RESIDENT AS TEACHER: TIPS TO IMPROVE TEACHING DURING NEW PATIENT ADMISSIONS

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Sir William Osler, one of modern medicine's greatest teachers, said "To study the phenomena of disease without books is to sail an uncharted sea, while to study books without patients is not to go to sea at all" [1]. Indeed, medical students arriving on the wards for the first time are acutely aware that they are embarking on a new voyage, and their excitement is palpable. As they set sail, with knowledge from lectures and textbooks to help them navigate, students need feedback on their performance during real-world clinical encounters so that they can develop and fine-tune their clinical skills.

There is no better place to teach these skills than on the wards during new patient admissions. Even the best standardized patient or objective structured clinical examination cannot replicate the excitement and anxiety of trying to solve an actual clinical case involving a real patient. The greatest learning on any case occurs within those critical first few hours when a student gathers the data and grapples to create a coherent narrative of the patient's presentation.

Residents serve on the front lines of these clinical encounters and usually are involved when students admit patients. In fact, medical students view residents as their most important teachers during clerkship rotations [2]. However, residents who feel poorly prepared to teach may avoid or not recognize teaching opportunities during patient admissions. Common barriers to teaching include lack of time, fear of not knowing the answer to a student's question, and lack of formal training in strategies for effective teaching.

Residents can benefit from the process of teaching. Since teaching requires an understanding of clinical skills and disease processes, residents who teach are more likely to learn and retain information needed to be an effective clinician and, thus, may be more likely to become better clinicians themselves [3]. In addition, residents can apply the same teaching techniques to become better patient educators and therefore potentially improve health care outcomes for their patients [4]. However, the best gift that a resident teacher receives is the joy of seeing a student comprehend a new concept or master a skill.

This article highlights some of the key challenges residents face in teaching during new patient admissions and offers practical strategies for overcoming these barriers so that students may maximize their learning in these encounters. To begin, consider the following scenario:

> It is 7 PM, and Jane Randall, a senior medicine resident on long call, is going to see her third admission of the night. The intern has seen the first admission and is currently seeing the second. The third, Mrs. Ross, is a 66-year-old woman actively undergoing treatment for breast cancer who presented to the emergency department with shortness of breath, fever, and dry cough.
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> Dr. Randall has assigned the third-year clerkship student to follow Mrs. Ross. As they head to see the patient, several thoughts run through Dr. Randall's head: *Mrs. Ross' presentation is concerning for pulmonary embolism. What should I teach the student about this patient? Can I even afford to take time for teaching, given the acuity of the situation and other admissions I need to complete?*

Challenge: "I don't have enough time to teach."

Every resident faces the challenge of time constraints. Particularly on a call day, time is a precious commodity. Bombarded with pages, a resident must be highly efficient in order to complete the necessary work. In such a setting, teaching can become an afterthought. However, several techniques can be used to teach students, even when time is limited.

Teach Through Role Modeling

It is important to recognize that students learn from residents regardless of whether there is an explicit attempt to teach something. A critical way that residents influence the development of medical students is through role-modeling clinical skills, critical thinking, and professional behavior during interactions with patients and professional colleagues. Residents

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Table 1. Role-Modeling Patient-Centered Care

Steps	Example
Ask the patient's permission to include the student in the admission process prior to the student entering the room	"Hi, Mrs. Ross. My name is Dr. Jane Randall. I am the medical resident who will be taking care of you during your stay in the hospital. We have a student on our team, John, who is learning to be a doctor. Would it be okay if he is involved in your evaluation and care during your stay?"
Explain to the patient what the admission will entail	"During your admission, the student and I will ask you questions about your illness as well as your past medical and social history. We will also examine you. If at any time you have questions or concerns, please feel free to interrupt us."
Ask the student to introduce him/herself when entering the patient's room	"John, when you enter the room, make sure you introduce yourself to the patient and shake her hand."
Explain to the patient the team's actions, most likely diagnosis (when applicable), and plan	"Mrs. Ross, John and I will now be examining your heart. It may take us a little while, but that is only because we want to be thorough. It does not mean that anything is wrong."
Provide closure for the patient, and allow the patient to ask questions	"So, Mrs. Ross, we talked about our plan to get that special x-ray called a CT scan to look for a blood clot in your lungs. And, we will be treating you with a blood thinner until we get the CT scan result. Do you have any questions about what we have discussed?"
Thank the patient for allowing the student to be involved	"Both John and I appreciate you allowing him to be involved in your care. All doctors start out as students, and you are helping John to become an excellent physician."
Prior to leaving for the night, have the student return to check on the patient to discuss the patient's questions/ concerns and clarify misunderstandings	"Hi, Mrs. Ross. It's John the medical student. I met you earlier. Before I leave for the night, I just wanted to check in to see how you are feeling. Do you have any additional questions about our plan?"

CT = computed tomography. (Adapted from Janicik RW, Fletcher KE. Teaching at the bedside: a new model. Med Teach 2003; 25:128.)

have been noted to teach positive behaviors, such as compassion and accountability, but also negative behaviors, such as unprofessional interactions with colleagues [5]. Thus, even when under significant stress or time pressures, residents should strive to demonstrate professionalism and patient-centered care (ie, always keeping the patient at the focus of any encounter). This act alone will provide a significant positive learning experience for students and interns. Some practical steps for role-modeling patient-centered care are presented in **Table 1**, using the case of Mrs. Ross as an example [5].

Prepare Appropriate Teaching Points

When alerted about a new admission, a resident should take a moment to consider high-yield teaching points relevant to the chief complaint and appropriate to the level of the learner (ie, medical student or intern). Some quick reading about the diagnosis and management of the chief complaint may be possible and reveal key points. It is also useful to consider the best teaching points to be made at the bedside.

Regarding the case at hand, Dr. Randall might look up the Wells score for the diagnosis of pulmonary embolism and then review the use of this clinical prediction rule with the student. Since the physical examination has limited diagnostic utility in the diagnosis of pulmonary embolism, the resident also might want to focus on teaching the key elements of the history. If the student fails to obtain pertinent historical features, this would be an excellent opportunity for role-modeling how to obtain a good history. By preparing for the encounter, the resident can remove much of the potential anxiety regarding teaching at the bedside [6]. A review of the literature on the important topic of bedside teaching is beyond the scope of this article. However, the reader is referred to several excellent articles that provide in-depth discussion of this subject [6–8].

Teach During Downtime

Even on the busiest call day, it is possible to find moments of downtime that allow a resident to teach practical clinical skills or impart a clinical pearl. For

example, the time spent walking to the emergency department to see the next admission or while eating dinner can be used to question a student's understanding of a case or to discuss a relevant clinical concept or fact. In the case of Mrs. Ross, while heading to see the patient, Dr. Randall might ask the student, "Given Mrs. Ross' chief complaint of shortness of breath, what diagnoses are you considering? Does the patient's history of cancer change your differential?"

In another example, the 5 minutes after administering sublingual nitroglycerin to a patient with chest pain might be used to have a student observe an abnormal finding while the resident performs another component of the physical examination. Downtime of this type could also be used to help the student interpret radiology or laboratory results.

Think Aloud

Thinking aloud provides a view into a resident's mental processing and allows a student to begin to understand why certain diagnoses are entertained or management decisions are selected. In the case example, Dr. Randall might say to the student, "Because Mrs. Ross has cancer, which leads to hypercoagulability, I need to consider pulmonary embolism. Because pulmonary embolism is such a dangerous diagnosis to miss, I will have a low threshold for obtaining a CT angiogram of the chest, which is one of the best tests to exclude the diagnosis." At the bedside, the resident should be mindful to avoid comments that might cause the patient unnecessary concern.

Teach by Way of Patient Education

Patient education provides another forum for teaching. While explaining a diagnosis or treatment to a patient, a resident can speak in a way that also teaches a student who is observing or participating in the encounter. For example, Dr. Randall might say to Mrs. Ross, "We are worried that you might have a blood clot in your lungs. We treat these with a drug called 'heparin,' which thins the blood and prevents the clot from growing, so your body can dissolve it over time." The patient would understand the plan, but the student would gain the additional insight that heparin does not actually dissolve the clot but instead prevents its propagation.

Challenge: I don't know enough to teach.

Even outstanding medical students can gain a great deal of practical knowledge from residents. The management of patients requires experience and practice, in addition to book knowledge, so this area provides fertile ground for teaching.

Teach the Basics

During new patient admissions, the resident is the clinical team leader and therefore controls the teaching environment. This is not the time to give a lecture on a topic. Instead, the resident should aim to teach 1 or 2 pearls that will help the student to learn pertinent content related to diagnosis or management. It is not necessary to know every detail about the patient's disease in order to provide meaningful teaching. Residents should stick to areas where their content knowledge is solid. A focus on basics is appropriate, such as how to take a good history, perform a lung examination, or read a chest radiograph or an electrocardiogram (ECG). Students also are eager to learn about how to present and write admission notes. In addition to these teaching opportunities, spending 5 minutes listening to and giving feedback on a new admission presentation is viewed as a valuable learning experience by third-year medical students [9].

Given a focus on the basics, nearly every resident should be able to teach at least 1 practical point about a newly admitted patient. For example, in the case of Mrs. Ross, Dr. Randall could have the student read the ECG and then ask the student what ECG finding is most commonly seen in pulmonary embolism. She could also teach about the utility of D-dimer testing to rule out pulmonary embolism, the importance of a heparin bolus when initiating heparin therapy, or simply the differential diagnosis for the case.

Challenge: When I teach, the student always asks me a question I can't answer.

Residents naturally raise concern about students asking questions that they cannot answer. In this situation, 2 common approaches can be taken, the "Great question, why don't you look that up for tomorrow" diversion or the "I don't know" approach. A third approach of improvising an educated guess, although not uncommon, is least desirable.

"Look It Up"

The potential advantage of having a student look up the answer to a question is that the exercise can promote life-long learning in the student while at the same time hiding a resident's knowledge gap. However, the potential disadvantage is that the student recognizes that the outcome of a question is a research assignment and, in a Pavlovian reflex, stops asking questions.

"I Don't Know"

The advantage of expressing uncertainty is in demonstrating that no physician has all the answers and that recognizing the limits of one's knowledge is important in taking good care of patients and developing skills in life-long learning. Furthermore, if this tactic includes researching a question with the learner, the student can learn how formulating a focused clinical question and searching for and applying appropriate evidence can help improve the care of patients.

Challenge: I try to let the student take the history, but I always have to interrupt to ask a key question.

While intervention is always appropriate if a student is acting in an unprofessional manner toward a patient, more often residents find themselves wanting to intervene or interrupt during a student evaluation out of concern that key clinical information is not being obtained. Unfortunately, when interrupted, a student may become nervous and defer to the resident even though he or she knows the correct questions to ask and physical examination maneuvers to perform, which in turn reduces active learning from the admission.

Prime the Student

Prior to a patient encounter, a resident can assess a student's ability to perform an adequate history and physical examination by priming the student with a brief discussion about the patient and the anticipated goals of the encounter. This is analogous to a lecturer who presents the learning objectives at the start of a talk.

For example, before going into Mrs. Ross' room, Dr. Randall might ask the student, "What key questions should you ask a patient with shortness of breath? What aspects of the pulmonary examination would you perform on this patient?" If the student can answer some but not all of the questions, the resident can quickly get the student up to speed on these points before entering the patient's room. Then, during the encounter, she can carefully assess the student's performance and take over the data gathering if the student struggles. This approach is beneficial in 2 ways: it saves the student embarrassment, and it saves the patient potential physical or emotional discomfort. If, however, the student cannot answer the "priming" questions adequately, the resident should recommend that the student carefully observe her perform the examination and formulate questions to ask after the encounter. In such a situation, the critical teaching moment occurs in the question and answer period after the resident and student leave the patient's room.

Emergency situations may also warrant that students observe rather than actively evaluate patients, although residents should not ignore these opportunities for teaching. Given the intensity of these situations, students can learn a great deal. Teaching is still possible with the techniques mentioned, especially if the student is primed before the encounter and a question and answer period follows shortly after the encounter.

Challenge: I've never been taught how to observe and give feedback on students' clinical skills.

All residents are familiar with the experience of shadowing attending physicians as they see patients. Like trying to learn how to play tennis by watching an expert, there is little chance of developing expertise until you actually get on the court and practice hundreds of groundstrokes. Similarly, students who actively participate in admissions are more likely to develop clinical skills than those who observe residents admitting patients. And, like tennis players who improve more quickly with direct feedback from their coaches than those who learn independently, students who perform clinical evaluations without prompting or interruption and who receive feedback on their performance are more likely to improve their clinical skills.

Direct observation and feedback while admitting a new patient is one of the most beneficial learning experiences a student can have during a clerkship rotation. Unfortunately, few attendings have or make the time to perform such observations, so this critical task often falls on the housestaff. The challenge for residents is that few have formal training on how to observe with an eye toward improving student performance. Basic steps in performing a direct observation are presented in **Table 2**, and practical tips for teaching skills in history taking, physical examination, and clinical reasoning are offered in the sections that follow. But first, 2 important caveats are in order.

- It is time consuming to directly observe a student's complete history and physical examination. Realistically, this may occur only once, if at all, during a 4-week ward rotation. However, the time involved should not preclude *any* observation of a student's clinical skills. From a practical standpoint, a resident can choose to observe the history of present illness on one call day and a physical examination (or a specific system examination) on another. It should be

Table 2. The Basic Tasks of an Observation

Steps	Example/Comment
Prime the student for the tasks to be performed	"Do you know any physical exam findings or maneuvers that you can use to assess for deep venous thrombosis?"
Explain to the student what you will be doing and how you will intervene during the encounter	"I may interrupt you to demonstrate a better approach to something you are doing and then ask you to repeat the technique to ensure that you have mastered it."
Sit in a location where you can fully observe both the student and the patient	Try to be as unobtrusive as possible unless you are making a teaching point.
Limit the focus to 1 or 2 observations when time constrained	"Since we have 3 admissions, I will only be able to observe your history of present illness and then do my own physical exam. I'll go see another patient and you can complete your evaluation. Page me when you finish and then I'll give you feedback on your history taking."
Note behaviors observed during the encounter so you can be specific during the feedback session	Observe history taking and physical examination skills. Also observe communication skills (including nonverbal behaviors) and professionalism.
	Be sure to perform the relevant elements of the physical examination so you can compare the student's findings with your own during the feedback session.
Provide feedback to the student during or soon after the encounter	Try to have the student repeat tasks needing improvement prior to completing the encounter, so the student can practice and potentially retain more of the feedback (eg, if the student did not hear the aortic stenosis murmur, have the student try again).

possible to complete these partial observations in 5 to 15 minutes, which is a manageable time frame on most call days.

- The value of observing a student is directly related to the quality of the feedback. Ideally, feedback on a student's clinical evaluation should occur shortly after the evaluation is completed and should focus on specific behaviors observed. For example, after leaving the patient's room, Dr. Randall might compliment the student on summarizing the patient's history to ensure its accuracy and suggest that the student remember to assess jugular venous pressure in all patients who present with shortness of breath. Usually, no more than 2 or 3 points should be made so that the student is not overwhelmed. That being said, giving constructive feedback can be challenging. A discussion of how to give feedback is beyond the scope of this article, but a previous article in this series addressed this topic in more depth [10].

Teaching History Taking: The Diagnosis-Focused History

Even in this era of burgeoning diagnostic tests, the history is still critical to making diagnoses in an efficient and cost-effective manner [11,12]. An excellent first step in building history-taking skills is to teach students to establish an initial diagnostic hypothesis around which to focus their line of questioning. Often, inexperienced clerkship students take a "machine-gun approach" to the history, figuring that if they fire enough "bullets" (ie, historical questions), one of them is bound to hit. Residents can help disorganized students adopt a more focused approach to history taking by teaching them how to develop a short differential based on the chief complaint and to ask questions related to each diagnostic possibility.

Although unrelated to efficiencies in gathering pertinent historical information, effective communication with the patient is essential for a successful clinical encounter. Thus, while observing a student's history taking, a resident can assess such communication skills as showing empathy, avoiding medical jargon, and maintaining eye contact.

Teaching Physical Diagnosis: Observe the Exam, Then Perform One

Many studies have documented the diminished ability of physicians to discover or interpret physical examination findings [13]. From a purely educational perspective, the best approach to teaching physical diagnosis skills is to observe while a student performs

a physical examination. Performing the examination while simultaneously observing the student's technique will lead to an inadequate examination, an inadequate observation, or both. By observing the student first, the resident can jot down specific examination techniques that were done well or poorly, so these details will be remembered when the resident provides feedback. However, in a very ill or debilitated patient, this approach may need to be modified. In either case, it is critical for the resident to perform a complete examination of the patient to ensure that all existing abnormalities are observed and documented.

Even a student with good physical examination techniques can miss findings ("you can't see what you don't know"), so it is important to ask the student to report his or her findings. When discrepancies exist and time permits, the resident should have the student repeat the examination and provide tips on how to discover the abnormality prior to the reexamination. For example, if a student fails to hear a split S2, the resident could say, "Listen carefully to the split in expiration. If you hear a longer S2 in inspiration, even if you don't hear a distinct additional sound, that finding is consistent with a split S2."

Assessing Clinical Reasoning: The 1-Minute Clinical Preceptor

Assessment of a student's clinical reasoning is a challenging aspect of teaching while admitting a new patient, because it demands careful inquiry into the student's thought process, feedback, and patience. Clinical reasoning, or the process of thinking through the diagnostic and management possibilities to determine a plan of care for a patient, requires skillful data gathering, a thorough knowledge of diseases, and the ability to weigh the benefits and risks of potential testing and treatment strategies. Resident teachers need to focus their teaching on one of these areas when time is limited.

Especially on a busy call day, a resident may have a tendency to bypass a student's line of clinical reasoning and simply tell the student the diagnosis and plan. However, the resident should challenge the student to actively think through the diagnostic and management possibilities for maximal learning. Some specific tasks that the student should be able to perform include formulating a prioritized problem list, comparing and contrasting the likelihood of potential diagnoses (differential diagnosis), and evaluating the advantages and disadvantages of different management plans. The ultimate goal of this teaching should be for the student to commit to a diagnostic and management plan and be able to defend this commitment by synthesizing patient data with preexisting medical knowledge. From a practical point of view, the resident usually discusses the student's clinical reasoning after leaving the patient's room, although skilled teachers may be able to remain at the bedside. However, theoretical discussions (eg, "What if the patient had…") should not be held at the bedside to avoid patient confusion [6].

Although there are many ways to teach clinical reasoning, the "1-minute preceptor" is a useful model that can help residents keep in mind basic principles [14]. The model was developed in the outpatient setting but can easily be applied in the inpatient setting. It both acknowledges time constraints and allows the resident to control the learning environment while assessing clinical reasoning. The 1-minute preceptor is based on the use of 5 microskills (steps) that guide the interaction between teacher and learner (**Table 3**) [14].

The first 2 steps focus on "diagnosing the learner" by asking questions that attempt to uncover what the student is thinking without making inaccurate assumptions. Because the questions require analysis and synthesis, the resident gains insight into how the student thinks. This type of question is in direct contrast to the more typical questions residents ask students (eg, "What are the 3 bugs that cause a typical pneumonia?"), which focus on memory and recall rather than problem solving. On a practical level, it is important for the resident to pause 10 to 15 seconds before answering the question or presenting the question in another way to help the student. Without the pause, the student will quickly learn that if he or she waits a few seconds, the answer will be given. The third step seeks to teach a general rule or pearl the student can use in future cases involving a similar patient. In the final 2 steps, the student is provided with specific feedback aimed at improving overall performance, including positive reinforcement of what was done well and constructive feedback on areas needing improvement.

The 1-minute preceptor technique has the potential to enhance learning because it encourages a student to carefully assess how he or she arrived at a leading diagnosis. It also promotes active learning, with the resident asking the student to explain his or her clinical reasoning as opposed to merely reciting a list of differential diagnoses or orders to the student. Finally, the tool can enhance the efficiency of resident teaching. By asking questions first, the resident can uncover gaps in a student's knowledge or reasoning and then focus teaching to address those specific areas.

Table 3. The 1-Minute Preceptor

Steps	Example
Get a commitment to a diagnosis or management plan	"What do you think is the leading diagnosis in this patient?" or "How would you manage this patient?"
Probe for supporting evidence/assess differential diagnosis	"What is the evidence for your belief that pulmonary embolism is the most likely diagnosis? Are there any other diagnoses that you are considering?"
Teach a general rule	"In patients who are at low or moderate risk for pulmonary embolism, a D-dimer test can rule out the diagnosis because of its high sensitivity."
Provide specific positive feedback	"Your evaluation of the pulsus paradoxus was excellent technically and showed that you had a broad differential, since you considered cardiac tamponade."
Correct mistakes	"When you examine patients with shortness of breath, especially with cancer, it's important to assess for deep venous thrombosis and congestive heart failure by examining the feet for edema and the calves for swelling or tenderness."

Adapted from Neher JO, Gordon KC, Meyer B, Stevens N. A five-step "microskills" model of clinical teaching. J Am Board Fam Pract 1992;5:419–24.

Conclusion

The multiple demands and challenges of a busy call day do not mean that residents must forsake teaching students while admitting new patients. In fact, residents have many opportunities to provide valuable teaching during new patient admissions. With an understanding of how to sidestep common obstacles to teaching and how to use structured teaching tools to facilitate active learning, residents can turn new patient admissions into some of the most useful learning opportunities that students experience during their rotations. The value of the learning experience will be enhanced if residents give specific and timely feedback to students regarding their performance.

Empowering residents with the skills needed to teach medical students likely improves residents' own clinical skills, although there is a paucity of evidence to support this hypothesis [3]. Teaching students has the potential to be a rewarding aspect of residency training. By incorporating some of the strategies and techniques described, residents can become more confident, effective teachers.

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