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Revision of a National Internal Medicine Curriculum: Process and Outcomes

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A well-designed curriculum with appropriate goals and clearly articulated, behaviorally based objectives is vital to the success of any learning experience. Curricula serve many important functions: focusing teaching and learning efforts; delineating required educational resources (faculty, patients, facilities, materials); influencing the selection of educational methods; setting standards of competence; and driving assessment. However, "a curriculum that is static gradually declines and dies. A successful curriculum is continually developing. It must respond to evaluation results and feedback."¹ This article describes the revision process of a national medical education curriculum and subsequent assessment.

The first national internal medicine clerkship curriculum was produced in 1995 as a collaborative project of the Clerkship Directors in Internal Medicine (CDIM) and the Society of General Internal Medicine (SGIM) through a contract with the Division of Medicine of the Health Resources and Services Administration (HRSA) Bureau of Health Professions.² The *CDIM/SGIM Core Medicine Clerkship Curriculum Guide's*³ purpose was to emphasize the learning of general clinical core competencies in the third year of medical school and to create a consensus for curricular content. A national survey of clerkship directors identified and prioritized

the basic competencies medical students should master by the end of the medicine core clerkship.⁴ Various training problems were included as examples of how the general clinical competencies could be achieved through common clinical problems and activities (eg, chest pain, abdominal pain, hypertension). The *Guide* also recommended that one third of the clerkship experience shift to the ambulatory generalist setting.

The HRSA also sponsored the second edition, released in 1998.⁵ In this version, greater emphasis was placed on evidence-based medicine and the care of specific populations. Individual learning objectives for each competency and training problem were expressed in specific behavioral terms⁶ and grouped by the knowledge, skills, and attitudes construct.⁷ After its release, use of the document among clerkship directors was widespread.⁸ Later that year, a companion pocket guide was produced. It was a more concise statement of the general competencies and training problems and of their associated knowledge and skills objectives intended for easy use by clerkship directors and students.⁹ The pocket guide also included a number of new training problems.

REVISION PROCESS

The expansion of medical knowledge is inevitable, and the educational environment is ever-changing. In 2004, the CDIM decided to undertake a second major revision of the *Guide*. One of the most important changes was the development and subsequent broad application of the Accreditation Council for Graduate Medical Education (ACGME) general competencies.

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The ACGME competencies apply to all facets of graduate medical education, including residencies and fellowships.¹⁰ They have been influential as a “new paradigm” for medical education as a whole. Some have suggested that the learning objectives for medical schools in general and for the medicine clerkship in particular be framed in a competency-based construct to facilitate the transition from student to resident and to emphasize the continuum of medical education.¹¹⁻¹³

Precedence existed for framing a medical student curriculum in the context of the ACGME general competencies, namely, the Family Medicine Curriculum Resource released by the Society of Teachers of Family Medicine in 2004 and funded by the HRSA.^{14,15} Citing the congruency of the broad-based calls for medical education reform with the ACGME competency structure, the advisory committee of the Family Medicine Curriculum Resource decided to use this framework. CDIM members served as consultants to the Family Medicine Curriculum Resource project and partners on the pre-clerkship workgroup; that process was informative regarding the planned internal medicine curriculum update.

The CDIM/SGIM Curriculum Guide Update Task Force subsequently agreed that the ACGME general competencies would be incorporated into the updated version (3.0) of the internal medicine curriculum. A complete revision centered specifically on these competencies was not feasible because of limited funding and human resources. The original guide structure was maintained (ie, organized by competencies and training problems with specific knowledge, skills, and attitudes objectives), and every individual learning objective was coded: patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism, or systems-based practice. Table 1 demonstrates the substantial overlap between the preexisting CDIM/SGIM general clinical core competencies and the ACGME general competencies. Assignment of general clinical core competencies to particular ACGME domains is not intended to imply exclusivity; rather, it indicates in which domains the preponderance of learning objectives exist. As in the original *Guide*, the general competencies were assigned a rank order (highest priority to lowest priority) and

category (1 = “should be taught in all cases,” 2 = “should be taught in most but not all cases,” and 3 = “should be taught in some but not all cases”). By the end of the core clerkship, medical students are expected to become more proficient in higher rank/category competencies than lower rank/category competencies.

As part of the preparatory work for the update, the CDIM conducted a survey of the membership at its national meeting in 2004. The first portion of the survey asked respondents to rank the 8 existing category 2 and category 3 general competencies in order of importance (1 = lowest priority and 10 = highest priority). The results are shown in Table 2. For the purposes of the survey, it was assumed that the category 1 competencies (“should be taught in all cases, when appropriate”) were all still valid. In general, the survey rank order was consistent with the original ordering of these competencies.⁴ Table 3 shows the original and updated rank order of all the general clinical core competencies.

The second portion of the survey asked respondents to select 5 potential topics for new training problems and rank them in order of priority (1 = lowest priority and 5 = highest priority). These topics were chosen by consensus of the update task force as potential areas of coverage. The results are shown in Table 4. Training problems are meant to serve as examples of how the general clinical core competencies may be covered through common clinical problems and activities, not as mandates for specific inclusions in any clerkship’s curriculum.

Three of the proposed new training problems were incorporated into existing curricular elements, including electrocardiogram interpretation and radiograph interpretation (covered in interpretation of clinical information) and chronic renal failure (covered in acute renal failure and chronic kidney disease). Excluding these 3, the top 5 candidates for new training problems were common musculoskeletal symptoms,¹⁶ approach to weight loss/gain,¹⁷ fever, common dermatologic problems, and common upper respiratory symptoms. Each of these problems was assigned a primary author for revision. Another member of the task force reviewed the drafts and provided commentary. The task force at large reviewed near-final drafts, seeking expert advice when necessary. Final drafts were reviewed by the task force co-directors for consistency of style and format. What emerged from this iterative process were training problems for knee pain, rheumatologic problems, obesity, fever, rash, and upper respiratory symptoms.

PERSPECTIVES VIEWPOINTS

- The CDIM and SGIM developed a national clerkship curriculum to consolidate the efforts of internal medicine clerkships and ensure a means of consistency across all undergraduate medical institutions.
- The curriculum features training problems highlighting different clinical activities that clerkship directors agreed students should know by the end of their clerkship year.
- The curriculum was revised for the third time in 2004, when the ACGME competencies were added.

Table 1 Clerkship Directors in Internal Medicine/Society of General Internal Medicine Versus Accreditation Council for Graduate Medical Education Competencies

CDIM/SGIM General Clinical Core Competencies	ACGME General Competencies						
	Category	Patient Care	Medical Knowledge	Practice-based Learning and Improvement	Communication Skills	Professionalism	System-based Practice
Diagnostic Decision Making	1	X	X				
Case Presentation	1	X			X		
History and Physical Examination	1	X			X		
Communication and Relationships with Patients and Colleagues	1	X			X	X	
Interpretation of Clinical Information	1	X	X				
Therapeutic Decision Making	1	X	X				
Bioethics of Care	1					X	
Self-directed Learning	1			X		X	
Prevention	1	X					
Coordination of Care and Teamwork	2	X				X	X
Geriatric Care	2	X	X				
Basic Procedures	2	X					
Nutrition	2	X	X				
Community Health Care	2						X
Continuous Improvement in Systems of Medical Care	3			X			X
Occupational and Environmental Health Care	3	X	X				
Advanced Procedures	3	X					

ACGME = Accreditation Council for Graduate Medical Education; CDIM = Clerkship Directors in Internal Medicine; SGIM = Society of General Internal Medicine. Category 1: Should be taught in all cases, when appropriate. Category 2: Should be taught in most but not all cases. Category 3: Should be taught in some but not all cases. Assignment of ACGME General Clinical Core Competencies to particular domains is not intended to imply exclusivity. It is meant to indicate in which domain(s) the preponderance of learning objectives exists.

Revision of the existing competencies and training problems followed a similar process. Each task force member was assigned a set of competencies and training problems. The primary objectives of the first revision were to ensure that the competency or training

problem conformed to a predetermined template; expand the prerequisites where necessary; update objectives for new medical knowledge and contemporary issues; code each individual learning objective to 1 or more of the ACGME general competencies as de-

Table 2 Survey Ranking of Competencies

CDIM/SGIM General Clinical Core Competency	Mean Rank	Mode Rank	Median Rank
Coordination of Care and Teamwork	7.74 (± 2.01)	10	8
Geriatric Care	7.57 (± 2.02)	10	8
Basic Procedures	7.34 (± 2.76)	10	8
End-of-life Care	7.04 (± 1.76)	6	7
Nutrition	6.12 (± 2.16)	6	6
Community Health Care	5.35 (± 2.72)	4	5
Continuous Improvement in Systems of Medical Care	5.06 (± 2.63)	5	5
Genetics	3.67 (± 2.06)	3	3
Occupational and Environmental Health Care	3.13 (± 1.88)	2	3
Advanced Procedures	2.77 (± 2.28)	1	2

CDIM = Clerkship Directors in Internal Medicine; SGIM = Society of General Internal Medicine. Respondents (n = 106) were asked to rank the listed competencies (including 2 new potential competencies, end-of-life care and genetics) in order of importance: 10 = highest priority and 1 = lowest priority.

Table 3 Version 3.0 Ranking of All Competencies

CDIM/SGIM General Clinical Core Competencies	Category	Version 3.0	Version 2.0/1.0
Diagnostic Decision Making	1	1	1
Case Presentation	1	2	2
History and Physical Examination	1	3	3
Communication and Relationships with Colleagues	1	4	4
Interpretation of Clinical Information (previously known as Test Interpretation)	1	5	5
Therapeutic Decision Making	1	6	6
Bioethics of Care	1	7	7
Self-directed Learning	1	8	8
Prevention	1	9	9
Coordination of Care and Teamwork	2	10	10
Geriatric Care	2	11	12
Basic Procedures	2	12	11
Nutrition	2	13	14
Community Health Care	2	14	13
Continuous Improvement in Systems of Medical Care	3	15	17
Occupational and Environmental Health Care	3	16	16
Advanced Procedures	3	17	15

CDIM = Clerkship Directors in Internal Medicine; SGIM = Society of General Internal Medicine. Category 1: Should be taught in all cases, when appropriate. Category 2: Should be taught in most but not all cases. Category 3: Should be taught in some but not all cases.

scribed above; add genetics,¹⁸ end-of-life care,¹⁹ and professionalism²⁰⁻²² objectives where appropriate; and identify a modest number of references useful to students.

Version 3.0 of the *CDIM/SGIM Core Medicine Clerkship Curriculum Guide* was subsequently published in the fall of 2006.²³ CDIM mailed 2 copies of the *Guide* and also 2 copies of the updated pocket guide to every internal medicine clerkship director in the United States and Canada.²⁴

SURVEY

To evaluate the effect of this curricular reform, the CDIM conducted an assessment of its 110 institutional members in the United States and Canada via the 2006 CDIM Survey, with a response rate of 74.5% (82/110). Seventy-nine (96%) of the respondents were familiar with the *Guide*, and 68 (83%) of the respondents used the *Guide* in the context of their clerkships. Of the 73 respondents who were aware of the availability of the pocket guide, 13 (18%) routinely gave it to their students at the beginning of the rotation. The main reasons for not doing so included the availability of other resources (including the online version of the *Guide*) and expense.

Of those respondents who used the *Guide*, 53 (78%) used it to establish key content, core topics, or lecture material; 30 (44%) found it helpful in faculty development efforts; 27 (40%) used it to help students understand the core topics that they should master; and 20 (68%) used it to prepare for Liaison Committee on Medical Education site visits. Other applications in-

cluded helping define the types of patients students must encounter to fulfill the objectives of the clerkship (31%),¹⁹ assisting in writing case-based questions (22%), helping students study for the end of clerkship examination (24%), and aiding with bedside teaching (7%).

Fifty-five respondents (67%) thought that the length of the *Guide* was "just right," with 18 (22%) thinking it was too long, 6 (7%) indicating it was too short, and 3 declining to answer. The addition of ACGME competencies tags was thought to be useful by 36 (44%), with 19 (23%) thinking it was less useful and 25 (30%) indicating they were unsure. Respondents who had a positive response generally thought that the competencies were important in emphasizing the continuum between undergraduate and graduate medical training; several had been struggling with mandates to include them in their undergraduate curriculum. Survey participants who opposed the addition of ACGME competencies generally did so because they did not think they were as appropriate for medical students as they were for residents.

Forty-four respondents (54%) found the addition of the new training problems to be useful, 31 respondents (38%) were not yet sure, and 3 respondents (4%) did not find them useful. The majority of respondents thought that they represented common problems that students would encounter and were not adequately covered in previous iterations of the curriculum. Respondents who were not in favor of the additions largely thought the curriculum was already difficult to cover in its entirety and thus were not supportive of lengthening

Table 4 Survey Ranking of Potential New Training Problems

Training Problem	Mean Rank
ECG Interpretation*	2.56 (\pm 2.15)
Common Musculoskeletal Complaints†	1.77 (\pm 1.88)
Approach to Weight Loss/Gain‡	1.56 (\pm 2.02)
Fever§	1.34 (\pm 1.88)
Common Dermatologic Problems	1.24 (\pm 1.76)
Radiograph Interpretation*	1.06 (\pm 1.61)
Common Upper Respiratory Complaints¶	1.06 (\pm 1.68)
Chronic Renal Failure#	0.98 (\pm 1.62)
Common GI Complaints	0.94 (\pm 1.57)
Thyroid Disorders	0.84 (\pm 1.47)
Dizziness	0.69 (\pm 1.28)
Edema	0.62 (\pm 1.38)
Women's Health	0.60 (\pm 1.33)
Common Ophthalmologic Problems	0.31 (\pm 0.92)
Bioterrorism	0.24 (\pm 0.82)
Men's Health	0.19 (\pm 0.79)

ECG = electrocardiogram; GI = gastrointestinal. Respondents (n = 106) were asked to select the 5 (only) potential topics for new training problems and rank them in order of priority: 5 = highest priority and 1 = lowest priority. Not selecting is counted as "0."

*Incorporated into the existing Competency Interpretation of Clinical Information.

†Became the new Training Problem Knee Pain.

‡Became the new Training Problem Obesity.

§Became the new Training Problem Fever.

||Became the new Training Problem Rash.

¶Became the new Training Problem Common Upper Respiratory Complaints.

#Incorporated into the existing Training Problem Acute Renal Failure.

it. Clerkships that were largely inpatient-based did not have a use for additional ambulatory competencies.

Similarly, 36 respondents (44%) found the addition of references to the new curriculum to be useful, 31 respondents (38%) were unsure, and 12 respondents (15%) did not think their addition was useful. Some survey participants thought they would be more useful to clerkship directors than to students, who often do not use references made available to them. Conversely, many respondents supported making more references available as long as they were updated on a regular basis.

DISCUSSION

The task force intended to update the *Guide* to reflect many of the changes occurring in medical education. To that end, competencies were added that a majority of clerkship directors thought were important and not adequately addressed in previous versions, with a particular emphasis on the outpatient setting and aspects of professionalism; other areas were updated to reflect the current state of medical knowledge. Recent trends in medical education have emphasized the importance of

process and outcomes, rather than simply the delivery of content.²⁵ Thus, as medical education moves further into the era of competency-based assessment, it seems prudent to link the content of the curriculum with the ACGME domains, which have become the norm in residency training, given that undergraduate and graduate medical education exist along a continuum.²⁶ As 1 survey respondent stated, the linked competencies have "been helpful regarding thinking about assessment." The competencies allow course directors to think "about more than just 'medical knowledge.'" It is the CDIM's eventual goal to have the curriculum organized by competency online. An electronic platform also would significantly facilitate a more continuous updating process.

Respondents were divided in their opinion of the utility of the references available in the *Guide*. Clerkship directors often struggle between steering students toward the use of general "review" textbooks versus encouraging investigation of the primary literature. There is a sense that the latter is often preferable but not practical. In our selection of references, we attempted to highlight articles that provided clinical practice guidelines or a review of the available literature when available. It is our hope that easy access to these resources will encourage students to pursue more in-depth reading on specific topics and allow faculty members ready access to the primary literature when planning teaching sessions and developing lecture materials.

It was notable that although opinions were generally favorable of this curricular reform, there were a significant number of survey respondents who were not yet thoroughly familiar with the newest version of the *Guide* or who had not implemented it in their clerkships. One reason may be that such changes typically occur at the beginning of the academic year. It is expected that as the experience of the clerkship directors grows, the CDIM will have a better understanding over time of how useful the updates have been. Barriers to use of the *Guide* are similar to the ones found in 1998,⁶ namely, the inability of faculty to devote sufficient time to curricular development in the clerkship and the difficulty with covering the large amount of content that must be delivered within the confines of the internal medicine clerkship.

The intention of the *Guide* has never been to dictate every element that should exist within an internal medicine clerkship curriculum, but rather to provide a framework for clerkship directors to use as they develop lecture material, learning resources, and patient care experiences, as well as a template by which the students could better understand the learning goals set out for them. It also was hoped that the *Guide* would serve as a useful model for the purpose of fulfilling accreditation guidelines.

The impact of this curricular reform effort must continue to be measured before future iterations are released. Future directions include a repeated survey of clerkship directors once the *Guide* has been more broadly implemented by additional institutions, as well as collection of objective outcomes data to determine whether use of the *Guide* has affected student performance, faculty satisfaction, clerkship evaluations, or compliance with Liaison Committee on Medical Education accreditation standards regarding clinical clerkships.¹⁹ As future changes occur, usability must be carefully balanced with amount of content, web-based sorting by competency, and linking to updated references will be necessary for the *Guide* to reach its full potential.

CONCLUSIONS

Over the years, the *Guide* has helped medical schools across the country in their efforts to strengthen the internal medicine curriculum in their clerkships.⁶ Moreover, it has served to unite clerkship directors in a discussion of learning objectives and a common sense of purpose. It has helped inform the discussion of assessment and examination strategy, facilitated efforts at curricular reform, and initiated a more critical programmatic appraisal at the level of many individual clerkships. As the needs of the learners and the educational environment change, it is important that the tools we have be adaptable. It is our hope that the most recent version of the *Guide* will serve to strengthen the foundation that previous versions have created while accommodating an ever-evolving medical education climate.

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References

1. Kern DE, Thomas PA, Howard DM, Bass EB. *Curriculum Development for Medical Education: A Six-Step Approach*. Baltimore, MD: The Johns Hopkins University Press; 1998.
2. Society of General Internal Medicine-Clerkship Directors in Internal Medicine. *SGIM/CDIM Core Medicine Clerkship Curriculum Guide*. Washington, DC: Health Resources Services Administration; 1995.
3. Goroll AH, Morrison G, Bass EB, et al. Reforming the core clerkship in internal medicine: the SGIM/CDIM Project. Society of General Internal Medicine/Clerkship Directors in Internal Medicine. *Ann Intern Med*. 2001;134:30-37.
4. Bass EB, Fortin AH, Morrison G, et al. National survey of Clerkship Directors in Internal Medicine on the competencies that should be addressed in the medicine core clerkship. *Am J Med*. 1997;102:564-571.
5. Society of General Internal Medicine-Clerkship Directors in Internal Medicine. *SGIM/CDIM Core Medicine Clerkship Curriculum Guide. 2nd edition*. Washington, DC: Health Resources and Services Administration; 1998.
6. Magar RF. *Preparing Instructional Objectives*. Atlanta, GA: CEP Press; 1997.
7. Bloom BS, ed. *Taxonomy of Educational Objectives. Handbook 1: Cognitive Domain*. White Plains, NY: Longman; 1984.
8. Jablonover RS, Blackman DF, Bass EB, et al. Evaluation of a national curriculum reform effort for the medicine core clerkship. *J Gen Intern Med*. 2000;15:484-491.
9. Society of General Internal Medicine-Clerkship Directors in Internal Medicine. *SGIM/CDIM Core Medicine Clerkship Curriculum Guide: Pocket Guide. Version 1*. Washington, DC: Society of General Internal Medicine-Clerkship Directors in Internal Medicine; 1998.
10. Accreditation Council for Graduate Medical Education. General Competency and Assessment: Common Program Requirements. Available at: <http://www.acgme.org/outcome/comp/compCPRL.asp>. Accessed May 12, 2008.
11. Whitecomb ME. More on competency-based education. *Acad Med*. 2004;79:493-494.
12. Greiner AC, Knebel E (eds). *Health Professions Education. A Bridge to Quality*. Institute of Medicine: Committee on the Health Professions Education Summit. Washington, DC: National Academy Press; 2003.
13. Whelan A, Appel J, Alper EJ, et al. The future of medical student education in internal medicine. *Am J Med*. 2004;116:576-580.
14. Society of Teachers of Family Medicine. Family Medicine Curriculum Resource (FMCR) Project. Available at: <http://www.stfm.org/curricular/index.htm>. Accessed May 12, 2008.
15. Stearns JA, Stearns MA, Paulman PM, et al. Family Medicine Curriculum Resource Project: the future. *Fam Med*. 2007;39:53-56.
16. Medical School Objectives Project. *Report VII. Contemporary Issues in Medicine: Musculoskeletal Medicine Education*. Washington, DC: Association of American Medical Colleges; 2005.
17. Medical School Objectives Project. *Report VIII. Contemporary Issues in Medicine: The Prevention and Treatment of Overweight and Obesity*. Washington, DC: Association of American Medical Colleges; 2007.
18. Medical School Objectives Project. *Report VI. Contemporary Issues in Medicine: Genetics Education*. Washington, DC: Association of American Medical Colleges; 2004.
19. Liaison Committee on Medical Education. Functions and Structure of a Medical School: Standards for Accreditation of Medical Education Programs Leading to the MD Degree. Available at: <http://www.lcme.org/standard.htm>. Accessed May 12, 2008.
20. National Board of Medical Examiners. *Embedding Professionalism in Medical Education: Assessment as a Tool for*

- Implementation*. Philadelphia, PA: National Board of Medical Examiners; 2002.
21. Inui TS. *A Flag in the Wind: Educating for Professionalism in Medicine*. Washington, DC: Association of American Medical Colleges; 2003.
 22. American Board of Internal Medicine. *Project Professionalism*. Philadelphia, PA: American Board of Internal Medicine; 2001.
 23. Clerkship Directors in Internal Medicine-Society of General Internal Medicine. *CDIM/SGIM Core Medicine Clerkship Curriculum Guide: A Resource for Teacher and Learners*. Version 3.0. Available at: <http://www.im.org/CDIM/CurriculumGuide/default.htm>. Accessed May 12, 2008.
 24. Clerkship Directors in Internal Medicine-Society of General Internal Medicine. *CDIM/SGIM Core Medicine Clerkship Curriculum Guide: Pocket Guide. Version 3.0*. Washington, DC: Clerkship Directors in Internal Medicine; 2006.
 25. Baum KD, Axtell S. Trends in North American medical education. *Keio J Med*. 2005;54:22-28.
 26. Swing SR. The ACGME outcome project: retrospective and prospective. *Med Teach*. 2007;29:648-654.