

# PEDIATRICS®

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

## **The Search for Effective and Efficient Ambulatory Teaching Methods Through the Literature**

Charlotte Heidenreich, Patricia Lye, Deborah Simpson and Mary Lourich

*Pediatrics* 2000;105;231-237

DOI: 10.1542/peds.105.1.S2.231

The online version of this article, along with updated information and services, is  
located on the World Wide Web at:

<http://www.pediatrics.org/cgi/content/full/105/1/S2/231>

PEDIATRICS is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since 1948. PEDIATRICS is owned, published, and trademarked by the American Academy of Pediatrics, 141 Northwest Point Boulevard, Elk Grove Village, Illinois, 60007. Copyright © 2000 by the American Academy of Pediatrics. All rights reserved. Print ISSN: 0031-4005. Online ISSN: 1098-4275.

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™



# EDUCATING CHILD HEALTH PROFESSIONALS

## The Search for Effective and Efficient Ambulatory Teaching Methods Through the Literature

Charlotte Heidenreich, MD; Patricia Lye, MD; Deborah Simpson, PhD; and Mary Lourich, BA

**Abstract.** *Objective.* Education in ambulatory settings is characterized by the conflicting agendas of clinical efficiency and educational effectiveness. In recognition of the challenge to teach more effectively, this review was undertaken to identify literature-based teaching methods for ambulatory-based education.

*Design.* Literature search resources included electronic databases and relevant journal indices. After preliminary title/abstract review, final critical review using a coding sheet was undertaken to define the teaching behavior or characteristic in each article, and to evaluate empirical data related to effectiveness and/or efficiency.

*Results.* Our literature search and subsequent article analysis yielded 11 clinical teaching methods, but no agreed upon descriptor or key features for these methods. Synthesis of this literature lead to succinct descriptions of each method and a label.

*Conclusions.* There is limited evidence regarding the effectiveness of ambulatory teaching methods in cited literature. By establishing a common nomenclature and descriptions for 11 methods, this review lays the foundation for investigators to systematically study the effectiveness and efficiency of ambulatory-focused clinical teaching methods both within and across specialties. *Pediatrics* 2000;105:231–237; *ambulatory education, clinical education, clinical teaching, medical education, precepting teaching behaviors, teaching methods.*

---

ABBREVIATIONS. ERIC, Educational Resources Information Center; TIPP, teaching in the patient's presence.

---

The pressures for clinical productivity and research funding pose critical challenges to ambulatory-based clinicians who fulfill the education mission of our medical schools. Skeff and colleagues<sup>1</sup> argue that the charge to physicians to teach more efficiently, so that they will have more time available for patient care, is merely an illusion. Teaching takes time. The ambulatory environment, in particular, is characterized by variability, unpredictability, immediacy, and lack of continuity. Irby's 1995 thematic review of the literature on teaching and learning in ambulatory care

settings<sup>2</sup> highlighted the lack of research on clinical teaching methods.

In 1998, Bordage and colleagues<sup>3</sup> identified a series of important research questions to be answered about education in ambulatory settings. Among the critical questions was a cluster that focused on teaching and instructional strategies. More specifically, for the ambulatory setting, Bordage and colleagues asked, "Are there effective "micro-teaching" skills or techniques? What are the characteristics of an effective teacher or preceptor in the ambulatory setting?" Irby's 1995 review, which focused on the literature from 1980–1994, began to address the question of the characteristics of effective clinical teaching, (eg, enthusiastic, clinically competent, organized, accessible). However, this review did not identify the specific teaching methods used by effective ambulatory clinical teachers. Rather, Irby presented a series of recommended clinical teaching methods based on principles of learning and cognitive psychology: to set clear and realistic expectations, to teach to the learners needs, to give specific feedback based on observation of the learner's performance, and to create a positive learning environment. Several authors, referencing Irby's model, have proposed precepting "systems," which are reported elsewhere.<sup>4,5</sup> The "microskills" and "one-minute" models of structuring ambulatory teaching encounters describe components of the teaching encounter that are discussed separately below.

In recognition of the challenge facing clinical teachers to be effective and efficient, and the call to answer questions about ambulatory teaching, this literature review focuses on identifying specific teaching methods, and to determine if there is any evidence supporting their association with effective (increased student learning; learner achieving educational objectives) and efficient (time/cost to the teacher) teaching in the ambulatory setting.

### METHODS

The search to identify effective and efficient teaching methods for ambulatory based education began with a search of the Medline and Pub Med databases and the Educational Resources Information Center (ERIC) databases since Irby's review (1995–1997). The search terms included: ambulatory, outpatient, clinical education, clinical teaching, precepting, teaching methods, ambulatory care, medical education, medical students, clerkship, clinical clerkship, and clinical observations, with English language as a baseline. The indices of *Academic Medicine, Journal of General Internal Medicine, Family Medicine, Advances in Health Sciences Education, Teaching and Learning in Medicine,*

From the Center for Ambulatory Teaching Excellence (CATE)—Departments of Pediatrics and Medicine, and Office of Educational Services, Medical College of Wisconsin, Milwaukee, Wisconsin.

Received for publication May 12, 1999; accepted Sep 20, 1999.

Reprint requests to (C.H.) Departments of Pediatrics and Medicine, Office of Educational Services, Medical College of Wisconsin, 9200 W Wisconsin Ave, Milwaukee, WI 53226. E-mail: cheiden@mcw.edu  
PEDIATRICS (ISSN 0031 4005). Copyright © 2000 by the American Academy of Pediatrics.

*Medical Teacher, Pediatrics, Archives of Pediatrics and Adolescent Medicine* and *Medical Education* were scanned post-1997 as were the reference sections of the articles generated through the database searches.

More than 630 articles/abstracts were generated. All titles and associated abstracts were reviewed to determine if they met the preliminary inclusion criteria: 1) the learners were medical students, residents, fellows, or physicians engaged in continuing medical education; 2) the focus of the article was on clinical teaching methods and/or teaching behaviors in ambulatory medical education. Stritter and Baker's<sup>6</sup> 1982 definition of clinical teaching was used as the standard for inclusion. Per Stritter, included articles must focus on "... the teaching/learning interaction between instructor (attending physician) and student (resident) that normally occurs in the proximity of a patient and focuses on the either the patient or a clinical phenomenon that concerns a patient or class of patients."

The preliminary title/abstract review process resulted in 67 articles meeting the criteria. Each article was then randomly assigned to 2 of the authors who independently reviewed the full text article, to verify that the article met the 2 preliminary inclusion criteria. If both reviewers agreed that the article met the inclusion criteria, the article was set aside for a secondary review. If both reviewers disagreed, a third author read the article and made the final decision for inclusion/exclusion. As a result of the full text article review process, 41 articles were determined to have a focus on ambulatory teaching methods or teaching behaviors for physicians in training.

A final review of these 41 articles was then undertaken with each article assigned to 1 author for analysis using a critical review-coding sheet. The coding sheet distinguished teaching behavior(s) or characteristic(s) (eg, clear and organized) from teaching method(s) (eg, strategy for morning report, orientating the learner). If the article described a teaching method, the specific method was then annotated on the coding sheet. The next step focused on the empirical data related to effectiveness and efficiency of this teaching method including the level of the learners, practice setting (eg, managed care), the study type (survey, associative study or correlation study, experiential or qualitative study),<sup>7</sup> and the efficiency/effectiveness of the teaching method.

## PRELIMINARY RESULTS

Based on the review, 11 teaching methods have been identified (see Table 1). Twenty-one of the 41 articles included empirical findings using either quantitative or qualitative research methods with 14 focused on teaching behaviors and 7 focused on teaching methods. The teaching behavior articles were typically observational or surveys asking learners or physicians the characteristics they associated with effective clinical teaching. The 7 studies of teaching methods<sup>4,8-13</sup> included a survey, associative/qualitative study, 2 experimental studies, and qualitative studies. The identified articles were from pediatrics, general internal medicine, and family medicine clinical teaching.

Owing to the limited evidence regarding effectiveness of the cited teaching methods and the lack of common features or shared nomenclature, the remainder of this review will provide a brief summary of these 11 methods to provide a common methodic description to standardize terminology and to guide future studies. The methods are ordered chronologically, seeking to follow the flow of a typical clinical teaching encounter.

### A Standard Nomenclature and Description for Ambulatory Teaching Methods

#### 1) *Orienting the Learner*

Planning and preparing for teaching can include assessing the learner before clinical encounters as

**TABLE 1.** Common Ambulatory Teaching Methods Distilled From the Literature

1. Orienting learner: Assess learner before clinical encounters, orient to the clinical site and preceptor style and expectations.
2. Prioritizing learning needs: Before clerkship/clinic session, assess, prioritize, and tailor learner's experience.
3. Problem-orientated learning: Focus on a theme for clinic day to control variability inherent in office-based practice (eg, well-child visits).
4. Priming: Teacher-directed brief (1–2 minutes) orientation of learner to the patient and task(s) immediately before entering the patient's room.
5. Pattern recognition: The "Aunt Minnie" method emphasizing learner report of chief complaint and presumptive diagnosis rather than detailed case presentation.
6. Teaching in the patient's presence: Learners present findings in front of patient with preceptor "teaching" in response to this presentation.
7. Limiting teaching points: Focus on 1 to 2 key concepts/principles per teaching interaction.
8. Reflective modeling: Learner observes preceptor actions complimented by preceptor explanations.
9. Questioning: Allows preceptor to assess learner to guide subsequent teaching of higher/lower-order concepts.
10. Feedback: Ongoing provision of information designed to guide learners performance beginning with concrete experience, learner self-assessment, abstraction of experience to general concept, then testing validity of concept (Kolb).
11. Teacher/learner reflection: Connects new elements to existing knowledge for both learner and teacher.

well as orienting at the clinical site, and can occur in several different formats. Several authors have advocated orienting the learner to the clinical site and/or the preceptor before patient encounters<sup>1,6,11,14-16</sup> Lesky and Hershman<sup>14</sup> propose a 3-part structure that we have expanded to incorporate the orientation elements recommended by other authors: 1) review of the details of the practice site (physical facilities, staff, clinic's charting format); 2) an explanation of the preceptor's vision of the student's role (patient care responsibilities, preceptor expectations); 3) a description of the preceptor's system of supervision/teaching (content and form of written notes and case presentations and guidelines for the outpatient case presentation); 4) setting a "contract" or expectations with a resident/student concerning the nature of the learning experience (eg, physician interaction with both parent and child) and giving the learner specific responsibilities in patient care that make him an active participant in the learning process. This clinic-specific orientation complements the general clerkship/rotation orientation. Usatine et al<sup>11</sup> emphasize orienting learners to the clinic's charting format by guiding the student through the charting process so that levels of documentation are identified. Preceptors reported that student assistance with charting is a major timesaving strategy, however no empirical assessment of this teaching method has been reported.

#### 2) *Prioritizing or Assessing the Learner's Needs*

Consistent with Irby's recommendation to teach to the learner's needs, a number of articles de-

scribed strategies for assessing or understanding the learner before the clerkship or each clinic session.<sup>1,11,14</sup> Lesky and Hershman<sup>14</sup> proposed asking the learner a series of questions before or at the beginning of a clerkship, such as past clinical rotations with outpatient experience, goals/expectations, educational resources favored by the learner, and desired feedback schedule. This strategy enables the instructor to tailor learning experiences by allowing him/her to make informed choices concerning patient case-mix selection and level of independence appropriate for learning and teaching methods.<sup>11,14</sup> Reviewing the daily schedule with the learner before clinic sessions, whether they are weekly continuity sessions or part of an ambulatory block experience, can help to continuously assess learner needs, identify evolving learner questions, and to help the preceptor adapt experiences to the learner. Qualters et al<sup>12</sup> studied ambulatory preceptors' and students' perceptions of educational planning in a longitudinal clinic experience and found that faculty reports of educational planning were not always perceived by students, underscoring the need for a common vocabulary in educational planning as well as explicit identification of the process of educational planning.

### 3) Problem-orientated Learning

Consistent with Stritter's definition of clinical teaching, theme or problem-orientated learning focuses on the patient's problem or concerns a class of patients.<sup>17-19</sup> Educational opportunities are created by dealing with individual patient issues and resolving the existing dilemma(s) using the rich fabric of the clinical problem as the focus for student learning. The themes can be derived by a preclinic review of that day's patient panel leading to the selection of a common theme (eg, anticipatory guidance, immunizations, developmental assessment) for that clinic session, or patient-specific focus. In the focused day/clinic session approach, students are given time before and during office hours to prepare, review charts, and reflect on the teaching issue.

Recommended for early clinical experiences (eg, first- and second-year medical students), this strategy controls the highly variable and unpredictable environment of the office-based practice.<sup>19</sup> In Esposito et al's<sup>17</sup> patient-specific model, the preceptor is asked to move through a series of steps, beginning with identification of initial impressions and confirmation or refutation of these initial impressions, to clear identification of the problem, with associated teaching goals, methods, and ending with evaluation of the degree to which these goals were achieved—the effectiveness in producing the desired outcome. Family medicine faculty reported satisfaction with this teaching method; however, there was no empirical evidence presented regarding its effectiveness as a teaching method.

### 4) Priming

The method of priming is defined as orienting the learner to the patient and task(s) immediately

before entering the patient's room.<sup>5,14-16,19-21</sup> Use of this teaching method is intended to focus the learner so that they are more time-efficient with the patient, thereby minimizing clinic disruption. A synthesis of recommended priming yielded 4 general topics to include in each encounter:

1. Tasks: Preceptor/attending must clearly define the tasks the learner is expected to complete while with the patient and the time frame, (eg, a 10-minute focused history for an 18-month-old with fever, a 10-minute focused respiratory examination on a 4-year-old with wheezing).
2. Attending Role: The attending states when and how he/she will reconnect with the learner.
3. Patient: If known, the attending should briefly review the patient and highlight any patient-specific cautions. (eg, avoiding inadvertently provoking anxiety in a nervous parent). If not known, the chief complaint should be reviewed.
4. Product: Attending should describe the product, (eg, patient chart note, 3-minute focused presentation with problem list) that the learner will have as a result of the patient contact.

Priming the learner to the individual patient encounter using the 4 priming steps of defining tasks, attending role, patient, and product should take 1 to 2 minutes only. For example, in a priming encounter involving a preceptor and third-year medical student, the preceptor might state the following: "The next patient is a 7-year-old child who is here for a well-child examination. In 15 minutes, please do a focused history, concentrating on preventive health care, and do physical examinations of the cardiovascular system and head and neck. I will enter the room at that point and ask you to summarize your findings in a 2-minute focused presentation."

McGee and Irby<sup>15</sup> outlined 2 specific forms of patient-centered priming: 1) the patient with a new problem (focus on differential diagnosis and what might be expected); 2) the follow-up visit (emphasize health maintenance or complication of chronic disease). Specific priming instructions detailing learner tasks for each patient follow-up encounter include: review chart, summarize the baseline information, develop a tentative patient-care agenda, develop a learning agenda, and discuss the agenda with the preceptor.<sup>21</sup>

Priming as a general teaching method is clearly commonly believed to increase preceptor time-efficiency in ambulatory settings. Although theoretically grounded in principles of experiential theory, no empirical data have been reported that demonstrate the clinical effectiveness or time efficiency of priming as an ambulatory teaching method.

### 5) Pattern Recognition, eg, The "Aunt Minnie" Method

Building on research in clinical decision-making and cognitive psychology, the "Aunt Minnie" method seeks to enhance the learner's ability to quickly recognize disease and management patterns.<sup>22</sup> The "Aunt Minnie" method emphasizes



that if the lady across the street laughs like your Aunt Minnie and walks like your Aunt Minnie, then she is likely your Aunt Minnie based on only a limited set of data. This process is called pattern recognition. In this clinical teaching method, the learner reports the chief complaint and the presumptive diagnosis. The preceptor then sees the patient, while the learner writes the note. The case is then discussed with the learner, either supporting the learner's impression or why the preceptor disagrees. With practice, the learners come prepared with a diagnosis and the data to support it. This strategy emphasizes that many experienced clinicians use early pattern recognition to solve common clinical problems. Experience with this method reveals that the dialogue between the learner and the preceptor is focused more on problem-solving than a detailed history and physical examination.

#### 6) *Teaching in the Patient's Presence (TIPP)*

Teaching at the bedside is the historic clinical teaching model and some authors have adapted this model to the ambulatory setting. In this adapted form, learners present their findings in front of the patient with the preceptor "teaching" in response to this presentation. This TIPP may serve to increase preceptor and patient contact time, reinforce the trainee's role, and facilitate almost instantaneous feedback from the patient.<sup>5,11,14</sup> TIPP allows the preceptor to take advantage of the teachable moments directly through verification of history (eg, feeding history), follow-up questions and/or proceed directly with the examination of the patient (eg, ear examination, neurologic examination).

Preserving the learner's autonomy is an important issue when teaching in the patient's presence. The learner may feel that they have been relegated to the role of an "assistant" if not given an opportunity for independent thought and action. Ferrenchik et al<sup>5</sup> argue that TIPP can be patient-centered by focusing on the following areas in the examination room: 1) asking the student for his/her diagnosis; 2) assessing the learner's clinical reasoning through questioning; and 3) focusing on 1 relevant teaching point in the encounter. At this point, the learner and the teacher can leave the examination room. Outside the room, the preceptor (4) verbally states what the student did well and identifies problem areas (eg, omissions) and steps for correction. Sensitive psychosocial issues, identified during priming, are also discussed. Anticipated advantages of this teaching method are that it saves time, allows the patient and/or patient's parent to contribute to the learning process, and provides the preceptor with an opportunity to observe the student in direct interaction with the patient, providing data for the feedback process.

#### 7) *One to Two Focal Teaching Points*

Limiting the number of teaching points is mentioned as an effective teaching method by multiple authors.<sup>4,5,14,15,20,23,24</sup> Clinician-teachers often have

too much to teach and are "eager to share all of their pearls of wisdom." Focusing on a few main points leads to the observation that "less teaching can lead to more learning."<sup>20</sup> The preceptor selects 1 teaching point or general rule emphasizing rational statements or principles that will apply to other clinical cases. Information should be general, avoiding anecdotes or idiosyncratic preferences, with the rationale that instruction is more memorable and more transferable to other cases when offered as a general rule.<sup>4</sup> At the end of clinic, issues only partially addressed during the clinic session can be identified and reviewed. Unresolved issues can be deferred until the next session with the understanding that the learner will be prepared to discuss the issue at that time.

#### 8) *Reflective Modeling*

In reflective modeling, the learner observes preceptor actions complimented by preceptor explanation(s).<sup>6,15,20,23,25,26</sup> This powerful teaching method allows the preceptor to continue normal patient care activities with the learner in the role of active observer. Residents and students constantly observe what teachers do, how they act and what they say, integrating these actions into their own behavior. However, a recent study by Biddle et al<sup>25</sup> found that the frequency of modeling decreased across a longitudinal primary care clerkship as students gained more competence and their patient contacts increased.

Learners will emulate both the intended and unintended behaviors of the teachers. Therefore, multiple authors emphasized the need for the preceptor to be explicit with the learner about what is being modeled by discussing what, how, or why a certain action is being taken.<sup>23</sup> This reflective component of modeling has long been recognized by learners as a characteristic of effective teachers who explain the basis for their decisions/actions.<sup>6</sup>

Several specific strategies for effectively using modeling as an ambulatory teaching method are described in the literature. These strategies include having the teacher "think-out-loud," thereby allowing the learner to understand key decision points, clinical hunches, and insights.<sup>15</sup> As the preceptor thinks-out-loud, the learner's understanding of controversial issues or the rationale for a specific decision is increased. Preceptors can also model appropriate strategies for obtaining information when they don't know the answer, by articulating a process used to gather information: identifying key parameters (eg, urgency of the situation) and sources of information (eg, literature search, consultation). This reflective approach to modeling is consistent with the principles of adult and experiential learning theories as the preceptor's role becomes one of facilitating learning by focusing on issues emerging from the immediate experience of the learners.<sup>20</sup>

#### 9) *Questioning*

Questioning is an often-used clinical teaching strategy used to guide the teaching encounter and

to promote higher-order thinking.<sup>23,27</sup> As a teaching method, it allows the preceptor to assess the learner and thereby guide the learner's exploration of linkages between signs, symptoms, and hypotheses.<sup>23</sup> Several teaching strategies were cited in the studies reviewed that are believed to be associated with effective question asking. For example, allowing 3 to 5 seconds of wait time (ie, silence) after posing the question improves the quality and quantity of the learner's answers.<sup>8,28</sup> Other cited strategies include asking only 1 question at a time, and seeking to ask higher-order questions to stimulate the learner to create higher-order associations. However, often a higher-order question (eg, What do you associate with abdominal pain in an adolescent patient?) is immediately followed by a question with a specific hypothesis (eg, Could it be appendicitis?) that does not force the learner to generate the differential diagnosis based on analysis, synthesis, and evaluation of the available data.<sup>23,28</sup>

The environment in which questions are asked also influences the effectiveness of questioning as a teaching method. Learners must be in a setting where they can respond incorrectly, reveal their ignorance, and explore implications that they had not previously considered, with minimal consequences. Although the questioning methods reviewed in this section are not exclusive to the ambulatory setting, the key features of sufficient wait time, asking higher-order questions, and asking 1 question at a time in a suitable environment are accepted as central to effective clinical teaching.

#### 10) Feedback

Feedback is the ongoing provision of information to guide learner's performance. Feedback is the most commonly cited teaching method with more than 15 authors describing approaches to feed-

back.<sup>4-6,9,11,14-16,20,22-24,28-33</sup> Feedback needs to be direct, timely, and clear. Smith et al<sup>29</sup> proposed that Kolb's learning cycle would be useful in stimulating learner reflection by beginning with a concrete experience, guiding the learner to reflection, moving the learner from reflection on a single experience to a general rule/principle, then experimenting with that principle to test its validity. Kolb's model can also be applied to feedback and provides a simple heuristic to summarize the multiple principles/strategies described in the articles reviewed (see Fig 1). Our summary is not meant to be inclusive of every feedback principle, but rather to illustrate the applicability of the Kolb as a 4-step cycle for feedback.

The model begins with the preceptor contracting with the learner, prompting them to recognize and expect feedback and providing the 4 steps of experience, reflecting, abstract conceptualization, and active experience. Based on selectively observed concrete experiences (eg, failure to assess for hip dislocation in a newborn), the learner is asked to self-assess and then receives guidance on what is done well and what needs improvement (following the well established feedback criteria of Ende and many others). As part of the preceptor feedback, the learner is then directed to move from this particular case to a general rule or principle that can be applied in other situations. This generalization is then followed by specific strategies to improve performance and further opportunities to demonstrate improvement.

#### 11) Teacher/Learner Reflection

"Reflection is the element that turns experience into learning . . ." <sup>34</sup> As a teaching method, reflection provides a means to connect a new element to existing knowledge by organizing information into

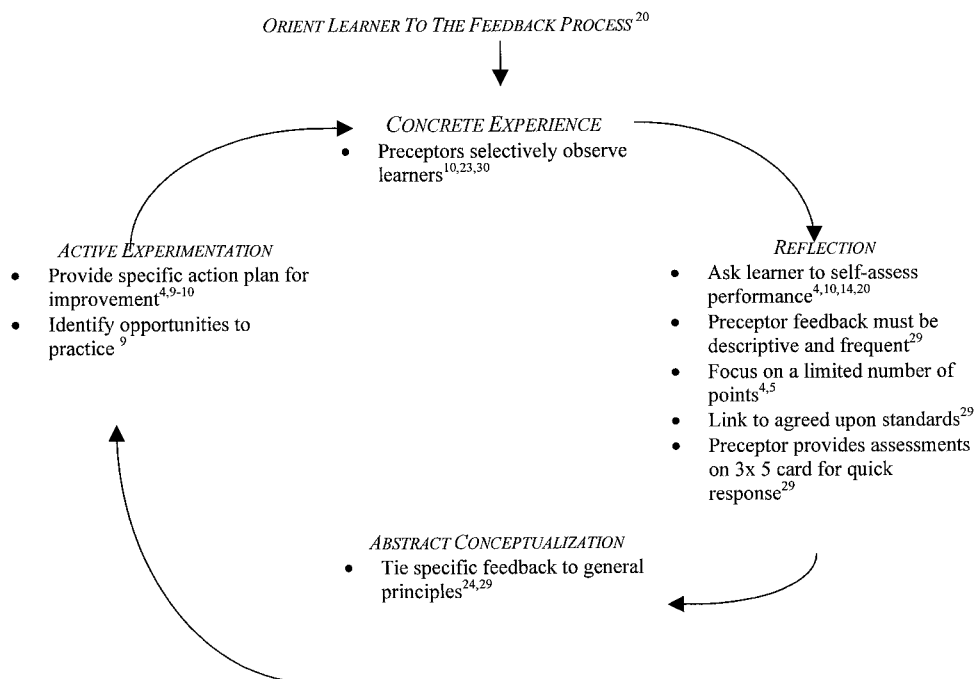


Fig 1. Summary of effective feedback features using the Kolb learning cycle.

integrated and structured wholes, or elaborated knowledge. This elaborated knowledge can enhance both learner and teacher performance. Literature-based strategies and their associated study results if available, will be described separately for learners and then teachers.

Learner reflection can be accomplished through a variety of strategies ranging from independent learning (learners do supplemental reading on disease entities they have observed and discuss with their preceptors the following day<sup>11</sup>) to preceptor stimulated reflection or small group reflection. Reflection can focus on individual patients or a group of patients as in formal exit rounds<sup>34,35</sup> or wrap-up rounds<sup>36</sup> that occur after the clinic half-day, giving faculty and learners a chance to discuss interesting cases from the session and identify common themes. In all of these strategies, the clinic experience itself serves as a stimulus for reflection and self-directed learning. For example, Brown et al<sup>10</sup> described how to use a weekly morning report session for a student clerkship. Students presented self-selected cases for discussion, generating teaching points, which were then used to formulate examination questions. Thomasson et al<sup>20</sup> suggest setting the agenda for the individual teaching encounter by using open-ended questions after the resident's presentation (eg, What are the specific questions you have regarding this patient's care today?). By encouraging resident reflection, if only for a few moments, the teaching interaction can then focus on the resident's needs.

Teacher reflection has been recognized as a critical component of effective teaching. Research has shown that in the context of professional practice, reflection is the key to learning from experience. The habits of reflective observation, deliberative evaluation, and planning for improvement are critical components of professional success for physicians as clinicians and teachers. "Teachers must reflect on their teaching if they are to identify ways to improve it".<sup>1</sup>

Several studies focused on teacher reflection provide insight into this strategy for improving one's teaching. Hewson<sup>13</sup> and Hekelman et al<sup>37</sup> used stimulated process recall by having the preceptor in a general internal medicine clinic observe a videotape of his/her teaching and then audiotaping the preceptor's reflections and thoughts. This strategy was used, in part, to encourage reflection and to identify individual areas of strength and weakness. Pinsky et al<sup>38</sup> in their study of successful teachers, found that successful teaching interactions were as important a stimulus for reflection, in shaping present teacher experiences, as were unsuccessful interactions. Successful teachers used reflection on success to incrementally improve the quality of their teaching. To engage in reflection, Ferencik et al<sup>5</sup> recommended that the preceptor take 1 minute per day to identify a teaching approach that was effective or ineffective. Then the preceptor should reflect on that teaching by responding to 2 questions: 1) "Why was this approach effective or ineffective?" and 2) "What, if anything, would you (the preceptor) do differently next time and why?"

Other strategies to promote reflection include reflecting on the characteristics of effective/expert teachers as described in the literature<sup>25,26,39-42</sup> relative to one's own teaching behaviors. This is particularly important as Bennard and Stritter<sup>42</sup> reported that observed clinical teaching did not conform to the teaching principles advocated in the literature or to recognized effective teaching methods, as they were perceived to be time-inefficient by teachers. Good teachers are enthusiastic and genuinely interested in students, actively involve the student in technical and problem-solving skills, allow increased responsibility, and answer questions clearly and willingly. Through teacher reflection on the congruence of these characteristics with their own behaviors, the effectiveness and efficiency of accepted characteristics of excellent teachers to ambulatory preceptors can be explored.

## SUMMARY AND CONCLUSIONS

Building on Irby's 1995 broad-based review of literature on ambulatory education,<sup>2</sup> this review set out to answer the question posed by Bordage and colleagues<sup>3</sup> specific to effective "micro-teaching" skills or techniques for ambulatory education. Our analysis of citations from Medline, Pub Med, and ERIC highlights 4 major findings. First, the existing literature on effective and time-efficient ambulatory-based clinical teaching methods is primarily focused on characteristics and behaviors of effective clinical teachers, not teaching methods. Only a limited number of ambulatory specific teaching methods are described in the literature and come from the fields of family medicine and general internal medicine, with only 2 citations from ambulatory pediatrics.<sup>22,33</sup> Third, while these teaching methods are often based on theoretical models and/or experience, they typically fail to present empirical data specific to the effectiveness and/or efficiency of these methods. Finally, there is no single source that provides a common description and/or terminology for these teaching methods on which to build research studies in the field of ambulatory-based clinical teaching.

The results of our literature search and subsequent article analysis yielded 11 general clinical teaching methods. Each teaching method was then described highlighting key features emerging from the review with associated references identified. This synthesis of ambulatory-focused teaching methods is intended to provide a foundational nomenclature enabling investigators to systematically study each of these clinical teaching methods with sufficient research rigor to make strong inferences about educational practices.<sup>3</sup>

Study design will depend on the specific hypotheses of the investigators, but concurrent use of qualitative and quantitative measures can test hypotheses and provide the in-depth understanding needed for theory building and hypothesis generation. Study populations should be multispecialty to identify key teaching methods across specialties and specialty-specific to highlight the unique features of teaching by discipline. For example, teaching the learner in the patient's presence (TIPP) has been described by



internists and family physicians, and family practice outpatients' perceptions of medical students involvement in their care has been reported as a positive experience.<sup>43</sup> What happens to the strategy of TIPP in pediatrics when the preceptor must not only manage the patient and learner in the examination room, but the parent/caregiver as well? Multisources of data (eg, learner, preceptor, patient, parent) must also be used to examine effectiveness of these teaching methods using varied outcome measures (eg, improved learner performance, preceptor patient efficiency, quality of patient care). Finally, the results of these studies must be published in journals that are available through commonly searched indices (eg, Medline, ERIC). Although there are descriptions of pediatric specific teaching methods in annual meeting abstracts, Council on Medical Student Education in Pediatrics materials, and books/monographs published by the Ambulatory Pediatric Association, these references are not indexed rendering them almost inaccessible to investigators in other specialties.

As the pressures to increase clinical productivity continue, we must provide our teachers with methods to effectively and efficiently educate learners based on evidence. We believe that providing a common terminology and descriptions of current ambulatory-based clinical teaching methods provides a first step. To paraphrase Greenberg and Siegel,<sup>44</sup> "the (educational) problems surround us; the terms have now been defined; the solutions are waiting to be studied."

#### ACKNOWLEDGMENTS

This project was partially funded by a Faculty Development Grant in General Pediatrics-General Internal Medicine (1 D28 PE50072) from the US Department of Health and Human Services, Deborah Simpson, PhD, Project Director.

#### REFERENCES

- Skeff KM, Bowen JL, Irby DM. Protecting time for teaching in the ambulatory care setting. *Acad Med.* 1997;72:694-697
- Irby DM. Teaching and learning in ambulatory care settings: a thematic review of the literature. *Acad Med.* 1995;70:898-931
- Bordage G, Burack JH, Irby DM, Stritter FT. Education in ambulatory settings: developing valid measures of educational outcomes, and other research priorities. *Acad Med.* 1998;73:743-750
- Neher JO, Gordon KC, Meyer B, Stevens N. A five-step "microskills" model of clinical teaching. *J Am Board Fam Pract.* 1992;5:419-424
- Ferenchik G, Simpson D, Blackman J, DaRosa DA, Dunnington GL. Strategies for efficient and effective teaching in the ambulatory care setting. *Acad Med.* 1997;72:277-280
- Stritter FT, Baker RM. Resident preferences for the clinical teaching of ambulatory care. *J Med Educ.* 1982;57:33-41
- Fraenkel JR, Wallen NE. *How to Design and Evaluate Research in Education.* New York, NY: McGraw Hill Inc; 1993:7-11
- Ende J. Feedback in clinical medical education. *JAMA.* 1983;250:777-781
- Cope DW, Linn LS, Leake BD, Barrett PA. Modification of residents' behavior by preceptor feedback of patient satisfaction. *J Gen Intern Med.* 1986;1:394-398
- Brown JL, Curry RH, Arseven A, Yarnold PR, Martin GJ. The educational value of a primary care clerkship morning report. *Teach Learn Med.* 1998;10:162-166
- Usatine RP, Nguyen K, Randall J, Irby DM. Four exemplary preceptors' strategies for efficient teaching in managed care settings. *Acad Med.* 1997;72:766-769
- Qualters DM, Regan MB, O'Brien MC, et al. Comparing ambulatory preceptors' and students' perceptions of educational planning. *J Gen Intern Med.* 1999;14:196-199
- Hewson MA. Reflection in clinical teaching: an analysis of reflection-on-action and its implications for staffing residents. *Med Teach.* 1991;13:227-231
- Lesky LG, Hershman WY. Practical approaches to a major educational challenge. *Arch Intern Med.* 1995;155:897-904
- McGee SR, Irby DM. Teaching in the outpatient clinic. *J Gen Intern Med.* 1997;12(suppl 2):S34-S40
- Smith CS, Irby DM. The roles of experience and reflection in ambulatory care education. *Acad Med.* 1997;72:32-35
- Esposito V, Schorow M, Siegel F. A problem-oriented precepting method. *J Fam Pract.* 1983;17:469-473
- Barrington DL. Planning practice-based clinical teaching: part 1. *Aust Fam Physician.* 1997;26:56-57
- Taylor C, Lipsky MS, Bauer L. Focused teaching: facilitating early clinical experience in an office setting. *Fam Med.* 1998;30:547-548
- Thomasson C, Levinson W, Acheson K, et al. Teaching tips for clinician-teachers. *J Gen Intern Med.* 1994;9:349-353
- Kurth RJ, Irigoyen M, Schmidt HJ. A model to structure student learning in ambulatory care settings. *Acad Med.* 1997;72:601-606
- Cunningham AS, Steven D, Blatt, MD, Fuller PG, Weinberger H. The art of precepting: Socrates or Aunt Minnie. *Arch Pediatr Med.* 1999;153:114-116
- Lesky LG, Borkan SC. Strategies to improve teaching in the ambulatory medicine setting. *Arch Intern Med.* 1990;150:2133-2137
- Irby DM. What clinical teachers in medicine need to know. *Acad Med.* 1994;69:333-342
- Biddle WB, Riesenber LA, Darcy PA. Medical students' perspectives of desirable characteristics of primary care teaching sites. *Fam Med.* 1996;28:629-633
- Wright SM, Kern DE, Koloder K, Howard DM, Brancati FL. Attributes of excellent attending-physician role models. *N Engl J Med.* 1998;339:1986-1993
- Hekelman FP, Vanek E, Kelly K, Alemagno S. Characteristics of family physicians' clinical teaching behaviors in the ambulatory setting: a descriptive study. *Teach Learn Med.* 1993;5:18-23
- Hekelman FP, Blase JR. Excellence in clinical teaching: the core of the mission. *Acad Med.* 1996;71:738-742
- Smith CS, Francovich C, Gieselman J, Servis M. A broader theoretical model for feedback in ambulatory care. *Adv Health Sci Educ.* 1998;3:133-140
- Ende J, Pomerantz A, Erickson F. Preceptors' strategies for correcting residents in an ambulatory care medicine setting: a qualitative analysis. *Acad Med.* 1995;70:224-229
- Wolverton SE, Bosworth MF. A survey of resident perceptions of effective teaching behaviors. *Fam Med.* 1985;3:106-108
- Skeff KM, Stratos GA, Mygdal WK, et al. Clinical teaching improvement: past and future for faculty development. *Fam Med.* 1997;29:252-257
- Pituch K, Harris M, Bogdewic B. The brief structured observation—a tool for focused feedback. *Acad Med.* 1999;74:599
- Arseneau R. Exit rounds: a reflection exercise. *Acad Med.* 1995;70:684-687
- DaRosa DA, Dunnington GL, Stearns J, Ferenchick G, Bowen JL, Simpson DE. Ambulatory teaching "lite": less clinic time, more educationally fulfilling. *Acad Med.* 1997;72:358-361
- Medley ES. Teaching in the ambulatory care setting. *J Med Educ.* 1982;57:322-323
- Hekelman FP, Flynn SP, Glover PB, Galazka SS, Phillips JA. Peer coaching in clinical teaching. *Eval Health Professions.* 1994;17:366-381
- Pinsky LE, Monson D, Irby DM. How excellent teachers are made: reflecting on success to improve teaching. *Adv Health Sci Educ.* 1998;3:207-215
- Gjerde CL, Coble RJ. Resident and faculty perceptions of effective clinical teaching in family practice. *J Fam Pract.* 1982;14:323-327
- Goertzen J, Stewart M, Weston W. Effective teaching behaviors of rural family medicine preceptors. *Can Med Assoc J.* 1995;153:161-168
- Glenn JK, Reid JC, Mahaffy J, Shurtleff H. Teaching behaviors in the attending-resident interaction. *J Fam Pract.* 1984;18:297-304
- Bennard BC, Stritter FT. Teaching medical students in ambulatory clinics: prescribed vs actual practice. In: Dabney DS, compiler. *Proceedings of the 28th Annual Conference on Research in Medical Education;* 1989; Washington DC: AAMC; 1989:141-146
- Devera-Sales A, Paden C, Vinson DC. What do family medicine patients think about medical students' participation in their health care? *Acad Med.* 1999;74:550-552
- Greenberg L, Siegel B. A commentary on publication in pediatric education in the Journal of the Ambulatory Pediatric Association. *Pediatrics.* 1999;103:A13-A14



## The Search for Effective and Efficient Ambulatory Teaching Methods Through the Literature

Charlotte Heidenreich, Patricia Lye, Deborah Simpson and Mary Lourich

*Pediatrics* 2000;105:231-237

DOI: 10.1542/peds.105.1.S2.231

<b>Updated Information &amp; Services</b>	including high-resolution figures, can be found at: <a href="http://www.pediatrics.org/cgi/content/full/105/1/S2/231">http://www.pediatrics.org/cgi/content/full/105/1/S2/231</a>
<b>References</b>	This article cites 37 articles, 6 of which you can access for free at: <a href="http://www.pediatrics.org/cgi/content/full/105/1/S2/231#BIBL">http://www.pediatrics.org/cgi/content/full/105/1/S2/231#BIBL</a>
<b>Citations</b>	This article has been cited by 7 HighWire-hosted articles: <a href="http://www.pediatrics.org/cgi/content/full/105/1/S2/231#otherarticles">http://www.pediatrics.org/cgi/content/full/105/1/S2/231#otherarticles</a>
<b>Subspecialty Collections</b>	This article, along with others on similar topics, appears in the following collection(s): <b>Miscellaneous</b> <a href="http://www.pediatrics.org/cgi/collection/miscellaneous">http://www.pediatrics.org/cgi/collection/miscellaneous</a>
<b>Permissions &amp; Licensing</b>	Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at: <a href="http://www.pediatrics.org/misc/Permissions.shtml">http://www.pediatrics.org/misc/Permissions.shtml</a>
<b>Reprints</b>	Information about ordering reprints can be found online: <a href="http://www.pediatrics.org/misc/reprints.shtml">http://www.pediatrics.org/misc/reprints.shtml</a>

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

