation the teaching resident takes no calls, so he/she can be available for teaching every day. Our experience showed that the presence of the teaching resident on a daily basis is very important for the student learning outcomes.

RESULTS

The new teaching rotation was approved by the Residency Curriculum Committee and implemented as of July 1, 2007. During 2.5 academic years (2007-2009) the teaching residents taught a total of 129 students. A retrospective data review study of the teaching rotation was approved by TTUHSC El Paso, IRB #E09076. Analysis was completed for recorded numerical and textual data. In rotation evaluation, we followed the four levels identified by Kirkpatrick (2006): reaction, learning, behavior and results.

Level 1: Reaction

Resident teaching assessment by the students is anonymous. Table 3 presents the teaching resident overall evaluations from students, on a 5-point Likert scale, where 1 is poor, and 5 is excellent.

Table 3 Student evaluations of teaching residents. Since there is only one teaching resident per month, to protect resident identity, results are reported in 6-month blocks.

Teaching Resident	Academic Period	Average Score
	July – December 2007	4.0
	January – June 2008	4.0
	July – December 2008	4.6
	January – June 2009	4.3
	July – December 2009	4.0
Average score for all teaching residents		4.2

Level 2: Learning

The student evaluation of the teaching rotation included 7 questions about resident's performance and quality of teaching. Table 4 presents the compound mean calculations of scores for all student groups

since the inception of the rotation in July 2007. All questions were rated on a Likert scale from 1 to 5, where 1 is poor and 5 is excellent. Though all ratings were above 4, the highest rating items were related to gaining better understanding about the topics taught by the teaching resident, appropriateness of the curriculum topics, and well-structured and organized teaching activities.

Table 4 Questionnaire items and compound mean scores across all students

Item	Average score
I gained a stronger understanding of the topics covered by the resident.	4.4
I found the resident's lectures to be interesting and engaging.	4.1
I received an adequate amount of guidance and mentoring during the rounds.	4.2
The content of the curriculum provided by the resident was appropriate.	4.3
The teaching was well-structured and organized.	4.3
The use of vignettes was valuable in teaching topics discussed.	4.2
This resident helped me prepare for the NBME.	4.2

Level 3: Behavior

Resident and student text comments submitted in teaching rotation and clerkship evaluations were analyzed with qualitative research software, The Ethnograph v5.0 (Qualis Research). Two major themes were identified: (1) guidance and support, and (2) improved learning environment.

Guidance and Support

The students perceived the teaching residents as “very knowledgeable,” “very patient,” “great teachers,” “very helpful” and “explaining really well.” It was important to the students to feel that the teaching residents exuded consideration for students' learning needs, and that the residents made an overt effort to make the learning process “fun and interactive.” As one student described,

“The teaching resident made sure we got involved in patient care in the nursery and did a very good job

orienting us to how things operate, and made us comfortable there during our nursery rotation. She also did a good job presenting information that was pertinent to our exam, as well as useful in clinic. She used lots of resources to make sure we learned high-yield information. She had enthusiasm for teaching. The vignettes were well organized and correlated to lectures well. She was always more than willing to answer questions thoroughly."

The need for guiding and supporting student learning was also recognized by the residents:

"I have learned that the students are really eager to learn, and that I have to maintain this enthusiasm. So, when I start getting the feeling that they start drifting off, I ask for their comments and I don't discourage them or stop them from voicing out their opinions. Right or wrong, I acknowledge their efforts."

Improved Learning Environment

The responsibility or preparing student didactic sessions and leading student teams placed an emphasis on the quality of resident preparation during the teaching rotation, which in turn improved the student understanding of the material, as well as the trust-relationship between residents and students. As one resident explained,

"I ended up enjoying this rotation because I learned a lot myself. I learned that if you are prepared and updated on your lessons, you'll be able to analyze how your students are thinking, help them enhance their clinical thought process and confidently explain. And after getting them to think, I share with them what is the correct answer, and I would hear them say "ah" and "oh."I got to know each student personally."

The students expressed their appreciation of the well-rounded curriculum, the engaging nature of the student-resident encounters, and the attentiveness in ensuring that all students learn:

"The teaching resident went through physical exam with us and then observed and critiqued our skills. We also did questions and went through articles that added to our education. The resident also helped with presentations and helped us find various data on our patients. He was very approachable, knew the material well and explained it well on the student level; he was great to have on rounds to help answer questions and give constructive feedback."

Residents reported they prepared more extensively on the topics they were scheduled to teach to students. Protected teaching time and time to prepare didactic materials was highly appreciated by the teaching residents, and also provided for self-study on selected topics for the pediatric board exam.

Level 4: Results

The percentage of the students in the pediatric clerkship on our campus who earned "Honors" in pediatrics, defined as achieving 75th percentile or higher on the shelf exam, steadily increased since the start of the resident clinical teaching rotation (Table 5).

Table 5 Percentage of honor students

Academic Period	% Honor Students
AY 2007-2008	15%
AY 2008-2009	28%
AY 2009-2010 (6 mo)	45%

Student feedback and improved shelf exam results, as well as increased student satisfaction with the pediatric clerkship are being attributed to the teaching rotation. The students are very satisfied with the teaching residents. As a student noted in the anonymous clerkship evaluation, "I loved everything about the teaching rotation! I love having teaching residents!" Another student wrote, "Keep the teaching residents! They are fantastic!"

LIMITATIONS

Our experience is limited to one residency program in pediatrics and encompasses only two-and-a-half academic years. Other events, such as improved session organization and small group contact time could have also been contributing factors to the observed outcomes.

CONCLUSION and RECOMMENDATION

Teaching courses may lead to improved resident confidence in teaching, as well as improved student evaluation of residents' teaching effectiveness (Wamsley et al, 2004; Bensinger, Meah & Smith, 2005). Our experience implies that a focused teaching rotation added to the annual teaching workshop-based interventions is valuable for student learning.

Our experience with a clinical teaching rotation for senior pediatric residents suggests that it is beneficial for student learning. Based on the improved student satisfaction with the pediatric clerkship and increased student achievement on the pediatric shelf exam, we recommend the implementation of teaching block-rotations to augment the training experiences and learning for both, residents and students.

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