

ACADEMIC INTERNAL MEDICINE

INSIGHT

AAIM IN ACTION

AAIM Board Chair Update

AAIM Board of Directors Chair Michael S. Bronze, MD, discusses another strong year for the alliance as well as the plans for growth and improvement in the short- and long-term future.

LEADERSHIP

The Seventh Core Competency: Training Residents to Lead the Health Care Team

How do residents incorporate the basics of leadership, conflict resolution, and the tools needed to become effective teachers? Senior residents are expected to juggle multiple competing priorities as they transition into more intense leadership and teaching roles. With little formalized training, many feel underprepared for these challenges.

MINDFUL PRACTICE

Practical Applications of Mindfulness: Tools for Managing Stress, Navigating Milestones, and Fostering Professional Growth

Educators must teach, assess, and monitor their learners while fulfilling clinical duties. Learners must manage work hours, provide clinical care, fulfill educational requirements, and maintain work-life balance. Balancing these responsibilities can become a source of stress, which can lead to burnout. Can we provide an educational environment that stimulates learning but minimizes stress and burnout?

CLINICAL REASONING

Teaching Clinical Reasoning in the Outpatient Clinic: Pearls for Efficient and Effective Diagnosis

A framework of educator training based on five scenarios can eliminate some of the barriers to teaching diagnostic reasoning. As educators form rapidly accessible mental patterns, they can rapidly recognize thought-based reasoning errors in a resident clinic and efficiently respond to unique scenarios with predetermined teaching points.

PATIENT SAFETY

The I-PASS Handoff Program: A Standardized Approach to Transitions of Care That Improves Patient Safety

The I-PASS Handoff Study measured the quality of resident-to-resident handoffs and medical error rates before and after implementation of a package of curricular interventions at several study sites. The curriculum taught residents to use the I-PASS mnemonic during verbal handoff communication as well as integrated the mnemonic into printed handoff documents, including electronic health records.

By the Numbers

2

23%

Decrease in medical errors after the implementation of I-PASS
Page 21

4

13

Skills detailed in the Core Entrustable Professional Activities for Entering Residency
Page 6

12

73%

Reduction in in-classroom content delivery by converting lectures to webinars
Page 10

18

Also in This Issue

- 6 **Bridging the Gap: Core Entrustable Professional Activities for Entering Residency and the Medicine Subinternship**
- 8 **A Joint Quality Improvement and High Value Care Curriculum**
- 10 **Cutting the Classroom, Not the Content**
- 15 **Preparing for the NAS Self-Study: Using Your Annual Program Evaluation to Create Effective Program Improvement**

21

AAIM Board Chair Update



Michael S. Bronze, MD

It has been a busy year for AAIM and the constituent councils!

One of the major activities this year has been examination of the AAIM meetings. The AAIM Educational Program Planning Task Force, formed in April 2014 and ably led by Dominick Tamaro, MD, is charged to evaluate our education offerings, both in the form of meetings and in non-meeting formats, such as webinars.

The task force presented to the AAIM Board of Directors a comprehensive plan for a new consolidated meeting in March that will include time for multiple precourses, a “meeting within a meeting” format that allows for the constituent organizations to maintain the flavor of their historical meetings, and opportunities for joint planning of major plenary sessions. This meeting will be held for the first time in March 2017. The task force continues to discuss the curriculum of our fall meeting. It is likely to focus on faculty skills development and will be in place for 2016.

With these changes, we will also align our program planning committee structure. One coordinating committee

Our core business is member engagement, especially in the areas of educational programs, advocacy, the innovation center, and our survey center. To support member engagement and these core programs, staff presented a “roadmap” of potential investment in several areas, especially in information technology, marketing, policy and advocacy, member services, and the innovation and survey centers.

will oversee the development of AAIM meetings and non-meeting educational offerings. Program planning of the spring and fall meetings will be managed by subcommittees formed initially from our existing program planning committees. They will work to develop the curriculum for that part of the consolidated meeting that is unique to the individual group as well as to work together to define joint workshops, precourses, and plenary sessions. As more details emerge, we will communicate these with you.

Our senior management team has been developing a “phase II” action plan and presented it to the AAIM Board at its January 2015 meeting. This plan is largely built upon a business line analysis that defines our products, services, and programs that provide both a professional home for our members and define value to each of our members. Our core business is member engagement, especially in the areas of educational programs, advocacy, the innovation center, and our survey center. To support member engagement and these core programs, staff presented a “roadmap” of potential investment in several areas, especially in information technology, marketing, policy and advocacy, member services, and the innovation and survey centers. Key is a fiscal year (FY) 2016 investment of nearly \$1 million in key personnel and information technology. These investments have been discussed with the AAIM Finance Committee, which will deliberate further and incorporate this “roadmap” into the FY 2016 and beyond budgets.

On the policy and advocacy front, AAIM has participated in a series of discussions that affect academic internal medicine. The AAIM Research Committee is close to finalizing the November 2015 Consensus Conference on the Future of the Physician Scientist; the committee has prepared two manuscripts defining parameters that predict success in training of physician scientists. The AAIM GME Funding and Physician Workforce Task Force has met several times in response to the an open letter from the Senate Committee on Energy and Commerce tasked to address the recent IOM Committee Report on Governance and Financing of GME. This report, in conjunction with prior MedPAC reports, argues for substantive changes in how GME funding might occur, especially arguing for payments based on performance metrics. The AAIM task force addressed several questions raised by the Senate Committee and provided some suggestions about potential performance metrics especially in the areas of patient centered care and quality, population-based health, and costs.

AAIM continues to strengthen its relationship with its stakeholders. In particular, AAIM is in close dialogue with the American Board of Internal Medicine and is developing an organizational response concerning maintenance of

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Alliance for Academic Internal Medicine

330 John Carlyle Street
Suite 610
Alexandria, VA 22314

Telephone: (703) 341-4540

Fax: (703) 519-1893

Email: AAIM@im.org

Website: www.im.org

AAIM is a consortium of five academically focused specialty organizations representing departments of internal medicine at medical schools and teaching hospitals in the United States and Canada. AAIM consists of the Association of Professors of Medicine (APM), the Association of Program Directors in Internal Medicine (APDIM), the Association of Specialty Professors (ASP), the Clerkship Directors in Internal Medicine (CDIM), and the Administrators of Internal Medicine (AIM). Through these organizations, AAIM represents department chairs and chiefs; clerkship, residency, and fellowship program directors; division chiefs; and academic and business administrators as well as other faculty and staff in departments of internal medicine.

AAIM continues to strengthen its relationship with its stakeholders. In particular, AAIM is developing an organizational response to ABIM concerning maintenance of certification. We will be soliciting feedback on the stance in the very near future.

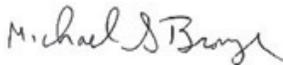
certification. We will be soliciting member feedback on the stance in the very near future.

We continue to make progress in our major strategic initiatives. The AAIM Innovations Committee met in late March and studied commissioned data about several representative organizations with innovation centers, largely focusing on governance, finance, and operations. Working with Rockbridge Associates and staff, the AAIM Innovations Committee will further define the structure, function, and IT needs of the center. Key to the success of the Innovations Center will be a learning management system that will help catalog and distribute education products and content. The committee also discussed the FY 2015 AAIM Innovation Grants, which received 73 completed proposals and funded 16 at a total of nearly \$48,000. The committee spent time thinking about strategic priorities for FY 2016 and developing specific performance measures that would be useful in measuring success of the AAIM Innovations Center.

Our AAIM High Value Care (HVC) Work Group, ably led by Lia S. Logio, MD, and Valerie J. Lang, MD, has made significant progress in developing curricula for HVC for both medical students and fellows. The work group is currently working on faculty development programs in this area, a toolkit for program directors to use in their residency, and a perspective piece on the effects of excessive imaging.

In closing, I want to express my appreciation to all of our volunteer leaders and to our members. Your support and hard work have been outstanding and I truly appreciate your trust and confidence. I also want to thank the outstanding AAIM staff.

Sincerely,



Michael S. Bronze, MD
Chair, AAIM Board of Directors

The Seventh Core Competency: Training Residents to Lead the Health Care Team

Rigorous training helps residents develop into competent physicians who deliver high quality care to their patients. We train residents in many aspects of the health care system and focus greatly on the core competencies: patient care, medical knowledge, practice-based learning and improvement, systems-based practice, professionalism, and interpersonal skills and communication. We know physician competency as a leader is also important to participate in team-based patient care. So where do residents learn how to become leaders? How do they incorporate the basics of leadership, conflict resolution, and the tools needed to become effective teachers? We assume that most may learn by watching others and through being self-driven and motivated. Senior residents are expected to juggle multiple competing priorities as they transition into more intense leadership and teaching roles. With little formalized training, many feel underprepared for these challenges.

Our internal medicine residency at Baystate Medical Center is unique in that we have well-defined roles in the hospital for our residents, who progress from being learners in their first year (working under the supervision of a senior resident) to managers in their second year. As managers, the residents are focused on efficiency, autonomy, and self-directed goals, working one-on-one with faculty. Residents then progress to a teacher role in their final year of training, supervising learners and serving the primary role of educator and leader of the team. This model (1-3) allows us to focus on our teachers (senior residents) to specifically address the skills necessary to be more effective teachers and leaders.

To provide senior residents with the tools they need to lead a medical team as well as become effective teachers, we created a weekly resident leadership session for all internal medicine senior residents on the medicine wards. During this protected educational time (the faculty cover their pagers; lunch is provided), the residents discuss and learn foundational

leadership topics and skills. The curriculum is based on eight sessions with four repeating topics (**Figure 1**) covered in each half of the academic year.

The program has four goals:

1. Educate senior residents on core leadership topics.
2. Maximize the senior resident role as teacher and team leader.
3. Improve senior resident teaching skills.
4. Provide an opportunity for peer-to-peer coaching.

The sessions are facilitated by two of our associate program directors to ensure consistency of education and message delivered, and to build trust among residents. The first 30 minutes of each session are dedicated to feedback on the wards, specifically discussing seniors' adjustment to their roles, what hurdles or challenges they have identified, and successes they have had with managing their teams, leadership, and teaching roles. During this time, we also solicit specific feedback about the teaching faculty, focusing on the effectiveness of teaching, efficiency of rounds, balance of autonomy and supervision, availability, and approachability. The second 30 minutes are dedicated to a set curricular topic.

During academic years 2012-2013 and 2013-2014, all 44 senior residents participated in the sessions. Of those surveyed, 97% felt they have a group of colleagues and mentors with whom they can discuss the challenges of being a senior resident and leader; 90% felt that they have a venue to discuss leadership and teaching challenges.

Responder comments included the following:

- "You could 'vent' in a safe setting and get feedback from other residents and faculty on solving problems with your attending or your interns."
- "The sessions allowed time and space for each of us to grow and blossom."

FIGURE 1. Curricular Topics

	Phase 1: Wards July-December	Phase 2: Wards January-June
Meeting 1	<ul style="list-style-type: none"> • What makes a good leader? • Learning climate & setting team expectations 	<ul style="list-style-type: none"> • Teaching on rounds and at the bedside to promote retention • Anticipating learner pitfalls • Teaching management decisions
Meeting 2	<ul style="list-style-type: none"> • Coaching/engaging the team • Addressing heterogeneity of the team • One-minute preceptor model 	<ul style="list-style-type: none"> • Teaching efficiency/organization
Meeting 3	<ul style="list-style-type: none"> • Supervision/autonomy—EPAs • Feedback 	<ul style="list-style-type: none"> • Conflict resolution/negotiations
Meeting 4	<ul style="list-style-type: none"> • Evaluation, debriefing • Intro to learner assessment tools 	<ul style="list-style-type: none"> • What great managers do

Bridging the Gap: Core Entrustable Professional Activities for Entering Residency and the Medicine Subinternship

In response to program directors' concerns that not all medical students are adequately prepared in all areas needed to begin residency, the Association of American Medical Colleges (AAMC) developed the Core Entrustable Professional Activities for Entering Residency (CEPAER) last year. Drafted within a competency-based educational framework, CEPAER detail 13 skills (Figure 1) that graduating seniors should be able to perform without direct supervision on day one of residency (1). CEPAER were meant to serve as a guideline for the development of subsequent curricular interventions and learner assessments in the clinical years of undergraduate medical education (UME). Taken together, this list of skills describes the core of work with which any beginning resident should be able to be entrusted, regardless of specialty or field. If its standards are universally realized, the CEPAER document should help the nation's medical schools better meet the health needs of the public while simultaneously aligning beginning interns' skillsets with the expectations of program directors.

To understand how UME educators may use CEPAER in the assessment of learners, one must first appreciate where entrustable professional activities (EPAs) fall within the conceptual framework of outcomes-based, workplace-based education and how they incorporate competencies and milestones. EPAs are best understood as the discrete, recognizable tasks that are carried out in the typical day-to-day work of a physician, and imply a supervisory decision (entrustment) that is task specific. EPAs are described by ten Cate as "units of professional practice, defined as tasks or responsibilities to be entrusted to the unsupervised execution by a trainee once he or she has attained sufficient specific competence" (2). The performance of any EPA requires integration of activities across multiple Accreditation Council for Graduate Medical Education (ACGME) competency domains (medical knowledge, patient care, professionalism, interpersonal communication, practice-based learning, and systems-based practice), with each domain generally encompassing multiple competencies. Milestones are observable incremental behaviors along the trajectory from novice to proficient within each specific competency. Therefore, to successfully execute an EPA, a learner must work across several competency domains and have met (and ultimately surpassed) the developmental milestones for the competencies relevant to performing the EPA, synthesizing the competencies and demonstrating proficiency. When considering the relationship of EPAs to competencies, the whole is indeed greater than the sum of its parts, and EPAs

To understand how UME educators may use CEPAER in the assessment of learners, one must first appreciate where entrustable professional activities fall within the conceptual framework of outcomes-based, workplace-based education and how they incorporate competencies and milestones.

operationalize competencies into specific familiar tasks that are more easily recognized by evaluators for assessment purposes.

While nearly all of the work to date to define EPAs within medical education in the United States has occurred in graduate medical education (GME), EPAs are beginning to gain traction within the UME community. To further the effort begun with the dissemination of CEPAER, 10 institutions were chosen by AAMC to participate in a five-year pilot to study the feasibility of teaching and assessing CEPAER and to delineate how entrustment decisions might be made. AAMC has also invited institutions not directly participating in the pilot study to develop their own initiatives surrounding CEPAER and to submit their experiences via the icollaborative on MedEdPortal (3).

Although medical school and residency have been viewed as distinct endeavors separated by medical school graduation and the conferral of the medical degree, clinical training truly occurs along a continuum from novice to expert, as detailed in the Dreyfus model of expertise development. Viewing all clinical training along a continuum, applying the same workplace-based, outcomes-based assessment strategies being adopted in GME makes sense (4). EPAs are an ideal starting point for developing such UME clinical assessment strategies because they allow for assessment of authentic experience within the clinical years. Further, because EPAs are meant to encompass recognizable, discrete tasks, they lend themselves to formative feedback based on direct observation as the learner undertakes

FIGURE 1. Core Entrustable Professional Activities for Entering Residency

1. Gather a history and perform a physical examination.
2. Prioritize a differential diagnosis following a clinical encounter.
3. Recommend and interpret common diagnostic and screening tests.
4. Enter and discuss orders/prescriptions.
5. Document a clinical encounter in the patient record.
6. Provide an oral presentation of a clinical encounter.
7. Form clinical questions and retrieve evidence to advance patient care.
8. Give or receive a patient handover to transition care responsibly.
9. Collaborate as a member of an interprofessional team.
10. Recognize a patient requiring urgent or emergent care, and initiate evaluation and treatment.
11. Obtain informed consent for tests and/or procedures.
12. Perform general procedures of a physician.
13. Identify system failures and contribute to a culture of safety and improvement.

deliberate practice, leading to growth along the Dreyfus curve in the direction of proficiency.

One important area in which to consider the applicability of CEPAER is the medicine subinternship. Created initially as a response to an intern shortage during World War II (5), the subinternship (or acting internship) has evolved into an important educational experience for medical school students, offered at nearly all medical schools and required for graduation at approximately 75% of medical schools (6). The medicine subinternship is viewed as especially valuable, with 25% of medical schools mandating its completion and approximately 75% of all US medical students choosing to complete a subinternship in internal medicine (6). Because the medicine subinternship generally strives to replicate the first month of internship, it is especially well positioned to bridge the perceived gap between medical school and residency training, and is a valuable initial lens through which to view CEPAER. While many of the skills encompassed in CEPAER list—for instance, CEPAER 8, 9, and 10 (Figure 1)—are introduced during clerkships, several higher-level skills are applicable only when a student reaches the level of patient manager in the reporter-interpreter-manager-educator framework. CEPAER, when applied to the medicine subinternship, creates an ideal starting point for the development of assessment strategies

applicable to clinical rotations in UME that are parallel to those being adopted in GME.

If the current 13 CEPAER are ultimately agreed on by both the UME and GME communities as the appropriate basic skillset for incoming interns, then one starting point for their inclusion in UME might be to first develop valid, reliable assessment strategies for each task. Once these assessment strategies are in place, each medical school could apply them to the clinical capstone experiences—especially the medicine subinternship—within its curriculum. Applied to these curricular rotations, each school could then discern which EPAs currently are adequately being taught within the existing curriculum, versus which EPAs require developing new curricula. In this way, schools could self-assess their current teaching of EPAs and quickly locate gaps in the curriculum and focus their attention accordingly.

The implementation of workplace-based, outcomes-based educational assessment strategies during the clinical UME years will require much work. An important first step must likely be agreement—across both UME and GME—that the 13 CEPAER detailed by AAMC are the most basic skill set that starting interns should be able to demonstrate mastery of before starting residency, so that they can be entrusted with these tasks on the first day of internship. Then the difficult work of creating reliable and valid assessment strategies, and subsequent needed faculty development, can begin in earnest. Ultimately, “bridging the gap” between medical school and residency training is in the best interest of each trainee, and the application of CEPAER to the medicine subinternship should be given consideration as a suitable and important starting point. 

AUTHORS

Corrie A. Stankiewicz, MD

Assistant Professor
Department of Medicine
Perelman School of Medicine at the University of Pennsylvania

Eric Goren, MD

Assistant Professor
Department of Medicine
Perelman School of Medicine at the University of Pennsylvania

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A Joint Quality Improvement and High Value Care Curriculum

Since the release of the Institute of Medicine's *To Err Is Human*, with its likely underestimated report of 44,000-98,000 annual medical errors, attention has turned to quality improvement (QI) and the need for additional training for residents around the country (1). Under new Accreditation Council for Graduate Medical Education mandates, QI training is a requirement monitored via Clinical Learning Environment Review Committees with a focus on resident participation in QI initiatives (2). Evidence suggests that QI training during residency is associated with involvement in QI activities after graduation (3).

As more information surfaces about the significant cost of health care waste, focus on teaching physicians to weigh costs and value into medical decision making becomes crucial, especially as doctors' decisions account for up to 87% of this spending (4). Little information is available on effective ways to teach this subject of high value care (HVC), nor on the concept of combining it with a QI curriculum. Because these topics are intimately linked, and with available time lacking due to duty hours, an integrated QI and HVC curriculum is an urgent necessity and feasible solution for internal medicine residency programs.

Methods

Our integrated curriculum was piloted as a two-week series of seminars, online modules, and self-directed projects. All residents with a consecutive two-week elective available were enrolled in the course. The rotation was divided into 10 seminars, introducing both QI and HVC concepts. We used available resources to help supplement the curriculum, specifically the Institute of Healthcare Improvement (IHI) Open School modules and the American College of Physicians (ACP)

High Value Cost Conscious Care curriculum, both of which are available without charge to academic institutions (5,6).

At the initiation of each two-week course, residents took a pre-exposure quality improvement knowledge application tool (QIKAT) (7) and a survey from the ACP modules evaluating their base understanding of current health care costs. Before each seminar, residents were assigned selected IHI modules to complete before the lectures to introduce or better illustrate the topics. Each seminar included QI techniques coupled with HVC theories, with the topics then illustrated using a series of inpatient and outpatient scenarios for a single standardized patient for experiential learning (Figure 1). Curricular focus during these discussions included reviewing health care waste expenses, access, decision-making processes, and communication of these tenants with patients, using standardized patient encounters that were discussed by faculty and residents.

At the beginning of the rotation, residents were divided into small groups within the larger cohort to develop and work on projects using the different techniques learned. Several faculty members volunteered to help teach seminars, allowing residents to interact with multiple staff for project coordination. During the final seminar, residents presented their proposed projects to their colleagues and a faculty member, illustrating different concepts, the proposed influence on cost, and plans for how to carry the project forward. After the presentations, residents took a post-exposure QIKAT and the ACP survey and provided anonymous feedback for the course.

Results

Of the 100 categorical and primary care residents, 60 took the course over 12 cohorts. Of those 60 residents, we

FIGURE 1. Overview of Seminar-Based Curriculum

	Quality Improvement	High Value Care	SP: Pat Smith	Project Work
1	To Err Is Human, Blame versus Accountability	Choosing wisely, current waste, patient expectations	Introduce patient—sore throat with expectation for antibiotics	Brainstorming ideas
2	Process Map, Root Cause Analysis (RCA)	N/A	Allergic reaction—process map and RCA	Select project, start RCA
3	Model for Improvement, Quality Measures	Biostatistics and need for tasting	Identify PDSA cycles to prevent medication error	Innovation for PDSA cycles
4	Change Management	Overcoming barriers to HVC	Role-play naps for resident fatigue	Identify stakeholders
5	Communications at Care Transitions	Over-ordering, medication prescribing	Hospital bill after CHF exacerbation	Work on presentations
6	Culture of Safety	Culture of spending	Medication reconciliation	Work on presentations
7	Human Factors Engineering (HFE)	Cost information and effects of HFE	Restructure hospital wards	HFE to improve projects
8	Equity in Health Care Delivery	Health care costs and payment models	Effects of dimensions of health care delivery on patient	Work on presentations
9	Communicating Medical Errors	N/A	Simulation lab with standardized patient	Work on presentations
10	Presentations	Presentations		

were able to obtain paired pre- and post-exposure data on 46 subjects.

The QIKAT is a validated tool to measure QI knowledge using three clinical scenarios with a total possible score of 15; in addition, it includes a survey rated on a five-point scale that measures self-assessed knowledge and comfort with QI topics. QIKATs were graded independently by three faculty instructors. We graded the first 20 QIKATs jointly with a Pearson correlation score of 0.99-1 and Bland-Altman plots showing no consistent bias, ensuring inter-rater reliability. Mean pre- and post-QIKAT scores and survey results were calculated for the 46 residents (Figure 2).

FIGURE 2. Pre- and Post-QIKAT Data

Variable	N	Mean	Std Dev	Minimum	Maximum
Pre-QIKAT	46	7.02	2.74	1.00	12.00
Post-QIKAT	46	11.10	3.01	3.33	15.00
Pre-survey	46	2.13	0.51	1.00	3.08
Post-survey	46	3.26	0.36	2.50	3.92

Using a two-tailed paired t-test with $\alpha=0.05$, both scores increased significantly from pre- to post-. The mean change for QIKAT was 4.08 (95% confidence interval 3.15 to 5.01, $p<0.0001$). The mean change for the self-evaluation survey was 1.13 (0.99 to 1.28, $p<0.0001$). QIKAT score improvement indicates improved knowledge of QI concepts. Survey score improvement indicates increase in residents' self-assessment of their comfort with QI.

All residents expressed that the standardized patient case was a useful adjunct in the course. Reviews on the usefulness of the IHI modules were mixed. Most residents felt that more time was needed for project work. Almost all residents expressed a better appreciation of QI and HVC issues in their everyday practice.

Discussion

After offering this course 12 times and evaluating the residents' feedback and QIKAT scores, we conclude that the overall design of combining QI and HVC was successful. We changed the order of the seminars after the third session to progress the subject matter optimally and enhance flow. Combining these subjects seamlessly is feasible. The use of a longitudinal standardized patient enhances the presentation of the topics, giving a chance for the residents to apply their new knowledge.

Significantly, this course can be offered in multiple formats. For example, our once-daily seminar 2-week structure could be adjusted to 1 seminar weekly over 10 weeks or 2 seminars a day over 1 week. This type of module and seminar-based curriculum has the flexibility to mold to the time available in a given residency program. Despite overwhelming interest among residents to get involved in QI projects, they struggled with finding time to continue the projects within the constraints of inpatient rotations once they left the protected time of the QI block. Transitioning to the X+Y schedule has allowed for a longitudinal approach; we find this better for information retention and project work. The longitudinal approach also allows for all residents to take the course, as opposed to 60% previous participation.

One of the most difficult aspects of our curriculum was faculty retention. In a rotation that ran as frequently as every two weeks, continued faculty commitment was trying, in part due to burnout from time constraints as well as lack of structured faculty development.

Another significant difficulty was the relative isolation of QI and HVC topics to this two-week period. Our institution, like many others, still struggles with culture change surrounding error reporting and health care waste management. Residents expressed that they did not always feel comfortable discussing errors and cost concerns with attendings outside of our core faculty. QI and HVC topics must be presented to all faculty for the entire institution's approach to shift.

Based on these lessons, we have made some critical shifts in our curriculum. The seminars transitioned to be more longitudinal, occurring in one half-day every +1 week of our X+Y schedule. This better facilitates knowledge retention and protected time for project work on a monthly basis. One eventual goal is to transition to a three-year curriculum with the core lectures to be given by postgraduate year (PGY) 3s as the "experts" among the residents. This will serve to both solidify the PGY3s' knowledge and partially offload direct faculty responsibility. 

AUTHORS

Suzanne Sweidan, MD

Clinical Assistant Professor

Department of Internal Medicine

George Washington University School of Medicine and Health Sciences

Anne Cioletti, MD

Assistant Professor

Department of Internal Medicine

George Washington University School of Medicine and Health Sciences

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Cutting the Classroom, Not the Content

During the course of the 2012-2013 academic year, the University of Kentucky College of Medicine Core Internal Medicine Clerkship had 110 hours of in-classroom content. Although our clerkship is long (16 weeks), it was a lot of time spent sitting in a classroom. While our formal curriculum appeared logical and well organized, we recognized that the course content must be delivered in a more productive form.

Our goals in this transition were to increase time spent by students in clinical experiences and to provide course content in a more flexible delivery method that would allow students to tailor the material to their individual study habits. We strove to develop a learning environment that trends away from the more traditional lecture format.

The Beginning

As stated, we provided 110 hours of in-classroom content over our 16-week clerkship. Our orientation lasted an entire week, with in-person meetings in the morning and the afternoon. These sessions generally included high-yield clinical skills. We held two “intraclerkship” weeks, with mornings reserved for didactics instead of inpatient duties. We also scheduled weekly seminars on Friday afternoons. Feedback from the students included “we should be reading about this on our own,” “repetitive,” and “lectures were often too technical and made me feel like I was back in second year learning about people’s research instead of learning about patient care.”

What Was Cut?

We started by looking at the student evaluations of the content. We found that the sessions scoring the lowest could most accurately be called “lectures.” They seemed to lack direct engagement with the students. Other sessions were repeated content from their first and second year courses and were easily trimmed.

What Stayed?

Sessions that involved vital clinical skills, such as ECG and chest x-ray interpretation, were retained. We also wanted to preserve sessions utilizing small group exercises, as they kept the students engaged. We have one exceptional seminar dealing with end-of-life issues that can only be experienced in person, as some teachers connect wonderfully with the students at these moments. We struggled, however, with how to retain the higher-evaluated and important lectures.

The Stopgap

Studies suggest online learning can meet student needs without sacrificing test scores (1). Fortunately, we had a strong tool already in place at our institution. ECHO360 can be used at the speaker’s desk to capture audio and video. It was installed in many of the classrooms on our medical campus. In the classrooms, however, it could only record the video and

Our goals in this transition were to increase time spent by students in clinical experiences and to provide course content in a more flexible delivery method that would allow students to tailor the material to their individual study habits.

audio (the video would generally contain the presentation in the shot). This technology allowed us to begin the transition by recording all seminars to be cut during the 2012-2013 academic year. All the sessions were hosted on BlackBoard (our college’s learning management system) as video files. We still needed to look at as many options as possible to find what might work for us in the long run.

Technology Options I

ECHO360 falls under webcasting tools—programs that capture all of the facets of a normal seminar (audio, video, and the presentation). Originally, it was our aim—what better way to simulate a seminar than one package that encapsulates all of its parts? The other option we looked at was Adobe Connect®, which does the same thing as ECHO360. Because it was developed by Adobe, it has a few more bells and whistles. Additionally, the Adobe product is capable of broadcasting the live event online, which would allow us the option to have interactive seminars remotely.

We next researched screen capture tools. These programs record whatever is on the screen, incorporating audio. It seemed a viable way for us to convert our content, even without the video of the presenter. The major player in this category is Adobe Captivate. Captivate fills the role of a screen capture program, but also incorporates quizzes and other interactive features into presentations. A multitude of screen capture options, such as SnagIt or the open-source OBS, are available, but Captivate is the best option for anyone looking to migrate to more e-learning, because of its superior ability to engage the learner. We moved forward by recording as many of our eliminated seminars as possible during the 2012-2013 year, with the plan of moving forward with Captivate.

New Student Feedback: More Flexibility, Please

As we moved through the 2013-2014 academic year, we asked for anecdotal feedback from some students. While they did like the increase in their clinical experiences, many had a new issue: they wanted more flexibility.

The recordings from ECHO360 allowed easier access to the seminars; however, similar to the results of a previous report (2), individual students were interested in different methods of digesting the information. Some wanted to listen to only the audio while at the gym. Others wanted to have the ability to access the PowerPoint slides (without the video and audio) as a study resource. These variations complicated matters, as Captivate would result in the same issues as ECHO360. We needed a simpler option.

Technology Options II: Audio

We decided to go with a much easier format—using audio recordings of the presentations bundled with the original PowerPoint presentations. This combination gives the students the option to use the pieces separately or together, at their discretion. It also allows for any manner of sound recorder to be used. Options include free software available with all operating systems, dictation applications on smartphones and tablets, and higher-end recording tools like Pro Tools or Audacity. We selected Audacity, primarily because of previous experience. The program is readily available at no cost.

Your Time Investment

Each of the technology options listed does require substantial initial investment to learn how to effectively utilize the technology; however, once everything is recorded, you only have to refresh the recording when the presentation itself needs to be updated. Most of our original recordings from 2012-2013 are still in place.

Get the Students Listening

We achieved a staggering 73% reduction of in-classroom content through this endeavor. With only one full year completed since this intervention, no notable data are available; however, our students' test scores in 2013-2014 were unchanged from previous years. The positives are already visible. The students still have access to a library of content, which is now easier to update and more adaptable to their needs. Having so much of the content online gives us the ability to tailor our curriculum around it. We can now focus the student studies on something specific, point them toward the seminar(s) and the online simulated cases, and then give them a quiz the following week. It gives the students more time in the clinical setting.

We still have much to do to refine the process, but our payoff so far has been worth the investment. We will happily strive to better prepare our students, and we hope other programs would consider a migration toward more online content. 

The positives are already visible. The students still have access to a library of content, which is now easier to update and more adaptable to their needs. Having so much of the content online gives us the ability to tailor our curriculum around it.

AUTHOR

Jonathan Gent

Third and Fourth Year Clerkship Coordinator
Department of Internal Medicine
University of Kentucky College of Medicine

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Practical Applications of Mindfulness: Tools for Managing Stress, Navigating Milestones, and Fostering Professional Growth

Educators face many challenges as they fulfill clinical duties, teach residents in the clinical setting, perform learner assessments, and monitor educational progress. Residents must manage work hours, provide clinical care, fulfill educational requirements, and maintain work-life balance. Balancing these responsibilities can become a source of stress for both residents and educators, which can lead to burnout (1-4). Educators must provide a learning environment that stimulates residents to take ownership of their education, but they must do so in a way that minimizes stress and burnout.

Additionally, as the novice resident works toward becoming competent physicians, the role of the educator is vital in helping them move through the stages of learning (Figure 1) (5,6). Through thoughtful and compassionate coaching, educators guide an unconsciously incompetent novice toward unconscious competence. However, to help the resident reach expertise, we suggest the role of the educator in this learning continuum should be to help the resident go a step above—to mindful competence. In other words, not only must residents learn to be competent at their art, but they should also learn the ability to

continuously recognize their own challenges and commit to lifelong learning.

With the goal of achieving mindful competence and mitigating stress, we present several tools to develop skills of self-reflection and mindfulness. We feel that these skills are invaluable for the personal and professional development of both residents and their educators.

Mindfulness

Mindfulness in the context of medical practice has been described as the practice of maintaining openness, curiosity, and compassion while focusing on an individual encounter, and this idea can be extended to medical education (7,8). Epstein described the four habits of the mind that lead to a mindful clinical experience: attentive observation, curiosity, beginner’s mind, and presence (9) (Figure 2). In the era of social media and hyperstimulation, residents can have difficulty maintaining focus (attentive observation and presence) on their learning process. Further, due to advances in technology and the easy attainability of information, learners can also have problems taking responsibility for their own education (beginner’s mind and curiosity).

FIGURE 1. Stages of Learning

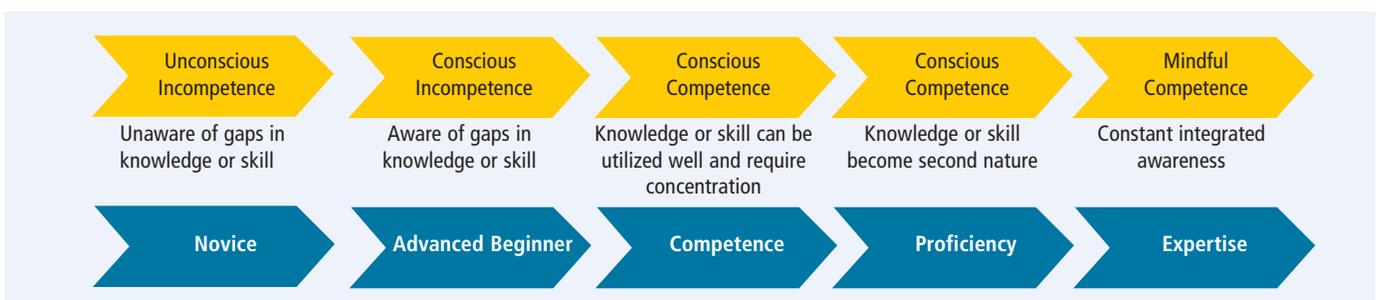


FIGURE 2. Four Habits of the Mind

Attentive Observation	Simultaneously observing oneself, the patient, and the clinical problem in such a way that one could “observe the observed while observing the observer”
Critical Curiosity	Having the courage to see the world as it really is rather than as one wants it to be; being willing to ask the question, “why,” while being open to new information and surprises; applying critical curiosity to oneself to learn new things, avoid succumbing to personal biases, and become open to new experiences
Beginner’s Mind	The ability to see a situation in a fresh way with the willingness to set aside preconceived notions and start with a blank slate
Presence	A purposeful willingness to simply be there, undistracted and focused on the task at hand

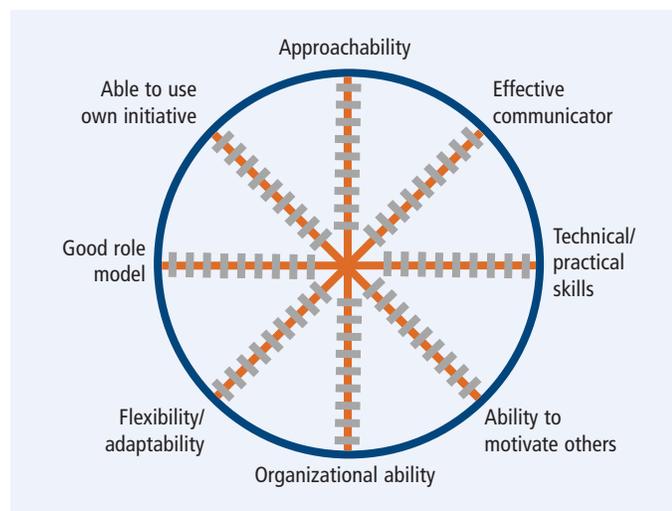
Self-Reflection

Self-reflection is a powerful medium for promoting focused self-directed learning (10,11). Kolb's theory of experiential learning describes that a concrete experience results from a process of reflective observation, abstract conceptualization, and active experimentation (12). Therefore, self-reflection is vital to learning from doing. Furthermore, the Accreditation Council for Graduate Medical Education (ACGME) milestones project explicitly encourages the use of self-reflection in practice-based learning, quality improvement, and professionalism (13). Several techniques have been described in the medical education literature on the use of self-reflective exercises to promote clinician skills such as empathy, stress relief, and communication (14). Gibbs' reflective cycle is often used as a basis for such exercises (15). We have been utilizing a self-reflection tool to facilitate understanding of learner needs (16) (Figure 3). In this exercise, learners rate their skills in the context of their practice, and they are then coached to discuss what they do well and how they wish to improve. Subsequently, the coach helps the learner create a focused plan for improvement within a specified time. Our experience with this exercise has been valuable in determining not only the needs of learners, but also where they are on the learning spectrum. It has empowered our residents to take ownership of the process and intent of learning. Additionally, we have utilized this tool in engaging our faculty in professional development.

Stress Reduction

As a complement to the applications of self-reflection discussed, self-reflection exercises can also engender awareness of our reactions in the work setting. Reflecting on both positive and negative interactions is vital in exploring our reactions to challenging situations. We can facilitate

FIGURE 3. Self-Reflection Exercise (16)



this reflection by asking learners to recall events at work that were perceived as negative or positive. By reflecting on how the events affected them, what they learned from the situation, and specific ways in which they have changed as a result of that interaction (that is, how they managed or would like to manage similar situations), learners may begin to recognize their own reactivity in situations that did and did not meet their expectations (15).

Since we are trained and expected to diagnose and mend problems, clinicians and educators often set expectations for how interactions are "supposed to" occur. However, recognizing that certain situations cannot be controlled is important. Stress can occur when outcomes do not match expectations. In every stressful situation, there are "three options: remove yourself from the situation, change it, or accept it totally" (17). Comparing what is happening in the moment (for example, a patient refuses discharge) to what should have happened (the patient promised he or she would leave today) takes us out of the present moment, into thoughts about how and why things are not going as we had hoped. This speculation about things we cannot change leads to stress and suffering, and in these stressful situations, we often react in ways that we may regret (for example, reacting angrily when the patient refuses discharge).

These stress reactions are a result of our body's evolutionary response to threatening situations; we may inaccurately perceive negative events as threats,

continued on page 14

FIGURE 4. Tips on Mindful Practice in Medicine (19)

- Focus on your breath while you are walking.
- Voluntary simplicity: turn off your email while you are charting.
- Slow down.
- When with a patient or with learners, avoid thinking about all of the other things you need to do or already did. You can't change the past or future, so stay with the present task at hand.
- When you feel your "fight or flight" reaction, pause, pay attention to your breathing, and check in with all five senses.
- Listen to your patients, not your thoughts about your patients.
- Give yourself a break.
- The 90/10 principle: 10% of life is made up of what happens to you; 90% of life is decided by how you react to it.
- Allow yourself to accept help.
- Notice the different ways you handle stress when you are and are not incorporating mindfulness into your daily practice.
- Eat mindfully. Turn off everything and concentrate on the sensations involved.
- In difficult interpersonal interactions, focus on one positive aspect of the individual(s) involved.
- Try not to take things personally.

continued from page 13

Developing our residents' curiosity and beginner's mind through self-reflection can encourage self-directed learning. In addition, by facilitating attentive observation and presence, these self-reflection exercises allow residents and educators to watch for reactivity and accept each moment as it comes.

unnecessarily activating our “fight or flight” response (that is, sweating, pulse racing, and so on). For example, during this confrontation with the difficult patient, an enraged resident may notice his or her heart is pounding. One can learn to mitigate these responses by “dwelling in stillness and... observing without reacting and without judging” (18). As we become more mindful of our reactions in each moment, without judging them, we will develop the ability to recognize the visceral sensations associated with these reactions. Now our enraged resident can recognize his or her heart pounding, pause, get present, and respond thoughtfully rather than react. Several simple ways can be used to embed presence into one's practice. (Figure 4).

Conclusion

The techniques described incorporate two aspects of mindfulness—self-reflection and presence—that are vital in cultivating the four habits of mind. Developing our residents' curiosity and beginner's mind through self-reflection can encourage self-directed learning. In addition, by facilitating attentive observation and presence, these self-reflection exercises allow residents and educators to watch for reactivity and accept each moment as it comes. In the ever-changing paradigm of medical education, these powerful tools enable residents and educators to mitigate stress and burnout as they progress toward mindful competence. 

AUTHORS

Shanu Gupta, MD

Assistant Professor
Department of Internal Medicine
Rush University Medical Center

Jill Wener, MD

Director of Education, Division of Hospital Medicine
Department of Internal Medicine
Rush University Medical Center

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Preparing for the NAS Self-Study: Using Your Annual Program Evaluation to Create Effective Program Improvement

The Accreditation Council for Graduate Medical Education (ACGME) common program requirements define the elements of an Annual Program Evaluation (APE) (1). Programs should use APEs to identify their strengths and areas for improvement. As one element of the Next Accreditation System (NAS), programs will conduct a self-study every 10 years (2). This self-study will precede a site visit by ACGME and provide an opportunity for the program to review its progress over the past 10 years. For APEs and the self-study to be meaningful, they require a commitment to improvement from program leadership and faculty and a coordinated process to track the progress. We discuss possible elements to review as part of the APE, describe how to use the APE to identify areas for program improvement, and suggest a strategy for effectively monitoring progress over the 10-year self-study cycle.

Annual Program Evaluation

ACGME common program requirements state that a program “must document formal, systematic evaluation of the curriculum at least annually, and is responsible for rendering a written, annual program evaluation.” (1) The program must monitor and track resident performance, faculty development, graduate performance, program quality, and progress on the previous year’s action plans. In addition, the program must prepare a written plan of action to document initiatives to improve performance in one or more of the areas listed as well as delineate how they will be measured and monitored. **Figure 1** lists possible data elements that can be reviewed for APE. This data must be organized in such a fashion that the program can readily recognize what it is doing well and identify opportunities for improvement. The program must document how it plans to address the deficiencies identified through the development of formal action plans, or what we term “program improvement plans” (PIPs).

Program Improvement Plans

The data reviewed for APE help programs readily identify areas in need of improvement. Examples include performance on the Internal Medicine In-Training Examination or other certifying examinations, curricular outcomes of a clinical rotation, or resident reporting of patient safety concerns. Identifying areas of potential program improvement is only a first step; the program must also clearly delineate the necessary actions to achieve improvement in those areas. Elements that portend successful PIPs include: clearly stating the problem and the desired outcome of the improvement plan, identifying the appropriate faculty or staff responsible,

FIGURE 1. Data Sources for Required Elements of the Annual Program Evaluation

Elements	Potential Sources of Data
Resident Performance	<ul style="list-style-type: none"> • Performance on In-Training Exam • Scholarly Activities • Case Logs • Procedure Logs • Quality Improvement Activities • Patient Satisfaction Surveys
Faculty Development	<ul style="list-style-type: none"> • Program-Sponsored Development Activities • Faculty Scholarship • Participation in Local/Regional/National Meetings • Resident Evaluations of the Faculty
Graduate Performance	<ul style="list-style-type: none"> • On-Time Graduation Rates • Board Pass Rates • Graduate Survey Results • Fellowships/Career Placement
Program Quality	<ul style="list-style-type: none"> • Program’s End-of-Year Survey (Resident and Faculty) • ACGME Survey (Resident and Faculty) • RRC Citations/Areas for Improvement • Recruitment • Attrition Rates • Curricular Outcomes • Policies (Supervision, Fatigue, Transitions in Care) • Duty Hours • QI Participation

and developing an anticipated timeline for the improvement process. We recommend that programs include how the deficiency was identified and a categorization of the deficiency. We also recommend using the same data source by which the issues were first identified as a method to track improvements. **Figure 2** is a sample template of how a program may organize the required data to track progress for individual PIPs. ACGME requires that APE includes a review of

continued on page 16

continued from page 15

FIGURE 2. Template for Tracking Program Improvement Project Data

Program:	<input type="text"/>
Description of the area of concern:	<input type="text"/>
How was this issue identified?	<input type="text"/>
How would you characterize the deficiency/problem?	<input type="text"/>
What is your action plan for improvement?	<input type="text"/>
What is your desired outcome?	<input type="text"/>
Who is responsible for implementing your action plan?	<input type="text"/>
What is the timeline?	<input type="text"/>
How will you measure success?	<input type="text"/>
What is the outcome after implementation?	<input type="text"/>

Example: ACGME Survey, ITE Results, Patient Survey, etc.

Example: Resource Faculty Development, Curriculum, Evaluation, etc.

the PIPs the previous year. Therefore, clarity about the specific problems, process, and outcomes allows one to easily track progress of the PIPs over time. A program should demonstrate steps toward successfully improving the previously identified deficiencies.

Self-Study

Figure 3 shows a conceptual model of the 10-year cycle within NAS. At the end of each academic year, programs will conduct their APEs. Data from these APEs will be used to perform a yearlong self-study during the ninth academic year, culminating in an ACGME visit during year 10. The self-study, while not yet fully described, will be an opportunity for programs to self-assess. It will focus on a program’s overall mission and aims—allowing reflection while identifying its strengths—as well as the factors that limit its success (3). An important new process of the 10-year self-study visit is that the core and dependent subspecialties will conduct their self-study visits together as a unit (for example, the core internal medicine residency program and all the internal medicine subspecialty fellowships will have a site visit by ACGME at the same time, every 10 years). Therefore, the self-study participant group that meets with the ACGME site visitor(s) should include individuals who will be affected by the results. This group may include program leadership and

core faculty, residents and fellows, and coordinators from all programs. This group must have a commitment to change for the better, and not simply a desire to check the “we did this to meet the ACGME requirement” box. The process for the annual self-study must therefore be intentional, with members fully engaged. The focus must be on outcomes, both those improvements achieved and those future actions that will improve the quality of the programs. In our view, the 10-year self-study process will be most effective if the self-study group works collaboratively over the entire 10-year cycle in a continuous quality improvement Plan-Do-Study-Act cycle model (4), sharing resources and solutions. To do this effectively, programs should have a central database to track PIPs.

Tracking PIPs

Tracking improvements for each program (the core and dependent subspecialties) will be a key element of APE and the 10-year self-study visit. The tracking mechanism must ensure that follow-up is complete and that all identified issues have been adequately addressed. It could be achieved in a variety of ways, depending on a program’s administrative support and organization. One example is to maintain binders for each PIP developed by programs over the 10-year self-study cycle. It may not be the most efficient method; a core

FIGURE 3. Model of the 10-Year Cycle within NAS



program with multiple dependent subspecialties that each initiate two PIPs per year could lead to 250 PIP tracking forms during the 10-year cycle. This cumbersome tracking system limits the ability of programs to collaborate to find common solutions. We have developed an electronic database using shared electronic access by our core program and dependent subspecialties. This database allows each program to enter their PIPs in a specified format and provides the required central oversight by the core program director, and allows us to identify common issues across programs within the department. Further, we can identify key faculty from several programs who can work together to identify common solutions to shared problems. This creates a more efficient process and the ability to share resources. The electronic database can be queried by any of the fields on our PIP tracking form (Figure 2). This central repository also allows us to ensure that follow-up is complete by setting up automatic reports by due date for each PIP. The Microsoft Access database that has been created can easily be replicated by other programs or shared among programs. Please contact the authors for a copy of the database template.

Conclusions

As programs embark through NAS and prepare for self-study visits, a comprehensive annual program evaluation process is essential. It should readily identify a program's strengths and areas ripe for program improvement projects. Core programs and their dependent subspecialties should find ways to collaborate. By identifying common problems and sharing resources, they can effectively develop common solutions. Creating a database that allows for comprehensive

and continuous tracking will aid in central oversight by the core program director and make the self-study process more meaningful and efficient. ☺

AUTHORS

Steven V. Angus, MD

*Program Director and Vice Chair
Department of Internal Medicine
University of Connecticut School of Medicine*

Lisa L. Willett, MD

*Program Director and Vice Chair of Education
Department of Medicine
University of Alabama at Birmingham*

Amy F. Chmielewski

*Academic Curriculum Coordinator
Department of Clinical Education
University of Connecticut School of Medicine*

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Teaching Clinical Reasoning in the Outpatient Clinic: Pearls for Efficient and Effective Diagnosis

Teaching clinical reasoning in a fast-paced outpatient setting requires that an educator address the clinical issues of the patient and any “thinking” problems in the learner. While there are a number of options for residencies to implement curricula related to diagnostic reasoning (1), it can be especially challenging in the ambulatory setting. Despite significant time constraints, residents are expected to perform efficiently both as clinicians and learners, creating significant pressure in the learner-educator dyad. Consequently, teachers have to ensure a safe and effective learner-patient encounter as well as deliver complex clinical reasoning concepts in a rapid and efficient manner.

In this article, we attempt to overcome some of the barriers to teaching diagnostic reasoning by providing a framework of educator training based on five scenarios. Learning these scenarios in advance can help the educator form rapidly accessible mental patterns. This training should allow educators to rapidly recognize thought-based reasoning errors in a resident clinic. Educators can then respond to unique scenarios with predetermined teaching points in an efficient manner.

The success of our proposed framework is predicated on uniformity of teaching among all educators working with

the pool of learners, so faculty development is critical to this process. Our approach is based on an effort to incorporate clinical reasoning into the case reviews of daily reports and the outpatient clinic at our institution. Based on that teaching experience, we have also included some “symptoms” or “signs” in the learner that may guide the educator to focus on certain teaching elements. Reinforcement of the lesson is provided in a diagnostic card (Figures 1 and 2) that can be given to learners (hard copy or electronic) for review after that session or for future learning assignments.

Scenario 1: Learner with Insufficient Knowledge of the Basic Principles of Cognitive Reasoning

The signs and symptoms include lack of knowledge about principles of clinical reasoning (that is, unfamiliarity with basic vocabulary).

Teaching Points

- **Metacognition:** Any attempt to teach clinical reasoning must start with increasing awareness of *how* we make diagnoses, especially the model of dual process thinking

FIGURE 1. Diagnostic Card (Side 1)

Common Clinical Reasoning Vocabulary	
Illness Script	Summary of diagnostic data for a clinical entity, including predisposing factors, pathophysiology, and common clinical findings; for example, deep venous thrombosis (DVT): post-operative, immobile patient with asymmetric lower extremity swelling with symptoms of pulmonary embolism (PE)
Problem Representation	An approach to organizing clinical data by summarizing predisposing factors, subjective data, and objective data to find a closely matching illness script to help produce differential diagnosis; for example, post-operative patient with left calf swelling, pain, hemoptysis, cough, pleuritic chest pain, and dyspnea—suggests DVT with PE
Dual Process Model of Diagnosis	Awareness that diagnoses can be arrived at by one or both of these cognitive processes: 1) fast pattern recognition by matching illness scripts to the problem representation, and 2) deliberate analytic thinking using diagnostic tools such as VITAMIN C or online tools that list etiologies for different symptoms
Heuristics	Mental/cognitive shortcuts to rapidly make actionable conclusions based on limited data with advantage of efficiency and speed; however, may cause us to commit cognitive biases and erroneous thinking (see side 2 of the card)
Signs of Reasoning Errors in the Clinic	
Unawareness of Cognitive Reasoning in Clinical Settings	Lack of knowledge about principles of clinical reasoning (that is, unfamiliarity with basic vocabulary)
Biased Thinking or Overreliance on Heuristics	A reactionary, quick plan is established with little diagnosis or explanation to back it up, possibly based on learner or patient characteristics
Overconfidence in Diagnosis	Fails to provide more than one hypothesis to explain patient symptoms, or expresses an inappropriately high confidence in plan
Underconfidence in Diagnosis	Unable to provide a reasonable differential diagnosis or set of diagnoses after presentation of the case
Recognition of Thought Error	Fails to appreciate and integrate lessons from diagnostic error

FIGURE 2. Diagnostic Card (Side 2)

Bias-Prone Heuristics	Definition
Anchoring Bias (Premature Closure)	Focus on features in the patient's initial presentation too early in the diagnostic process, without adjusting the outcome when further information is available
Emotional Bias	Negative or positive feelings toward patient influences diagnosis (counter-transference); examples: obese patients, non-adherent patients, chronic pain as drug seeker
Availability Bias	Evaluating a diagnosis as more probable because the provider is familiar with it or recently encountered it
Confirmation Bias	Tendencies to look for confirming evidence that supports your diagnosis and ignore refuting evidence
Diagnostic Momentum	Failure to consider diagnostic evaluation due to prior diagnostic "labels" attached
Blind Obedience	Showing undue deference to authority or technology; example: ED has "ruled it out;" not considering false positive or false negative rates of a test
Unpacking	Failure to elicit all pertinent information to make diagnosis; example: failing to obtain sexual history and delaying diagnosis of HIV
Framing Effect	The source of the information and how it is framed influencing diagnosis based on problem representation

(that is, diagnoses are arrived at by using either pattern recognition or detailed/analytic thinking). In other words, we need to develop an awareness of how we think.

- **Problem Representation:** Learners must acquire the ability to provide a problem representation—a summary of the key elements of a patient's problem list for the day's visit. As discussed by Bowen (2), the physician's restatement of the patient's relevant problem list is crucial to how we think about and remember a given case. An example of a problem representation is "This is a 54-year-old Midwestern farmer with fever, chills, chest pain, lower extremity rash, cough, and new hilar lymphadenopathy on chest radiograph."
- **Illness Script:** Illness scripts are physicians' images of diseases or presentations stored in their clinical memory. In the process of making a diagnosis, we match a patient's problem representation to our stored knowledge of illness scripts and thereby make a diagnosis.
- **Diagnostic Error:** As a community of learners and physicians, we must acknowledge the prevalence and types of diagnostic error. We must encourage learners to embrace the honest and open acknowledgement of diagnoses that are: 1) missed—no diagnosis was ever made; 2) wrong—another diagnosis was made before the correct one; or 3) delayed—sufficient information was available to make the diagnosis earlier. This can be taught formally as a concept or informally through modeling. In cognitive fields such as internal medicine, neurology, or emergency medicine, the rate of diagnostic error is estimated to be about 15% (3).

Scenario 2: Learner Demonstrating Biases or Overreliance on Shortcuts to Make a Diagnosis

The signs and symptoms include establishing a reactionary, quick plan with little diagnostic reasoning or explanation to support it, possibly based on learner features (for example, fatigue or preoccupation) or patient characteristics (for example, anxiety or opioid use). Overreliance on prior diagnoses and plans from previous clinicians.

Teaching Points

- **Look for Bias:** Cultivate an awareness of biases that can influence the thinking process (for example, emotional bias and obedience bias) (Figure 2).
- **Heuristics:** Be mindful of the human tendency to use cognitive shortcuts (heuristics) which, in certain scenarios, result in missed diagnoses. (See Figure 2 for common, problematic heuristics.)

Scenario 3: Learner or Educator with Inappropriately High Confidence in His or Her Diagnosis

The diagnostician fails to provide more than one hypothesis to explain patient symptoms and expresses an inappropriately high confidence in his or her plan.

Teaching Points

- Have learners state their confidence about a given diagnosis.
- Force an awareness that errors are common and ask, "What else could this be?" Ask the learner to assume that

continued on page 24

continued from page 23

the favored diagnosis is wrong, and provide examples of common, dangerous, and exotic (unusual) alternative diagnoses.

- Discuss the etiology of the diagnosis: Ask, “Why does this patient have this diagnosis?” (For example, What is the cause of the patient’s urinary tract infection? Is it due to diabetes, detrusor abnormality, or mucosal dryness?)
- The learner may have actually arrived at the correct diagnosis, but through flawed reasoning.

Scenario 4: Learner with Low Confidence in Diagnosis or No Diagnosis

The learner is unable to provide a reasonable differential diagnosis or set of diagnoses after presentation of the case.

Teaching Points

- Review the value of a “diagnostic timeout” and discuss approaches and resources to make a more confident diagnosis (4). Discuss how to inform a patient that his or her problem is not yet diagnosed, and come to an agreement on how follow-up will be obtained.
- Review steps to take now: obtain a better history or review of systems; ask what the patient thinks is wrong; reconsider all available data, including test characteristics.
- Review tools used to analytically think about a problem (such as VITAMIN CD mnemonic for establishing a differential diagnosis).

Scenario 5: Learner Fails to Reflect on Diagnostic Error

Learner fails to appreciate and integrate lessons from diagnostic error.

Teaching Points

- Discuss how to inform any other participating physicians of the correct diagnosis.
- Attempt to identify biases or shortcuts that led to an error to promote metacognition.
- Model by sharing one’s own experience with diagnostic error. (We have found this to be a powerful way to role model and discuss the approach to diagnostic error.)

Summary

Teaching the basics of clinical reasoning and diagnostic error in the outpatient setting requires educators to choose which lesson best fits that learner and the clinical problem

being addressed. Based on our review of the literature and experience, we prepared five scenarios that address major elements of clinical reasoning with the goal of reducing diagnostic error. To efficiently and effectively teach learners elements of clinical reasoning, educators must agree on 1) a common vocabulary and 2) a uniform preparation of lessons to teach. This preparation is critical in a time-limited precepting clinic, and may best be provided in faculty development sessions. After gaining skills with different scenarios, educators can approach learning opportunities in a “diagnose and treat” manner and can adjust to the competing demands of the outpatient clinic setting (Figures 1 and 2). 

AUTHORS

Rohul Amin, MD

Chief Resident (2014-2015)

Department of Internal Medicine

Walter Reed National Military Medical Center at Bethesda

Adam M. Barelski, MD

Senior Resident

Department of Internal Medicine

Walter Reed National Military Medical Center at Bethesda

Timothy L. Krohe, MD

Clinician Educator

Department of Internal Medicine

Walter Reed National Military Medical Center at Bethesda

Joan B. Ritter, MD

Associate Program Director

Department of Internal Medicine

Walter Reed National Military Medical Center at Bethesda

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DISCLAIMER

The views expressed are those of the authors and do not reflect the official policy of the Department of Army/Navy/Air Force, Department of Defense, or US government.

The I-PASS Handoff Program: A Standardized Approach to Transitions of Care That Improves Patient Safety

The Joint Commission cites communication errors among hospital personnel as a contributing cause of approximately two-thirds of sentinel events in hospitals (1). Communication errors are especially common during handoffs of patient care (2). As a result of more stringent duty-hour requirements and increasing clinical and educational demands on residents, handoffs are increasing in frequency in academic health centers. Because of this increased frequency, along with the recognition that poor handoffs can lead to errors in communication, the Accreditation Council for Graduate Medical Education (ACGME) now requires that residency programs “ensure and monitor effective, structured handoff processes (VI.B.2),” and “ensure that residents are competent in communicating with team members during the hand-over process (VI.B.3)” (3). Despite these requirements, there is a paucity of well-studied handoff curricula and validated tools to assess the handoffs skills of residents (4-7).

The I-PASS Handoff Study

In 2010, a group of medical educators, health service researchers, and hospital administrators collaborated to launch the I-PASS Handoff Study at 11 academic institutions (including 9 data collection sites, 1 data coordinating center, and 1 pilot site) across North America (8,9). In this study, investigators developed a package of curricular interventions, known as the I-PASS Handoff Bundle, and measured the quality of resident-to-resident handoffs and medical error rates before and after its implementation at all of the study sites (10). The cornerstone of the bundle was the I-PASS mnemonic, the components of which are detailed in Figure 1 (11). The curriculum taught residents to use the I-PASS mnemonic during verbal handoff communication. The mnemonic was also incorporated into printed handoff documents, including those that were integrated into electronic health records.

In addition to the mnemonic, the bundle also included the following training and educational components (10):

- **Core Resident Workshop**—This two-hour interactive didactic session teaches the components of the I-PASS bundle, including TeamSTEPS team communication techniques (12,13).
- **Handoff Simulation Exercises**—These one-hour interactive role-play sessions allow learners to practice the techniques learned in the workshop (14).
- **Computer-Based Training Module**—This computer module allows for independent learning of the I-PASS Handoff Bundle components (15).
- **Faculty Development Resources**—These resources are necessary to train faculty in all aspects of the I-PASS

FIGURE 1. The I-PASS Mnemonic

I	Illness Severity	<ul style="list-style-type: none"> • Stable, “watcher,” unstable
P	Patient Summary	<ul style="list-style-type: none"> • Summary statement • Events leading up to admission • Hospital course • Ongoing assessment • Plan
A	Action List	<ul style="list-style-type: none"> • To-do list • Timeline and ownership
S	Situation Awareness & Contingency Planning	<ul style="list-style-type: none"> • Know what’s going on • Plan for what might happen
S	Synthesis by Receiver	<ul style="list-style-type: none"> • Receiver summarizes what was heard • Asks questions • Restates key action/to-do items

Handoff Bundle and facilitate implementation of the program (16,17).

- **Faculty Observation Tools**—These assessment tools guide faculty observation and assessment of resident handoff skills, and reinforce I-PASS concepts (18).
- **Campaign Toolkit**—These materials and strategies are necessary to facilitate change in institutional culture and to promote implementation and sustainability, including materials such as a logo (see logo in Figure 1), a slogan, pocket cards, posters, and computer monitor frames (19).

All of these components are available for download from the MedEdPORTAL website as well as the I-PASS Study website (8,20).

Results of the I-PASS Study

During the study period—July 2011 to May 2013—855 residents and 267 faculty members from 9 study institutions were trained in the I-PASS Handoff Program (10). During this period, faculty members carried out 888 observations of resident-to-resident handoffs. After the workshop training, almost all (80%-99%) residents and faculty reported that they were able to perform all aspects of the I-PASS standardized handoff and that the training promoted acquisition of relevant skills related to patient care activities (10).

Implementation of the I-PASS Handoff Bundle was associated with a tremendous reduction in medical errors and improvement in patient safety. The main study outcomes were released in the *New England Journal of Medicine* in

continued on page 22

continued from page 25

All curricular materials now have been adapted to fit the needs of health care providers who care for hospitalized adults in both medical and surgical specialties.

early November 2014. Investigators found that in 10,740 patient admissions, overall medical error rates decreased 23% from the pre-intervention to post-intervention period (24.5 versus 18.8 per 100 admissions, $P < 0.001$), and preventable adverse events decreased 30% (4.7 versus 3.3 events per 100 admissions, $P < 0.001$) (21). Across all sites, the inclusion of key elements in both written (nine key elements) and verbal (five key elements) handoff communication increased significantly. Notably, implementation of the I-PASS Handoff Bundle did not increase the amount of time it took for residents to hand off and did not significantly alter resident workflow, including the amount of time they spent with patients or working on computers.

Dissemination of the I-PASS Handoff Program

Since the release of the curricular materials in May 2012, the dissemination of the I-PASS Handoff Program has been remarkable. At the time of this publication, 1,365 individual requests for access to the materials (through the I-PASS Institute website and MedEdPORTAL) came in from 500 unique institutions and organizations. Requests have come from 48 US states and the District of Columbia, as well as 25 countries outside of the United States. Most of the requests have come from individuals in the disciplines of pediatrics and internal medicine.

Because this study was conducted in pediatric residency programs, the curricular materials, including cases and simulations, focused on patients under the age of 18. However, all curricular materials now have been adapted to fit the needs of health care providers who care for hospitalized adults in both medical and surgical specialties. These adaptations are undergoing additional refinements as part of the Society of Hospital Medicine I-PASS Mentored Implementation Program that will begin in spring 2015. This program will provide mentored implementation of the I-PASS Handoff Bundle at 32 internal medicine and pediatric

residency programs and their corresponding institutions across the United States (22).

Conclusion

Implementation of the I-PASS Handoff Bundle at nine sites across North America was not only a valuable training exercise for both residents and faculty members, but also was associated with a remarkable decrease in medical error rates and preventable adverse events. The implications of the I-PASS Study are clear—one of the most important things a training program can do to enhance the safety of patients is to ensure that residents use a structured communication process to handoff their patients. The I-PASS Handoff Bundle provides a simple and evidence-based approach to meet this need and comply with ACGME regulatory requirements. 

AUTHORS

Jennifer K. O'Toole, MD

Associate Program Director
Departments of Pediatrics and Internal Medicine
University of Cincinnati College of Medicine

Zia Bismilla, MD

Assistant Professor
Department of Pediatrics
University of Toronto Faculty of Medicine

Jennifer L. Everhart, MD

Assistant Professor
Department of Pediatrics
Stanford University School of Medicine

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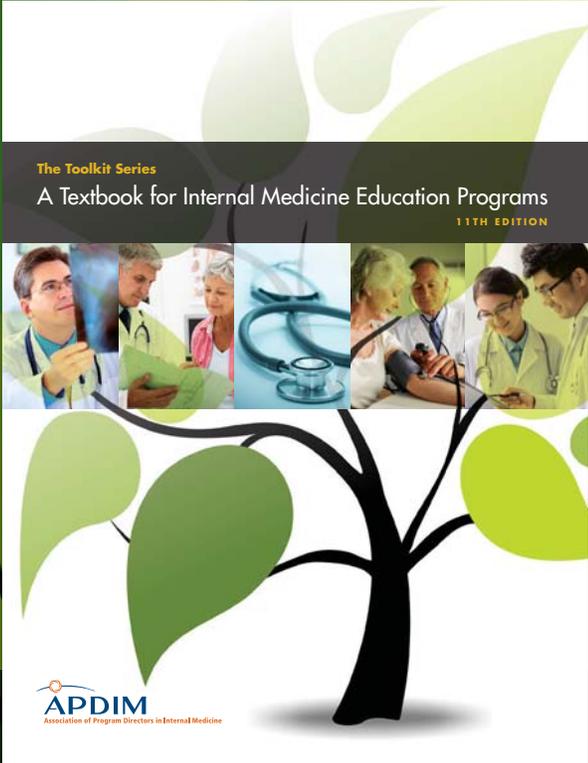
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