

**Title Page**

Title: Teaching at the Bedside: Maximal impact in Minimal Time

**Authors:**

William G. Carlos<sup>1</sup>

Patricia A. Kritek<sup>2</sup>

Alison S. Clay<sup>3</sup>

Andrew M. Luks<sup>4</sup>

Carey C. Thomson<sup>5</sup>

**Affiliations:**

<sup>1</sup>Division of Pulmonary, Critical Care, Sleep, and Occupational Medicine, Indiana University School of Medicine, Indianapolis, Indiana; <sup>2</sup> Division of Pulmonary and Critical Care Medicine, University of Washington School of Medicine, Seattle, Washington; <sup>3</sup>Duke University Medical Center, Durham, North Carolina; <sup>4</sup> Division of Pulmonary and Critical Care Medicine, Department of Medicine, Harborview Medical Center and the University of Washington, Seattle, Washington; <sup>5</sup> Division of Pulmonary and Critical Care Medicine, Department of Medicine, Mount Auburn Hospital, Harvard Medical School, Boston, Massachusetts.

**Corresponding author information:** W. Graham Carlos, MD, Division of Pulmonary, Critical Care, Sleep, and Occupational Medicine, Department of Medicine, Indiana University School of Medicine, Eskenazi Hospital, 720 Eskenazi Avenue, H5-510, Indianapolis, IN 46202. Email: [wcarlos@iu.edu](mailto:wcarlos@iu.edu) 317-691-8107

**Source(s) of support:** None.

**Running Head:** Teaching at the Bedside

**MeSH Key Words:** Education, Training, Professional

**Total Word Count:** 1889

**Abstract:**

Academic physicians encounter many demands on their time including patient care, quality and performance requirements, research, and education. In an era when patient volume is prioritized and competition for research funding is intense, there is a risk that medical education will become marginalized. Bedside teaching, a responsibility of academic physicians regardless of professional track, is challenged in particular out of concern that it generates inefficiency, and distractions from direct patient care, and can distort physician-patient relationships. At the same time, the bedside is a powerful location for teaching as learners more easily engage with educational content when they can directly see its practical relevance for patient care. Also, bedside teaching enables patients and family members to engage directly in the educational process. Successful bedside teaching in the intensive care unit can be aided by consideration of four factors: climate, attention, reasoning, and evaluation. Creating a safe environment for learning and patient care is essential. We recommend that educators set expectations about use of medical jargon and engagement of the patient and family before they enter the patient room with trainees. Keep learners focused by asking relevant questions of all members of the team and by maintaining a collective leadership style. Assess and model clinical reasoning through a hypothesis-driven approach that explores the rationale for clinical decisions. Focused, specific, real-time feedback is essential for the learner to modify behaviors for future patient encounters. Together, these strategies may alleviate challenges associated with bedside teaching and ensure it remains a part of physician practice in academic medicine.

**Word count:** 254

**Text:**

Bedside teaching is a powerful method for medical education. Patients and their illnesses become tangible, helping to cement the content in the learners' memory (1). Sir William Osler gave bedside teaching great value, commenting that 'to study the phenomena of disease without books is to sail an uncharted sea whilst to study books without patients is not to go to sea at all' (2). While Osler's approach informed academic medical practice for a long time, currently only 48% of undergraduate trainees report receiving sufficient bedside teaching during their education (3, 4). Other data demonstrate that bedside teaching of physical examination has decreased from an incidence of 75% in the 1960's to less than 20% today (5, 6).

The amount of bedside teaching has declined for a variety of reasons including increased patient volume (7), tight competition for research funding (8), and increased reliance on electronic medical records and imaging (9, 10). In a survey of 52 participants conducted during a workshop at the American Thoracic Society International Conference in 2015, 28 respondents (54%) indicated that lack of time was their biggest factor limiting bedside teaching. In addition, many physicians fear that bedside teaching compromises patients' satisfaction with their care (5, 11) despite evidence to the contrary (3, 12-14), while others feel limited by their own bedside teaching skills.

Given the ongoing demands of learners for bedside teaching and the significant demands on academic physicians' time, there is a need for tools to help physicians improve their skills and maximize their bedside efficiency. Toward this end, we present a structured

approach to bedside teaching emphasizing 4 key elements that may improve teaching efficiency and efficacy at the bedside. This approach is based on a framework described in a workshop at the 2015 American Thoracic Society International Conference. During the workshop, video reenactments of teaching encounters were used to demonstrate the nuances of bedside teaching calling specific attention to the four elements -- Climate, Attention, Reasoning, and Evaluation (CARE). Feedback from the workshop was overwhelmingly positive with 96% of participants responding that this was a helpful way to remember aspects of an effective bedside teaching encounter.

### **Climate**

The first step in creating a healthy bedside teaching climate is to ensure that the patient and learners are comfortable with the interaction. Not all patients (or learners) are suitable for bedside teaching on a given day. Advance planning as to which patients are appropriate for this approach each day can enhance efficiency and avoid difficult bedside situations.

### *Learner Expectations*

At the start of a rotation, set ground rules for bedside encounters with your learners (5). Inform trainees of your expectations including minimizing medical jargon, avoiding “one-upsmanship”, and including the patient and family in the discussion. Inform the learners that you will observe both their physical examination and communication skills. If there is something specific you are evaluating, tell the learner up front, as this will improve the evaluation process.

It is helpful to reassure your learners that you do not seek to embarrass them in front of their patient or peers (1). This concern may limit their participation or jeopardize their relationship with the patient.

### *Patient Expectations*

It is also important to set expectations with the patient and their family members. Begin by asking permission to teach at the bedside. Then inform the patient and family members what you plan to do. Allow patients to decide if they would like visitors or family members to remain in the room. Encourage them to interrupt, ask questions, and express fears or concerns. It is helpful to explain the specific purpose of the visit such as “We are going to review the events and findings from the last 24 hours” or “We would like to do a focused physical examination today” so the patient knows what to expect. It may also be helpful to inform patients that certain theoretical discussions may occur that are not applicable to their illness (4). This can put the patient at ease and keep the visit focused on relevant issues, thereby maximizing efficiency.

### **Attention**

Keeping the encounter concise and developing a plan for your bedside actions or teaching *prior* to entering the room helps maintain attention. Examples of focused encounters include:

- Demonstration of ventilator waveforms
- Motivational interviewing for smoking cessation
- Taking a more detailed history for weight loss
- Reviewing the plan of care for the day

Calling attention to time and limiting distractions are also important for maintaining learner attention. Decide on how much time you want to spend in the room before you enter (4). When the patient census is high or rounds are running long, adjust the time and content of your teaching points accordingly. When the attending physician is distracted by their cell phone, the television in the room, or other visual or auditory distractions it is easy for the team to become distracted as well. Team leaders should remember that learners constantly observe their behavior and often model themselves on observed actions.

Maintaining learner attention can be particularly challenging when rounding on patients who have been on the service for long periods of time and have seemingly few active issues. The learning value of such situations can be increased, however, by planning specific teaching encounters for these cases. “What if” scenarios such as, “What would you do if this patient began seizing?” are useful questions that help the trainees consider situations they might face outside of rounds that could directly impact patient care (Table 1). Such planned, focused questions are clinically applicable and can add educational benefit to an otherwise uninteresting clinical encounter.

Finally, if learners do not feel invited to participate in the encounter, they may disengage and lose attention. To minimize this, particularly when teaching a large group of

learners at the bedside, it may be helpful to adopt a collective style of leadership. This style involves sharing the attention and encouraging all learners to participate in the encounter. Strategies to achieve this include having the learners each ask the patient a question, taking a “poll”, or having each learner offer a differential diagnosis.

## **Reasoning**

The teaching of clinical reasoning is well-suited to patient bedside encounters. One benefit of this approach is that it affords the opportunity to model and assess the performance of a hypothesis-driven physical examination, which entails looking for specific clinical signs and testing diagnostic hypotheses by direct observation (Table 2) (15). This is particularly important for students who are still discovering how to integrate elements of the history and focus their subsequent line of questioning and examination. Physical exam findings are more readily found when the physician has a diagnostic hypothesis in mind as opposed to ‘just looking’ mechanistically (16-18).

Having set proper learner expectations ahead of time, teachers can then ask probing questions (Table 3) to discern the learner’s underlying thought processes. Your aim is to discover if the trainee understands the rationale behind the treatment course or disease presentation. When offering probing questions avoid questions that ask learners to ‘read my mind’. For example, after a patient informs the team that they developed hemoptysis overnight it is tempting to ask, “Does the patient have orthodeoxia?” A better question would be, “What elements of the clinical history suggest arterio-venous malformation as a possibility to explain the hemoptysis?” Both questions demonstrate a hypothesis-driven approach to clinical

reasoning, but only the latter question follows a logical stepwise approach and avoids asking the learner to make any assumptions. In letting the learner process through the potential causes of the hemoptysis and their likelihoods you assess their ability to rationalize interventions.

Another tactic to assess clinical reasoning at the bedside is to ask the trainees questions on behalf of the patient. This technique allows you to create opportunities to assess knowledge, reasoning, and communication. Examples of questions include:

- What should she do if she begins to notice muscle cramps after starting this medication?
- Would you advise him to get his influenza vaccination this year?
- What would you recommend to the patient after discharge should he develop increased wheezing?

Finally, in examining the patient with the team, remember that clinical signs or changes in status are good opportunities to further assess reasoning skills. Let the team process the new findings with you. When necessary “think out loud” so they understand the rationale behind your treatment decisions. Remember to work through the implications of these changes with the team while remaining sensitive to the fears and anxiety this may create in the patient.

## **Evaluation**

The final part of bedside teaching includes closing the loop with the learners by using direct observations to generate useful feedback (19). This practice has become an essential part



of undergraduate and graduate medical education given the recent emphasis on assessing milestones and performance on entrustable professional activities (20-22). The word “evaluation” is used in the mnemonic “CARE” but a better word is probably “feedback.” Specifically, bedside teaching allows a great opportunity for formative feedback and enables real-time, low risk input on a learner’s performance designed to help him/her modify behaviors in subsequent interactions. Ideally, real-time performance feedback focuses on specific behaviors and is delivered in a timely, honest fashion (23, 24). In particular, bedside patient interaction affords a unique opportunity to provide explicit feedback on physical examination and communication skills, and allows the instructor novel insights into a trainee’s humanistic qualities such as empathy and compassion.

When giving formative feedback at the bedside, avoid giving pointed criticism of learners as this may erode trust with the patient and embarrass the learner (1). Choose your words carefully and save more critical input for advice delivered later outside of the patient’s room. If the patient interaction went particularly poorly, feedback with the learner may be best suited for a private setting. Other feedback, however, such as proper exam technique, is best delivered at the moment of the interaction. The best time to correct a learner who is incorrectly performing a clinical exam skill is at the moment of the interaction. Prompt demonstration of appropriate technique with supervised practice is more likely to change behavior (24).

Rather than providing all feedback during or immediately following the patient encounter, it may be appropriate to delay the feedback and encourage the learner to reflect on the interaction before offering your feedback. If you have prepped the learner for this type of feedback, self-reflection can be a tremendous learning opportunity for the learner. Consider

using “you-you” questions of the learner such as, “What do *you* feel *you* could have done to make the patient feel more at ease in that situation?”

Finally, your observations of the learner’s bedside encounters with patients and families can inform more formal, summative evaluation at the end of a rotation. If you have the opportunity to see the learner interact with other members of the team and the patient at the bedside, your overall evaluation will be richer than if it is driven by second hand impressions.

## **Conclusions**

Bedside teaching does not necessarily have to involve a complete patient presentation and comprehensive physical exam performed in front of the patient. Instead, a carefully planned, focused, encounter that takes into account the learning climate, maintains attention, explores aspects of clinical reasoning and provides opportunities for formative feedback (Table 4) can enhance efficiency and improve teaching in an increasingly difficultly environment for educating trainees of all levels.

## References:

- 1 Langlois JP, Thach S. Teaching at the Bedside. *Fam Med* 2000;32(8):528-530.
- 2 Stone MJ. The wisdom of Sir William Osler. *Am J Cardiol* 1995;75:269–276.
- 3 Nair BR, Coughlan JL, Hensley MJ. Student and patient perspectives on bedside teaching. *Med Edu* 1997;31:341-346.
- 4 Ramani S. Twelve tips to improve bedside teaching. *Med Teach* 2003;25:112-115.
- 5 LaCombe MA. On Bedside Teaching. *Ann Intern Med* 1997;126:217-220.
- 6 Crumlish CM, Yialamas MA, McMahon GT. Quantification of bedside teaching by an academic hospitalist group. *J Hosp Med* 2009;4:304-307.
- 7 Nair BR, Coughlan JL, Hensley MJ. Impediments to bed-side teaching. *Med Educ* 1998;32:159-162.
- 8 Moses III H, Matheson DH, Carins-Smith S, George BP, Palisch C, Dorsey R. The Anatomy of Medical Research US and International Comparisons. *JAMA* 2015;313(2):174-189.
- 9 Verghese A, Brady E, Kapur CC, Horwitz RI. The Bedside evaluation: ritual and reason. *Ann Intern Med* 2011;155:550-553.
- 10 Thibault GE. Bedside rounds revisited. *N Engl J Med* 1997;336:1174-1175.
- 11 Fitzgerald FT. Bedside teaching. *West J Med* 1993;158:418-420.

12 Wang-Cheng RM, Barnas GP, Sigmann P, Riendl PA, Young MJ. Bedside case presentations: why patients like them but learners don't. *J Gen Intern Med* 1989;4:284-287.

13 Simons RJ, Baily RG, Zelis R, Zwillich CW. The physiologic and psychological effects of the bedside presentation. *N Engl J Med* 1989;321:1273–1275.

14 Peters M, Cate O. Bedside teaching in medical education: a literature review. *Perspect Med Educ* 2014;3:76-88.

15 Yudkowsky R, Otaki J, Lowenstein T, Riddle J, Nishigori H, Bordage G. A hypothesis-driven physical examination learning and assessment procedure for medical students: initial validity evidence. *Med Educ* 2009;43(8):729-740.

16 Norman GR, Brooks LR, Regehr G, Marriott M, Shali V. Impact of feature identification on medical student diagnostic performance. *Acad Med* 1996;71(suppl):108-109.

17 Norman GR, Leblanc V, Brooks LR. On the difficulty of noticing obvious features in patient appearance. *Psychol Sci* 2000;11:112-117.

18 Hatala RM, Norman GR, Brooks LR. Impact of a clinical scenario on accuracy of electrocardiogram interpretation. *J Gen Intern Med* 1999;14:126-129.

19 Fromme HB, Karani R, Downing SM. Direct observation in medical education: a review of the literature and evidence for validity. *Mt Siani J Med* 2009;76:365-371.

20 Nasca TJ, Philibert I, Brigham T, Flynn TC. The next GME accreditation system – rationale and benefits. *N Engl J Med* 2012;366:1051-1056.

- 21 Swing SR, Beeson MS, Carraccio C. Educational milestone development in the first 7 specialties to enter the next accreditation system. *J Grad Med Educ* 2013;5:98–106.
- 22 Ten Cate O. Nuts and bolts of entrustable professional activities. *J Grad Med Educ* 2013;5:157–158.
- 23 Brambleby P, Coates R. Learning contracts in higher professional training: a user's guide. *Postgrad Med J* 1997;73:279-282.
- 24 Kritek PA. Strategies for Effective Feedback. *Ann Am Thora Soc* 2015;12(4):557-560.

**Table 1.** Examples of “What if” scenario questions.

- What should you do if this patient begins bleeding from his tracheotomy?
- What should be your response if the patient’s tracheotomy tube is dislodged tonight?
- What should be your next step if this patient develops hypertension, bradycardia, and tachypnea?
- What will you do if this man develops agitated delirium again tonight?
- What should be your plan tonight if this difficult to sedate patient has an unplanned extubation?
- What should be your plan tonight if the patient has increased breath stacking after we transition to lung protective ventilation this afternoon?

**Table 2.** Hypothesis-driven clinical questions

- What exam findings would we expect if our patient developed cor pulmonale?
- What can we look for on exam to confirm the patient's reported history of cirrhosis?
- What are some things we should look for at the bedside to determine the cause of the patient's high peak inspiratory pressures?
- What physical exam findings can we look for that would support our thought that this patient has hereditary hemorrhagic telangiectasia?
- What are we looking to see on the bedside ultrasound to confirm that this patient has pulmonary edema as the cause of her dyspnea?

**Table 3.** Probing questions

- Why is the patient more hypoxemic in the supine position?
- We suspect this patient has a shunt; what could worsen that physiology?
- Yesterday we initiated diuresis; today the patient has a metabolic alkalosis. What may explain this?
- What is the rationale for targeting an oxygen saturation of 88-94% in our patient with chronic carbon dioxide retention?
- Why did your pneumonia patient's arterial oxygen saturation improve after you volume-resuscitated him?



## **Table 4.** Features of CARE

### Climate

- Set learner expectations
  - Avoid medical jargon
  - Avoid “one-upsmanship”
  - Be explicit on what you will be observing
- Set patient expectations
  - Ask permission
  - Explain purpose and plan for the encounter
  - Encourage questions and participation

### Attention

- Plan the encounter
- Remain focused
- Keep content relevant for all learners
- Maintain democratic leadership style

### Reasoning

- Encourage hypothesis-driven examination
- Ask probing questions
- Avoid ‘read my mind’ questions

## Evaluation

- Give formative feedback
- Focus on specific behaviors
- Avoid pointed criticism
- Encourage reflection after the encounter
- Compile observations for summative feedback

**Image 1.** One of the authors (far left) demonstrating a bedside teaching scenario using a standardized patient.

