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REVIEWS

Maximizing Teaching on the Wards: Review and Application of the One-Minute Preceptor and SNAPPS Models

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Hospitalist educators face a number of challenges in teaching clinical reasoning to residents and medical students. Helping to develop trainees' clinical acumen is an essential and highly nuanced process, yet complex patients, documentation requirements, and productivity goals compete with teaching time. Workplace-based assessment is particularly important for residents with the institution of the developmental milestones for meeting Accreditation Council for Graduate Medical Education competencies. Two frameworks for facilitating the clinical reasoning discussion—the One-Minute Preceptor preceptor and SNAPPS—have been well studied in the outpatient setting with positive results. Both models show promise for use in the inpatient teaching environment with little modification. This narrative review compares and contrasts these 2 teaching frameworks and discusses their application to the inpatient teaching environment. These models can provide opportunities for hospitalist educators to better assess trainees, integrate regular feedback, and encourage self-directed learning. These teaching frameworks can also allow hospitalists to provide more focused education to trainees without taking additional valuable time. *Journal of Hospital Medicine* 2015;10:125–130.

An important role of the hospitalist educator is to teach residents and medical students how to diagnose and manage acute medical problems. However, clinical reasoning is complex and nuanced, and there are many challenges to teaching this important process. Medical inpatients are increasingly complex, older, and more seriously ill.[1] Documentation requirements and productivity obligations compete with teaching time. Hospitalists must adjust their teaching for learners from different professions and at various levels of training. In addition, hospitalists tend to be less experienced, and must balance the need to learn their roles as clinicians with developing their own skills as educators.[2]

Despite the challenges inherent to the setting, inpatient rotations provide tremendous teaching and learning opportunities. Patients with undifferentiated complaints or known diagnoses in need of management decisions are available to stimulate discussion. Hospitalist educators have the opportunity to assess residents' progress along the developmental milestones, which residency programs are now required to report for accreditation,[3] and provide role modeling for residents who are developing their own teaching skills.

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To maximize these opportunities, attendings must engage trainees to practice clinical reasoning and identify their own knowledge gaps. Various strategies for facilitating the clinical reasoning discussion exist, but two frameworks—the One-Minute Preceptor (OMP) and SNAPPS—have been well studied, albeit mainly in the outpatient setting. Both models offer ways to maximize teaching and assess clinical reasoning, but they have different methods and strengths. This article provides a narrative review of the two frameworks and discusses how they can be applied to the inpatient teaching environment. Hospitalists can utilize these models or components of each framework to facilitate teaching on inpatient teams and enhance their roles as educators.

ONE-MINUTE PRECEPTOR

The OMP was first described in 1992 by Neher and colleagues as an alternative to the traditional model of precepting.[4] It gives preceptors a method to facilitate learners presentation of their thought process and then for the preceptor to provide targeted teaching points.[4] The OMP helps diagnose both learner and patient, whereas the traditional model focuses on diagnosing the patient.[5] In the traditional model, the attending questions the learner to diagnose the patient, which does not often make clear the learner's thinking process. Thus, there may be a mismatch between the teaching points the preceptor makes and what the learner really needs to know.[5] There are several key benefits to the OMP compared to the traditional model; broadly, these relate to improved ability to assess the learner and provide targeted teaching,[4–7] improved integration of feedback,[4,8–10] learner preference,[11] and ease with which it is learned by faculty members.[4]

TABLE 1. One-Minute Preceptor

A 5-step framework in which the preceptor does the following:
1. Get a commitment
2. Probe for supporting evidence
3. Provide general rules
4. Reinforce what was done correctly
5. Correct mistakes

TABLE 2. SNAPPS

A 6-step framework in which the learner does the following:
1. Summarize briefly the history and findings
2. Narrow the differential to 2 or 3 possibilities
3. Analyze the differential by comparing/contrasting the possibilities
4. Probe the preceptor by asking questions
5. Plan management for the patient's medical issues
6. Select a case-related issue for self-directed learning

The OMP model consists of five steps outlined in Table 1. Step 1, getting a commitment, can involve any aspect of the case—diagnosis, treatment, or follow-up—and learners should be challenged to make intellectual commitments just beyond their level of comfort.[12] Steps 1 and 2 bring to light the learner's individual learning needs,[11] then the preceptor follows up with personalized teaching. The OMP is efficient; no increase in time was needed to precept a case in an outpatient study.[9] In a separate outpatient study, the OMP led preceptors to be more likely to teach about disease-specific points and differential diagnosis, as compared to generic items such as history taking and presentation skills with the traditional model.[5]

Faculty feel better prepared to assess learners and provide feedback with the OMP model.[6,9] Aagaard and colleagues provided 116 mostly ambulatory preceptors with scripted, videotaped encounters of the OMP and traditional models. The OMP improved preceptors' confidence at rating students' presentation skills, clinical reasoning, and fund of knowledge. It was rated more efficient and effective, and preceptors were able to diagnose the patient with the same or improved accuracy compared to the traditional model.[6] In a pre-post study assessing the efficacy of a faculty development workshop, students rated ambulatory teaching encounters incorporating the OMP model as having increased quantity and quality of feedback. Furthermore, faculty reported improved ability to evaluate students and were more likely to let students reach their own conclusions and create their own postencounter learning plans.[9]

The OMP is also well-received by trainees. Teherani and colleagues analyzed medical students' responses to videotaped teaching encounters of the OMP and traditional models. Students gave higher mean ratings for all studied items (including feedback, involving the student in decision-making, and overall effectiveness) to the OMP model, and preferred it over the traditional model.[11]

Several studies have evaluated the OMP for use by residents as teachers,[10,13,14] and it is one of the most common models taught to residents.[13] One study evaluated the impact of a one-day workshop for 276 residents that included the five-step microskills model (also known as the OMP).[10] Residents felt more prepared to teach, set expectations, and provide feedback.[10] The OMP model, despite brief training, is effective in improving residents' teaching effectiveness and confidence.[13]

The only study we found that exclusively evaluated the OMP in the inpatient setting was a randomized trial[8] involving 57 internal medicine residents. Interns and students rated OMP-trained residents more highly in 4 of 5 behaviors. The behavior that showed no difference from the control group was "teaching general rules."[8] However, there was no difference in ratings of overall teaching effectiveness between groups.[8]

Our review of the literature on the OMP shows it is a quickly learned, easily implemented framework for teaching clinical reasoning. It has been used across specialties and settings, provides a built-in mechanism for feedback, and allows educators to assess trainees' reasoning while extracting the clinical information needed to work efficiently.

SNAPPS

SNAPPS was first described in 2003 by Wolpaw and colleagues. It is a six-step learner-centered model as outlined in Table 2.[15] Unlike the OMP, SNAPPS requires both trainee and teacher to learn the framework. In doing so, the responsibility for directing the teaching encounter is shifted toward the learner.[15] Consequently, this model may be best suited to advanced or motivated learners. Like the OMP, SNAPPS was originally described for the ambulatory environment. However, it has been studied in the inpatient setting as well.

With SNAPPS, the teaching encounter is learner driven. The trainee presents the case and directs the discussion of differential diagnosis. The educator does not have an active role until the fourth step, where the learner asks questions or identifies areas of uncertainty. But even at this stage, the discussion is learner driven. Step 5, planning management, is collaborative, with trainees suggesting management plans with appropriate attending guidance. Depending on learner skill level or case difficulty, the preceptor may need to play more or less of an active role. The final step, picking a case-related issue to examine, extends the learning beyond the initial encounter, and ensures that it is individualized and relevant. This step also encourages learner progression toward the Accreditation Council for Graduate Medical Education (ACGME) competency of practice-based learning and improvement.[3]

TABLE 3. Example Scenario: The One-Minute Preceptor

	Attending/ Senior Resident	Learner	Practical Tips
	Active listening.	"Ms. Weinstein is a 60 year old with a history of alcohol abuse and osteoarthritis, admitted with 1 day of epigastric pain and coffee ground emesis. Workup revealed normal vital signs, mild epigastric tenderness, and mild anemia, with normal pancreatic and liver enzymes."	Learners may end their presentation here and expect you to fill in with your assessment and plan. Rather than jumping in, turn it back to the learner following the OMP model.
Get a commitment	"What do you think is going on?"	"The most likely diagnoses are upper GI bleed due to peptic ulcer disease, gastritis, or Mallory-Weiss tear."	If the diagnosis is already established or the leaner prematurely closes the differential, ask "What else could this be?" If the student does not expand the differential, direct this question to the intern.
Probe for supporting evidence	"Why do you think this?"	"Peptic ulcer disease is most likely because of her alcohol abuse and her daily use of NSAIDs for arthritis pain. Gastritis is equally likely for the same reasons. Mallory-Weiss tear is less likely, as she was not retching prior to the episode of bleeding."	Learners should use the "key findings" to argue for or against each diagnostic hypothesis. Novice learners often need reminders that vital signs and negative findings (e.g. absence of tachycardia) are often key findings.
Provide general rules	"When a patient with a history of alcohol abuse has a GI bleed, you should consider whether she has underlying liver disease or a coagulopathy. If she did have liver disease, what other sources of bleeding should you consider?"	"Esophageal varices?"	This is the step the residents tend to struggle with when teaching.[8] If your senior resident is leading the case discussion, be prepared to step in with some clinical pearls.
Reinforce what was done correctly	"You did a nice job considering her predisposing factors, including NSAIDS and alcohol. This helped you prioritize the most likely diagnoses."	"Thank you."	Tell them what they did right and the effect it had.
Correct mistakes	"You did not address her risk for alcohol withdrawal. This increases in patients who are hospitalized for a medical illness. Next time be sure to include substance abuse in your problem list."	"I'll make sure to do that."	Tell them what they did not do right and how to improve for the next time. If the student is presenting, consider asking the intern or senior resident for a management plan.

NOTE: **Abbreviations:** GI, gastrointestinal; NSAIDs, nonsteroidal anti-inflammatory drugs; OMP, one-minute preceptor.

A handful of studies have evaluated the SNAPPS model. A randomized comparison group trial found that SNAPPS-trained students outperformed students trained to elicit feedback and students who received the usual and customary preparation.[16] Notably, SNAPPS students expressed more than twice as many differential diagnoses, justified their reasoning more than five times as often, and expressed more questions and uncertainties. The SNAPPS students' presentations were no longer than in the usual and customary group, and were just one minute longer than in the group trained to elicit feedback.[16] A follow-up analysis found that 100% of the SNAPPS students expressed an uncertainty (i.e. step 4) compared with 54% of the comparison group, and that most of these uncertainties related to diagnostic reasoning.[17]

A study of medicine clerkship students evaluated the impact of extending SNAPPS to the inpatient setting and including "educational prescriptions."[18] The goal was to facilitate the formulation and answering of clinical questions by using the patient, intervention, comparison, outcome (PICO) format for step 6 (selecting a case-based issue to learn about). Dubbing this "SNAPPS-Plus," the authors found that 99% of cases included a question, and 93% of those were answered. Most questions related to therapeutics, and there was a positive correlation between questions more closely corresponding to the PICO format and higher quality answers.[18]

As with the OMP, SNAPPS does not require additional time for case presentations compared to the usual method.[16] From the perspective of a busy hospitalist, this model takes some responsibility for education away from faculty and places it on the learner. This is an important process for fostering self-directed learning. As with the OMP, SNAPPS appears easily translatable from the outpatient to inpatient setting. Its main downside is the training time required for both parties to implement it.

TRANSLATING THE MODELS TO THE INPATIENT SETTING

The OMP and SNAPPS have largely been used in the outpatient setting. However, we propose that hospitalists can adapt either model for teaching on ward rotations, as the steps of each framework are not exclusive to one clinical setting.

Although the OMP is typically used between a preceptor and single trainee, it is well suited to engaging the entire group on inpatient rounds (Table 3). For

TABLE 4. Example Scenario: SNAPPS

	Learner	Attending/ Senior Resident	Practical Tips
1. Summarize	"Ms. Weinstein is a 60 year old with a history of alcohol abuse and osteoarthritis, admitted with 1 day of epigastric pain and coffee ground emesis. Workup revealed normal vital signs, mild epigastric tenderness, and mild anemia, with normal pancreatic and liver enzymes."	Active listening.	Rather than a complete, detailed history and physical, we emphasize tailoring the oral presentation to include only those components relevant to this admission. Then, transition to the SNAPPS presentation with a "summary statement" as presented here.
2. Narrow the differential	"The most likely diagnoses are upper GI bleed due to peptic ulcer disease, gastritis, or Mallory-Weiss tear."	If the diagnosis is already established or the leaner prematurely closes the differential, ask "What else could this be?"	Hospitalized patients often have multiple problems. Learners can go through this process of SNAPPS for each problem or only the primary problem.
3. Analyze the differential	"Peptic ulcer disease is most likely because of her alcohol abuse and her daily use of NSAIDs for arthritis pain. Gastritis is equally likely for the same reasons. Mallory-Weiss tear is less likely, as she was not retching prior to the episode of bleeding."	"That's a very reasonable differential. You did a nice job considering her predisposing factors. What do her vital signs tell you about how much blood she has lost?"	Learners should use the "key findings" to argue for or against each diagnostic hypothesis. Novice learners often need reminders that vital signs and negative findings (eg, absence of tachycardia) are often key findings.
4. Probe the preceptor	"I know alcohol increases the risk of esophageal cancer, but I was not sure if that could present like this."	"You are right that she has a higher risk of cancer. Because most tumors are slow-growing, what kind of symptoms do you think a mass in the esophagus might cause?"	Guide learners to the correct answer, helping them connect pre-existing knowledge to the question at hand. This is also a good spot to provide real-time feedback.
	NOTE: This is a great place for learners to ask questions that might be harder to look up, or to ask about physical findings (eg, "I thought I heard crackles but was not sure. Could somebody check this with me?")	"Does anyone else on the team have thoughts about this question?"	Alternatively, give the senior resident an opportunity to address the question. This allows the attending to assess the senior resident's clinical reasoning and gives him or her an opportunity to practice teaching.
5. Plan management	"For the suspected GI bleed, I would like to start a proton pump inhibitor, call a GI consult for an EGD, and check the hematocrit every 8 hours. We can use sequential compression devices for DVT prophylaxis. We will also counsel on alcohol cessation and monitor for withdrawal."	"Good start. Does anyone else on the team want to add to the management plan?" "We have a pharmacist rounding with us today. Is there a difference in outcomes or costs with BID dosing versus continuous infusion of a proton pump inhibitor?"	If a student is presenting, offer the intern and/or senior resident an opportunity to add to the plan. Incorporate the expertise of ancillary providers rounding with the team.
6. Select a case-related issue for self-directed learning	"I would like to look up the best way to treat her alcohol withdrawal if she develops it."	"Great! We do have a protocol at the hospital, but it is a good idea to review the literature behind it."	Set aside 10 minutes before rounds each day for learners to present their findings. Consider having learners write educational prescriptions following the PICO format.

NOTE: **Abbreviations:** BID, twice daily; DVT, deep venous thrombosis; EGD, esophagogastroduodenoscopy; GI, gastrointestinal; NSAIDs, nonsteroidal anti-inflammatory drugs; OMP, one-minute preceptor; PICO, patient intervention comparison outcome; SNAPPS, summarize briefly the history and findings, narrow the differential to 2 or 3 possibilities, analyze the differential by comparing/contrasting the possibilities, probe the preceptor by asking questions, plan management for the patient's medical issues, select a case-related issue for self-directed learning.

example, a student could commit to and support a diagnosis (steps 1 and 2), whereas the intern could commit to and provide evidence for a treatment or management option. Attendings can repeat steps 1 and 2 for patients' secondary problems, encouraging learners to commit to other items on the problem list.

While teaching general rules (step 3) in the group setting, hospitalists should emphasize basic principles for students (which will serve as reinforcement for residents) as well as discuss more complex rules for the edification of all team members. Hospitalists should encourage senior residents to speak up during this step and share their knowledge with the group. This is an opportunity for residents to practice their role as teachers, and for faculty to assess their clinical acumen. However, residents struggled with teaching general rules in Furney and colleagues' randomized trial.[8] Successful clinical teachers use a mix of improvisational teaching and "curriculum scripts" developed through years of experience.[19] Hospitalists can model this method of instruction for residents who are learning to teach. For more junior hospitalists who may still be developing their own teaching scripts, the OMP provides an opportunity to regularly integrate these scripts into rounds.

The OMP teaching encounter ends with feedback. Providing real-time feedback to an individual in the group setting could feel awkward. Reassuringly, in Furney and colleagues' study, some of the greatest gains were in the realm of feedback, as reported by both the senior residents providing the feedback and the interns and students on the receiving end.[8] Although the OMP builds in a space for feedback, it does not teach one how to give feedback. Although it is possible that not all feedback is beneficial, trainees are eager to receive constructive input, and hospitalists should not fear providing this in front of the group. Thoughtful critique of one trainee can provide learning opportunities for others listening in.

SNAPPS is also well suited to inpatient education (Table 4). Because it emphasizes a discussion of differential diagnosis, it works well for new admissions.

Because hospitalized patients usually have multiple problems, learners may repeat steps 2 and 3 for each problem, or just for the primary issue. On subsequent days, a standard presentation may work better, but if new problems arise (e.g. fever), hospitalists can ask learners to go through the SNAPPS steps for the new issue.

Step 6 of SNAPPS provides trainees an opportunity to search for and present relevant information to guide patient management. To incorporate more formal teaching time each day, set aside 10 minutes before rounds for learners to present their answers to the team. Also, because SNAPPS has the learner ask about uncertainties, faculty can use their on-the-fly teaching time to answer questions for which trainees do not know the answer. In the era of problem-based learning (PBL) and medical school curricula that foster self-directed learning from day one, many students should find SNAPPS a natural extension of PBL-style learning from the preclinical into the clinical years.

Unlike the OMP, SNAPPS does not build in a step for feedback. Therefore, preceptors should focus on step 4 as an opportunity for this. Because feedback is paired with discussion of an uncertainty, it focuses on a trainee's immediate needs and can maximize learning opportunities.[17]

Clinical educators must simultaneously diagnose and manage patients as well as assess learners' abilities.[20] Workplace-based assessment is particularly important for residents, and hospitalists play a pivotal role in determining their progression along the developmental milestones for achieving the ACGME competencies in medical knowledge, patient care, and practice-based learning and improvement.[3] Both the OMP and SNAPPS frameworks encourage trainees to "think out loud," providing some transparency to their thought process and enabling faculty to more accurately assess their clinical reasoning.

CONCLUSION

Many hospitalists may already use a teaching approach resembling the OMP. It has a familiar, back-and-forth rhythm. By explicitly following its steps, however, attendings can ensure they are providing feedback and individualized teaching with each case. SNAPPS, on the other hand, relieves faculty of their familiar role of leading the thought process and imparting teaching points. Instead, the trainee directs the encounter, leaving the attending in the role of guide.[15] SNAPPS aims to help students and residents take charge of their education and develop lifelong learning skills.

Both frameworks can be transferred from the ambulatory to inpatient setting with little modification. The OMP is older and better studied. It is easy to learn, and can be utilized by attendings and residents as teachers. In contrast, SNAPPS requires both teacher and trainee to learn the framework. Typically, this means that SNAPPS needs to be implemented systematically, via a clerkship or residency program. However, if a team was motivated, they could learn and apply it for their time together on service. Though it requires more effort to put in place, SNAPPS provides a novel approach to teaching clinical reasoning. Finally, hospitalists need not implement all steps of either framework for every teaching encounter, but can use components of either model, depending on the individual learners, team composition, time available, or clinical case.

Additional studies examining both frameworks' use for inpatient teaching and assessment would be helpful. Potential questions to address include how the team structure of inpatient rotations impacts the effectiveness of either model (e.g. which trainees benefit when committing to diagnoses or getting feedback in front of a group?), whether either model improves senior residents' ability to lead rounds and teach, whether written faculty assessments of residents are more specific and accurate with either model, and the impact of not following all steps of either model. Higher level outcomes for both models would be another area for investigation, including change in clinical performance, exam performance of students and residents, or patient outcomes, such as length of stay, cost per case, or need for rapid response/intensive care unit transfer.

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