Competency-Based Education and Training in Internal Medicine

Steven E. Weinberger, MD; Anne G. Pereira, MD, MPH; William F. Iobst, MD; Alex J. Mechaber, MD; Michael S. Bronze, MD; and the Alliance for Academic Internal Medicine Education Redesign Task Force II*

Recent efforts to improve medical education include adopting a new framework based on 6 broad competencies defined by the Accreditation Council for Graduate Medical Education. In this article, the Alliance for Academic Internal Medicine Education Redesign Task Force II examines the advantages and challenges of a competency-based educational framework for medical residents. Efforts to refine specific competencies by developing detailed milestones are described, and examples of training program initiatives using a competency-based approach are presented. Meeting the challenges of a competency-based framework and supporting these educational innovations require a robust faculty development program.

Challenges to competency-based education include teaching and evaluating the competencies related to practice-based learning and improvement and systems-based practice, as well as implementing a flexible time frame to achieve competencies. However, the Alliance for Academic Internal Medicine Education Redesign Task Force II does not favor reducing internal medicine training to less than 36 months as part of competency-based education. Rather, the 36-month time frame should allow for remediation to address deficiencies in achieving competencies and for diverse enrichment experiences in such areas as quality of care and practice improvement for residents who have demonstrated skills in all required competencies.

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For author affiliations, see end of text.

* For members of the Alliance for Academic Internal Medicine Education Redesign Task Force II, see the **Appendix** (available at www.annals.org).

On the 100th anniversary of the Flexner Report (1), calls for redesign of medical education are again intensifying and raise the question of whether our current medical education system produces physicians who can meet the health care needs of the 21st century (2). Our interest includes the evaluation of graduate medical education, the final training that physicians receive before entering clinical practice (3–7).

The traditional model of graduate medical education is structured by specific time-based curricular experiences that are required during training. Assessment of the learner and evaluation of the program focus largely on demonstrating acquisition of specific knowledge and, to a much lesser extent, skills and attitudes. Learners successfully complete training by meeting time, process, and curricular requirements. The application of what was learned frequently is not evaluated directly in the context of actual health care delivery.

Proponents of redesigning this model advocate for competency-based education and training (CBET), "an outcomes-based approach to the design, implementation, assessment and evaluation of an education program using an organizing framework of competencies" (8). When the Accreditation Council for Graduate Medical Education (ACGME) Outcome Project launched in 2001, accreditation of residency programs began transitioning from a time- and process-based framework to a competency-based orientation. As defined by the ACGME, "competency-based education focuses on learner performance (learning outcomes) in reaching specific objectives (goals and objectives of the curriculum)" (9). Successful accreditation now requires programs to demonstrate that physicians-in-training have acquired the knowledge, skills, attitudes, and behaviors encompassing a well-defined set of competencies necessary for safe and effective practice.

We present deliberations of a working group from the Alliance for Academic Internal Medicine Education Redesign Task Force II. The alliance includes the Association of Professors of Medicine, the Association of Program Directors in Internal Medicine, the Association of Specialty Professors, the Clerkship Directors in Internal Medicine, and the Administrators of Internal Medicine. The task force also includes representatives from the American College of Physicians and the American Board of Internal Medicine. Building on the work of the first task force (7), the second task force was charged with examining CBET more deeply. Our article presents the task force's consensus and was approved by the Alliance for Academic Internal Medicine Board of Directors.

The National Imperative

An emerging national imperative exists for education reform, specifically CBET. Several Institute of Medicine reports question whether medical education has sufficiently responded to shifting patient expectations and demographics, changing health care delivery systems, quality improvement, and use of new technologies (10, 11). Similarly, the recent health care reform debate has highlighted the role of changing medical education to meet the nation's health care needs. A RAND Corporation study commissioned by

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Table 1. **Comparison of Traditional and Competency-Based Educational Models***

Variable	Educational Model	
	Traditional	Competency-Based
Goal of educational encounter	Acquisition of knowledge	Application of knowledge
Responsible for driving the educational process	Teacher	Learner
Responsible for content	Teacher	Student and teacher
Timing of assessment	Emphasis on summative (high-stakes final evaluation)	Emphasis on formative (ongoing feedback facilitating improvement)
Typical assessment tool	Indirect, proxy assessment	Direct assessment, with observation of real tasks of profession
Evaluation standards	Relative to peers (norm-referenced)	Relative to objective measures (criterion-referenced)
Program completion	Fixed time	Variable time

* Adapted from reference 17.

the Medicare Payment Advisory Commission has reinforced these concerns and reported that curricula of surveyed internal medicine residency programs were not well aligned with the objectives of a reform-based delivery system (12).

We have identified at least 4 broad areas of deficient educational content and experiences. First, physicians must obtain knowledge and skills relating to quality improvement, including the methodology of assessing quality and the use of tools to implement practice or system changes to address deficiencies (10, 11, 13). Second, physicians-in-training must learn to practice effectively in various health care settings and in multidisciplinary teams, and trainees must learn how to conduct smooth patient care transitions between health care settings and caregivers (2, 12, 14, 15). Third, training should focus on a patient-centered approach that equally emphasizes disease prevention and chronic disease management (12) and not acute illness or worsening of a chronic disease. Experiences in ambulatory settings must be of high quality and lead to competent, patient-centered outpatient care. Finally, health care reform requires that future physicians be better trained to incorporate cost-consciousness, value, and cost-effectiveness into equitable decision making (12, 16), and physicians must learn how to weigh the cost and value of diagnostic and treatment interventions, as well as understand their effectiveness.

In addition to these areas of educational content and the context of training, a greater societal demand exists for public accountability in the education of competent physicians (17–22). To meet these needs, medical educators must rethink how the key competencies are measured and maintained (23, 24). Traditional views about physician competency have been largely physician-centered and defined by the profession. However, the public now expects physicians to demonstrate competencies that meet their needs and that these competencies will continue to be evaluated after the physician has completed training.

Features of a Competency-Based Framework

Unlike the traditional model of graduate medical education, the CBET framework defines the competencies that the learner must demonstrate having mastered at specific stages of training. The curriculum, assessment tools, and evaluation system must be structured to facilitate achievement and documentation of the resident's competence. **Table 1** compares key differences between a traditional model of medical education and a competency-based model (17). Overall, the competency-based model focuses more on objective and direct measures of whether the learner can apply what has been learned, and he or she can advance only after demonstrating appropriate competency.

In 2001, the ACGME Outcome Project identified 6 general competencies that should be required for residents in all specialties. **Table 2** describes these general competencies, which provide a framework for education and evaluation (9). The competencies of medical knowledge and patient care have traditionally been centerpieces of both education and evaluation during residency training. Although the competencies of professionalism and communication skills were often not formally taught and evaluated, physicians-in-training previously have been expected to acquire them as byproducts of their professional development and maturation. The final 2 competencies, practice-based learning and improvement and systems-based practice, reflect the relatively recent understanding that the ultimate desired outcome of the educational program should be delivery of high-quality patient care in a well-functioning system of care that includes the physician partnering with a complementary health care team.

However, achievement of the ACGME's 6 general competencies focuses on defining the desired "finish line" of residency training, not the path for getting there. In 2007, the 33-member Milestones Taskforce convened by the American Board of Internal Medicine and the ACGME developed key features of this path by detailing milestones specifically designed for internal medicine residency training and identifying individual components of each competency, the estimated timeline to meet competencies during training, and broad approaches to assess achievement of goals (25). These milestones represent important intermediate points in the development of a com-

petency, ensuring that residents demonstrate the knowledge, skills, and attitudes necessary to advance in training.

Table 3 shows a set of milestones within the practice-based learning and improvement competency (25). In this example, residents learn to evaluate quality of care in their own panel of patients by using information from the electronic health record and other sources and comparing this information with other benchmarks. The residents then develop and evaluate an intervention to improve quality.

CURRENT CBET INITIATIVES IN INTERNAL MEDICINE

Ten years after the ACGME started the Outcome Project, the academic internal medicine community has recognized that substantial work must be accomplished before CBET is fully realized. Training programs are still developing curricula and evaluation tools to teach and measure the 6 ACGME general competencies. We have identified examples that demonstrate substantial progress in the areas of program design and competency assessment.

Program Design

Several programs provide "enrichment time" for residents who have demonstrated competence in core educational areas. For example, residents at Duke University Medical Center in Durham, North Carolina, who have met core requirements can enter a leadership or business management track or a global health track or apply for a clinical epidemiology course to enhance their educational experience (McNeill D. Personal communication). At the University of Michigan in Ann Arbor, Michigan, eligible trainees can select a medical education or health care administration track composed of a 2-year curriculum of assigned readings, small group seminars and workshops, and mentored scholarly projects (Chick D. Personal communication). Finally, at St. Peter's University Hospital Program in New Brunswick, New Jersey, qualified residents can enroll in a multidisciplinary advanced training seminar in medical administration (26).

Conversely, some programs use competency-based remediation for residents who need additional support or time to gain competency sufficient for promotion or graduation. The Dartmouth-Hitchcock Medical Center program uses a competency-based remediation plan to guide residents in deficient areas, targeting specific knowledge, behaviors, or skills needed to achieve competence (Friedman H. Personal communication).

Tufts University School of Medicine's Baystate Medical Center program uses the Baystate Manager Model, which promotes residents to more advanced roles based on attainment of competency rather than time spent in training. In this model, first-year residents are initially promoted to a manager level with more patient care autonomy but without the additional responsibility of supervising other residents (27). This promotion is delayed for residents who are deficient in key milestones. Subsequently, on the basis of competency-focused assessments, residents are advanced to a teacher level, which corresponds with the more traditional role of supervisory resident.

Baystate Medical Center has redesigned its educational program around discrete, measurable steps to achieve specific milestones for each competency. Clearly described milestones serve as the roadmap for programmatic restructuring, curricular change, faculty development, and resident evaluation. Acknowledging the challenges in transitioning to this model, involved program directors at Baystate Medical Center describe undertaking a 5-year process of faculty development, community building, and resident education to achieve this shift.

Development of Measurement Tools

Complementing the work of the Milestones Taskforce, several training programs are integrating and validating direct competency measurements within their curricula. At the Aurora Sinai Medical Center program, 2 reviewers use behavioral checklists to assess videotaped encounters between patients and interns before promoting interns to a supervisory role (Gennis M. Personal communication). These videos become part of the trainees' self-maintained electronic portfolios.

At Southern Illinois University, faculty use the 12-station Objective Structured System-Interaction Examination to evaluate trainees' ability to work effectively within a

Table 2. **The 6 General Competencies of the Accreditation Council for Graduate Medical Education***

Competency	Description
Medical knowledge	Residents must demonstrate knowledge of established and evolving biomedical, clinical, epidemiologic, and social–behavioral sciences, as well as the application of this knowledge to patient care.
Patient care	Residents must be able to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health.
Professionalism	Residents must demonstrate a commitment to carrying out professional responsibilities and adherence to ethical principles.
Interpersonal and communication skills	Residents must demonstrate interpersonal and communication skills that result in the effective exchange of information and collaboration with patients, their families, and health professionals.
Practice-based learning and improvement	Residents must demonstrate the ability to investigate and evaluate their care of patients, to appraise and assimilate scientific evidence, and to continuously improve patient care on the basis of constant self-evaluation and lifelong learning.
Systems-based practice	Residents must demonstrate an awareness of and responsiveness to the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care.

* Adapted from reference 9.

Table 3. **Example of American Board of Internal Medicine/ACGME Milestones, Excerpted From the Practice-Based Learning and Improvement Competency***

ACGME Competency	Developmental Milestones Informing ACGME Competencies	Approximate Time Frame by Which Trainee Should Achieve Stage, *mo*	Assessment Methods/Tools
Learning and improving via audit of performance Systematically analyze practice using quality improvement methods, and implement changes with the goal of practice improvement	Improve the quality of care for a panel of patients Appreciate the responsibility to assess and improve care collectively for a panel of patients	12	Several elements of quality improvement project Standardized tests
	Perform or review audit of a panel of patients using standardized, disease-specific, and evidence-based criteria	24	
	Reflect on audit compared with local or national benchmarks and explore possible explanations for deficiencies, including physician-related, system-related, and patient-related factors	24	
	Identify areas in resident's own practice and local system that can be changed to improve the processes and outcomes of care	36	
	Engage in a quality improvement intervention	36	

ACGME = Accreditation Council for Graduate Medical Education.
* Adapted from reference 25.

complex system of care (28). At Abington Memorial Hospital, residents submit videotaped patient encounters for analysis by using the Roter Interaction Analysis System (RIASWorks, Baltimore, Maryland). Although program leaders recognize that the cost of this software may prevent its broader use, they aim to enhance communication assessment and provide more specific instruction for residents who have not yet reached competence in interpersonal and communication skills (Smith DG. Personal communication).

Meeting the Challenges of CBET in Internal Medicine

To be truly competency-based, internal medicine training programs must address 3 major challenges: 1) improving approaches to incorporate the 2 "newest" competencies of practice-based learning and improvement and systems-based practice into an educational framework that has not typically focused on these areas, 2) improving measures for valid evaluations of resident competency, and 3) constructing training models in which advancement during training is based on attainment of competency rather than time in training.

Incorporating the "Newest" Competencies Into the Educational Framework

The practicalities of teaching practice-based learning and improvement and systems-based practice in the context of real-life experiences require rethinking the structure of the educational program and training teaching program faculty who often lack previous preparation or experience. Achieving the competency of practice-based learning and improvement should entail not simply having a resident complete one project but rather instilling a culture of patient safety and quality into everyday clinical practice. Orienting the practice around opportunities to identify gaps in patient safety and areas for improvement in quality of care is imperative. Faculty role models and other health care professionals who embody a commitment to these aspects of care, understand approaches to obtain needed data for these goals, and can implement and evaluate improvements are needed.

The competency of systems-based practice involves inpatient and outpatient care settings, as well as the transitions between these and other settings where the patient resides or receives care. The definitions of the practice or the system of care are moving targets given the current era of health care reform and newer models of health care delivery, including the patient-centered medical home.

Assuring Valid Competency Assessment

Valid assessment of resident competencies must be incorporated into the context of delivering patient care and performed by faculty who have the time and training to conduct these evaluations. Direct observation of residents

providing patient care and multisource evaluation, especially including patients and nurses, are essential to competency-based evaluation. The development of "core faculty," as described in the ACGME's requirements for internal medicine training, involves training faculty to become experts in the core competencies and in the use of innovative assessment tools, such as standardized patients and appropriate use of simulation. Faculty must accept accountability for the quality of the educational program and the hands-on evaluation of competencies as part of their job responsibilities. Resident evaluations need to be frequent, and residents should receive formative feedback (ongoing feedback intended to catalyze improvement) and summative feedback (a final evaluation or grade) that ideally use mileposts, such as those defined in the American Board of Internal Medicine Milestones Project (25). Achievement of these objectives requires additional resources and financial expenditures that have yet to be fully quantified.

Defining the Role of Competency-Based Versus Time-Based Training

Competency-based education and training raises the important questions of whether and how the duration of residency may vary among different residents, depending on how rapidly they demonstrate achievement of the competencies. For residents deficient in 1 or more areas by the end of the traditional 36-month training, training ideally should be prolonged until the resident has completed all of the competencies.

Conversely, the Alliance for Academic Internal Medicine Education Redesign Task Force II recommends against abbreviating training for residents who fulfill the competency requirements before 36 months. Instead, these residents should receive opportunities for additional, richer educational experiences that can advance their ultimate career goals. A 36-month training period is necessary for sufficient exposure to the diverse types of internal medicine patients, adequate longitudinal care of a panel of patients, and time to refine the complex interpersonal and professional skills needed to care for these patients. In addition, the structure of internal medical training relies on postgraduate year 3 residents, who are needed to train less-experienced residents and students and simultaneously learn by teaching (29).

Moving Forward

The examples of training redesign that we have described show ways to transition from a traditional time-based framework to a competency-based approach. On a national scale, the challenge will be to implement these changes in all training programs with limited additional resources. Although this article focuses on resident training in internal medicine, a competency-based educational framework can start even in medical school, and some schools have aligned institutional educational objectives with the ACGME competencies (30).

To facilitate the transition to a CBET framework, we endorse the expansion of innovative pilot projects to determine the effectiveness of CBET and to develop various models that can be applied across the nation's training programs. The pilot projects need to achieve the following goals: 1) develop curriculum and experiences during residency training with clearly defined outcomes and goals, such as those described in the Milestones Project (25); 2) develop and use robust and valid evaluation systems, including direct observation and multisource feedback; 3) ensure that learners actively participate in their own education and assessment; 4) expand the use of formative evaluation with ongoing feedback, and assure the validity of the high-stakes summative evaluation in order to confidently verify to the general public that all graduating residents are competent to provide safe and effective patient care; and 5) initiate widespread faculty development programs to ensure that faculty have the skills needed for valid and reliable assessment of trainee competencies.

The Alliance for Academic Internal Medicine Education Redesign Task Force II believes that the Residency Review Committee for Internal Medicine and the Association of Program Directors in Internal Medicine must have important roles in catalyzing the sharing of ideas and disseminating the lessons learned. With successful implementation of CBET, residents will be well prepared for the independent practice of medicine, and patients will receive the high-quality, safe, patient-centered care to which they are entitled.

From the American College of Physicians and American Board of Internal Medicine, Philadelphia, Pennsylvania; Hennepin County Medical Center, Minneapolis, Minnesota; University of Miami Miller School of Medicine, Miami, Florida; and University of Oklahoma Health Sciences Center, Oklahoma City, Oklahoma.

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Corresponding Author: Steven E. Weinberger, MD, American College of Physicians, 190 North Independence Mall West, Philadelphia, PA 19106; e-mail, sweinberger@acponline.org.

Current author addresses and author contributions are available at www.annals.org.

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Current Author Addresses: Dr. Weinberger: American College of Physicians, 190 North Independence Mall West, Philadelphia, PA 19106.
Dr. Pereira: Hennepin County Medical Center, 701 Park Avenue, Minneapolis, MN 55415.
Dr. Iobst: American Board of Internal Medicine, 510 Walnut Street, Suite 1700, Philadelphia, PA 19106.
Dr. Mechaber: University of Miami Miller School of Medicine, PO Box 016960 (R-129), Miami, FL 33101.
Dr. Bronze: Department of Medicine, University of Oklahoma Health Sciences Center, PO Box 26901, WP1140, Oklahoma City, OK 73190.

Author Contributions: Conception and design: S.E. Weinberger, A.G. Pereira, W.F. Iobst, A.J. Mechaber, M.S. Bronze.
Drafting of the article: S.E. Weinberger, A.G. Pereira, W.F. Iobst, M.S. Bronze.
Critical revision of the article for important intellectual content: S.E. Weinberger, A.G. Pereira, W.F. Iobst, A.J. Mechaber, M.S. Bronze.
Final approval of the article: S.E. Weinberger, A.G. Pereira, W.F. Iobst, A.J. Mechaber, M.S. Bronze.
Collection and assembly of data: A.G. Pereira, W.F. Iobst, M.S. Bronze.

Appendix: Alliance for Academic Internal Medicine Education Redesign Task Force II

In addition to the authors, the Alliance for Academic Internal Medicine Education Redesign Task Force II includes Robert J. Anderson, MD; Stewart F. Babbott, MD; Lee R. Berkowitz, MD; Raquel Buranosky, MD; Donna R. Devine; Mark W. Geraci, MD; Stephen A. Geraci, MD; Karen E. Hauer, MD; Harry Hollander, MD; Regina A. Kovach, MD; and Elizabeth A. Wildman.