

ACADEMIC INTERNAL MEDICINE

INSIGHT

AAIM IN ACTION

AAIM Deputy Chief Executive Officer Update: AAIM Women Rock!

AAIM Deputy Chief Executive Officer Bergitta E. Cotroneo discusses the growing number of women in alliance board and council leadership and how AAIM is supporting women faculty and staff in departments of internal medicine through education, awareness, and networking.

LEADERSHIP

Speaking with Leaders: AAIM Interviews Wendy S. Levinson, MD

The popular "corner office" interview format yields new lessons from former department chair Wendy Levinson, MD, who discusses leadership lessons, how to be a mentor, growing a collaborative leadership style, and challenges for women leaders.

TECHNOLOGY

Electronic and Mobile Resources for Practicing and Teaching Evidence-Based Medicine

Three types of electronic resources—"pull," "push," and electronic file cabinets—are information management tools that support high-quality instruction and evidence-based practice. These tools can be put together in a variety of ways to create an effective information-management system beneficial to residents and faculty.

QUALITY IMPROVEMENT

Quality Improvement Curriculum for Internal Medicine Residents: A Team Approach

It is critical that training programs design and integrate quality improvement and safety curricula. Findings are shared from a longitudinal, team-based quality improvement curriculum implemented in a university-affiliated, community-based teaching hospital.

MILESTONES

Chart-Stimulated Recall: A Valuable Tool for Milestones Reporting

Chart-stimulated recall, a process in which the medical chart is used to prompt learner discussion with an evaluator, can be adapted to focus on a variety of resident milestones. Key considerations in building a chart-stimulated recall tool are presented.

STUDENT MILESTONES

Capstone and CEPAERs: Creating the Well-Prepared Intern

Fourth-year capstone courses have been introduced at many institutions to address trainee skills gaps. Results from an innovative program facilitating the transition from medical school to internship focuses on six core management topics.

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By the Numbers

59%

US medical schools that require
capstone courses
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Recommended number of
milestones to assess chart-
stimulated recall
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34%

AAIM Board and council leaders
who are women
Page 2

Deputy Chief Executive Officer Update: AAIM Women Rock!



Bergitta E. Controneo

As we close the door on another successful fiscal year (FY) at AAIM—98% membership renewal rate, record attendance by chief residents (806) at the 2015 APDIM Chief Residents Meeting, and equally superb results for meetings registration overall—I write to share another area of emerging excellence at AAIM: the incredible engagement and leadership by women volunteers in governance and education.

Representative Governance

The FY 2015 AAIM Board of Directors has many dedicated leaders. The organization is working hard to ensure diversity in leadership at all levels of governance in AAIM. Data tell us that organizations that promote women to leadership positions tend to outperform groups that do not. The alliance and its constituent organizations have benefited greatly from the leadership and perspectives of the women leaders elected to serve as officers and members of the five founding member councils and the AAIM Board of Directors.

In FY 2015, AAIM Board Vice Chair and CDIM Past President Sara B. Fazio, MD; CDIM President Valerie J. Lang, MD; APDIM President-Elect Lia S. Logio, MD; APM Past President Wendy S. Levinson, MD; and AAIM Governance Committee Chair (and a past CDIM president) Heather Harrell, MD, led the way. Their board service, contributions, and insights were invaluable in shaping the strategic direction of AAIM.

Dr. Fazio was elected by her peers on the AAIM Board to serve as the FY 2016 board chair! As chair of the board, Sara will also chair the board's executive committee, working closely with me and AAIM President D. Craig Brater, MD.

Volunteers Make It Happen!

Figure 1 notes other women who served on founding member councils in FY 2015. Even more women will assume the leadership roles on councils in FY 2016. Those stepping up to serve as president elect (Patty Wright, MD, for ASP and Mary E. Klotman, MD, for APM) will also become new members of the AAIM Board of Directors. Others will continue to contribute as councilors, treasurers, key committee chairs, and leaders of affiliate groups within AAIM. Their commitment to service and member engagement has a tremendous impact on our overall success. You probably know many of the people in Figure 1. I encourage you to reach out through AAIM's online communities and at in-person meetings to learn more about the work they are doing on your behalf. You can also get tips on how you can become involved as an AAIM volunteer.

FIGURE 1. Women Leaders on Council

Volunteer	Position
Nancy D. Adams, MD	ASP Councilor
Donna J. Astiz, MD	APDIM Councilor
Kelly Barnes	MPPDA Executive Committee Member
Sharon Brangman, MD	ASP Councilor
Nancy J. Brown, MD	APM Councilor
Erica Brownfield, MD	CDIM Councilor
Karen M. Chacko, MD	APDIM Councilor
Shobhina Chheda, MD	CDIM Councilor
Frances A. Collichio, MD	ASP Councilor
Katherine Chretien, MD	CDIM Survey and Scholarship Committee Chair
Monica Fawthrop	AIM Treasurer
Marissa Galicia-Castillo, MD	ASP Councilor
Alda Maria Gonzaga, MD	MPPDA Secretary-Treasurer
Eva Greenwood	AIM Councilor
Masada (Musty) Habhab	AIM Councilor
Susan T. Hingle, MD	CDIM Program Planning Committee Chair
Mary E. Klotman, MD	APM Councilor
Cynthia H. Ledford, MD	CDIM Councilor
Diana B. McNeill, MD	APDIM Treasurer
Lauren Meade, MD	APDIM Councilor
Sandra A. Moutsios, MD	MPPDA President
Lisa Oliver	CDIM Clerkship Administrators Advisory Council Chair
Jennifer K. O'Toole, MD	MPPDA Member Representative
Polly Parsons, MD	APM Councilor
Alisa Peet, MD	CDIM Councilor
Eileen Reynolds	ASP Councilor
Ruth H. Smith	APDIM Program Administrators Advisory Council Chair
Cynthia Sutton	AIM Councilor
Patricia Vassallo, MD	ASP Councilor

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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.

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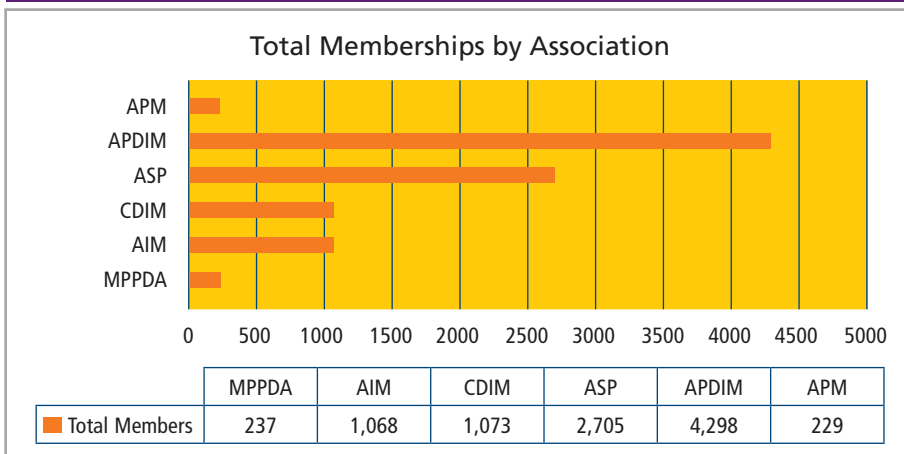
Several recently launched strategic initiatives and collaboratives achieved very successful outcomes this fiscal year. Here are just a few:

- AAIM Innovation Grants Program (led by Donna Astiz, MD).
- Resident to Fellowship Interface Committee (led by Elaine Muchmore, MD).
- AAIM Finance and Audit Committee's oversight of plans to invest significant reserves in AAIM infrastructure (supported by council treasurers Monica Fawthrop and Diana McNeill, MD).
- Local community outreach and support for schools in cities where AAIM conferences are held (led by Ruth Smith and Lisa Oliver).

The AAIM member community is diverse, but as you see from this sample, our volunteers were able to explore unique ways to ensure member engagement and member satisfaction.

Who Are Those People?

FIGURE 2. AAIM Membership as of May 31, 2015



As you see in **Figure 2**, AAIM constituent groups have grown from just under 4,400 total members in FY 2009, when I joined the organization, to over 9,600 members (of which approximately 48% are women).

Increasing numbers of women faculty members are managing key roles in US institutions:

- 20 of 130 department chairs are women.
- 57 of 125 medical school clerkship directors are women.
- 108 of 372 residency program directors are women.

AAIM Leads the Way through Dialogue and Education

As in many arenas, women in medicine often experience disparity in pay, leadership opportunities, and promotion consideration. AAIM is committed to providing education and professional development opportunities designed to help close the gaps, and give women in academic medicine tools for advancement.

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Speaking with Leaders: AAIM Interviews Wendy S. Levinson, MD

Wendy S. Levinson, MD, is Professor in the Department of Medicine at University of Toronto Faculty of Medicine. She previously served as department chair at that institution. She is a former president of APM.

Her interviewer, Paul B. Aronowitz, MD, is Clerkship Director in the Department of Medicine at University of California, Davis, School of Medicine and a past president of APDIM.



Wendy S. Levinson, MD

Tell me a little bit about your most recent position and current situation.

I was chair of the Department of Medicine at University of Toronto; I finished 10 years in June 2014. Currently, I'm running Choosing Wisely Canada and am also in charge of a consortium of 16 countries implementing Choosing Wisely.

What was your earliest leadership experience?

I'd say no matter where I've been, I've tried to do some leadership things, but Society of General Internal Medicine was really my first major leadership role. Before that, I had local leadership roles at the community hospital where I worked in Portland, Oregon.

What were some of your earliest leadership lessons?

I've always been a student of leadership. I moved to University of Chicago for really only one reason: to be a student of leadership of Arthur Rubenstein. Arthur was chair of medicine at University of Chicago and was well respected. So when I went there as chief of general medicine, I told him

I had one bottom line negotiating demand—that I wanted to meet with him once a week to talk about leadership.

I learned a lot from Arthur. I learned that integrity is the most important part of leadership. Without integrity you don't build the kind of environment that makes people flourish. Leadership is about other people—not about you. Leadership is about creating a vision others believe in and enabling others to do the work. I don't use the term "servant leadership," but I think the essence of this concept is true. If you have a lot of ego, I don't think that makes for the best leadership. This is a little counterintuitive given the fact that we tend to promote many people in medicine who have a lot of ego. You have to be about others—not about yourself.

One of the many things Arthur taught me is that you may have a lot of things you want to achieve, but you have to know when the right time is to try and accomplish each thing. For example, for a while, I'd go to our weekly meeting and complain about one division. Finally, after a few weeks, Arthur said, "Wendy, you bring that up every week, but you have to know when the right time is to fix the division. So unless this is that time to fix it, stop bringing it up."


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How can you engage in the discussion? I encourage you to read the June 2015 AAIM Perspectives in the *American Journal of Medicine*—"Gender Differences in Salary of Internal Medicine Residency Directors: A National Survey" (also available at www.im.org/Publications). You can attend several workshops at Academic Internal Medicine Week 2015 (registration is now open at www.im.org/meetings):

- 101. Promoting Collaborative Environments.
- 311. Being Female in Academic Medicine: Politics, Power Posing, and Promotions.
- 404. How to Say What You Mean and Mean What You Say: Preventing and Managing Communication Misfires in Academic Medicine.

In support of leadership development for women, plan to join me and Co-course Director Sara Fazio, MD, at the inaugural AAIM Women in Medicine Leadership Development

Forum, also scheduled to be offered this fall—Thursday, October 8, at Academic Internal Medicine Week 2015. This one-day forum will feature panel discussions, breakout sessions, and networking opportunities. Women from all AAIM constituencies are welcome!

AAIM women volunteer leaders and members are doing great things. Join me in congratulating them on a job well done and decide to work with your colleagues to keep the forward momentum! 

Sincerely,
Bergitta E. Cotroneo, FACMPE
AAIM Deputy Chief Executive Officer and EVP

If you were to encapsulate your leadership style in one word, what would that word be?

That's not difficult for me—collaborative. I help to create a vision, and I'm the spokesperson for that vision. I'm all about creating an environment where people thrive in their careers. If they thrive working toward that vision, then we accomplish two things—we achieve that vision, and they also grow and are proud of what they have done.

What have been your most favorite and least favorite parts of being in leadership positions?

It's about the people I've worked with. In each place I've been—Portland, Chicago, and Toronto—those deep friendships with the people who I've worked with are the best thing.

I also feel that one of my greatest strengths is my creativity. I'm someone who can see where things are going, and I can help people see the "forest for the trees." It's a lot of fun to tap into that creativity. In contrast, in the jobs I don't like, the ratio of creativity to administration is in the wrong direction. I don't thrive in a place where there's too much administrative work.

The other thing that all leaders dislike is recalcitrant people. I'm not referring to difficult interactions—one must always deal with conflict in leadership. What I mean is a person who has an inherent flaw in his or her personality. They're not fun, and dealing with them involves a great deal of negative energy.

What are the key features of a great mentor?

David Sackett and Sharon Straus recently came out with an excellent book called *Mentorship in Academic Medicine*. I did my APM Presidential Address about the research in mentorship.

I think the features of a great mentor are understanding what the other person's goals and values are and what makes that person happy, and then helping to create opportunities for that person to realize his or her potential. It's about networking and connecting people and helping your mentee to create an opportunity to realize potential. It's not about creating someone in your mold—it's not about cloning. Great mentorship is also about being there when things aren't going well and helping get that person through those rough parts.

A good mentor also has to be willing and able to give people difficult feedback. The mentor has to identify potential problems and give supportive, honest feedback.

If someone who aspired to be a leader came to you for advice, what would you tell that person are the key skills needed to develop into a good leader?

Leadership is about enabling a team. If you think of leading as about what you are going to do, you won't get very far—one person can only do so much. But if a leader can enable a team to come together and to succeed, that

In each place I've been, those deep friendships with the people who I've worked with are the best thing.

leader can accomplish much more and have fun working collaboratively.

How about advice for younger, up-and-coming leaders?

I'd tell them to take a piece of whatever needs to be done, own it, and develop it. I'd also tell them to make sure that they deliver. It's important not to be seen as someone who takes something on and then drops it. When chairs of medicine are looking for leaders, they ask themselves about whether someone they're looking at has a track record of finishing tasks and projects. If you're going to trust someone to take on an important task, you want to know it will get done.

Being physicians and wanting to help people sometimes makes being the tough guy in a leadership role difficult—many physician leaders seem to struggle with this. Do you?

If you do things that have a path, not everyone will like your path. Some people will try and throw up roadblocks. I don't believe people have tough skins; as humans, we want people to like us. I had to rely on a confidante to help enable me to do the difficult things, to help me get through these things. You can definitely get beaten up by having to do these hard things.

Not everyone in my department likes me, but I think most people would say I have integrity, and am honest and fair. You can't need to be liked all the time. A leader simply cannot be effective if he or she is liked all the time.

I will give you an example that applies to women in leadership positions. Women, I think, are hard-wired to be supportive and nurturing. But even though you're a woman in a leadership position, you simply can't be a people pleaser all the time and succeed. I was working with a consultant for our hospital consortium, and things were going well in our meetings. One day, she said, "Can I tell you something?" I said, "Of course." She went on to tell me that she was really enjoying working with me and was surprised by that because she had been warned that I was a bitch. Someone had told her this with the intent of undermining me, and one potentially effective way to undermine a woman leader is to call her a bitch.

What was so different about this situation was that the consultant was willing to open up and tell me this—otherwise I never would have known. I like to tell other women leaders in medicine this story because it's important for them to be aware that such criticism can and almost certainly will happen

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to them at times if they reject the role of women purely acting as people pleasers.

What are you most proud of in your career?

My first *New England Journal of Medicine* article on combining career and family. In a lot of ways that is really what I'm most proud of—combining career and family.

But in terms of leadership, I'm probably most proud of the Department of Medicine at University of Toronto. When I got to Toronto, each of multiple hospitals had its own identity and faculty competed with the faculty at other sites, which seemed completely crazy to me. So we created a strategic plan, and the title of that first plan was "Collaborating for Excellence." I really think that I helped to change the culture there. Culture change is really tough and I've done that a few times in my career, but am most proud of creating a culture of collaboration.

What book(s) about leadership would you recommend to someone in a leadership position in medicine?

Good to Great is a really great book. It resonates with that core belief that I have that leadership is not about yourself or your ego but about empowering others. That book is about making other people effective.

Tell me your "best-ever story" as chair of medicine?

That's easy. There was a person who wanted a leadership position and had not competed well for prior jobs because he gave off an arrogant, know-it-all air. But I ended up offering him the position despite a lot of controversy. Early on he did some things that really angered some people. He shot himself in the foot and they came to me and said, "We told you so—he's just a terrible leader."

So I sat down with him. He told me he had his resignation letter in his pocket. But I told him I didn't want his letter, and went on to give him really honest feedback. I told him I really believed in him—I wanted him to be successful and thought he could be successful. I told him this was just a bump in the road and that I would continue to work with him. Subsequently, he's done really well and is highly successful; there is such an air of happiness about him. Even though I'm not chair anymore, he periodically seeks me out to tell me how happy he is and how well things are going. Those are really rewarding episodes—when you can deliver tough news in a way that makes people feel valued, you build real trust. 🌀

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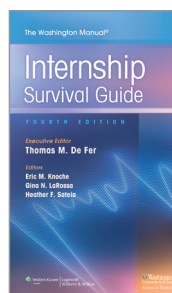


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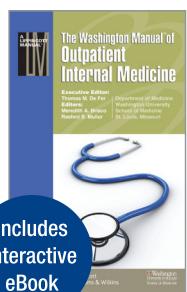


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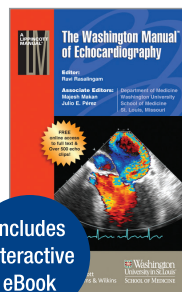
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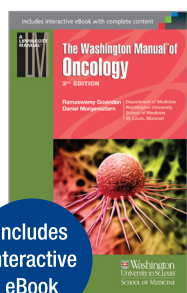


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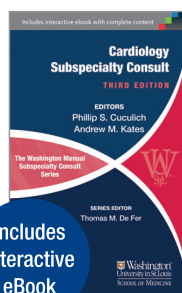
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Electronic and Mobile Resources for Practicing and Teaching Evidence-Based Medicine

Effective use of information technology is an important skill in medicine, as described by the Accreditation Council for Graduate Medical Education milestone, “learns and improves at the point of care” (1). This article discusses three types of electronic tools—“pull” resources, “push” resources, and the electronic file cabinet—that facilitate evidence-based practice and high-quality teaching. Internet access and mobile versions of these tools allow their use at the point of care. Serving different but complementary roles, they fit together as an effective information-management system that is useful to medical students, residents, and faculty.

Pull Resources

Pull resources are information databases that can be searched on demand to answer the five to 20 clinical questions that arise per day for providers (2). Providers should become familiar with a few pull resources, as none will be perfect for every situation.

PubMed is comprehensive and provides direct access to the primary literature, but requires time and skill to search. UpToDate is fast to search and synthesizes evidence and expertise into clear clinical guidance, but does not explicitly describe the criteria used to select and appraise evidence. Resources such as Clinical Key, an automated evidence search engine, allow users to search the primary medical literature, guidelines, and standard textbooks via a user-friendly interface. DynaMed is rigorously compiled, ranks highly on the evidence resource value pyramid (3) and presents information in a bulleted format. Pull resources can focus on certain types of information, such as the Cochrane Collaboration (systematic reviews) or JMAEvidence (history and physical examination and literature interpretation).

Users can begin with their institution’s library to find the search tools and databases that are available to them and best fit their preferences. Asking learners to construct and find the answers to focused clinical questions in real time will help hardwire this behavior and stimulate rich discussion about information resource selection, critical appraisal, and application of evidence.

Push Resources

Push resources send information automatically to users on a regular basis. The McMaster Premium Literature Service is a database of recent articles that are continuously selected from the medical literature according to a rigorous critical appraisal process. This service feeds content into multiple push resources, including EvidenceUpdates and Journal Wise. These services send high-quality summaries of recent evidence to users via email and are effective ways to stay up to date on the most recent evidence. Other services such as *New England Journal of Medicine Journal Watch* push out evidence

summaries with expert commentary as well as medical news and drug information. All of these resources allow users to choose the topic areas they will receive content about and select how frequently they want to receive information. Most services send content by email.

Services traditionally used as pull resources also offer ways to have information pushed regularly to users. DynaMed offers email alerts so users can know when topics are updated. By creating a free “My NCBI” account in PubMed, users can have the results of PubMed search strategies they design emailed to them on a regular basis. These emails can help a student or resident to stay up to date in an area in which they are conducting research, allow a faculty member to remain current on a topic on which they lecture regularly, or enable educators to update a curriculum.

The Electronic File Cabinet

Clinicians and educators have traditionally stored copies of articles in paper format. While popular, this approach has drawbacks. Effort is required to copy and file away material, which can then be hard to find. (Was that great article on pulmonary complications of HIV filed under infectious disease, pulmonary, or HIV?) Material stored in a metal file cabinet is accessible in only one location. Reviewing and updating paper files can be a Herculean task.


An electronic file cabinet is a personal reference library that can be accessed from multiple locations, including smartphones and tablets; facilitates easy filing, retrieval, and sharing of material; and has its contents safely backed up.

Cloud-based storage services such as Dropbox, Box, Google Drive, SpiderOak, and Evernote serve as platforms for an electronic file cabinet. These services allow users to access stored content via computer, smartphone, or tablet. Changes to documents or additions to content are immediately synchronized and available on all connected devices. Certain services offer advanced indexing options, such as adding descriptive “tags” to documents. For example, adding “infectious disease,” “pulmonary,” and “HIV” as tags to an article on pulmonary complications of HIV obviates the need to choose or remember a precise storage location, as a search for any of these three terms will locate the paper.

Most services offer a certain amount of free storage and functionality, with additional features available with paid subscriptions. Some offer more advanced word processing and collaborative editing, while others offer sharing of audio files, the ability to email content directly into storage, and use of content tags. Although different cloud-based storage services cannot communicate directly with each other, some allow users to share content with people who do not have an account, through direct download or document-viewing links.

An electronic file cabinet provides an ideal place to store and organize articles retrieved or received from push or pull resources and is an effective tool for clinical care, teaching, and scholarly activity. Students, residents, and faculty can easily access their electronic file cabinet via smartphone or tablet when on the wards or in the ambulatory setting. Research materials or presentations can be developed or accessed for presentation via multiple devices. (Protected health information must always be properly secured.) We have found that learners enjoy when they are given access to an electronic folder into which their teaching faculty places articles relevant to a curriculum or to cases. The collaborative features offered by many products allow all members of a team to place articles into a shared electronic folder. Students or residents can be given specific folders to highlight their contributions and enhance feedback by faculty.

Conclusion

Residents and faculty can combine pull and push information resources with an electronic file cabinet to form an effective information-management system that facilitates the teaching and practice of evidence-based medicine. We encourage educators to introduce these concepts and resources to medical students, residents, and faculty on the wards, in the ambulatory setting, or in conference and faculty-development venues. 

AUTHORS

Daniel I. Steinberg, MD

Associate Professor
Department of Medicine
Icahn School of Medicine at Mount Sinai

J. Richard Pittman, MD

Assistant Professor
Department of Medicine
Emory University School of Medicine

Eduard Vasilevskis, MD

Assistant Professor
Department of Medicine
Vanderbilt University School of Medicine

Daniel D. Dressler, MD

Professor
Department of Medicine
Emory University School of Medicine

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Quality Improvement Curriculum for Internal Medicine Residents: A Team Approach

An Institute of Medicine 2010 report notes that the fragmentation of care in the complex US health care system permits opportunities for medical errors that compromise quality and value of care (1). Since then, patient safety and quality improvement (QI) movements have transformed the culture of health care delivery (2,3). Furthermore, the Accreditation Council for Graduate Medical Education adopted a focus on team training and competence in practice-based learning and improvement and in systems-based practice as an integral component

of resident education (4,5). This focus has had significant impact on learners across the medical education curriculum. Active resident involvement in QI initiatives provides distinct opportunities for residents to change models of care delivery and may facilitate improvements in health care quality (2,6). Training programs must design and integrate QI and safety curricula into their educational platforms (6,7). We describe a longitudinal, team-based QI curriculum implemented in a university-affiliated, community-based teaching hospital.

FIGURE 1. Curriculum Overview

Goal	<ul style="list-style-type: none"> To provide faculty and residents with the knowledge and skills to improve quality of care for patients through the application of a team-based QI/PS curriculum.
Objectives	<ul style="list-style-type: none"> Demonstrate understanding of quality/process gaps in performance. Identify key areas to improve and recognize that a change leads to an improvement. Develop an aim statement. Demonstrate understanding of the FOCUS PDCA model for improvement. Develop a measurement plan. Effectively collect, analyze, and display data. Monitor the process/sustainability of an improvement plan. Work in teams and collaborate with health care institution leadership to link strategy to action.
Resident Curriculum Delivery Structure	<ul style="list-style-type: none"> Internal medicine and medicine-pediatrics residents were assigned to five teams based on specialty, year of training, and aptitude. Two faculty mentors and QI experts were assigned to each team. Ninety minutes of conference were assigned monthly or bimonthly for QI. The resident teams identified QI projects based on gaps they identified, and developed AIM statements. The AIM statements were developed into charters and presented to hospital administration for sponsorship. Each conference session consisted of pre-readings, short didactic sessions, and team discussions to apply the principles to the teams' identified QI projects. Task lists were developed at each session; data gathering occurred between conference times. Residents attended monthly, integrated meetings of QI experts, university faculty, and hospital business leaders to present ongoing project work and obtain help in removing barriers to success. This also ensured alignment to health system strategy.
Educational Resource	<ul style="list-style-type: none"> FOCUS PDCA were derived from existing performance improvement methodology in use in our health care system. IHI modules were incorporated into pre-readings. Key references from the literature. A portal environment containing all curricular content, tools, supporting literature, a team discussion site, a calendar, and homework assignments
Evaluation and Assessment	<ul style="list-style-type: none"> Pre- and post-curriculum surveys (Figure 4). QIKAT (Figure 5). Focus groups. Project evaluation. Post-session evaluations on session objectives and team interactions.

Innovation

We used Kerns' six-step approach and Harden's SPICES model to develop the QI curriculum and educational strategies (8,9). We used focus groups and literature review to identify the course content and objectives focused on fundamentals of QI, measurements for improvement, QI models, root cause analysis, data analysis and interpretation, and systems thinking. We used a needs assessment to determine our construct for delivering the material and the barriers to implementation. We implemented a longitudinal QI program during the internal medicine residency conference series. We used online learning modules, classroom application activities, and reflective exercises as the educational methodologies. We used a team, project-based approach to develop and implement QI projects based on resident-identified patient safety issues, which allowed for participation in meaningful QI initiatives and assisted with resident time constraints. We used the Six Sigma FOCUS PDCA derived from the existing performance improvement

QI projects based on resident-identified patient safety issues allowed for meaningful participation and assisted with resident time constraints.

methodology in our health care system as the framework to develop the QI projects. The key elements of the formal curricula are outlined in **Figure 1** (10).

Implementation

We assigned 63 internal medicine and medicine-pediatrics residents at University of Illinois College of Medicine at Peoria and St. Francis Medical Center in Peoria, Illinois, to five teams based on specialty and year of training. Two faculty mentors were assigned to each team and designated QI experts assisted. We assigned 90 minutes of conference monthly or bimonthly for 15 months. Using Kolb's principles of experiential learning, residents applied the concepts gathered during their lectures and pre-readings to QI initiatives (11). These initiatives (**Figure 2**) were based on gaps identified in patient care and delivery models. The aim statements were developed into charters presented to hospital administration for sponsorship.

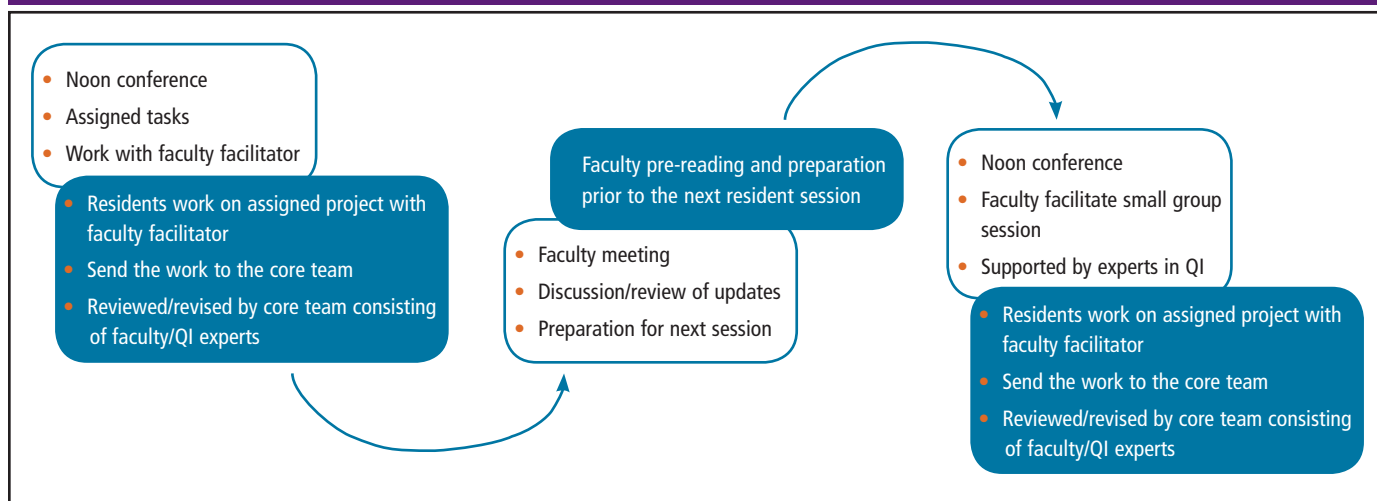
An online portal environment housed all curricular content, supporting literature, a team discussion board, a calendar, and homework assignments. Conference sessions

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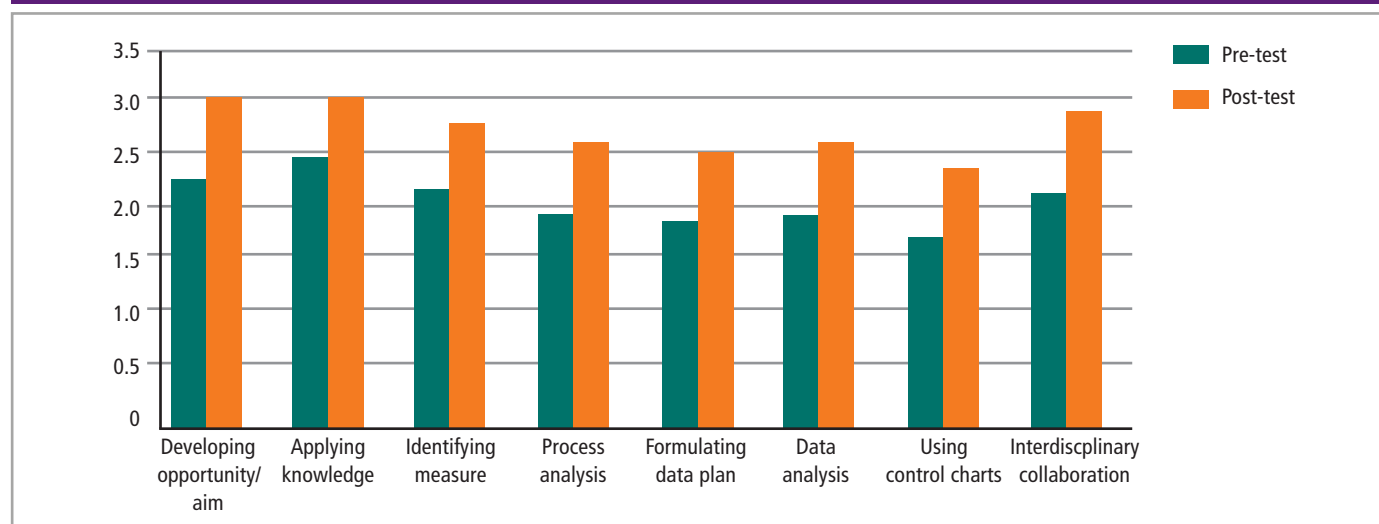
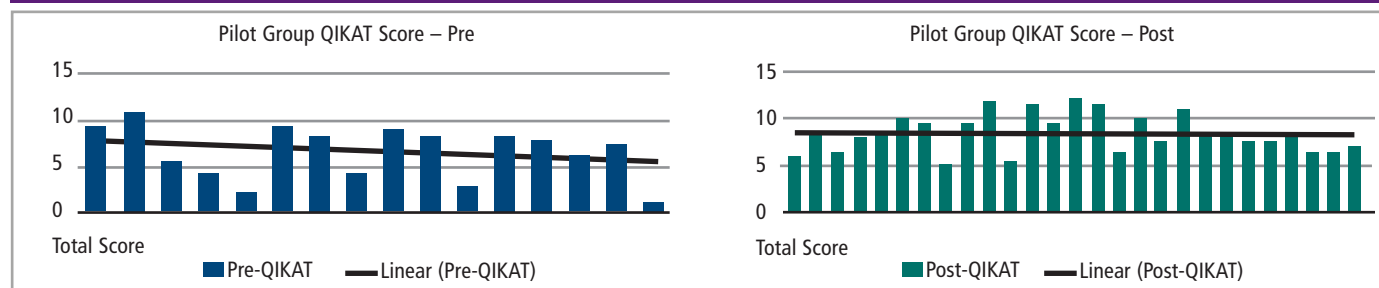
FIGURE 2. Five QI Initiatives

1. Improved accuracy of primary care physician assignment in the resident clinic
2. Improved accuracy of medication reconciliation in the resident clinic
3. Improved hand-offs for regional transfer patient admissions using a standardized hand-off tool
4. Implementation of best practice "Opt-Out" HIV screening
5. Improved efficiency of resident rounds using a patient- and family-centered approach

FIGURE 3. Structure for "Just-in-Time" Faculty Development for Group Facilitators



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FIGURE 4. Resident Pre- and Post-Curriculum Self-Assessment**FIGURE 5. Quality Improvement Knowledge Application Tool (QIKAT)**

consisted of pre-readings, short didactics, team discussions, and self-reflection surveys. Between conferences, teams worked on their initiatives with faculty mentors, who were identified based on interest. We provided “just-in-time” faculty development (Figure 3) to develop faculty mentors’ QI skills. The residents presented updates at monthly integrated meetings of QI experts, university faculty, and hospital business leaders to demonstrate progress, obtain assistance with barriers, and ensure alignment to health system strategy.

Curriculum/Program Evaluation

We conducted focus groups and pre- and post-curriculum surveys identify level of comfort with QI proficiency in developing an aim statement, applying knowledge, identifying measure, process analysis, formulating a data plan, data analysis, using control charts, and interdisciplinary collaboration (3). Residents and faculty completed final project evaluations and post-session evaluations on session objectives and team interactions. We performed a pre- and post-quality improvement knowledge application tool (QIKAT) (3), which was graded by two independent and blinded raters.

Results

After the teams completed plan-do-check-act cycles and tests of change, implementation of the QI curriculum yielded positive outcomes for all five projects. The curriculum yielded positive results in resident perception of their skills in quality improvement. The pre-implementation survey showed that residents lacked confidence in their knowledge and skills in QI. The post-curriculum survey showed significant improvement in resident self-assessment of eight facets of performance improvement proficiency (Figure 4). Additionally, QIKATs showed an overall improvement in resident performance after participation in the QI curriculum (Figure 5).

Discussion

Our longitudinal, team-based approach to QI proved successful in meeting the goals of the curriculum. Literature review and our early experience show us that a project-based approach to QI changes attitudes of residents (3,6). Residents demonstrate improved skills in developing and focusing on an aim statement and understanding the model for improvement.

FIGURE 6. Key Elements to Successful Implementation of the Curriculum

	Keys to Successful Implementation of Curriculum	Keys to Integrating with the Sponsoring Institution
Faculty	<ul style="list-style-type: none"> Program and faculty champions "Just-in-time" faculty development 	<ul style="list-style-type: none"> University leadership support of faculty development and participation in QI Hospital QI experts engaged
Curriculum Structure	<ul style="list-style-type: none"> QI Projects based on resident-identified need Project time built into existing conference time 	<ul style="list-style-type: none"> Institutional buy-in with resident projects Resident project status reports as standing agenda at leadership meetings
Leadership Support	<ul style="list-style-type: none"> Institutional culture based on QI tenets with available QI experts 	<ul style="list-style-type: none"> Joint collaborations between the university and the teaching hospital

Additionally, post-survey data demonstrate that the residents have improved confidence in understanding interdisciplinary care and identifying and analyzing process or system gaps. Teamwork and collaboration were imperative to move projects forward and to complete assigned work, which allowed for distribution of work to meet the demanding resident schedules.

Just-in-time, ongoing faculty development served as a useful strategy to enhance participation by faculty who were motivated but lacked adequate QI skills. In this model, faculty were coached on concepts and their application to their projects in a private session with QI experts before the resident sessions, which provided a useful construct for faculty development without delaying implementation of our curriculum (Figure 3).

Figure 6 identifies elements key to successful implementation of the curriculum. Integration with the sponsoring institution provided additional resources and support that were imperative to the success of our projects. This collaboration provided valuable educational opportunities for residents and faculty who presented to the hospital business leaders. Additionally, the collaboration demonstrated the competence and relevance of the resident programs in effectively identifying and implementing key quality initiatives that are beneficial to the institution.

Challenges and Future Directions

While our curriculum design and implementation was successful, we did face challenges with implementation, and curricular refinements are under way at this time. Despite the group work, residents still struggled to complete course work. Faculty time commitment was also difficult to balance. Using two faculty mentors per group eased this problem; however, engaging 10 faculty at any given time will be difficult. Future steps in overcoming these challenges include a phased implementation of the curriculum by year of training. We feel this will introduce concepts early in training, and reinforce and build on them over the course of training. Residents will receive a certificate of achievement at the end of the longitudinal curriculum. An institutional application for maintenance of certification credit is currently under way in an effort to further incentivize faculty participation.

Conclusion

QI skills must be integrated into residency education to better prepare residents to practice in complex health care systems. Faculty development and institutional leadership buy-in are critical aspects for the effective implementation of this curriculum. Immersing residents in actual QI projects that offer opportunities for residents to apply their skills and affect health care delivery is important for effective resident engagement and learning. 🌀

AUTHORS

Teresa J. Lynch, MD

Program Director
Department of Internal Medicine
University of Illinois College of Medicine at Peoria

Shweta Ramsahai, MD

Associate Program Director
Department of Internal Medicine
University of Illinois College of Medicine at Peoria

Patricia McMahon

PI Facilitator/Coach
Physician Performance Improvement
OSF St. Francis Medical Center

Meenakshy K. Aiyer, MD

Associate Dean for Academic Affairs
University of Illinois College of Medicine at Peoria

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Chart-Stimulated Recall: A Valuable Tool for Milestones Reporting

With the increased emphasis on the documentation and reporting of educational outcomes in residency training that has come with the implementation of the internal medicine milestones, the need for efficient and flexible methods for resident assessment is greater than ever. Chart-stimulated recall (CSR), a method in which the medical chart is used to prompt learner discussion with an evaluator regarding various aspects of a clinical case, has become an essential resident assessment tool within our training program. CSR use for assessment of physician competence was first reported by the specialty examination board for emergency medicine in 1984 (1). In this report, performance on CSR was significantly correlated with American Board of Emergency Medicine test scores. Other investigations have reported high reliability and validity of CSR that show it is at least comparable to, if not superior to, other methods of physician assessment (including standardized patient exams and oral examinations) (2). Furthermore, some have suggested that, because CSR includes direct communication between the evaluator and the learner, physicians find it to be more palatable than other evaluation tools (such as passive chart audit) that do not incorporate such communication. Reliability and validity of the CSR tool have been established for evaluating practicing physicians in a number of specialties and also in the allied health fields (2-5). Based on these reports, the Accreditation Council for Graduate Medical Education has suggested that CSR be used as a tool for resident evaluation (6).

Potential Applications for CSR

We have found that CSR can be used not only to generate outcomes-based assessments of resident development in several competency areas, but also to provide immediate formative feedback to our learners as they progress through their training. Because of its flexibility, the CSR tool can be designed or adapted to target a variety of milestones, including clinical reasoning, documentation, systems-based practice, use of the electronic medical record, and delivery of high value care. In addition, the CSR tool can be employed as a mode of evaluation or to generate formative feedback across a wide spectrum of settings, from continuity clinic to inpatient internal medicine to subspecialty consult rotations.

Special Scenarios

Just as the CSR tool allows for flexibility in the competency being assessed and in the setting of assessment, it similarly lends itself to application across varying types of learners. We have had success in using CSR as both a means of assessing and “diagnosing” educational difficulties, and a

The most skilled residents can walk away from a CSR session with formative feedback for immediate incorporation into clinical practice.

means for providing formative feedback to problem learners within our training program. For example, application of a CSR tool in the continuity clinic may uncover that a learner struggling with provision of inter-visit care may not be appropriately utilizing the ancillary services in the clinic to accomplish necessary tasks. In this scenario, an educator would be able to use the deficiency identified by CSR not only as an opportunity to set clear expectations regarding inter-visit care (providing an important assessment in the realm of systems-based practice), but also to provide immediate formative feedback regarding how ancillary clinic services can be best utilized to assist the learner in delivery of such care. On the other hand, the CSR exercise can also play a valuable role in pushing advanced trainees to their learning edge. During a CSR exercise, a highly skilled inpatient medicine resident may be asked by an educator to dissect their clinical decision making according to the principles of high value care, and to consider what he or she may do differently in the future based on these principles. As a result, even the most skilled residents can walk away from a CSR session with formative feedback for immediate incorporation into clinical practice.

How to Build a CSR Tool

A number of essential steps must be taken to successfully incorporate CSR into an established educational program. First and foremost, the desired setting and timing of implementation must be determined. This decision will depend on educational need (that is, where in our program we need a mode of resident assessment to add to, replace, or complement methods already in use) and on the availability of faculty and residents within the selected setting. Identification of the competencies to be targeted is the next essential step to the development process; targeted competencies may be dictated by external forces (the need for outcomes data for milestones reporting), by internal forces (program-identified educational needs), or

by both. Once the targeted competency has been chosen, the milestones-based assessment form can be created. We recommend a maximum of five milestones for assessment; when evaluators are asked to assess too many areas, the exercise can become laborious for both evaluator and learner. Furthermore, feedback has less depth and becomes less meaningful to the learner if it is too broad. Finally, for each milestone, first decide which anchors will characterize the learner as deficient at one end of the spectrum and aspirational at the other, and then fill in the intervening anchors. These anchors will not only generate milestones-based assessments for residents, but also provide evaluators with specific language that may be incorporated into real-time formative feedback.


Implementing CSR: Lessons Learned

Using the process outlined, we developed a CSR exercise for incorporation into our intern continuity clinic experience. We learned a number of valuable lessons:

- Faculty development is key. It is important not only to get buy-in, but also for provision of specific instructions to your evaluators. In addition, it allows for some degree of standardization to your process.
- Resident preparation and buy-in are also crucial. Letting residents know why the exercise is being done and that it is not high stakes (for formative feedback and improvement, not just for assessment) creates a learner-friendly environment.
- Schedule CSR sessions in advance, if possible. It is especially true if clinical time needs to be blocked for both the learner and the evaluator. We were able to set aside 30 minutes at the beginning of the clinic day for each intern to go through the CSR exercise with a clinic preceptor.

Conclusions

CSR is an efficient yet flexible and interactive method that can be used to generate milestones-based assessments of internal medicine residents at varying levels and in various

clinical settings. In addition, it can be used as a launching point for real-time formative feedback regarding a variety of competencies from clinical reasoning to systems-based practice. We have had success using a CSR exercise with interns in our continuity clinic. Devoting time to faculty development, ensuring trainee preparation, and scheduling CSR sessions in advance have been instrumental to our process. 

AUTHORS

Deborah DiNardo, MD

Clinical Instructor
Department of Medicine
University of Pittsburgh School of Medicine

Shanta Zimmer, MD

Program Director
Department of Medicine
University of Pittsburgh School of Medicine

Asher Tulskey, MD

Associate Program Director
Department of Medicine
University of Pittsburgh School of Medicine

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Capstone and CEPAERs: Creating the Well-Prepared Intern

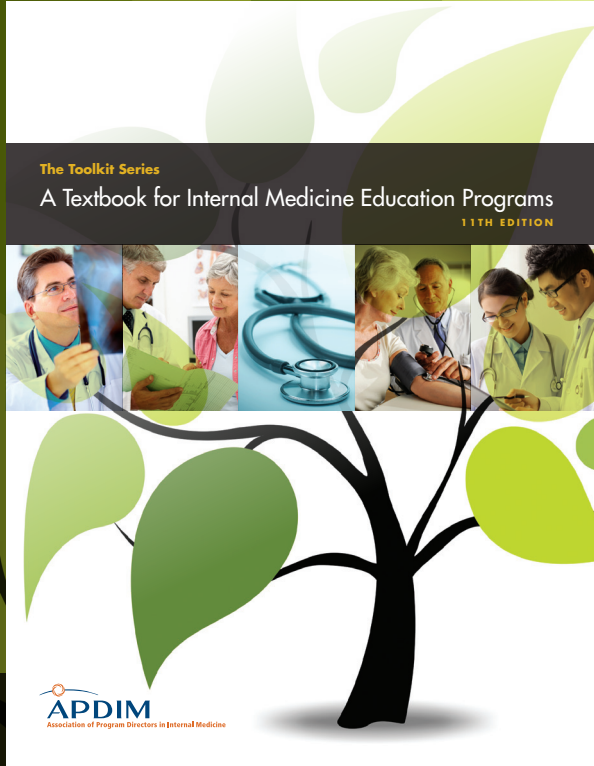
Over the past decade, program directors have expressed concern that some medical school graduates are not prepared for residency (1). The reasons for this gap in experience and expectations are varied, and have not been formally studied. Likely, duty hour limits for residents have provided fewer opportunities for students on core rotations to participate in meaningful overnight clinical activities, where experience in many core clinical skills had been provided previously. Also, due to service/education concerns for trainees, as well as for patient safety benefits, procedural “teams” have developed in many academic medical centers. That students are meaningfully participating on such teams is unlikely, and as a result, these well-intentioned services are another potential source of lost procedural experience for the medical student.

At the same time, recent research has demonstrated that interns in their initial months of training are performing clinical responsibilities—typically without direct attending supervision—that were not formally observed during medical school training (2). Together, these competing forces

Curricula for capstone courses are also intermixed with miscellaneous components.

are creating an increasing skills gap in our trainees, and resulting in potential risks to patient safety. While the Clinical Learning Environment Review program is assessing how graduate medical education programs are monitoring trainee supervision and credentialing for procedures, this program is still in its infancy, and has not yet resulted in direct accreditation decisions (3).

In response to this gap in education, a recent addition to the curriculum at many institutions is a fourth-year



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capstone course. Data from 2013 found that capstone courses are required by 80 (59%) schools. The curricula and dedicated times for these courses are diverse, but they are usually placed toward the end of the fourth year. Duration ranges from several days to four weeks, with a few schools integrating the experience throughout the fourth year. The curricula are also varied, with a mix of lectures, small group discussions, team-based exercises, role-play, clinical experiences, and simulation. The curricular goals frequently include management of common or serious medical conditions, review of pertinent basic science concepts, practicing procedural skills, functioning as part of a hospital team, professionalism, and advanced diagnostic and communication skills (4). Frequently, the curricula for capstone courses are also intermixed with miscellaneous components, largely driven by Liaison Committee on

Medical Education standards that were not met in previous clerkships.

The Association of American Medical Colleges (AAMC) released the Core Entrustable Professional Activities for Entering Residency (CEPAERs) in 2014. This publication delineates 13 entrustable professional activities (EPAs) that all entering residents should be expected to perform at graduation without direct supervision (5). Ideally, training and assessment of activities tied to the CEPAERs would be implemented from day one of medical school and re-assessed early and often. However, the complete curricular redesign to accomplish this would be a daunting option at many of the medical schools that are currently training our incoming residents.

Innovation

In 2012, Sidney Kimmel Medical College at Thomas Jefferson University started a capstone course, Gateway to Internship, to address the educational gaps and facilitate the transition from medical school to internship. Gateway to Internship has six curricular domains: core medical management, advanced communication skills, advanced diagnostics, evidence-based medicine, end-of-life skills, and wellness for the intern (Figure 1). Six core management topics (shortness of breath, chest pain, fever, altered mental status, pain, and hypotension) are discussed in large group settings, and this knowledge is assessed in specialty-specific simulated patient settings and in small group evidence-based medicine discussions. The simulation curriculum incorporates handoff and cross-cover issues while managing the stresses of multitasking as an intern (Figure 2). The small group discussions emphasize differential diagnoses, critical thinking skills, and initial management decisions for common outpatient or emergency room complaints. Students receive training on informed consent with a standardized patient encounter, and discuss end-of-life issues, including the process of dying as well as death pronouncement and documentation. Additionally, sessions and activities on how to manage stress or anger, maintaining personal health and nutrition, and work-life balance during residency are discussed.

With the release of the draft version of the AAMC CEPAERs, it was noted that multiple EPAs were taught in the Gateway to Internship curriculum, and therefore demonstrate that a capstone course is a useful checkpoint in medical school training to inform an EPA if total curricular redesign is not possible. To assess our capstone course's effect on student perceived preparedness, the 2014 Gateway to Internship students completed precourse and postcourse self-assessment surveys of the 13 CEPAERs. This survey asked multiple comfort-level questions to inform each EPA, and was scaled at the levels of need for direct

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FIGURE 1. Gateway to Internship Curricular Domains

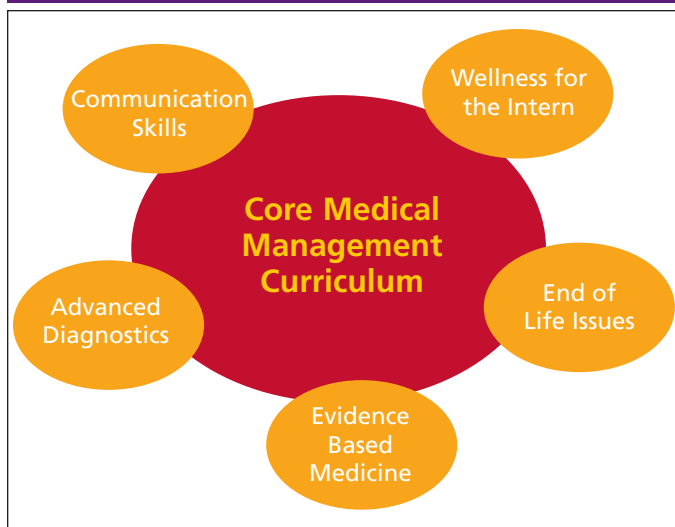
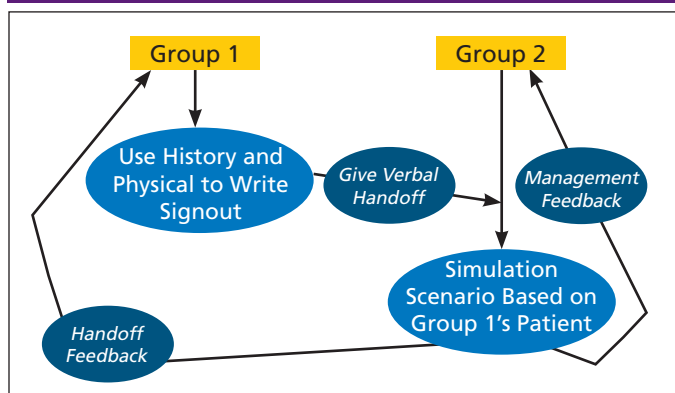


FIGURE 2. Handoff Schematic



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FIGURE 3. Sample Survey Questions

EPA 8: Regarding my ability to receive a patient handover to transition care responsibility to another health care provider or team		
Direct Supervision	Indirect Supervision	Independent Practice
I often need to be reminded to add key information to my written or oral handover summaries.	I occasionally need to be reminded to add key information to my written or oral handover summaries.	I rarely need to be reminded to add key information to my written or oral handover summaries.
I am often uncomfortable prioritizing the information to be delivered in a handover.	I am occasionally uncomfortable prioritizing the information to be delivered in a handover.	I am comfortable prioritizing the information to be delivered in a handover.
I am often uncomfortable assessing the workload and circumstances of the individual to whom I am transferring care.	I am occasionally uncomfortable assessing the workload and circumstances of the individual to whom I am transferring care.	I am comfortable assessing the workload and circumstances of the individual to whom I am transferring care.

FIGURE 4. Student Comfort Level Results

EPA Domain	Pre-course 3-point Likert Scale	Post-course 3-point Likert Scale	P Value
Differential Diagnosis	2.4	2.6	0.01
Handovers	2.3	2.5	0.002
Recognize/Manage Emergency	2.1	2.4	0.002
Informed Consent	2.3	2.8	0.0001

supervision, indirect supervision, or independent practice (Figure 3). The data demonstrated improvement in comfort level for the following EPAs that were taught during Gateway to Internship: EPAs 2, 8, 10, and 11 (Figure 4).

Discussion and Limitations

These results suggest that a capstone course does improve student confidence in performing day-one tasks of an intern at the indirect supervision level for the skills addressed. With our capstone course, students felt more confident in their ability to develop a differential diagnosis, perform a handoff, recognize and take the first steps in managing an emergency, and obtain informed consent. Next steps in this process would include formalizing the direct observation tools needed to objectively confirm competency in these skills before proceeding to internship. The time available to remediate any deficiencies is a critical limitation of the capstone course as a resource to evaluate EPAs. With most capstone courses occurring toward the end of the fourth year core rotations, the ability to remediate students at the direct supervision level is limited. Therefore, capstone courses are an excellent resource to solidify a skill set and confirm competency of EPAs that need to be continuously evaluated throughout medical school training. 🔄

Results suggest that a capstone course does improve student confidence in performing day-one tasks of an intern at the indirect supervision level for the skills addressed.

AUTHORS

Emily Stewart, MD

GATEWAY to Internship Director

Department of Medicine

Sidney Kimmel Medical College at Thomas Jefferson University

Gretchen Diemer, MD

Residency Program Director

Department of Medicine

Sidney Kimmel Medical College at Thomas Jefferson University

Gregory Young, MD

Assistant Professor

Department of Medicine

Geisel School of Medicine at Dartmouth

John Caruso, MD

Senior Associate Dean, GME and Affiliations

Sidney Kimmel Medical College at Thomas Jefferson University

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