Education Research:

Positive effect of scheduled faculty modeling on clerkship student bedside skills exposure and learning

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ABSTRACT

Objective: To evaluate the effect of scheduled bedside skills modeling for third-year medical students on their neurology clerkship.

Methods: During the 2012–2014 academic years, 56 third-year medical students participated in a curricular pilot program involving a scheduled bedside skills modeling experience during the first week of their neurology clerkship, whereas 131 students underwent the typical rotation. The experience consisted of observing a faculty member conduct a comprehensive encounter on a new outpatient. To promote active learning, students were provided an observation guide to document questions and observations. An anonymous survey was conducted at the end of each clerkship block assessing student exposure to bedside skills modeling. Using qualitative thematic analysis, observation guide statements were transcribed and coded into emergent learning themes.

Results: A total of 57.4% (95% confidence interval [CI] 43.3%–71.5%) of students in the modeling group reported observing both a comprehensive history and neurologic examination vs 37.5% (95% CI 28.2%–46.8%) in the nonmodeling groups ($p = 0.023$). A total of 253 observation statements were transcribed and coded from the observation guides. The most common learning themes included (1) strategies for performing a neurologic examination, (2) techniques for eliciting a neurologic history, and (3) importance of detail and thoroughness of the history and examination.

Conclusions: Our study demonstrated that there was a significant increase in structured observation by students of neurologic bedside skills with the inclusion of a scheduled modeling experience, and we provide a qualitative description of the most common learning themes associated with this experience. *Neurology*® 2017;88:e236–e239

GLOSSARY

CI = confidence interval.

In the modern medical era, bedside skills have become devalued with increased reliance on medical technological advances and the electronic health record. Numerous editorial and opinion articles have been published in recent years highlighting the decline in bedside skills education for medical trainees and the effect of this on patient care.^{1–4} Despite this knowledge, it is currently estimated that only 8%–19% of learning is done in the presence of the patient.⁵ Barriers to bedside teaching include devaluation of teaching and inadequate faculty development to promote bedside teaching skills among faculty.^{6,7} Modeling of clinical encounters has been shown to improve both physical examination and procedural skills, and can be effective for teaching humanism and professionalism values.^{8–10}

The aim of this study was to evaluate whether a scheduled modeling experience for third-year medical students starting their neurology clerkship increased overall student exposure to clinical skills modeling during the clerkship. In addition, we intended to discover using qualitative thematic analysis what specific learning points were acquired during the experience.

METHODS Participants. During the 2012–2014 academic years, a portion of University of Rochester School of Medicine and Dentistry third-year neurology clerks participated in a pilot aimed at improving bedside learning and instruction. During the first academic year, students in 4 out of 8 clerkship blocks (56 total) participated in a scheduled modeling experience, whereas students in the remaining blocks underwent the typical rotation (131 total). This is a retrospective study done to analyze the usefulness of this

Supplemental data
at Neurology.org

From the University of Rochester, NY.

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bedside modeling pilot. It was evaluated by the University of Rochester Research Subjects Review Board, which determined that it met federal and University criteria for exemption.

Modeling experience. For the modeling experience, students were scheduled to observe a clinical encounter during the first week of the clerkship. This consisted of a 1-hour session with a faculty member in the outpatient clinic setting. During this time, the student observed the neurologist conduct a comprehensive history and neurologic examination on a new patient, followed by an opportunity for questions and debriefing. Students were supplied with an observation guide that detailed the elements of the history and neurologic examination, included a checklist for each element, and allowed space for written observations and questions (figure e-1 at Neurology.org). Faculty were recruited to model these encounters via e-mail on a voluntary basis. They were provided with a preceptor guide as training that included a general description of the procedure to follow as well as the major learning goals for the student.

Data analysis and student survey. At the conclusion of each clerkship block, students completed an anonymous survey meant in part to assess their exposure to modeling experiences during the clerkship. The survey was delivered on the last day of their 4-week rotation. The survey was developed by one of the study authors (R.T.S.) for the purpose of assessing the curricular change, and piloted during the first clerkship block of the trial period. Students were asked about their ability to observe a faculty member perform bedside skills (for definitions, see survey questions in figure e-2). The proportion of students reporting observation of a comprehensive history or comprehensive examination was calculated in the 2 groups, and their difference compared using a 2-sample *z* test, with a 2-tailed α of 0.05.

Qualitative thematic analysis was undertaken to examine patterns of student learning during the experience. To conduct this analysis, the observation guides were collected, deidentified, and written student comments/questions were transcribed. Subsequently, 2 members of the research team (R.T.S., T.T.) independently reviewed the transcribed statements and coded emergent learning themes and subthemes through their reading of the statements. Since this was a retrospective study, a set number of statements were available and saturation of themes could not be assumed. In a consensus-building meeting, the 2 coders discussed their independent themes, and consolidated and refined them through discussion to create the final coding.

RESULTS The end-of-rotation survey had an overall response rate of 81% (84% for modeling group; 79% for nonmodeling group). Of the 47 students in the modeling group who responded to the survey, 57.4% (95% confidence interval [CI] 43.3%–71.5%; *n* = 27) reported that they successfully observed a comprehensive encounter (defined as both a comprehensive history and complete neurologic examination). In contrast, 37.5% (95% CI 28.2%–46.8%; *n* = 39) of the 104 students in the nonmodeling group who completed the survey reported observing a comprehensive encounter (*p* = 0.023). The remainder of our survey data that compare student ability to observe the history and examination are presented in table e-1.

A total of 43 completed observation guides were collected from the 56 students who participated in

the modeling experiences. A total of 253 observation statements were transcribed and coded from the returned observation guides, and 5 major learning themes as well as numerous subthemes were identified (table 1). The following serve as exemplar statements from each category.

Strategies/techniques for performing a neurologic examination.

“[I] learned to stabilize the joint for more effective strength testing.”

Table 1 Major learning themes and subthemes identified from 253 modeling observation statements collected from 56 students at the University of Rochester School of Medicine and Dentistry during the 2012-2013 academic year

Theme	Total statements (%)
Strategies/techniques for performing a neurologic examination	103 (40.7)
Technique of a specific examination component (e.g., cranial nerve, reflexes)	75
Neurologic examination of the pediatric patient	28
Evaluation when psychogenic etiology suspected	4
Evaluation when acute stroke suspected	3
Techniques for eliciting a neurologic history	73 (28.9)
Eliciting/clarifying history	28
Eliciting pediatric history	17
Open-ended questioning	9
Directing history based on chief complaint	7
Role of records/prewritten questionnaires in history-taking	5
Involving all individuals present	4
Summarizing information	3
Importance of detail, thoroughness of history and examination	45 (18)
Thorough/time spent	18
Importance of including all sections of history and establishing important details	14
Necessity for detailed examination	13
Importance of connecting and communicating with the patient and family	19 (7.5)
Communication skills	9
Showing empathy and compassion	7
Family-centered communication	3
Strategies for effective flow of the encounter	13 (5.1)
Flow and organization of examination	8
Flow of history-taking	5

“[I learned how to] assess for Hoover sign to help distinguish [poor] effort from true weakness.”
“Must do [limb dysmetria testing] in full extension or won’t accurately test.”

Techniques for eliciting a neurologic history.

“[The attending] directed [the] HPI and history of weakness away from [their] previous health care visits.”
“[The attending] avoids trying to give synonyms for sensations, instead asks ‘how would you describe it?’”
“[The attending] puts a lot of emphasis on understanding [the] patient’s baseline mental status and ADLs.”

Importance of detail and thoroughness of the history and examination.

“[The attending] spent approximately 75% of visit on HPI, at least ≥ 30 minutes!”

Importance of connecting and communicating with the patient and family.

“[The attending] establishes great rapport by involving all members of family present (allowed all family members to feel like part of the plan).”
“Explained diagnosis and plan, discussed treatment and side effects [in such a way so] the patient felt heard.”

Strategies for effective flow of the encounter.

“[I was] struck by the flow of the exam—[the physician] had her distinctive approach to the exam, organized to her preferences.”

DISCUSSION The main findings of this study are (1) the significant increase in students reporting observation of comprehensive neurologic bedside evaluations with the inclusion of a scheduled modeling experience in the neurology clerkship curriculum and (2) a qualitative description of the most common learning themes associated with such a modeling experience.

The survey data show that students who underwent the structured modeling blocks were significantly more likely to report having observed a comprehensive neurologic encounter (as opposed to problem-focused). There is no literature identifying the specific merits of modeling a comprehensive history and examination; however, there are theoretical benefits, including the ability to learn the flow of an efficient yet complete neurologic examination and the thoroughness and time spent by a neurologist obtaining a neurologic history and examining a new patient. These theoretical benefits are supported by their inclusion in our discovered learning themes.

In addition, exposing the student to a comprehensive physical examination ensures that the student observes all elements during the clerkship. In addition to the opportunity to learn proper techniques for history-taking and examination, modeling is essential for teaching physician–patient communication skills and professionalism,⁴ and this pilot provided further opportunity for such learning.

Our qualitative analysis yielded various learning themes associated with the modeling experience. These results provided insight into the shared experiences of direct observation from the students’ perspective. This knowledge could help shape future formal modeling experiences, allowing us to make informed improvements to learning objectives and observation guides. For example, all students could be asked to complete an observation guide that includes listing examination techniques that were novel to them or applied to a specific disease state. It is difficult to assess the effect modeling may have had on the student’s ultimate neurologic bedside skills given the many clinical experiences throughout the clerkship. However, the results of our qualitative analysis are congruent with previous studies that have shown the effectiveness of live modeling experiences on acquiring procedural (including physical examination) and cognitive skills.^{8,9}

There were a few challenges that we identified to the incorporation of a scheduled modeling experience for neurology clerks, and the biggest difficulty was how to work the experience around clinic no-shows. There were several limitations to this study as well. The sample size of students who participated in the modeling experience was relatively small. In addition, this was a retrospective evaluation of an educational curricular change, and as such it is not clear that saturation of learning themes was reached. Another important consideration is that the student survey was not specifically validated. We were evaluating both the structured modeling experience as well as active learning with an observation guide, and could not separate these interventions in the analysis. As such, students participating in the scheduled modeling experience may have been more likely to recall observing a comprehensive encounter.

Future studies could include collecting qualitative data from students undergoing structured modeling on their perceptions of the importance of the history and examination, and how their knowledge, skills, or attitudes about clinical practice may have been affected by the experience. In addition, it would be worth examining the differences in learning themes between students observing a comprehensive vs problem-focused neurologic encounter to discover whether or not the former allows for more educational opportunities. Our study demonstrates the benefit of scheduling modeling encounters to increase

student exposure to observation of comprehensive neurologic bedside skills. In an era where the use of bedside teaching has diminished, the program helped bring learning back to the patient.

AUTHOR CONTRIBUTIONS

Robert Thompson Stone: design and conceptualization of the study, analysis and interpretation of the data, drafting and revising the manuscript. Trenton Tollefson: analysis and interpretation of the data, aided in drafting the manuscript. Ronald Epstein: conceptualization of the study, aided in drafting the manuscript. Ralph Jozefowicz: conceptualization of the study, aided in drafting the manuscript. Jonathan Mink: conceptualization of the study, aided in drafting the manuscript.

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DISCLOSURE

The authors report no disclosures relevant to the manuscript. Go to Neurology.org for full disclosures.

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